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(54) A WATERPROOF STRIP LIGHT THAT FACILITATES AUTOMATED PRODUCTION

(57) The present invention discloses a waterproof strip light for automated production, comprising: a strip light holder, a light housing, a light emitting circuit board and a waterproof light holder, said waterproof light holder comprising: an end cover, set on a mounting opening with a insertion hole; a plug connector, the connection structure of which is fixedly connected to the inner side of said end cover, the body of which extends into said light housing and is provided with a first waterproof structure between the inner wall of said light housing; an electrical connection assembly, comprising an external component set on said insertion hole. The electrical connection assembly, including an external connector set on said insertion hole, a second electrical connection set on said plug and said first electrical connection resiliently against said electrical connection and said external connector and said second electrical connection, said conductive member extends through said plug and sealed through the channel by the second waterproof structure; the present invention connects the second electrical connection of the electrical connection assembly and the first electrical connection on the light-emitting circuit board by elastic means. The second electrical connection of the electrical connection assembly and the first electrical connection on the light-emitting circuit board are electrically connected by elastic tightening, avoiding the need for manual welding operations and allowing automated production.

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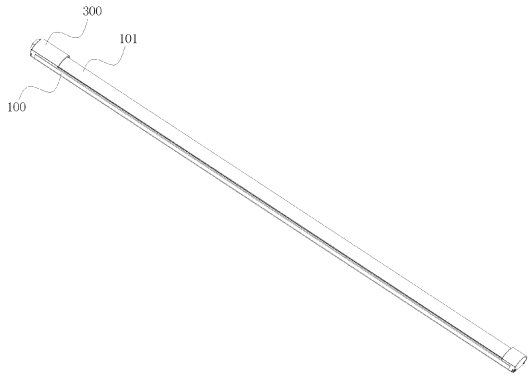

Figure 1

(52) Cooperative Patent Classification (CPC): (Cont.)
H01R 33/94

Description

Related applications

[0001] This application claims priority to Chinese patent application CN 202110106695.1 filed on January 26, 2021

Technology Field

[0002] The present invention relates to the field of lighting manufacturing, in particular, a waterproof strip light that facilitates automated production.

Background Technology

[0003] In the context of energy saving and environmental protection, LED lamps and lanterns are increasingly used in home and commercial lighting because of their high luminous efficiency and good light gathering performance.

[0004] In the prior art, lamps generally include a lamp holder, a lamp cavity/housing, a circuit board and a lamp cap. The end cover of the lamp cap is used to encapsulate the installation port of the lamp. One end passes through the end cap and is connected to the circuit board in the lamp cavity. At present, external connectors are generally connected to the circuit board by wire welding, which requires manual assembly and low assembly efficiency.

Invention content

[0005] In view of this, the present invention provides a waterproof light holder that facilitates automated production to solve the above technical problems.

[0006] A waterproof strip light for easy automated production, comprising:

A strip light holder,
a light housing, provided on said strip light holder and extending along the length, with a mounting opening at least at one end;
a light emitting circuit board, provided in said light housing, with a first electrical connection at one end, said first electrical connection being close to said mounting opening;
a waterproof light holder, set on said mounting opening;
said waterproof light holder comprises:

an end cover, set on said mounting opening with insertion hole,
a plug connector, connection structure fixedly connected to the inner side of said end cover, the plug connector body extending into said light housing and provided with a first waterproof structure between it and the inner wall of said light housing;
an electrical connection assembly, comprising an external member provided on said insertion hole, a second electrical connection member provided on said plug connector to elastically abut against the against said first electrical connection member for tight electrical connection and a conductive member connecting said external member to said second electrical connection member, said conductive member passing through a passage into said plug connector and sealing the passage through a second waterproof structure.

[0007] Preferably, said first waterproof structure comprises a front baffle, set on said plug connector; a rear baffle, spaced from said front baffle so as to form a first glue filling cavity between the plug connector and the inner wall of said light housing, said first glue filling cavity having glue filling holes.

[0008] Preferably, a connecting post is provided between the front baffle and the rear baffle, the outer profile of the connecting post being smaller than the inner profile of the cross-section of the light housing so that said first glue filling cavity is annular.

[0009] Preferably, that said plug connector is provided with said second waterproof structure on the outside of said rear baffle.

[0010] Preferably, said second waterproof structure is a second glue filling cavity surrounding said channel, said second glue filling cavity being in communication with said first glue filling cavity.

[0011] Preferably, said first waterproof structure is detachable in the direction of the length of said strip light holder perpendicular to said strip light holder, it is divided into an upper part fixedly connected to said plug connector and a lower part detachably connected to said upper part.

[0012] Preferably, said upper part and lower part are provided with said channel at the connection.

[0013] Preferably, said plug connector and the electrical connection assembly are integrally injection-molded.

[0014] Preferably, said plug connector, said first waterproof structure and said electrical connection assembly are integrally injection molded.

[0015] Preferably, said first electrical connection member is provided with a conductive area, and said second electrical connection member is a spring piece that is pressed against the conductive area.

[0016] Preferably, the light housing is transparent material made as one-piece by injection molding.

[0017] Technical effects of the present invention.

[0018] The waterproof strip light of the present invention is easy to be produced automatically. The second electrical connection member of the electrical connection assembly and the first electrical connection member on the light-emitting circuit board are electrically connected by elasticity pressing against each other, and the conductive connection can be completed by inserting the

waterproof light holder into the light housing, avoiding the need for manual welding operation, and the overall sealing effect is good and can be produced automatically.

Description of drawings

[0019] Embodiments of the present invention are described below in connection with the accompanying drawings, wherein.

Figure 1 shows a schematic diagram of the structure of the waterproof strip light of this embodiment that facilitates automated production.
Figure 2 shows an exploded schematic diagram of the waterproof strip light of this embodiment that facilitates automated production.
Figure 3 shows a partially exploded schematic diagram of the waterproof strip light of this embodiment that facilitates automated production.
Figure 4 shows a partial cross-sectional diagram of the waterproof strip light of this embodiment that facilitates automated production.
Figure 5 is a schematic diagram of the structure of the waterproof light holder of this embodiment.
Figure 6 shows a schematic diagram of the structure of a waterproof light holder of another embodiment.
Figure 7 shows the exploded diagram of the waterproof light holder of Figure 6.

Detailed description

[0020] The following specific embodiments of the present invention are described in further detail 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.

[0021] As shown in Figures 1-5, the waterproof strip light of this embodiment for easy automated production includes a strip light holder 100, a light housing 101, a light emitting circuit board 200 and a waterproof light holder 300.

[0022] The strip light holder 100 can be made of metal material for carrying other components. In this embodiment, the said strip light holder 100 is extruded from aluminum, as the light-emitting circuit board 200 will generate a lot of heat while energized to emit light, the aluminum strip light holder 100 helps to dissipate heat.

[0023] The lamp housing 101 is arranged on the strip lamp holder 100 and extends along the length direction. The lamp cavity 101 is used to accommodate the light-emitting circuit board 200, which can be formed by buckling with the strip lamp holder 100 through an optical element (such as a lampshade). The buckle needs to be sealed. This is not redundant in the prior art, and it can also be integrally formed. In this embodiment, the lamp housing 101 is made of transparent material, which is generally made of transparent plastic, which reduces assembly and sealing materials and has better sealing effect. At least one end of the lamp housing 101 is provided with a mounting opening 102, or both ends can be provided with a mounting opening 102, and the other end can also be encapsulated by the waterproof lamp cap 300 of the present embodiment, or by the prior art, which will not be repeated.

[0024] The light-emitting circuit board 200 is arranged in the lamp housing 101, which is provided with a light-emitting module, and the light-emitting module can adopt an LED chip. This is not repeated since it is in the prior art. One end of the light-emitting circuit board 200 is provided with a first electrical connection member/connector 201, which is close to the mounting opening 102.

[0025] The waterproof light holder 300 is arranged on the mounting opening 102, and the waterproof lamp holder 300 includes an end cover 301, a plug connector 302 and an electrical connection assembly 304. The waterproof lamp holder 300 is used to encapsulate the mounting opening 102 and is provided with an external member/connector 3041 to connect the external power supply. The end cover 301 is arranged on the mounting opening 102 with a plug hole 3011. It is generally fixed outside the mounting opening 102 and sometimes partially extends into the mounting opening 102. The end cover 301 is fixedly connected with the strip lamp holder 100. In this embodiment, it is fixedly connected by screws 3012. The plug connector 302 is used to set the second electrical connection member 3042 to be electrically connected with the light-emitting circuit board 200, the root/connection structure 3021 of the plug connector 302 is fixedly connected with the inner 3012 of the end cover 301, the body extends into the light housing 101, and a first waterproof structure 303 is arranged between the body and the inner wall of the light housing 102. The first waterproof structure 303 can be a solid elastic seal, such as a sealing ring, etc., In order to improve the waterproof grade, the sealing and waterproof can also be realized by using the glue injection/filling cavity. In this example, the first waterproof structure 303 includes a front baffle 3031 and a rear baffle 3032; the front baffle 3031 is arranged on the plug connector 302; the rear baffle 3032 is spaced from the front baffle 3031 to form a first glue filling cavity 3033 between the plug 302 and the inner wall of the lamp cavity 102, and the first glue filling cavity 3033 is provided with a glue injection hole 3034. The glue injection hole 3034 is arranged on the lamp cavity 101.

[0026] The electrical connection assembly 304 includes an external member/connector 3041 arranged on the insertion hole 3011, a second electrical connection member/connector 3042 arranged on the plug 302 elastically against the first electrical connection member 201 to realize electrical connection, and a conductive member 3043 connecting the external connector 3041 and the second electrical connector 3042. The conductive member 3043 passes through the plug 302 and seals the passage 3022 through the second waterproof structure 305. The electrical connection assembly 304 is gen-

erally an integral part, so assembly needs to be considered. The external connector 3041 may extend out of the end cover 300 through the insertion hole 3011 with a wire, or may be arranged inside the end cover 300 in the form of a socket. In this embodiment, the external connector 3041 is a socket, and the socket is arranged on the insertion hole 3011.

[0027] In order to reduce the amount of glue, a connecting column 3133 is arranged between the front baffle 3031 and the rear baffle 3032. The outer contour of the connecting column 3133 is smaller than the inner contour of the cross section of the lamp housing 101, so as to make the first glue filling cavity 3033 into a ring and reduce the amount of glue.

[0028] Meanwhile, the plug connector 302 is provided with the second waterproof structure 305 on the outside of the rear baffle 3032. Specifically, the second waterproof structure 305 is a second glue filling cavity 3051 surrounding the channel 3022. In order to facilitate glue injection, the second glue filling cavity 3051 is connected with the first glue filling cavity 3033.

[0029] In order to facilitate manufacturing and installation, in this embodiment, the first waterproof structure 303 can be divided into an upper part 3035 fixedly connected with the plug connector 302 and a lower part 3036 detachably connected with the upper part 3035 in a direction perpendicular to the length of the strip light holder 100. This facilitates the installation of the electrical connection assembly 304. The upper part 3035 and the lower part 3036 are provided with the channel 3022 at the connection. When the upper 3035 and the lower 3036 part are separated, it is convenient to install the electrical connection assembly 304. After installation, the upper 3035 and the lower 3036 part are spliced together to complete the fixation

[0030] The electrical connection component is 304 fixed on the upper part 3035 and then the lower 3036 and the upper 3035 part are assembled to fix the electrical connection assembly 304. At the same time, the lower 3036 is also matched with the upper 3035 to form the front and rear glue filling cavities. After the front and rear glue injection cavities are filled with glue, the waterproof effect can be better improved. Finally, the plug connector 302 is assembled with the end cover 301 to form a waterproof lamp holder/cap 300, The waterproof lamp holder 300 can save the trouble of manual wire welding and realize automatic assembly.

[0031] The second electrical connection member 3042 and the first electrical connection/connector 201 of the invention realize electrical connection through elastic butting. The first electrical connection 201 of the embodiment is provided with a conductive area 2011, and the second electrical connector 3042 is a spring piece butting with the conductive area 2011. The conductive area 2011 is a conductive sheet or metal foil. In addition to the cooperation between the elastic sheet and the conductive area 2011, it can also be connected by means of a pin and a conductive pinhole. This is the prior art to realize plug-in electrical connection, which is not repeated in the present invention. Generally, the electrical connection is divided into positive and negative electrodes. Therefore, the second electrical connection member 3042 of this embodiment is provided with two side-by-side, which are positive and negative electrodes respectively. The conductive member 3043 can adopt a conductor, which can also be divided into positive and negative conductors.

[0032] As shown in FIGS. 6 and 7, in addition to being sealed in the above manner, the second waterproof structure 305 can also be directly realized by integral molding. In another embodiment, the plug connector 302 is integrally injection molded with the electrical connection assembly 304. Further, the plug connector 302 and the first waterproof structure 303 are integrally injection molded with the electrical connection assembly 304. The second waterproof structure 305 is the plug connector 302 body, so only the first waterproof structure 303 needs to be set, and the overall structure is simpler. However, the above process cost is high, and it is not applicable to the electrical connection assembly 304 with too long electrical connection assembly 3043. In the actual installation, the plug- connector 302 of this embodiment is set separately, the mounting part 3023 fixing the second electrical connection member 3042 is detachably connected with the main body of the plug connector 302.

[0033] 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. Any modification, equivalent replacement or improvement within the spirit of the present invention, etc., is covered by the scope of the claims of the present invention.

Claims

1. A waterproof strip light for easy automated production, comprising.

   Strip light holder (100).
   a light housing (101), provided on said strip light holder (100) and extending along the length, with a mounting opening (102) at least at one end;
   a light emitting circuit board (200), provided in said light housing (101), with a first electrical connection (201) at one end, said first electrical connection (201) being close to said mounting opening (102);
   a waterproof light holder (300), set on said mounting opening (102);
   characterized in that said waterproof light holder (300) comprises,
   an end cover (301), set on said mounting opening (102) with insertion hole (3011), a plug connector (302), connection structure (3021) fixedly connected (3012) to the inner side of said end cover (301), the plug connector body extending

into said light housing and provided with a first waterproof structure (303) between it and the inner wall of said light housing (102);
an electrical connection assembly (304), comprising an external member (3041) provided on said insertion hole (3011), a second electrical connection member (3042) provided on said plug connector (302) to elastically abut against said first electrical connection member (201) for tight electrical connection and a conductive member (3043) connecting said external member (3041) to said second electrical connection member (3042), said conductive member (3043) passing through a passage (3022) into said plug connector (302) and sealing the passage (3022) through a second waterproof structure (305).

2. The waterproof strip light for easy automated production according to claim 1, **characterized in that** said first waterproof structure (303) comprises

a front baffle (3031), set on said plug connector (302);
a rear baffle (3032), spaced from said front baffle (3031) so as to form a first glue filling cavity (3033) between the plug connector (302) and the inner wall of said light housing (102), said first glue filling cavity (3033) having glue filling holes (3034).

3. The waterproof strip light for easy automated production according to any of the claims 1-2, **characterized in that** a connecting post (3133) is provided between the front baffle (3031) and the rear baffle (303), the outer profile of the connecting post (3133) being smaller than the inner profile of the cross-section of the light housing (101) so that said first glue filling cavity (3033) is annular.

4. The waterproof strip light for easy automated production according to any of the claims 1-2, **characterized in that** said plug connector (302) is provided with said second waterproof structure (305) on the outside of said rear baffle (3032).

5. The waterproof strip light for easy automated production according to claim 4, **characterized in that** said second waterproof structure (305) is a second glue filling cavity (3051) surrounding said channel (3022), said second glue filling cavity (3051) being in communication with said first glue filling cavity (3033).

6. The waterproof strip light for easy automated production according to any of the claims 4-5, **characterized in that** said first waterproof structure (303) is detachable in the direction of the length of said strip light holder (100) perpendicular to said strip light holder (100), it is divided into an upper part (3035) fixedly connected to said plug connector (302) and a lower part (3036) detachably connected to said upper part (3035).

7. The Waterproof strip light for easy automated production according to any of the claims 4-6, **characterized in that** said upper part (3035) and lower (3036) part are provided with said channel (3022) at the connection.

8. The waterproof strip light for easy automated production according to any of the claims 1-7, characterized wherein the plug connector (302) and the electrical connection assembly (304) are integrally injection-molded.

9. The waterproof strip light for easy automated production according to any of the claims 1-8, **characterized in that** said plug connector (302), said first waterproof structure (303) and said electrical connection assembly (304) are integrally injection molded.

10. The waterproof strip light for easy automated production according to any of the claims 1-9, **characterized in that** said first electrical connection member (201) is provided with a conductive area (2011), and said second electrical connection member (3042) is a spring piece that is pressed against the conductive area (2011).

11. The waterproof strip light for easy automated production according to any of the claims 1-9, **characterized in that** said light housing (101) is made of transparent material in one piece.

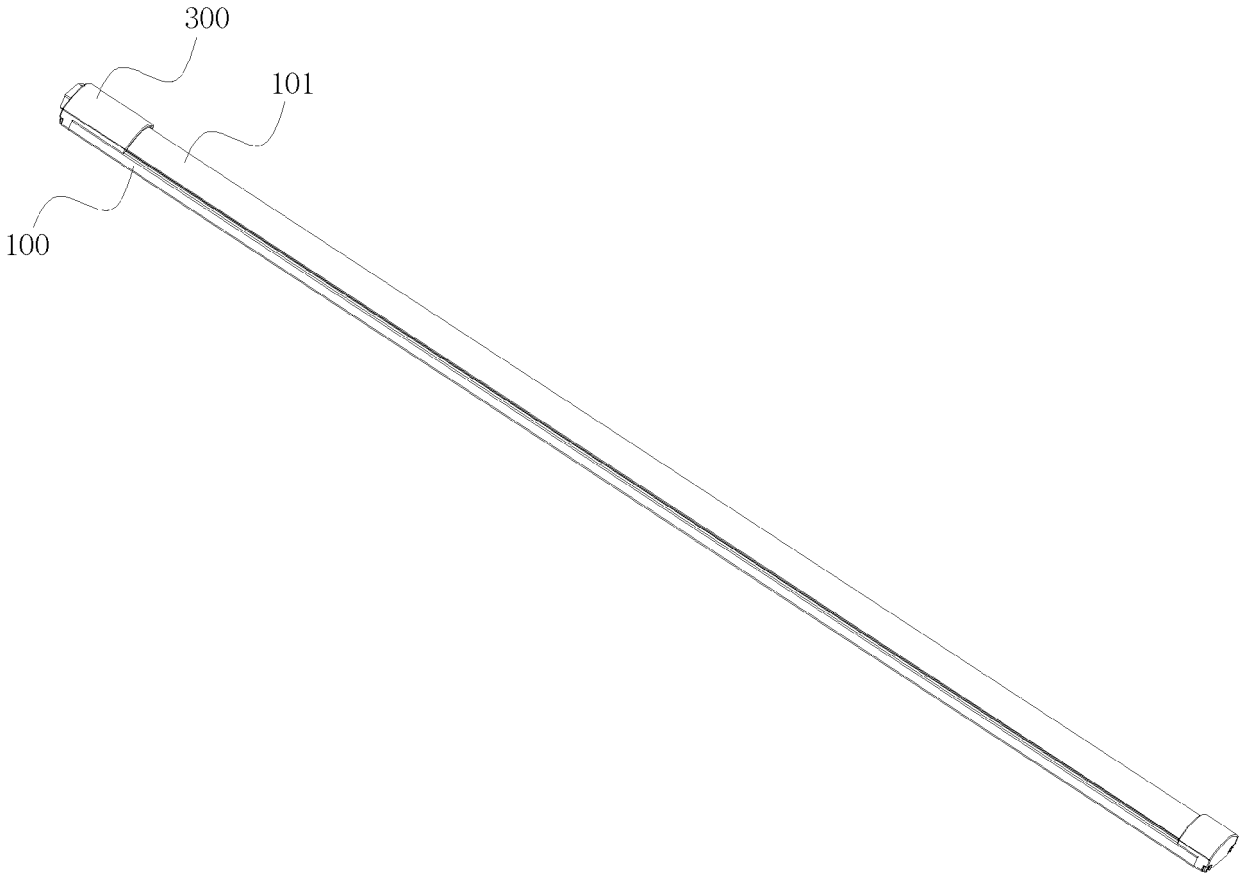

Figure 1

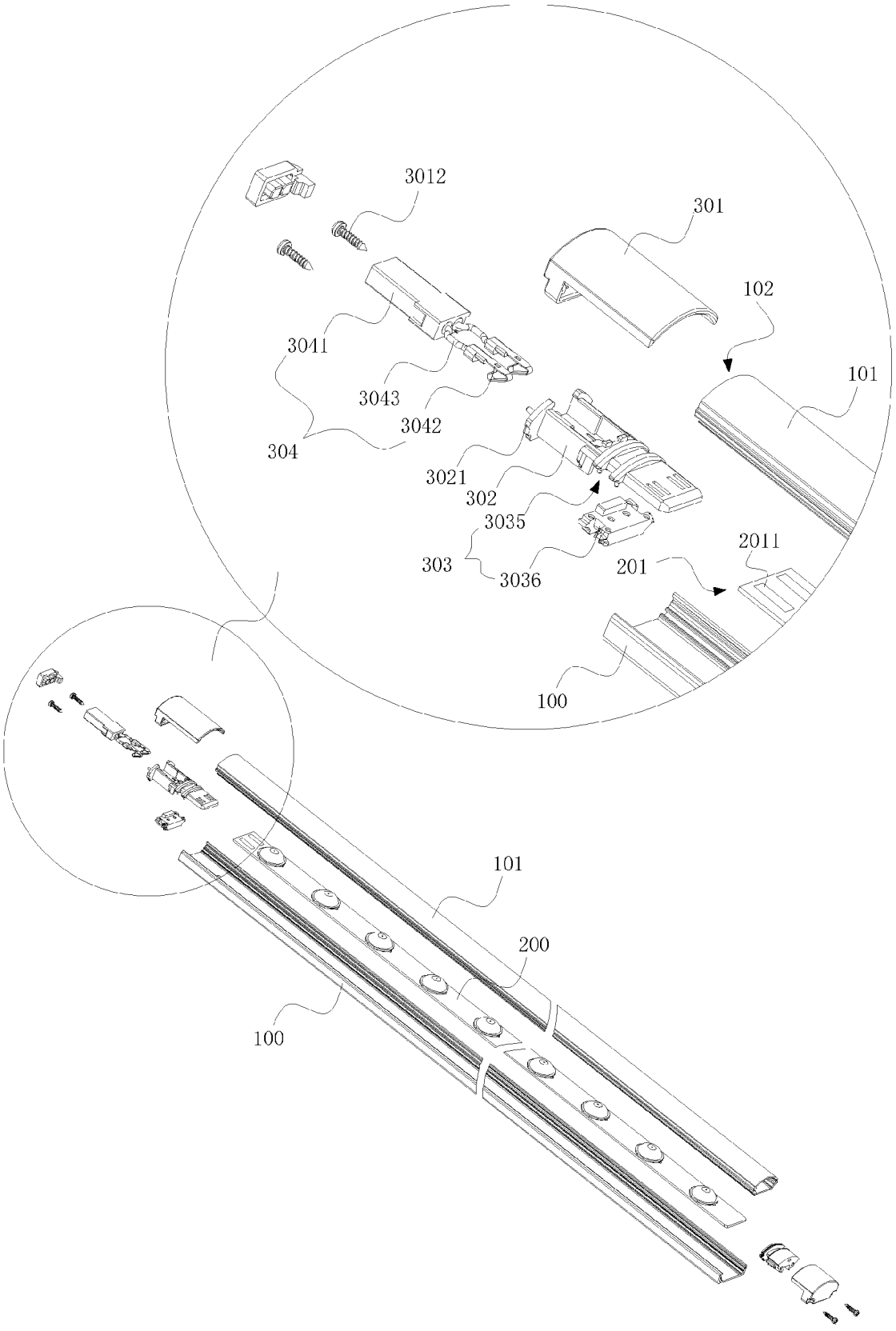
3012
301
102
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Figure 2

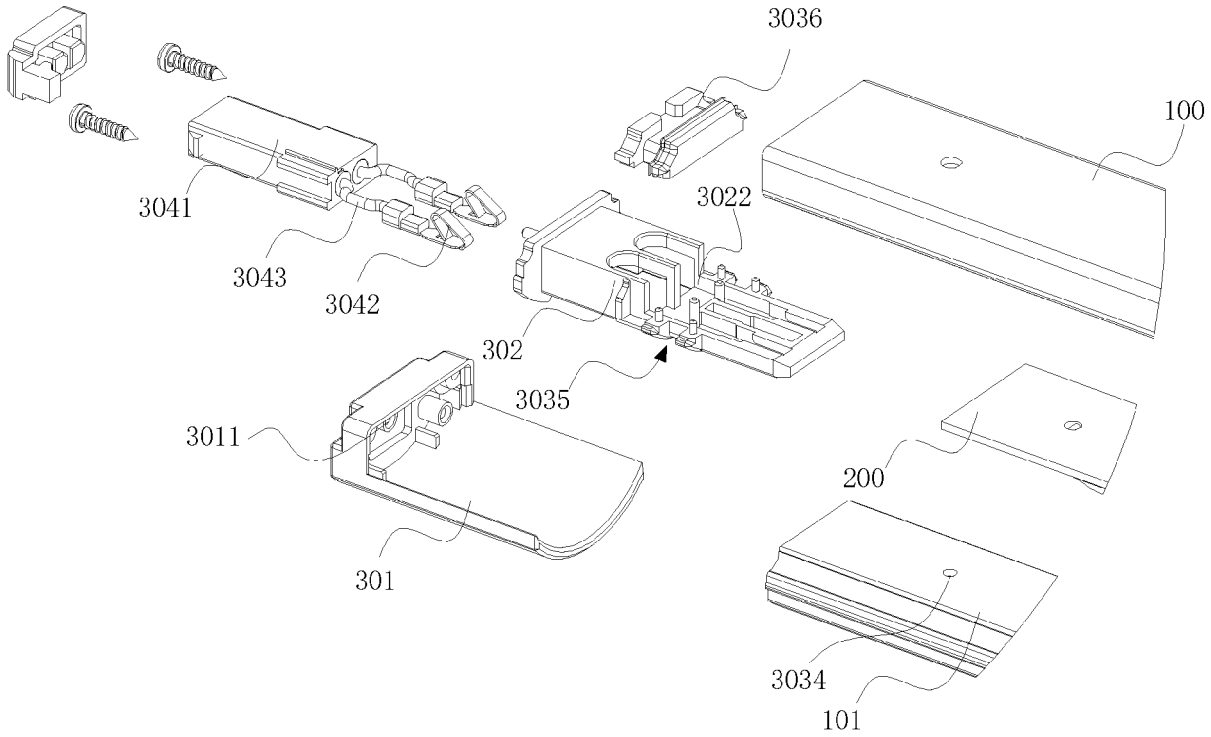

Figure 3

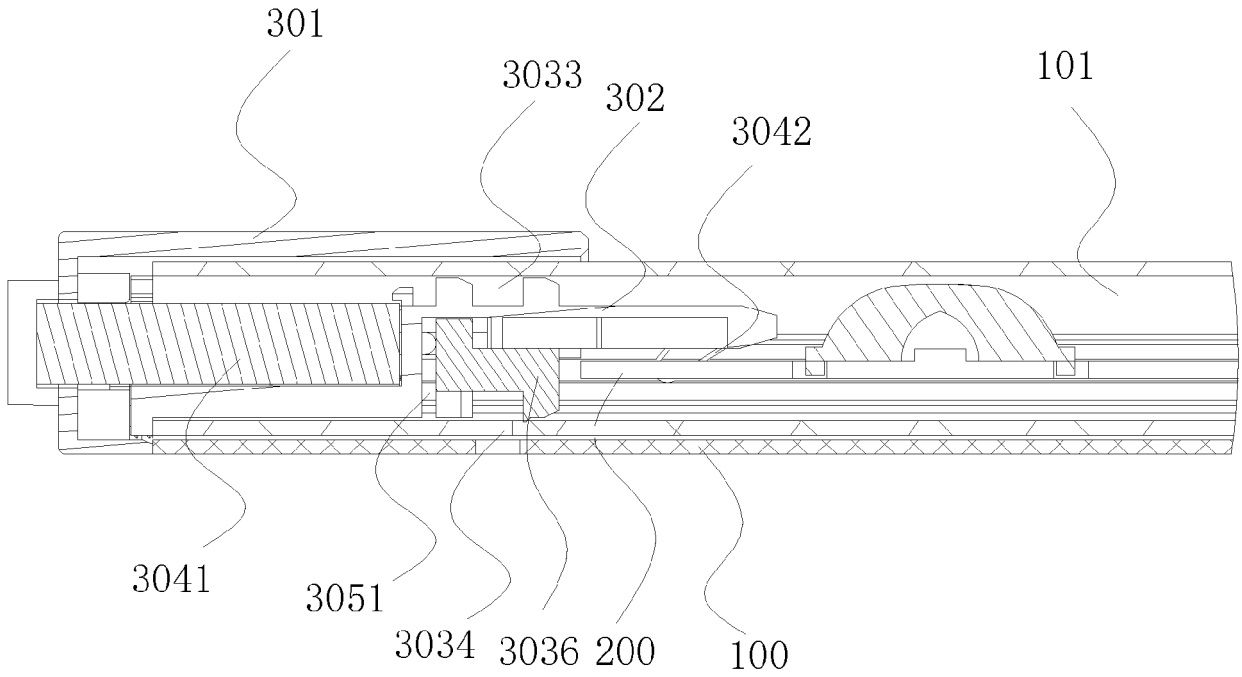

Figure 4

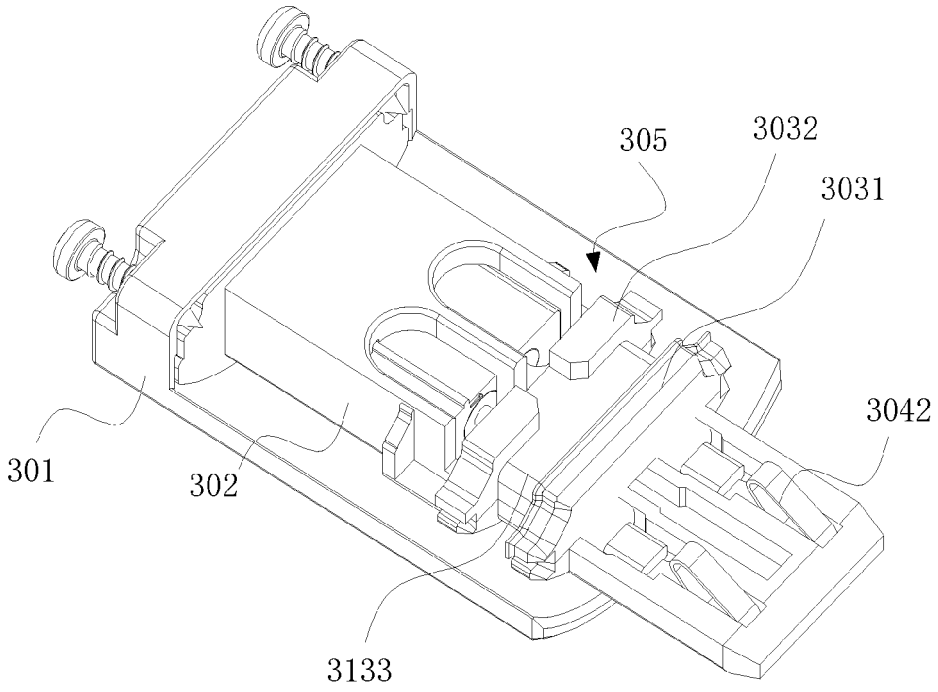

Figure 5

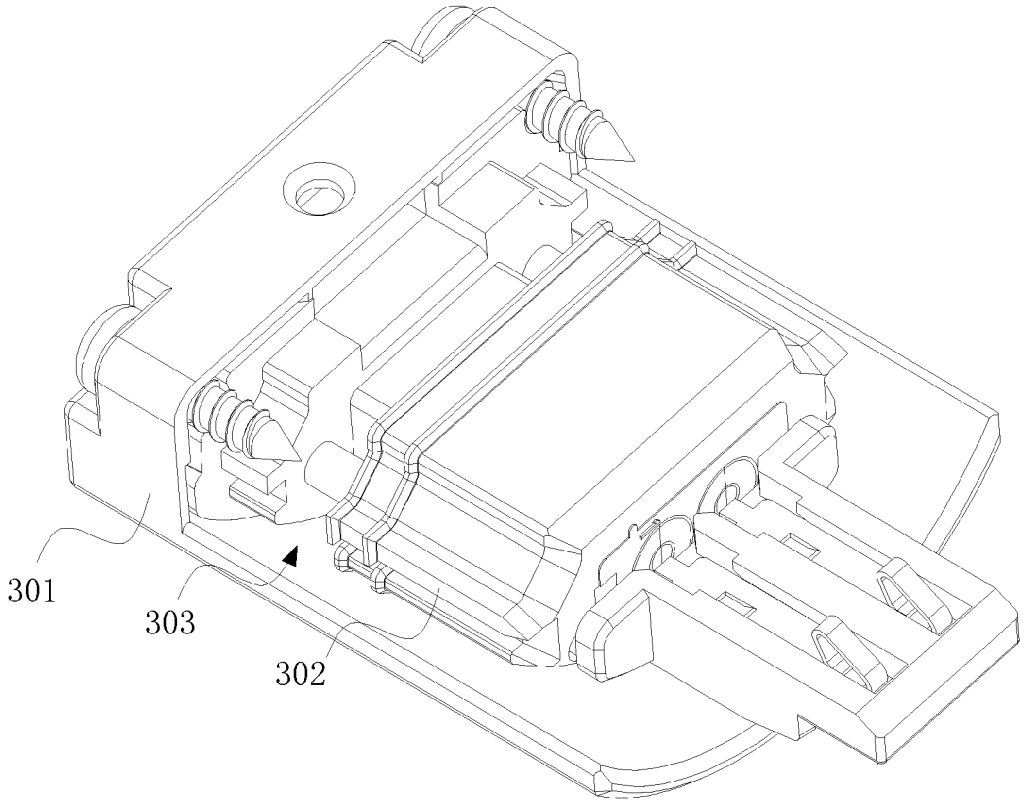

Figure 6

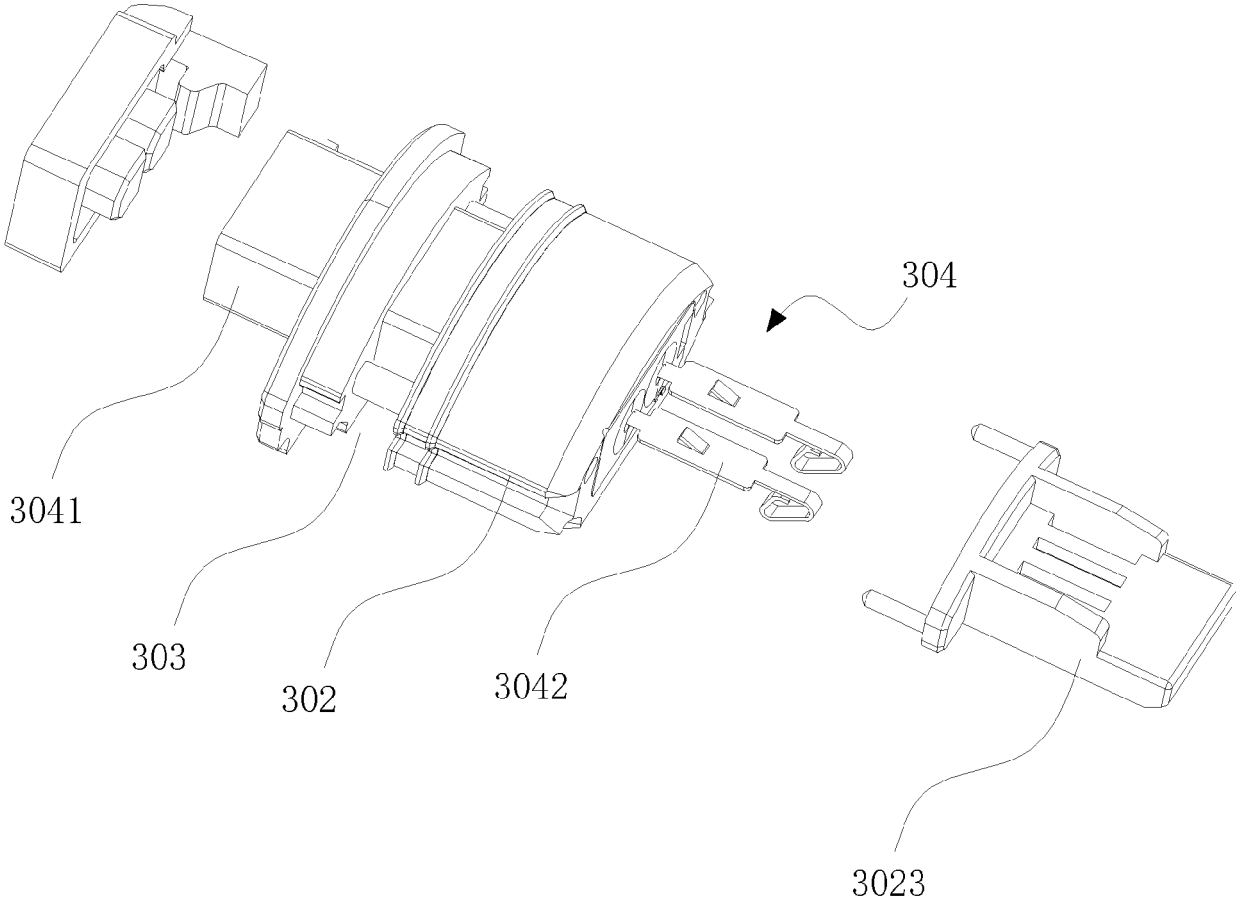

Figure 7

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EUROPEAN SEARCH REPORT

Application Number
EP 22 15 2414

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A	* paragraphs [0119] - [0140]; figures 6a, 6b, 7,8 *	2-7	
A	US 9 726 330 B2 (CREE INC [US]) 8 August 2017 (2017-08-08) * figures 1-33 *	1-11	
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H01R
F21V
F21K
F21Y

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 June 2022	Ferreira, João

CATEGORY OF CITED DOCUMENTS

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08-06-2022

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