



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.11.2020 Bulletin 2020/47

(51) Int Cl.:
F21V 33/00 (2006.01)

(21) Application number: **20175000.7**

(22) Date of filing: **15.05.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

• **Lin, Wanjiong**
Ningbo City, Zhejiang 315103 (CN)

(72) Inventors:
• **ZENG, Guoqing**
Ningbo, 315103 (CN)
• **He, Zuping**
Ningbo, 315103 (CN)
• **Xu, Kai**
Ningbo, 315103 (CN)

(30) Priority: **17.05.2019 CN 201910415070**

(71) Applicants:
• **Self Electronics Co., Ltd.**
Ningbo City, Zhejiang 315103 (CN)
• **SELF ELECTRONICS Germany GmbH**
51149 Köln (DE)

(74) Representative: **2K Patentanwälte Blasberg Kewitz & Reichel Partnerschaft mbB**
Schumannstrasse 27
60325 Frankfurt am Main (DE)

(54) **LIGHTING APPARATUS WITH ILLUMINATED SIGN-BOARD**

(57) The invention relates to a lighting apparatus with an illuminated sign-board, comprising a bracket, a lighting unit and an illuminated identification unit, said lighting apparatus further comprises a power distribution unit, including at least one input end and at least two output ends, wherein the input end is configured to be electrically connected to a power supply module, the first output end

is electrically connected to the lighting unit, and the second output end is electrically connected to the illuminated identification unit. The lighting apparatus with illuminated sign-board of the present invention integrates the lighting and identification power supply lines, so that the installation is more convenient during use and beautiful, while improving safety.

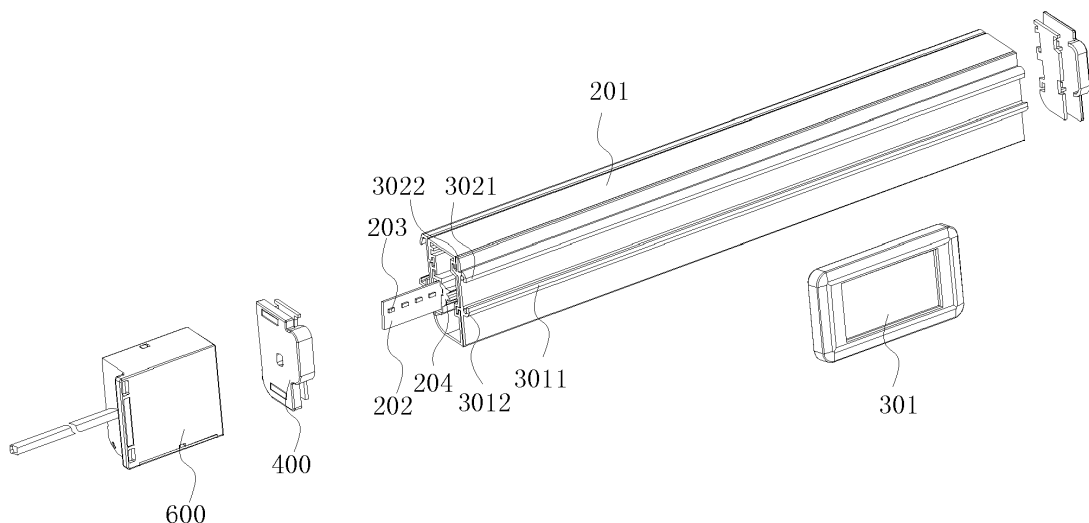


FIG.2

Description

RELATED APPLICATION

[0001] This application claims priority to Chinese Patent Application No. CN 201910415070.6, filed on May 17, 2019.

FIELD OF THE TECHNOLOGY

[0002] The present invention relates to the field of lighting technology, with particular emphasis on a lighting unit (luminaire) with an illuminated identification plate or sign-board.

BACKGROUND OF THE INVENTION

[0003] A large number of shelves to place items being displayed are used in supermarkets, shopping malls, museums, exhibition halls and other places. In actual use, shelves are generally disposed in at least two layers of panels. The lighting between these layers of panels generally comes from light sources in two directions: one comes from the general light sources at the ceiling of buildings such as supermarkets, shopping malls, etc., and the other comes from light sources provided in each layer.

[0004] At the same time, in order to better display the goods or indicate the product price, the shelves are generally equipped with identification plates or sign-boards. In order to display the contents of the identification plates or sign-boards more clearly, the identification plates may also be configured to emit light, such as energizing the identification plates or lighting them or using electronic screens directly. No matter which method is used, it needs to be energized, and the common way to energize is to connect to the power supply via wires.

[0005] It can be seen that the afore-mentioned light sources and identification plates need to be energized. However, many wires need to be provided for this purpose to accomplish the energization, and problems with wire winding or entanglement may occur, which is neither beautiful nor safe.

BRIEF SUMMARY OF THE INVENTION

[0006] In view of the above problems, the present invention provides a lighting apparatus (light fixture) with an illuminated sign-board (identification plate) suited to solve the afore-mentioned technical problems.

[0007] A lighting apparatus with illuminated sign-board according to the present invention comprises a bracket, a lighting unit and a illuminated identification unit, and further comprises: a power distribution unit, including at least one input end and at least two output ends, wherein the input end is electrically configured to be connected to a power supply module, a first output end of the at least two output ends is electrically connected to the light-

ing unit, and a second output end of the at least two output ends is electrically connected to the illuminated identification unit.

[0008] In order to adapt to existing products and reduce costs, advantageously, the power distribution unit comprises a voltage reducing circuit that reduces the voltage output of the second output end.

[0009] In order to fit on the shelf, advantageously, the illuminated identification unit comprises: a positive conductive track provided or arranged on the bracket; a negative conductive track provided or arranged on the bracket; an illuminated sign-board provided arranged on the positive conductive track and the negative conductive track and electrically connected thereto.

[0010] In order to make the lighting apparatus compact, advantageously, the power distribution unit comprises: a mounting base disposed on the bracket and located on one side of the positive conductive track and the negative conductive track; a power distribution main board disposed on the mounting base and provided with the input end, the first output end, and the second output end.

[0011] For ease of manufacture and installation, advantageously, the mounting base is provided with a positive elastic (resilient) member and a negative elastic (resilient) member electrically connected to the positive conductive track and the negative conductive track, respectively.

[0012] For ease of manufacture and installation, advantageously, the second output end on the power distribution main board is a two-point connection hole, and the head of the spring pin is fixed in the connection hole, and the tip of the spring pin abuts against the elastic member.

[0013] In order to fit on the shelf, advantageously, the lighting unit comprises: a strip-shaped lighting (light fixture) housing disposed on the bracket and located on the back of the illuminated identification unit; a circuit board disposed in the strip-shaped lighting housing; and a light source disposed on a light source mounting surface of the circuit board.

[0014] To make the structure more compact, advantageously, the mounting base comprises an end cover for sealing one end of the strip-shaped lighting housing, wherein the end cover is provided with the positive elastic member and the negative elastic member, and the power distribution main board is disposed in the strip-shaped lighting housing, and one end of the positive elastic member and the negative elastic member protrudes from the strip-shaped lighting housing and are electrically connected to one end of the positive conductive track and the negative conductive track, respectively.

[0015] To facilitate installation and improve security, advantageously, the mounting base further comprises a baffle plate disposed between the power distribution main board and the inner side of the end cover, wherein two spring pin pass through the baffle plate and electrically connect with the positive elastic member and the

negative elastic member, respectively.

[0016] For ease of manufacture and installation, advantageously, the positive conductive track and the negative conductive track are oppositely arranged strip-shaped card slots, and the strip-shaped card slots are respectively provided with a metal rod for conducting electricity, wherein one end of the metal rods is electrically connected to the positive elastic member or the negative elastic member.

[0017] To make the wiring more elegant, advantageously, the lighting apparatus with illuminated sign-board further comprises a wire winding box fixedly connected to an outer side of the end cover.

Technical effects of the invention:

[0018] The lighting apparatus (light fixture) with an illuminated sign-board (identification plate) of the present invention integrates the power supply lines of lighting and identification, so that installation is more convenient and beautiful, and safety is improved at the same time when in use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The following describes embodiments of the present invention with reference to the accompanying drawings, in which:

FIG. 1 is a schematic diagram of a three-dimensional structure of a lighting apparatus with illuminated sign-board according to the present invention.

FIG. 2 is an exploded schematic view of a lighting apparatus with illuminated sign-board according to the present invention.

FIG. 3 is a schematic structural diagram of a lighting apparatus with illuminated sign-board according to the present invention.

FIG. 4 is a schematic cross-sectional view of FIG. 3 in the direction of A-A.

FIG. 5 is an exploded schematic view of a power distribution unit of the present invention.

FIG. 6 is an exploded view of the power distribution unit of the present invention from another angle.

FIG. 7 is a schematic diagram of a three-dimensional structure of a power distribution unit according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Hereinafter, specific embodiments of the present invention will be described in further detail based on the accompanying drawings. It should be understood that the description of the embodiments of the present invention is not intended to limit the scope of protection of the present invention.

[0021] As shown in FIG. 1 to 7, the lighting apparatus with illuminated sign-board according to this embodiment

includes a bracket or stand 100, a lighting unit 200, an illuminated identification unit 300, a power distribution unit 400, and a wire winding box 600.

[0022] The power distribution unit 400 is used to integrate the functions of multiple wires, including at least one input end and at least two output ends. The input end 401 is electrically connected to a power supply module 500. The first output end 402 is electrically connected to the lighting unit 200 and the second output end 403 is electrically connected to the illuminated identification unit 300. The power supply module 500 generally may be a constant voltage power supply for supplying power to the lighting unit 200. The illuminated identification unit 300 may either be illuminated or an electronic screen for displaying information, both of which require a power supply. In the prior art, battery power is generally used or another wire needs to be installed for power supply, which results in the need for replacement of the battery or that the wiring is complicated. In this embodiment, the wires are integrated into the power distribution unit 400, and an output end and an input end are provided. According to the present invention devices such as a power distribution circuit board or a wire divider or other devices can be commonly used to solve the above problems.

[0023] Generally, the operating voltage of the illuminated identification unit 300 is different from that of the lighting unit 200. In order for the illuminated identification unit 300 to work normally, the power distribution unit 400 may comprise a voltage reducing circuit for reducing the voltage output of the second output end.

[0024] This embodiment is generally for use in shelves. The sign-boards (identification plates) and price tags on the shelves are generally arranged at the outermost edges of the shelf layers. The bracket 100 is a mounting rack or a part of a shelf. In order to implement a power supply of the illuminated identification unit 300, the illuminated identification unit 300 comprises: a positive conductive track 301 provided on the bracket 100; a negative conductive track 302 provided on the bracket 100; an illuminated sign-board or identification plate 303 arranged on the positive conductive track 301 and the negative conductive track 302 and electrically connected thereto. The illuminated sign-board 303 is disposed at any position along the length direction of the positive conductive track 301 and the negative conductive track 302, for easy installation and use.

[0025] In order to simplify the structure and make the lighting apparatus more compact overall, the power distribution unit 400 comprises a mounting base 404 and a power distribution main board 405. The mounting base 404 may be disposed on the bracket, and be located on one side of the positive conductive track 301 and the negative conductive track 302. The power distribution main board 405 may be disposed on the mounting base 404 and provided with the input end 401, the first output end 402 and the second output end 403.

[0026] There are many ways to electrically connect the positive conductive track 301 and the negative conduc-

tive track 302 to the power distribution main board 405, for example, by using wires. In order to make the structure compact, in this embodiment, the mounting base 404 is provided with the positive elastic member 406 and the negative elastic member 407 electrically connected to the positive conductive track 301 and the negative conductive track 302. The elastic piece has a small volume and a large contact area, and can achieve a contact-type electrical connection mode, avoiding the trouble of welding wires.

[0027] The second output end 403 on the power distribution main board 405 includes two connection holes. The head of the resilient pin (spring pin) 4031 is fixed in the associated one of the connection holes. The tip of the respective spring pin 4031 abuts against the associated elastic member (the elastic member is a positive elastic member 406 or a negative elastic member 407). The small size and small contact area of the resilient pin make the structure of the lighting apparatus more compact. In addition to the resilient pin, other contact electrical connection methods may also be used such as the use of a spring sheet for the same purpose.

[0028] The lighting unit 200 comprises a strip-shaped lighting housing 201, a circuit board 202, and a light source 203. The strip-shaped lighting housing 201 is disposed on the bracket 100 and located on the back of the illuminated identification unit 300; the circuit board 202 is disposed in the strip-shaped lighting housing 201; the light source 203 is disposed on a light source mounting surface of the circuit board 202. At the same time, a lens 204 is also provided for light distribution to achieve a better light output effect. In this embodiment, the strip-shaped lighting housing 201 is provided with a light-transmitting surface oriented downward, and the lens 204 adopts two total reflection surfaces to divide the light emitted by the light source 203 into two directions to achieve the effect of light emitted from the upper and lower layers. Of course, the structure and light output method of the lighting apparatus are not the focus of this application. This application is applicable even if no lens is provided or light is emitted in a single direction. In order to manufacture and install conveniently, the strip-shaped lighting housing 201 and the conductive track and the bracket may be integrated together by a plastic extrusion process.

[0029] In order to make the structure of this embodiment more compact, the mounting base 404 may comprise an end cover 408 for sealing an end of the strip-shaped light fixture housing 201. The end cover 408 is provided with the positive elastic member 406 and the negative elastic member 407, and the power distribution main board 405 is arranged in the strip-shaped lighting housing 201. One end of the positive elastic member 406 and of the negative elastic member 407 protrudes from the strip-shaped lighting housing 201 and is folded inward, and then contacts with one end of the positive conductive track 301 and the negative conductive track 302, respectively, for electrical connection. Integrating the

power distribution unit 400 into the lighting unit 200 can effectively avoid an increase in parts and components and an increase in volume.

[0030] In order to improve the sealing performance and ensure safety, the mounting base 404 may also include a baffle plate 409 disposed between the power distribution main board 405 and the inner side of the end cover 408. The two spring pins 4031 pass through the baffle plate 409 and electrically connect with the positive elastic member 406 and the negative elastic member 407, respectively. The baffle plate 409 is provided with through holes 4032 that cooperates with the spring pins 4031. The baffle plate 409 is provided with two convex posts 4033 facing the end cover 408 and corresponding to the two through holes 4032. The end cover 408 is provided with two bosses 4081. The boss 4081 is provided with a jack 4082 mated with the convex post 4034. The bottom of two jacks 4082 are respectively provided with a positive elastic member 406 and a negative elastic member 407. The above structure can make installation more convenient while protecting the spring pin and the elastic member. After the power distribution main board 405 is patched, it is riveted with the post on the baffle plate 409, so that the power distribution main board 405 and the baffle plate 409 are fixed together, and the baffle plate 409 is closely fitted with the end cover 408. During the tight fitting process, the spring pin on the main board and the elastic member on the end cover 408 reliably contact together.

[0031] The positive conductive track 301 and the negative conductive track 302 are used to install and power the illuminated sign-board 303. There are many forms to implement. For the convenience of manufacturing and installation, in this embodiment a first strip-shaped card slot 3011 and a second strip-shaped card slot 3021 are arranged oppositely. The first strip-shaped card slot 3011 is provided with a first metal rod 3012 for conducting electricity, and the second strip-shaped card slot 3021 is provided with a second metal rod 3022 for conducting electricity. One end of the two metal rods is electrically connected to the positive elastic member 406 and the negative elastic member 407, respectively. In this embodiment, the metal rod is made of copper.

[0032] The wire winding box 600 is fixed on the outer side of the end cover 408. In this embodiment, a permanent magnet is used for connection and separation. The wires of the power supply module 500 are first wound in the wire winding box 600 and then connected to the input end 401 of the power distribution main board 405. There are two magnets on the back of the wire winding box 600 and two irons (yaws) on the outer surface of the end cover 408. When the wire winding box 600 is finished, the magnets on the wire winding box 600 are attracted to and aligned with the magnets on the outer surface of the end cover 408. When the wire is pulled out of the wire winding box 600, the front magnet can be attracted to the iron bracket on the shelf, which is beautiful and meets the different needs of customers for the wire. When the light

fixture is installed on the shelf, the distance between the light fixture and the power connection is different for each manufacturer, which leads to different demands for the length of many kinds of wires. With the wire winding box 600, all the different demands can be covered, which greatly reduces the management of wires of various lengths and the pressure of stock preparation brought by material preparation.

[0033] The above disclosure has been described by way of example and in terms of exemplary embodiment, and it is to be understood that the disclosure is not limited thereto. Rather, any modifications, equivalent alternatives or improvement etc. within the spirit of the invention are encompassed within the scope of the invention as set forth in the appended claims.

Claims

1. A lighting apparatus with illuminated sign-board, comprising a bracket (100), a lighting unit (200) and an illuminated identification unit (300), said lighting apparatus further comprising a power distribution unit (400) comprising at least one input end and at least two output ends, wherein the input end (401) is configured to electrically connected to a power supply module (500), a first output end (402) of the at least two output ends is electrically connected to the lighting unit (200), and a second output end (403) of the at least two output ends is electrically connected to the illuminated identification unit (300).
2. The lighting apparatus with illuminated sign-board as claimed in claim 1, wherein the power distribution unit comprises a voltage reducing circuit for reducing the voltage output of the second output end.
3. The lighting apparatus with illuminated sign-board as claimed in claim 1 or 2, wherein the illuminated identification unit (300) comprises:
 - a positive conductive track (301) provided on the bracket (100);
 - a negative conductive track (302) provided on the bracket (100);
 - an illuminated sign-board (303) provided on the positive conductive track (301) and the negative conductive track (302) and electrically connected thereto.
4. The lighting apparatus with illuminated sign-board as claimed in claim 3, wherein the power distribution unit (400) comprises:
 - a mounting base (404) disposed on the bracket and located on one side of the positive conductive track (301) and the negative conductive

track (302);

a power distribution main board (405) disposed on the mounting base (404) and provided with the input end (401), the first output end (402) and the second output end (403).

5. The lighting apparatus with illuminated sign-board as claimed in claim 4, wherein the mounting base (404) is provided with a positive elastic member (406) and a negative elastic member (407) electrically connected to the positive conductive track (301) and the negative conductive track (302), respectively.
6. The lighting apparatus with illuminated sign-board as claimed in claim 5, wherein the second output end (403) on the power distribution main board (405) has two point connection holes, wherein the head of a respective spring pin (4031) is fixed in the associated connection hole and the tip of the respective spring pin (4031) abuts against the associated elastic member.
7. The lighting apparatus with illuminated sign-board as claimed in any of claims 1 to 6, wherein the lighting unit (200) comprises:
 - a strip-shaped lighting housing (201) disposed on the bracket (100) and located on the back of the illuminated identification unit (300);
 - a circuit board (202) disposed in the strip-shaped lighting housing (201);
 - and a light source (203) disposed on a light source mounting surface of the circuit board (202).
8. The lighting apparatus with illuminated sign-board as claimed in any of claims 4 to 7, wherein the mounting base (404) comprises an end cover (408) for sealing one end of the strip-shaped lighting housing (201), the end cover (408) is provided with the positive elastic member (406) and the negative elastic member (407), the power distribution main board (405) is disposed in the strip-shaped lighting housing (201), one end of the positive elastic member (406) and of the negative elastic member (407) protrudes from the strip-shaped lighting housing (201) and is electrically connected to one end of the positive conductive track (301) and the negative conductive track (302), respectively.
9. The lighting apparatus with illuminated sign-board as claimed in claim 8, wherein the mounting base (404) further comprises a baffle plate (409) disposed between the power distribution main board (405) and the inner side of the end cover (408), and two spring

pin (4031) pass through the baffle plate (409) and electrically connect with the positive elastic member (406) and the negative elastic member (407), respectively.

5

10. The lighting apparatus with illuminated sign-board as claimed in any of claims 5 to 9, wherein the positive conductive track (301) and the negative conductive track (302) are oppositely arranged strip-shaped card slots, and the strip-shaped card slots are respectively provided with a metal rod for conducting electricity, and one end of the metal rods is electrically connected to the positive elastic member (406) or the negative elastic member (407).

10

15

11. The lighting apparatus with illuminated sign-board as claimed in claim 8 or 9, further comprising a wire winding box (600) fixedly connected to an outer side of the end cover (408).

20

25

30

35

40

45

50

55

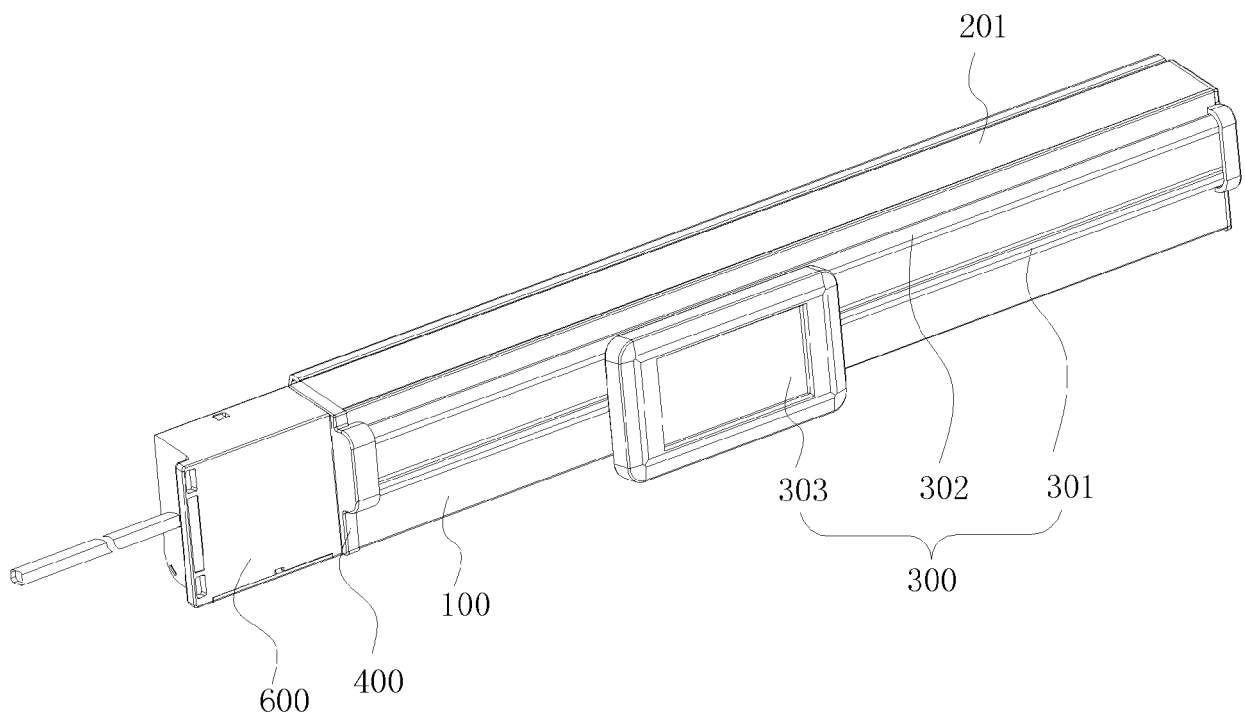


FIG.1

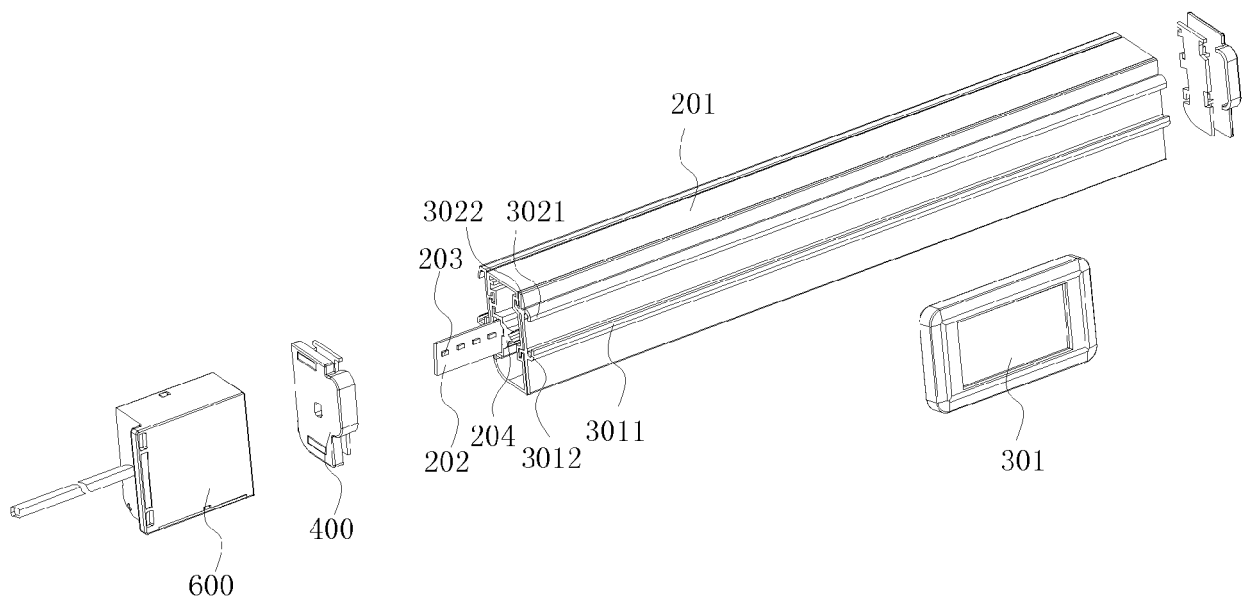


FIG.2

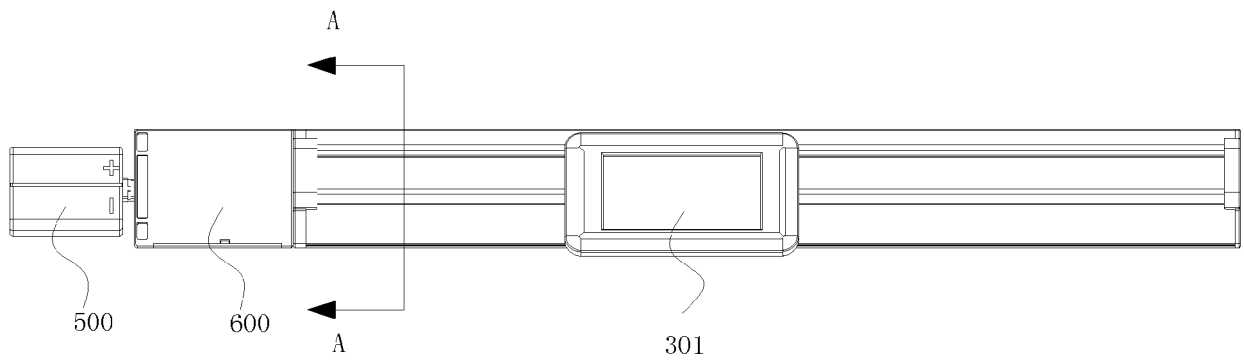


FIG.3

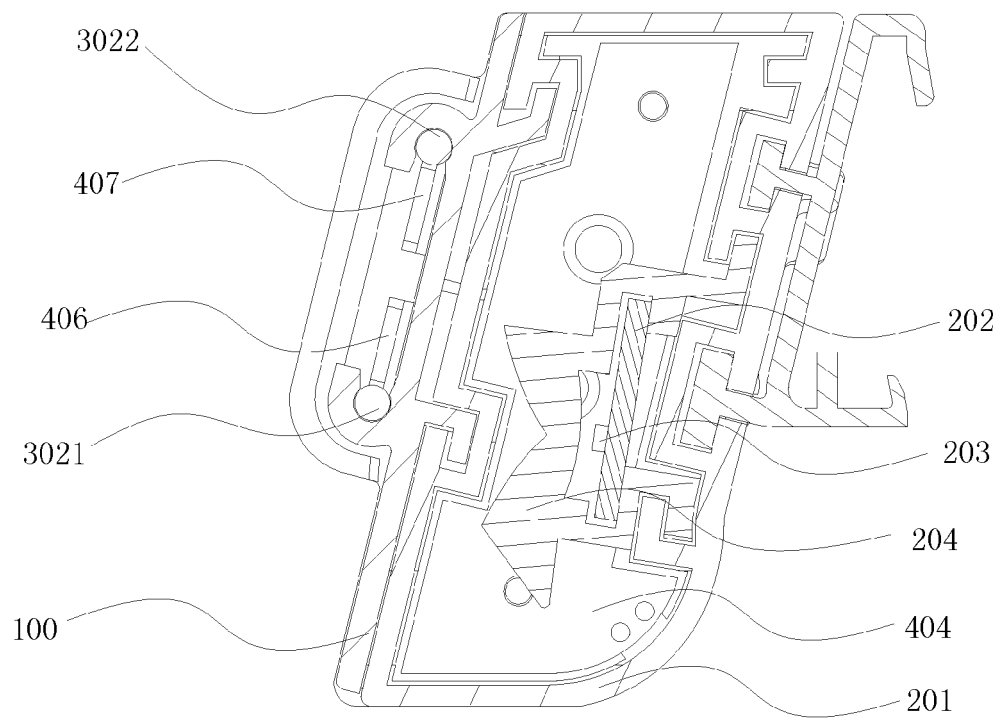


FIG.4

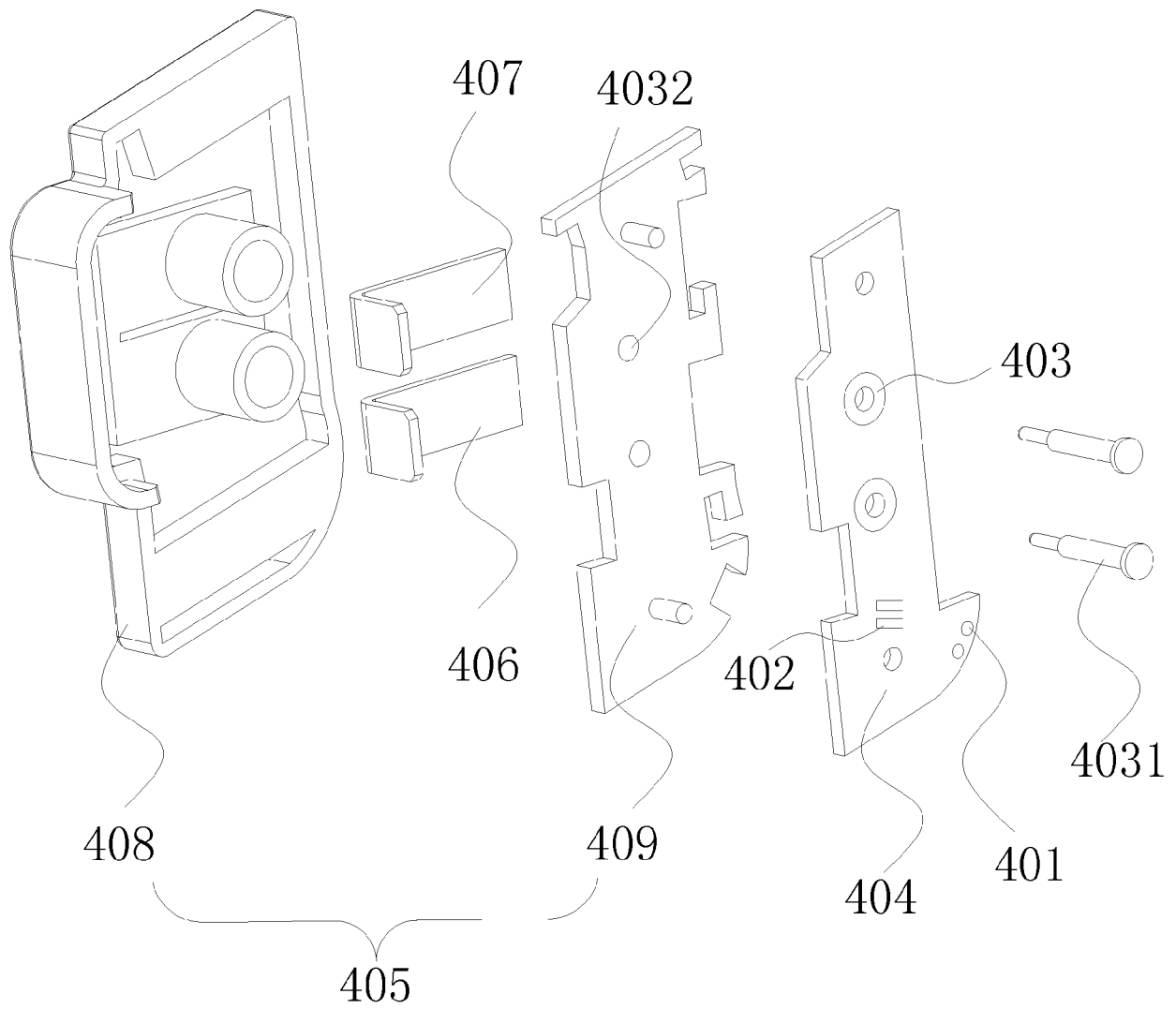


FIG.5

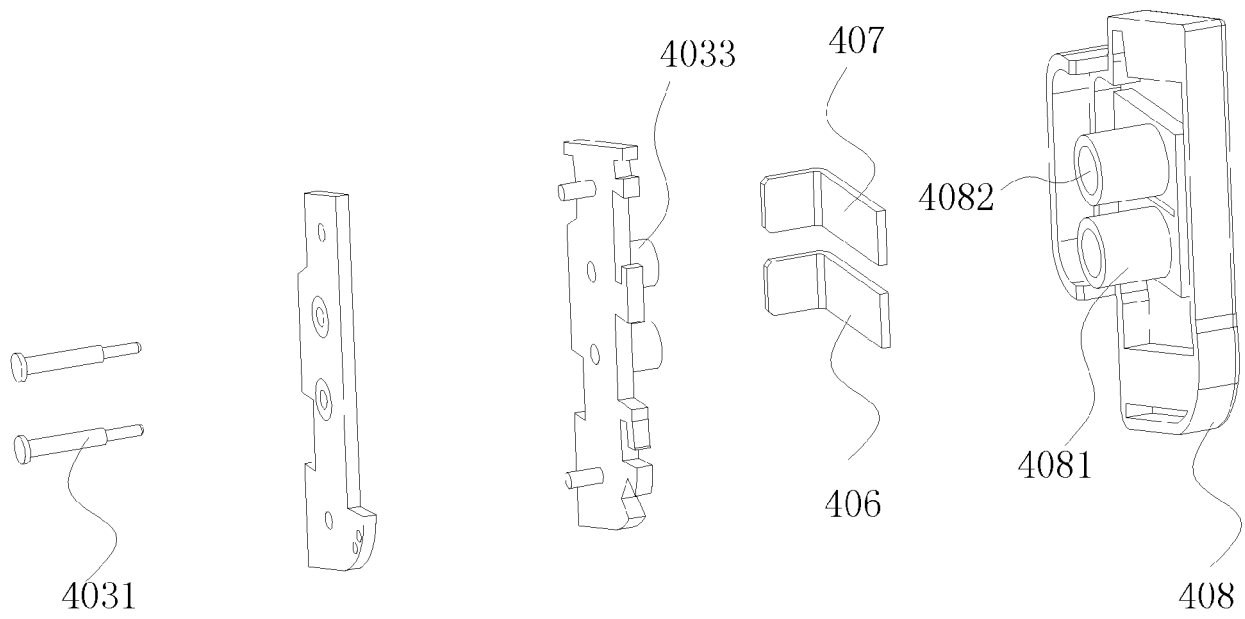


FIG.6

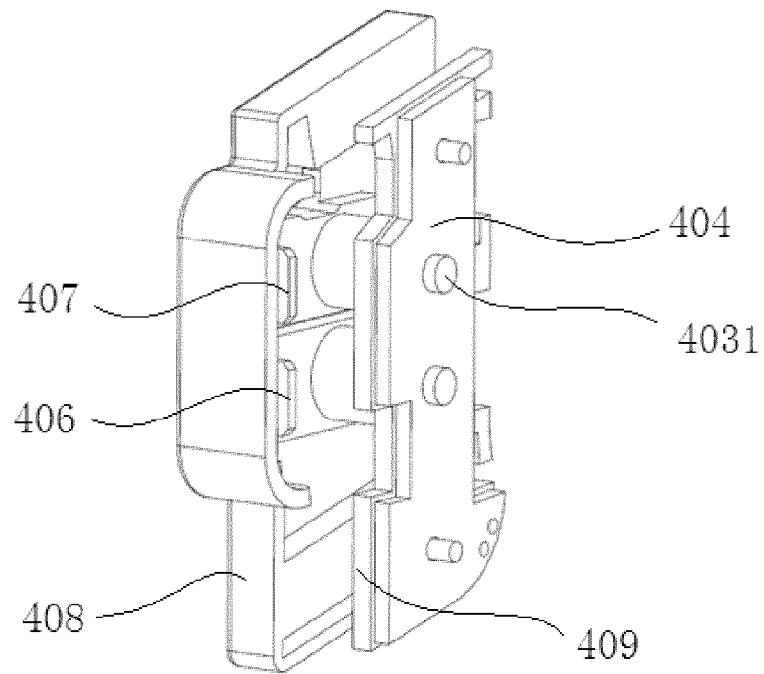


FIG.7



EUROPEAN SEARCH REPORT

Application Number
EP 20 17 5000

5

10

15

20

25

30

35

40

45

50

55

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 2 220 965 A2 (JUVEMA AG [DE]) 25 August 2010 (2010-08-25)	1-3,7	INV. F21V33/00
A	* paragraphs [0010] - [0012]; figures 2a-5 *	4-6,8-11	

X	DE 10 2018 103692 A1 (VISPLAY INT AG [CH]) 23 August 2018 (2018-08-23)	1-3,7	
A	* figures 1-11 *	4-6,8-11	

X	US 9 410 682 B1 (WANG YU-LIN [TW]) 9 August 2016 (2016-08-09)	1-3,7	
A	* figures 1-8 *	4-6,8-11	

X	EP 3 338 596 A1 (SELF ELECTRONICS CO LTD [CN] ET AL.) 27 June 2018 (2018-06-27)	1-3	
	* figures 1-5 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			F21V A47B F21W F21S F21Y A47F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 September 2020	Examiner Kebemou, Augustin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

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

EP 20 17 5000

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-09-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2220965 A2	25-08-2010	DE 102009003509 A1	02-09-2010
		DK 2220965 T3	25-06-2018
		EP 2220965 A2	25-08-2010
		ES 2673995 T3	26-06-2018

DE 102018103692 A1	23-08-2018	CH 713509 A2	31-08-2018
		CH 713515 A1	31-08-2018
		DE 102018103692 A1	23-08-2018

US 9410682 B1	09-08-2016	NONE	

EP 3338596 A1	27-06-2018	CN 106724404 A	31-05-2017
		EP 3338596 A1	27-06-2018
		US 2018180261 A1	28-06-2018

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201910415070 [0001]