(19) Europäisches Patentamt
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(11) **EP 4 001 736 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.05.2022 Bulletin 2022/21

(21) Application number: **21207138.5**

(22) Date of filing: **09.11.2021**

(51) International Patent Classification (IPC):
F21S 4/20 *(2016.01)* ***F21V 15/015*** *(2006.01)*
F21V 27/02 *(2006.01)* ***F21V 31/04*** *(2006.01)*
F21Y 115/10 *(2016.01)* *F21Y 103/10* *(2016.01)*

(52) Cooperative Patent Classification (CPC):
F21S 4/20; F21V 15/015; F21V 27/02; F21V 31/04;
F21V 23/002; F21Y 2103/10; F21Y 2115/10

(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

(30) Priority: **13.11.2020 CN 202011265825**

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

(72) Inventors:
- **Liu, Xiaoyun**
  Ningbo, 315103 (CN)
- **Xu, Kai**
  Ningbo, 315103 (CN)
- **CHEN, Dong**
  Ningbo, 315103 (CN)
- **Lin, Wanjiong**
  Ningbo 315103 (CN)

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

(54) **WATERPROOF LAMP**

(57) The present invention discloses a waterproof lamp with wires comprising: a strip-shaped lamp body provided with a mounting cavity extending along its length and having a mounting opening at an end thereof; a light source assembly, provided within said mounting cavity; an end cover assembly for encapsulating said mounting opening; said end cover assembly comprising: an inner baffle, provided within said mounting cavity near said mounting opening; a baffle cover, provided at an end of said strip-shaped lamp body for encapsulating said mounting opening, the cover being provided with a first threaded hole, said gluing cavity being formed between said cover and inner baffle, said gluing cavity being provided with a glue filling hole; an external connector with a wire passing through said first threaded hole into said mounting cavity for electrical connection to said light source assembly, said wire comprising a plurality of inner wires and an outer sheath covering all inner wires, the end of said outer sheath being located within said gluing cavity. The present invention prevents water from entering the lamp body between the outer sheath covering and the inner wires, improving water resistance and reliability

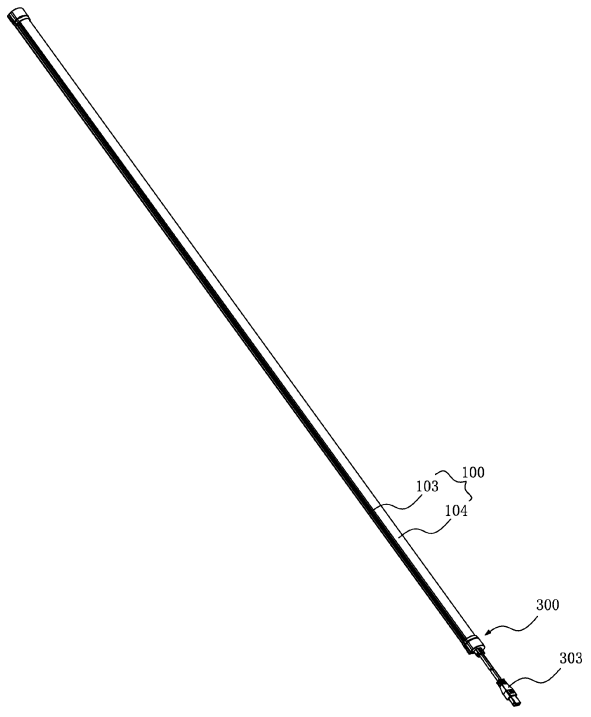

FIG. 1
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Description

Technical field

[0001] The present invention relates to the technical field of waterproof lamps, and in particular to a waterproof lamp with a wire.

background technology

[0002] Lamps and lanterns mainly include lampshade, lamp holder, main board, and end structure seal. Generally, the end seal structure on the market is divided into two types: waterproof and non-waterproof. The wires are divided into tension devices and tension requirements. Waterproofing is generally achieved by filling the space with soft materials to achieve the waterproof effect. However, there are small gaps in the neutral silicone between the lampshade, the aluminum bottom, lampshade and aluminum bottom, which cannot meet the waterproof requirements, and the waterproof consistency is also not high, and into the general waterproof lamp the water will enter through the gap between the outer sheath of the wire and the inner sheath (the sheath of the inner wire), because the lamp will produce internal and external pressure difference after the lamp is lighted, causing water to escape from the wire sheath There is no good solution in the prior art. Therefore, how to improve the waterproof effect of lamps with external wires becomes important.

Summary of the invention

[0003] In view of this, the present invention provides a waterproof lamp with a wire to solve the above technical problems.

[0004] A waterproof lamp with wires including:

A strip-shaped lamp body is provided with a mounting cavity extending along its length and provided with a mounting opening at the end;

a light source assembly is provided within said mounting cavity;
an end cover assembly for encapsulating said mounting opening;

Said end cover assembly comprising;

an inner baffle, provided in said mounting cavity near said mounting opening;
a baffle cover, provided at the end of said strip-shaped light body for encapsulating said mounting opening, the cover body provided with a first threaded hole, said baffle cover and inner baffle forming a glue-filling cavity between said baffle cover and said glue-filling cavity provided with a glue-filling hole.

[0005] An external connector with wires passing through said first threaded hole into said mounting cavity to electrically connect to said light source assembly, said wires comprising a plurality of inner wires and an outer sheath covering encasing all of the inner wires, said outer sheath covering ending in said glue-filled cavity.

[0006] Preferably, said baffle cover is provided with a connecting rod on the side facing the inner baffle, and said inner baffle is provided with a connecting hole for mating with said connecting rod.

[0007] Preferably, said baffle cover is provided with said glue injection holes.

[0008] Preferably, said baffle cover is manufactured from a transparent material.

[0009] Preferably, said inner baffle is manufactured from a flexible material, and is in interference fit to said mounting cavity.

[0010] Preferably, said strip-shaped light body comprises a strip-shaped base and an strip-shaped optical element that are interlocked to form said mounting cavity.

[0011] Preferably, said strip-shaped optical element is a lampshade.

[0012] Preferably, said light source assembly comprises a strip-shaped circuit board disposed within said mounting cavity and a light emitting unit disposed with said strip-shaped circuit board facing said strip-shaped optical element.

[0013] Preferably, said strip-shaped circuit board is provided with pads at the end of said strip-shaped circuit board, said pads being located at or near said mounting opening.

[0014] Preferably, said strip-shaped circuit board is provided with a fixing hole at one end provided with a pad, and said inner baffle is provided with a post that fits into the fixing hole.

[0015] Preferably, said side of said baffle cover facing said inner baffle is a flat surface.

[0016] Preferably, said strip-shaped optical element is shorter at the end than said strip-shaped base, said portion of said baffle cover protruding towards said baffle cover in proximity to said strip-shaped optical element, said gluing cavity being divided into a smaller upper cavity and a larger lower cavity, said wire being located in said lower cavity.

[0017] Preferably, said end cover assembly further comprises an outer cover provided on the outside of said baffle cover, said outer cover being provided with a second threaded hole for said wire to pass through.

[0018] Preferably, said outer cover is provided with a protruding plurality of hock elements on the outer side around the second threaded hole, said hock element being distributed around said second threaded hole, at least one hock element being provided with a convex rib on the inner side, said end cover assembly further comprising a locking sleeve that circumferentially locks all the hock element.

[0019] Preferably, said hock element is provided with two symmetrically arranged hock elements, each hock

element having a barb on the outer side, said locking sleeve having a locking hole on the side wall that fits into said barb.

[0020] Technical effects of the present invention.

[0021] The waterproof lamp with wires of the present invention is provided with a gluing cavity at the end of the lamp body for gluing and encapsulation by means of an end cover assembly to improve the waterproof level, and the wires of the external plug connector are glued and encapsulated in said lamp body, and the end of the outer sheath covering of the wires is encapsulated in the gluing cavity to prevent water from entering the lamp body between the outer sheath covering of said external plug connector and the inner wires to further improve the waterproof reliability.

Illustrations

[0022] Embodiments of the present invention are described below in connection with the accompanying drawings, wherein.

FIG. 1 is a schematic diagram of the structure of the waterproof lamp with wires of this embodiment.

FIG. 2 is a schematic diagram of the exploded structure of the waterproof lamp with wires of this embodiment.

FIG. 3 shows an enlarged schematic view of part A of FIG. 2.

Figure 4 shows a schematic diagram of the exploded structure of Figure 3 at a different angle.

FIG. 5 is a schematic diagram of the structure of the waterproof lamp with wires (with the outer cover removed) of this embodiment.

Figure 6 shows a cross-sectional schematic view of a longitudinal section of the waterproof lamp (part) with wires of this embodiment.

Figure 7 shows a cross-sectional schematic view of a longitudinal section of a waterproof lamp with wires (partly) of another embodiment.

Detailed Description of the drawings

[0023] Specific embodiments of the present invention are described in further detail below based on the accompanying drawings. It should be understood that the description of embodiments of the present invention herein is not intended to limit the scope of protection of the present invention.

[0024] As shown in FIGS. 1 to 6, the waterproof lamp with wires of this embodiment includes a strip-shaped lamp body 100, a light source assembly 200 and an end cover assembly 300. the strip-shaped lamp body 100 is provided with a mounting cavity 101 extending along its length and having a mounting opening 102 at an end; the light source assembly 200 is provided in said mounting cavity 101; the end cover assembly 300 is used to encapsulate said mounting opening 102. Said mounting opening 102 may be provided at only one end of said mounting cavity 101 or both ends, in this embodiment, both ends are provided with a mounting opening 102, one end of which does not need to be connected to electricity and therefore can be sealed using a prior art waterproof end cover, while the end of the other end of the mounting opening 102 needs to be sealed by an end cover assembly 300, in this embodiment, said end cover assembly 300 includes an inner baffle 301, a baffle cover 302, and an external plug 303.

[0025] The inner baffle 301 is provided in said mounting cavity 101 near said mounting opening 102 for blocking glue, so that neutral silicone will not spill into the interior of the lamp body during production, improving production efficiency; further, said inner baffle 301 is made of a flexible material, and is overfitted with said mounting cavity 101, and the overfitting can improve the effect of blocking glue.

[0026] Baffle cover 302 is provided at the end of said strip-shaped light body 100 for encapsulating said mounting opening 102, and the cover is provided with a first threaded hole 3021, and a gluing cavity 400 is formed between said baffle cover 302 and inner baffle 301, and said gluing cavity 400 is provided with a glue filling hole 401; during manufacture, neutral glue is filled in through the glue filling hole, and neutral glue flows out from the gap between baffle cover 302 and mounting opening 102 and from the first threaded hole 3021, which indicates that the glue injection is complete. Further, said baffle cover 302 is manufactured from a transparent material so that the extent of glue filling can be seen, allowing the glue filling process to be controlled and preventing overfilling or not filling. In order to make said inner baffle 301 easy to position when installed, in this embodiment, said baffle 302 is provided with a connection bar 3022 on the side facing the inner baffle 301, and said inner baffle 301 is provided with a connection hole 3012 that fits with said connection bar 3022. further, said baffle cover 302 is provided with said glue injection hole 401 for the convenience of glue injection; alternatively, the glue injection hole 401 may also be provided in said strip-shaped light body 100.

[0027] The external plug 303 has a wire 3031 that passes through said first threaded hole 3021 into said mounting cavity 101 and is electrically connected to said light source assembly 300, said wire 3031 comprising a plurality of inner wires 3033 and an outer sheath 3034 that covers all of the inner wires 3033, the end of said outer sheath 3034 being located in said glue injection cavity 400. In the prior art, if the end of the outer sheathing covering 3034 is not sealed, water will seep into the lamp body between the outer sheathing covering of the wires and the inner wires due to the pressure difference between the inside and outside of the lamp, and the above structure avoids this problem while accomplishing an effective seal of the mounting opening 102.

[0028] In this embodiment, said strip-shaped light body 100 includes a strip-shaped base 103 and a strip-shaped

optical element 104 which are docked to each other to form said mounting cavity 101. Shaped with a slot 1031 on both sides, said strip-shaped optical element 104 extending downwardly on both sides to form a card edge 1041, said card edge 1041 inserted into the slot 1031 to achieve a connection, before the connection the strip-shaped base 103 is dotted with neutral silicone, the strip-shaped optical element 104 is connected to the strip-shaped base 103, and The gap filling is to achieve the waterproof effect in the circumferential direction of the installation cavity 101 .

[0029] The strip-shaped optical element 104 is used to distribute the light of the light source, and may be a lens or an ordinary lampshade, and the lampshade may incorporate diffusion powder to make the light output more uniform, and in this embodiment, said strip-shaped optical element 104 is a lampshade with an arched cross-section.

[0030] Said light source assembly 200 may be a variety of devices that emit light via electricity, and for ease of manufacture and installation, said light source assembly 200 in this embodiment comprises a strip-shaped circuit board 201 provided within said mounting cavity 101 and a light emitting unit 202 provided within said strip-shaped circuit board 201 toward said strip-shaped optical element 104. Further, said light emitting unit 202 is an LED chip. Said strip-shaped base 103 is provided with a mounting slot 1032 penetrating said strip-shaped circuit board 201.

[0031] Said external plug 303 is electrically connected to the strip-shaped circuit board 201 in many ways, either by plugging or by soldering, in this embodiment, said strip-shaped circuit board 201 is provided with pads 2011 at the end of said strip-shaped circuit board 201, said pads 2011 being located at or near said mounting opening 102. Said external plug 303 is electrically connected by soldering the inner wires 3033, generally, the inner wires 3033 are provided with two positive and negative terminals, correspondingly, there are also two pads 2011 are also provided.

[0032] In this embodiment, said strip-shaped circuit board 201 is provided with a fixing hole 2012 at one end of the pad 2011, and said inner baffle 301 is provided with a tab 3011 that fits into this fixing hole 2012. Said strip-shaped circuit board 201 and inner baffle 301 are connected to achieve fixation.

[0033] The inner surface of said baffle cover 302 needs to be matched to the mounting opening 102. As shown in FIG. 7, in an alternative embodiment, said baffle cover 302 is flush on the side facing said inner baffle 301. If said strip-shaped optical element 104 is flush with said strip-shaped base 103 at the end, at that point said baffle cover 302 may be located on the outside of the end. If said strip-shaped optical element 104 is shorter at the end than said strip-shaped base 103, the mounting opening 102 forms a step, at which point the baffle cover 302 may be mounted flush with said strip-shaped optical element 104 at the end within the strip-shaped base 103.

[0034] In this embodiment, said strip-shaped optical element 104 is shorter at the end than said strip-shaped base 103, said portion of said baffle cover 302 near said strip-shaped optical element 104 protrudes in the direction of said baffle cover 302, said glue injection cavity 400 is divided into a smaller upper cavity 402 and a larger lower cavity 403, said wire 3031 is located in said lower cavity 403, and wire 3031 is provided in the lower cavity 403. The above structure allows for complete encapsulation of the wire 3031 while reducing the amount of glue.

[0035] In this embodiment, said end cover assembly 300 further comprises an outer cover 304 provided on the outside of said baffle cover 302, said outer cover 304 being provided with a second threaded hole 3041 for said wire 3031 to pass through. Since there will be adhesive spillage between the baffle cover 302 and said mounting opening 102, the outer cover 304 is added to wrap around the baffle cover 302 for aesthetic considerations. The outer cover 304 is secured by screws 305 to said strip-shaped light body 100, while pressing to secure said baffle cover 302.

[0036] In this embodiment, the outer side of said outer cover 304 is provided with a protruding plurality of hock elements 3042 around the second threaded hole 3041, said hock element 3042 is distributed around said second threaded hole 3041, at least one hock element 3042 is provided with a convex rib 3043 on the inner side, and said end cover assembly 300 further comprises a locking sleeve 3045 that circumferentially locks all hock element 3042. the above structure in the second threaded hole 3041 is positioned to compress the wire 3031 to achieve a wire pull-proof effect, which is efficient and convenient in terms of production efficiency.

[0037] The lock sleeve 3045 is also secured in many ways, and in this embodiment, said hock element 3042 is provided with two symmetrically arranged hock elements, each hock element 3042 having a barb 3046 on the outer side, and said lock sleeve 3045 is provided with a lock hole 3047 in the side wall that fits with said barb 3046.

[0038] The above is only a preferred embodiment of the present invention and is not intended to limit the scope of protection of the present invention, and any modifications, equivalent replacements or improvements, etc. within the spirit of the present invention are covered by the scope of the claims of the present invention.

Claims

1. A waterproof lamp with wires comprising:

A strip-shaped lamp body (100) provided with a mounting cavity (101) extending along its length and having a mounting opening (102) at its end;
a light source assembly (200), provided within said mounting cavity (101);
an end cover assembly (300) for encapsulating

said mounting opening (102);
characterized in that said end cover assembly (300) comprises:

an inner baffle (301) provided in said mounting cavity (101) near said mounting opening (102);
a baffle cover (302), provided at the end of said strip-shaped light body (100) for encapsulating said mounting opening (102), the baffle cover being provided with a first threaded hole (3021), said baffle cover (302) and inner baffle (301) forming a glue filling cavity (400), said glue filling cavity (400) being provided with a glue filling hole (401);
an external plug (303) with wires (3031) electrically connected to said light source assembly (300) through said first threaded hole (3021) into said mounting cavity (101), said wires (3031) comprising a plurality of inner wires (3033) and an outer sheath (3034) encasing all of the inner wires (3033), the end of said outer sheath (3034) located within said glue injection cavity (400).

2. The waterproof lamp with wires according to claim 1, **characterized in that** said baffle cover (302) is provided with a connecting rod (3022) on the side facing the inner baffle (301), said inner baffle (301) being provided with a connecting hole (3012) for mating with said connecting rod (3022).

3. The waterproof lamp with wires according to any of the claims 1 - 2, **characterized in that** said baffle cover (302) is provided with said glue filling holes (401).

4. The waterproof lamp with wires according to any of the claims 1- 3, **characterized in that** said baffle cover (302) is made of transparent material.

5. The waterproof lamp with wires according to any of the claims 1 -4, **characterized in that** said inner baffle (301) is made of a flexible material, overfitted with said mounting cavity (101).

6. The waterproof lamp with wires according to any of the claims 1 -5, **characterized in that** said strip-shaped light body (100) comprises a strip-shaped base (103) interconnected to form said mounting cavity (101) and an strip-shaped optical element (104).

7. The waterproof lamp with wires according to claim 6, **characterized in that** said strip-shaped optical element (104) is a lampshade.

8. The waterproof lamp with wires according to any of the claims 1 - 7, **characterized in that** said light source assembly (200) comprises a strip-shaped circuit board (201) provided in said mounting cavity (101) and a light emitting unit (202) provided in said strip-shaped circuit board (201) towards said strip-shaped optical element (104).

9. The waterproof lamp with wires according to claim 8, **characterized in that** said strip-shaped circuit board (201) is provided with pads (2011) at the end of said strip-shaped circuit board (201), said pads (2011) being located at or near said mounting opening (102).

10. The waterproof lamp with wires according to claim 9, **characterized in that** said strip-shaped circuit board (201) is provided with a fixing hole (2012) at one end provided with a pad (2011), and said inner baffle (301) is provided with a tab (3011) that fits into this fixing hole (2012).

11. The waterproof lamp with wires according to any of the claims 1 - 10, **characterized in that** said baffle cover (302) has a flat surface on the side facing said inner baffle (301).

12. The waterproof lamp with wires according to any of the claims 6 - 11, **characterized in that** said strip-shaped optical element (104) is shorter at the end than said strip-shaped base (103), said baffle cover (302) protrudes towards said baffle cover (302) in the proximity of said strip-shaped optical element (104), said glue-filled cavity (400) is divided into a smaller upper cavity (402) and a larger lower cavity (403), said wire (3031) being located in said lower cavity (403).

13. The waterproof lamp with wires according to any of the claims 1 - 12, **characterized in that** said end cover assembly (300) further comprises an outer cover (304) provided on the outside of said baffle cover (302), said outer cover (304) being provided with a second threaded hole (3041) for said wires (3031) to pass through.

14. The waterproof lamp with wires according to claim 13, **characterized in that** said outer cover (304) is provided with a protruding plurality of hock elements (3042) on the outer side around said second threaded hole (3041), said hock elements (3042) being distributed around said second threaded hole (3041), at least one hock element (3042) being provided with a rib (3043) on the inner side, said end cover assembly (300) further comprising a locking sleeve (3045) circumferentially locking all of the hock elements (3042).

15. The waterproof lamp with wires according to claim 14, **characterized in that** said hock element (3042) is provided with two symmetrically arranged hock elements, each hock element (3042) being provided with a barb (3046) on the outer side, said locking sleeve (3045) being provided with a locking hole (3047) on the side wall to fit said barb (3046).

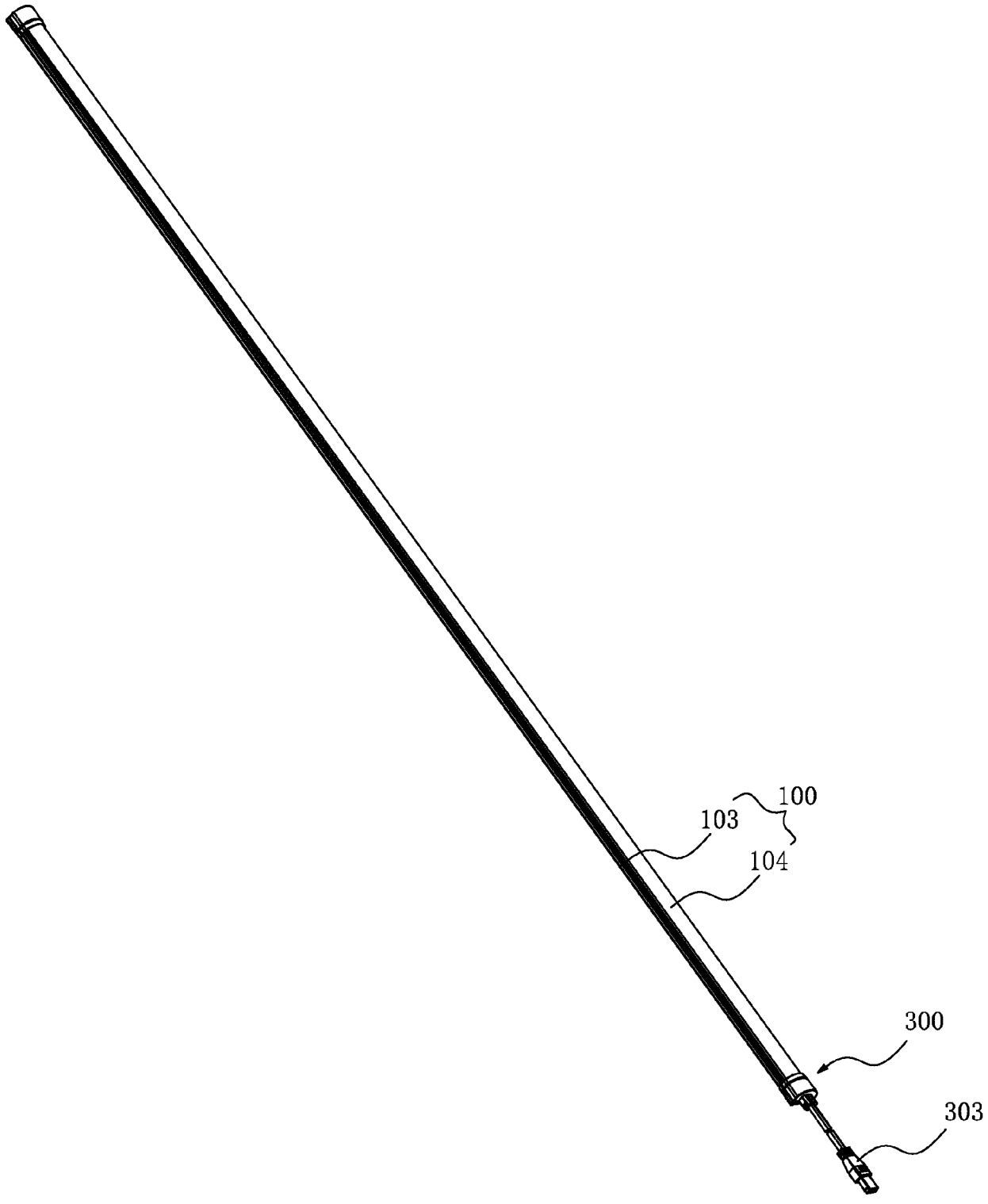


FIG. 1

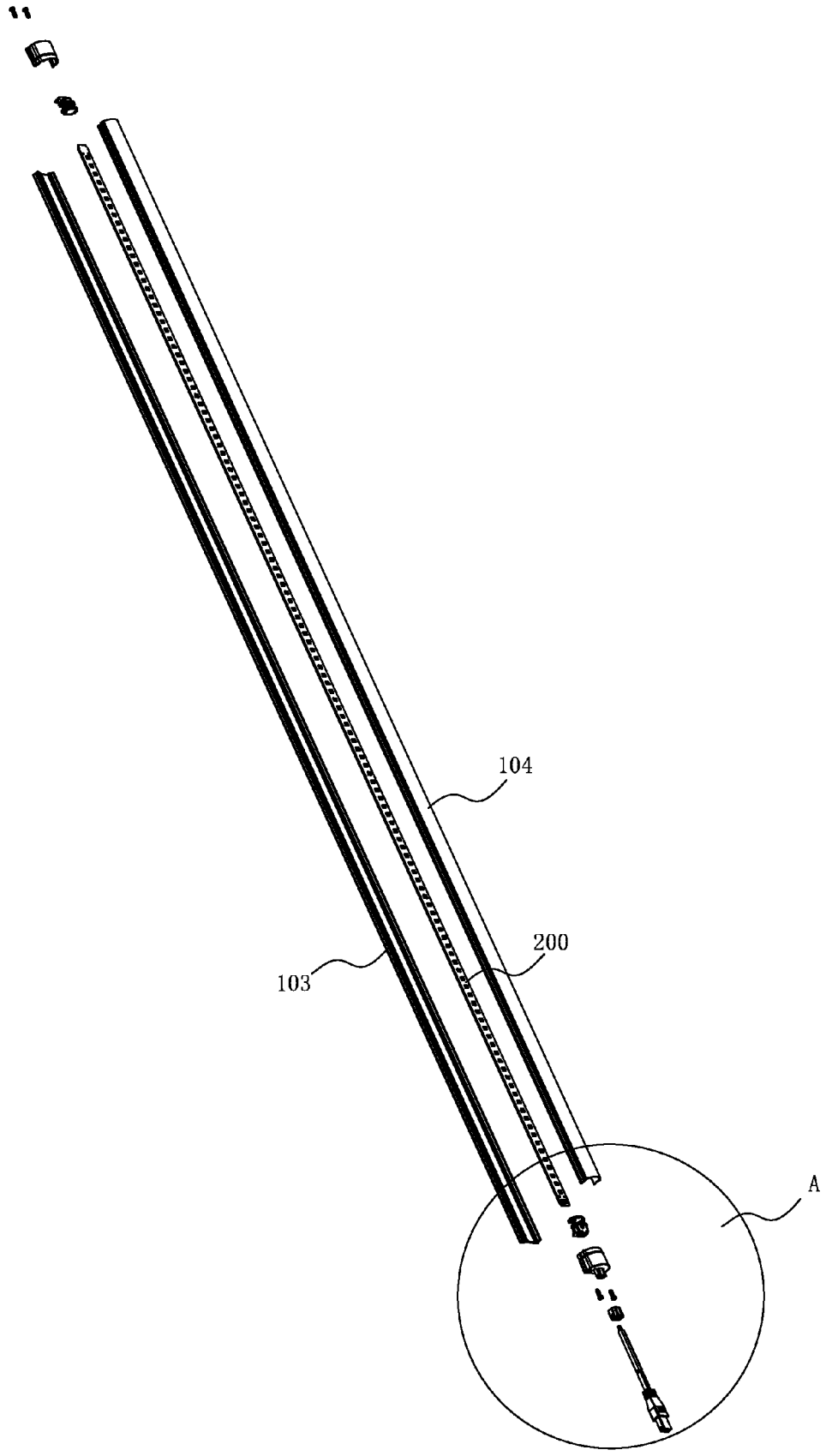
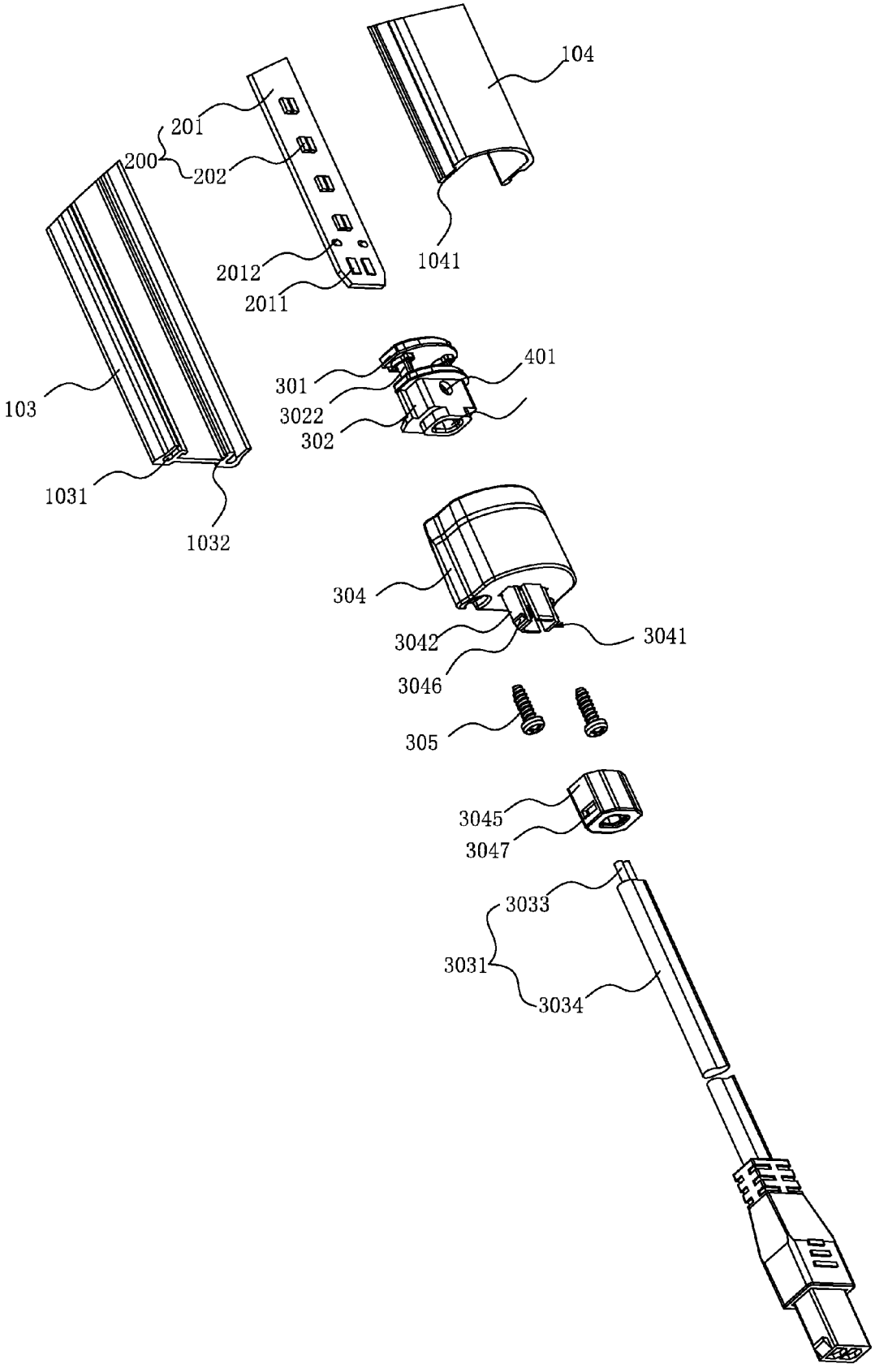


FIG. 2


104
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202
2012
2011
1041
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305
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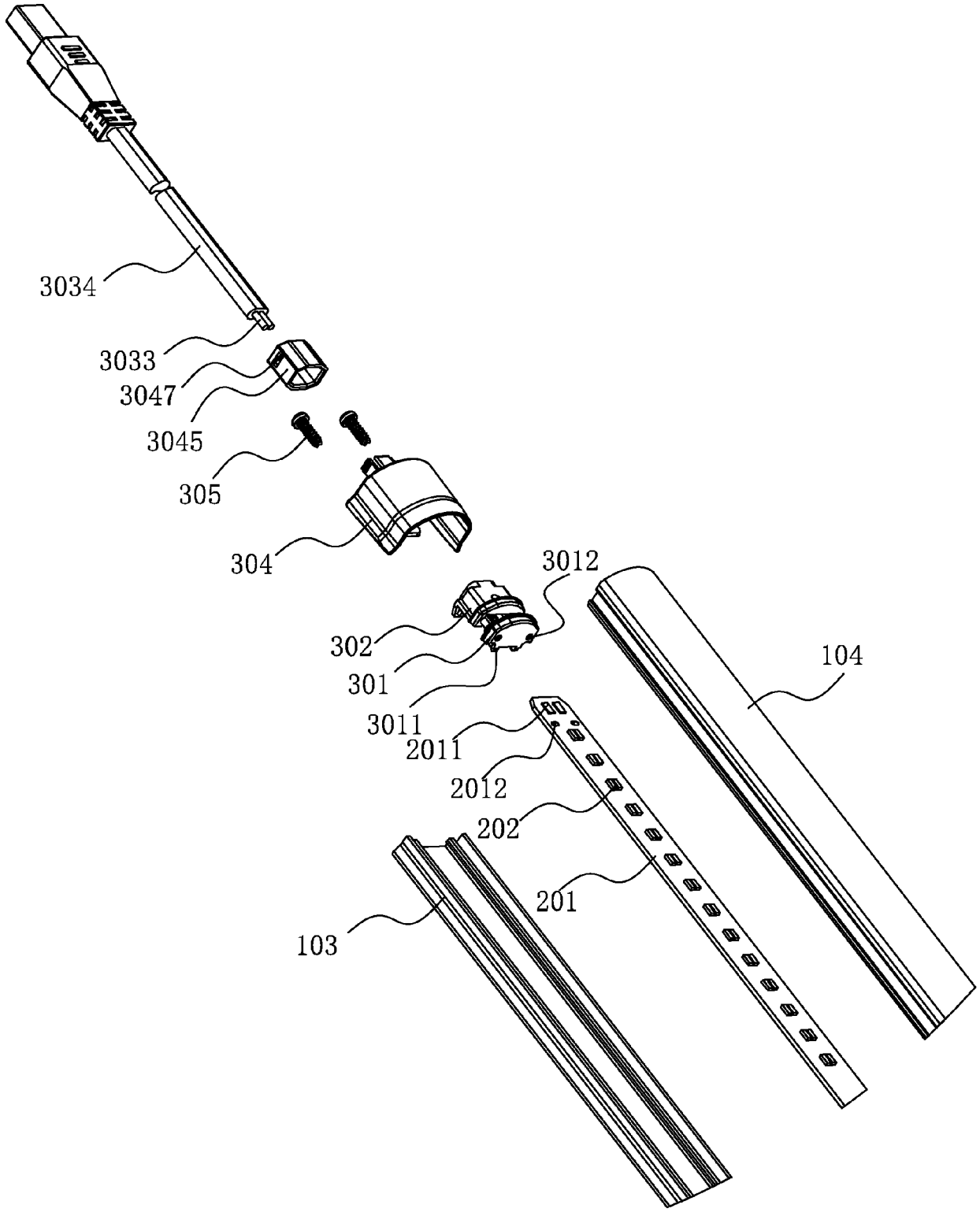
3034

FIG. 3


3034
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3045
305
304
3012
302
301
3011
2011
2012
202
201
103
104

FIG. 4

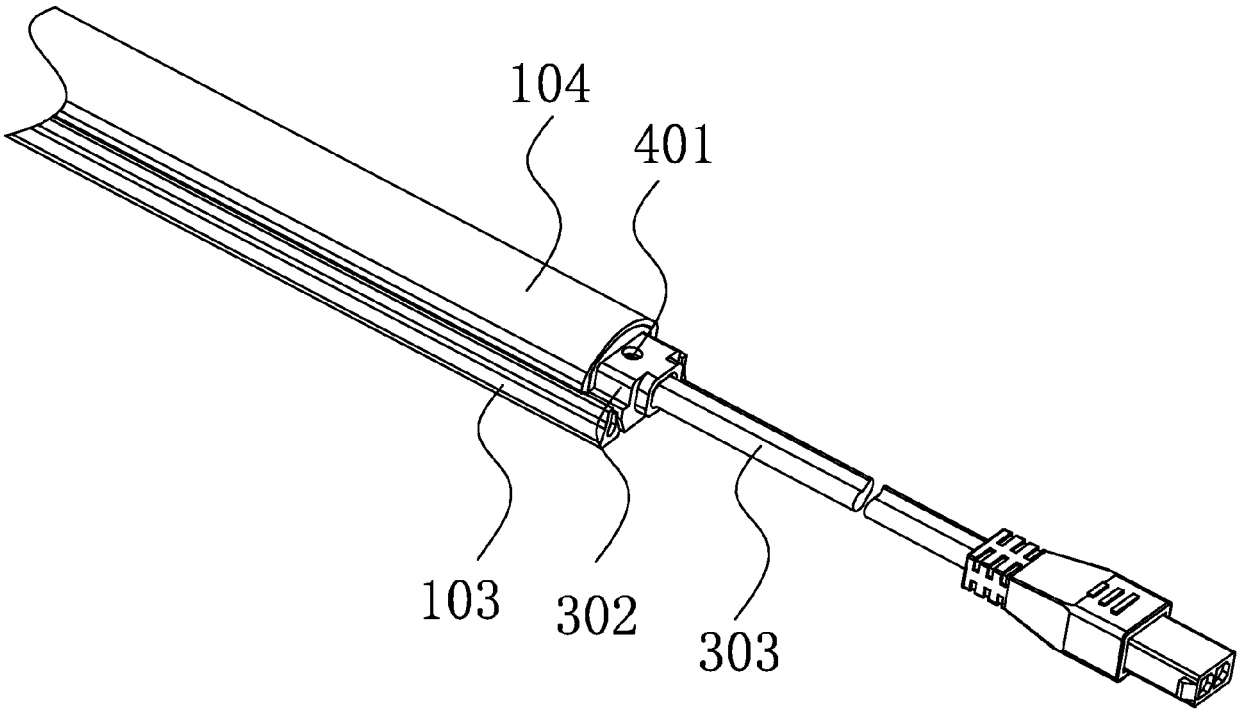
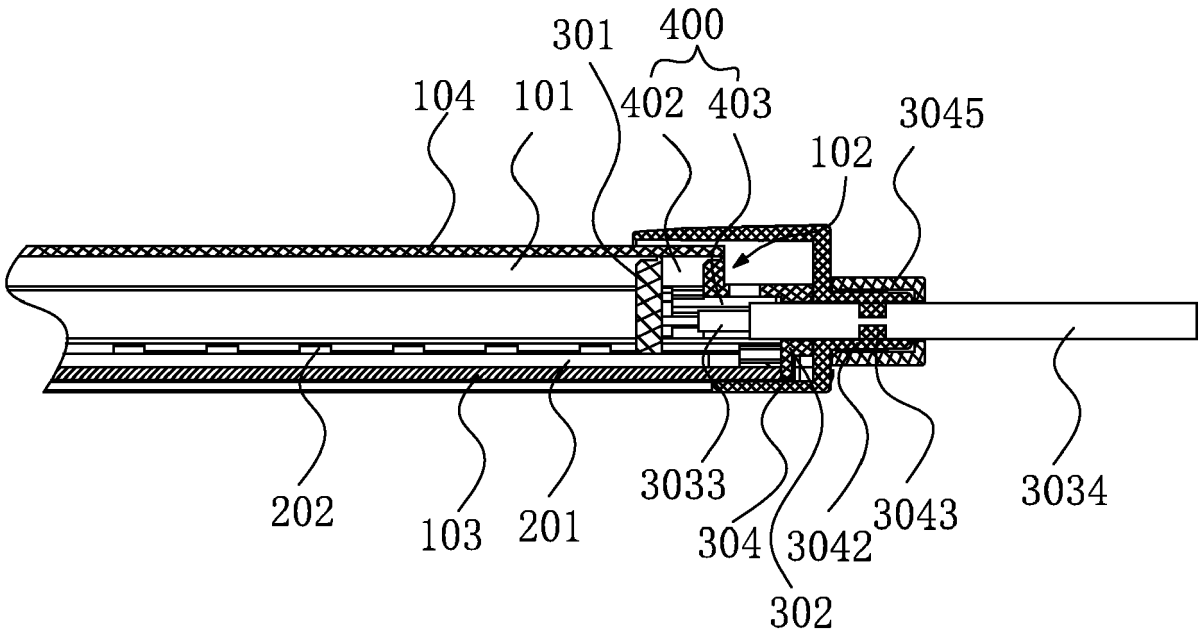


FIG. 5


301
400
104
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402
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3045
102
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103
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3042
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3034
302

FIG. 6

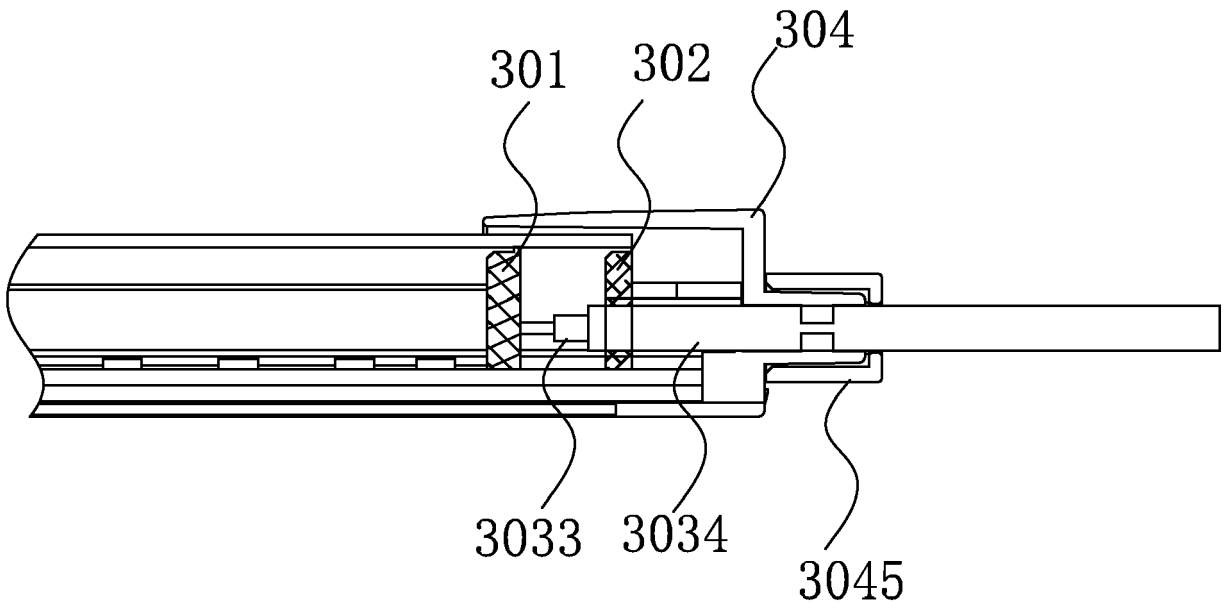

FIG. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 21 20 7138

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 Y A	US 2019/368720 A1 (XUE YUANFANG [CN] ET AL) 5 December 2019 (2019-12-05) * the whole document * -----	1,5-11 1-13 14,15	INV. F21S4/20 F21V15/015 F21V27/02 F21V31/04
Y	CN 203 771 142 U (ARTLED TECHNOLOGY CORP) 13 August 2014 (2014-08-13) * the whole document * -----	1-13	ADD. F21Y115/10 F21Y103/10
Y	CN 111 853 572 A (SELF ELECTRONICS CO LTD) 30 October 2020 (2020-10-30) * paragraphs [0058] - [0059] * -----	1-13	
Y	CN 110 043 812 A (SELF ELECTRONICS CO LTD) 23 July 2019 (2019-07-23) * paragraph [0060]; figures 1-11 * -----	1-13	
Y	EP 2 960 576 A1 (LIN WANJIONG [CN]) 30 December 2015 (2015-12-30) * abstract; figure 2 * -----	13	

TECHNICAL FIELDS SEARCHED (IPC)

F21S
F21V
F21Y

1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 March 2022	Thibaut, Arthur

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 20 7138

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
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10-03-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019368720 A1	05-12-2019	CN 108662497 A	16-10-2018
		US 2019368720 A1	05-12-2019
CN 203771142 U	13-08-2014	NONE	
CN 111853572 A	30-10-2020	NONE	
CN 110043812 A	23-07-2019	NONE	
EP 2960576 A1	30-12-2015	CN 105318303 A	10-02-2016
		EP 2960576 A1	30-12-2015
		US 2015377475 A1	31-12-2015

EPO FORM P0459

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