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(54) **Led lamp assembly**

(57) A LED lamp assembly (100, 200) includes a rectangular electrical box (11, 21) formed of two symmetrical U-shaped frame panels (111, 211) that are detachably fastened together by a tongue-and-groove joint and holding therein a control circuit board (119) that is affixed to two parallel mounting grooves (117) in one U-shaped

frame panel (111, 211) by screw nails (118), a back cover plate (12, 22) and a bracket (13) affixed to the electrical box (11, 21) at two opposite sides for mounting, and an elongated, rectangular light source unit (14, 24) affixed to the bracket (13) and controllable by the control circuit board (119) to emit light.

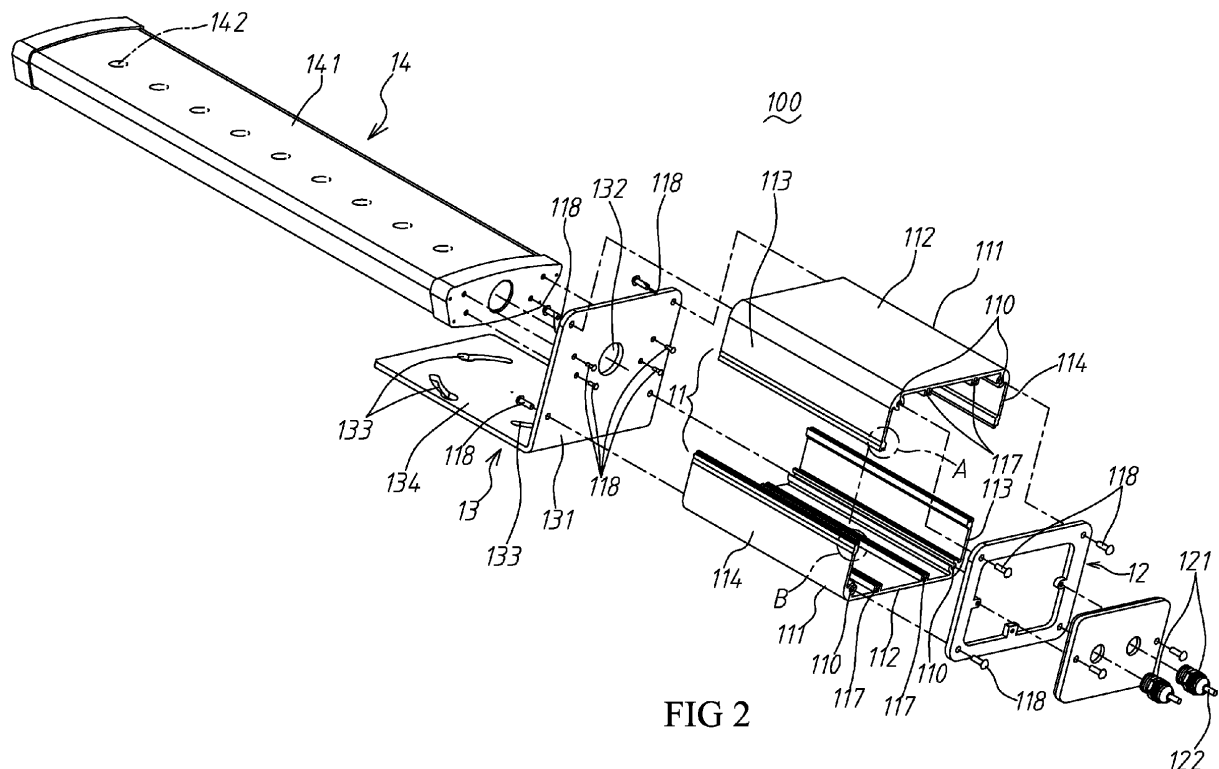


FIG 2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention:

[0001] The present invention relates LED lighting technology and more particularly, to a LED lamp assembly designed for use in a subway tunnel or a wind tower of a wind turbine generating system, which is conveniently detachable, facilitating maintenance and repair works.

2. Description of the Related Art:

[0002] US Application No. 13/156,988, discloses a LED lamp design entitled "LED LAMP ASSEMBLY FOR USE IN A LONG PASSAGE", which comprises a holder frame carrying a plurality of male/female connectors and a switch and having a rectangular top face, an elongated, rectangular lighting unit having a light-transmissive face and a circuit board therein, the circuit board carrying multiple LEDs and a control circuit that controls the LEDs to emit light through the light-transmissive face, a rectangular plate mounted at the bottom side of the lighting unit and selectively affixed to the holder in one of four equi-

angularly spaced positions, and a mounting plate extended out of the holder frame. The mounting plate has mounting holes for fastening to support means in a long passage in a parallel manner or at any desired inclined angle relative to the long passage by fastening members.

[0003] FIG. 1 illustrates another prior art design of LED lamp assembly. As illustrated, this design of LED lamp assembly comprises an electrical box **91**, a back cover plate **92**, a mounting plate **93**, a light source unit **94**, and a control circuit board **95**.

[0004] According to the aforesaid prior art design, the electrical box **91** is a hollow rectangular frame tube adapted for accommodating the control circuit board **95**. The electrical box **91** is a one-pieced member, not detachable. This design of LED lamp assembly requires much installation time and labor, not convenient for maintenance or repair.

SUMMARY OF THE INVENTION

[0005] The present invention has been accomplished under the circumstances in view. It is main object of the present invention to provide a LED lamp assembly, which is practical for use in a subway tunnel or a wind tower of a wind turbine generating system. It is another object of the present invention to provide a LED lamp assembly, which is conveniently detachable, facilitating maintenance and repair works.

[0006] To achieve this and other objects of the present invention, a LED lamp assembly comprises an electrical

box, a back cover plate, a bracket, and a light source unit. The electrical box comprises two symmetrical U-shaped frame panels fastened together to exhibit a rectangular configuration, and a control circuit board mounted in between the two U-shaped frame panels. Each U-shaped frame panel comprises a horizontal wall, a first upright wall and a second upright wall. The first upright wall and the second upright wall are respectively perpendicularly extended from two opposite lateral sides of the horizontal wall in a parallel manner. The first upright wall comprises a coupling groove located on the bottom edge thereof. The second upright wall comprises a coupling flange located on the bottom edge thereof. The coupling flange and coupling groove of one U-shaped frame panel are respectively fastened to the coupling groove and coupling flange of the other U-shaped frame panel. The horizontal wall of each U-shaped frame panel comprises two mounting grooves located on the inside wall thereof in a parallel manner. The control circuit board is affixed to the mounting grooves of one U-shaped frame panel by screw nails. Further, the control circuit board comprises an electrical wire electrically connected to the light source unit. The back cover plate covers one end of the electrical box, having installed therein a power input connector electrically connected to the control circuit board of the electrical box for input of an external power supply. The bracket comprises a front cover panel covering the opposite end of the electrical box, a round hole located on the front cover panel for the passing of the electrical wire of the control circuit board, an extension panel extended from the front cover panel at right angles, and a plurality of mounting through holes located on the extension panel for fastening to an external mount. The light source unit is an elongated rectangular device affixed to the front cover panel of the bracket by screws, comprising a light-transmissive surface located on one side thereof and a LED circuit board mounted therein and carrying a plurality of light-emitting devices. The LED circuit board is electrically connected with the electrical wire of the control circuit board for enabling the control circuit board to control the light-emitting devices to emit light through the light-transmissive surface.

[0007] In a second embodiment of the present invention, the LED lamp assembly comprises an electrical box, a back cover plate, a front cover plate, a light source unit, and a bracket. The electrical box comprises two symmetrical U-shaped frame panels fastened together to exhibit a rectangular configuration, and a control circuit board mounted in between the two U-shaped frame panels. Each U-shaped frame panel comprises a horizontal wall, a first upright wall and a second upright wall. The first upright wall and the second upright wall are respectively perpendicularly extended from two opposite lateral sides of the horizontal wall in a parallel manner. The first upright wall comprises a coupling groove located on the bottom edge thereof. The second upright wall comprises a coupling flange located on the bottom edge thereof. The coupling flange and coupling groove of one U-shaped frame panel are respectively fastened to the coupling groove and coupling flange of the other U-shaped frame panel. The horizontal wall of each U-shaped frame panel com-

prises two mounting grooves located on the inside wall thereof in a parallel manner. The control circuit board is affixed to the mounting grooves of one U-shaped frame panel by screw nails. Further, the control circuit board comprises an electrical wire electrically connected to the LED circuit board. The back cover plate covers one end of the electrical box, having installed therein a power input connector electrically connected to the control circuit board of the electrical box for input of an external power supply. The back cover plate comprises an extension panel extended from the bottom side thereof at right angles, and a plurality of mounting through holes located on the extension panel for fastening to an external mount. The front cover plate covers the opposite end of the electrical box. The light source unit is affixed to the front cover plate, comprising a light-transmissive surface located on one side thereof and a LED circuit board mounted therein and carrying a plurality of light-emitting devices. The LED circuit board is electrically connected with the electrical wire of the control circuit board for enabling the control circuit board to control the light-emitting devices to emit light through the light-transmissive surface. The bracket is affixed to one end of the light source unit opposite to the front cover plate and the electrical box, comprising an extension panel extended from the bottom side thereof at right angles and a plurality of mounting through holes located on the extension panel for fastening to the external mount to which the back cover plate is affixed.

[0008] The aforesaid second embodiment, the mounting through holes are respectively located on the back cover plate and the bracket at two distal ends of the LED lamp assembly to fit a different installation requirement.

[0009] Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a schematic exploded view of a part of a LED lamp assembly according to the prior art.

FIG. 2 is an exploded view of a LED lamp assembly in accordance with a first embodiment of the present invention.

FIG. 2A is an enlarged view of Part A of FIG. 2.

FIG. 2B is an enlarged view of Part B of FIG. 2.

FIG. 3 is an elevational assembly view of the LED lamp assembly in accordance with a first embodiment of the present invention.

FIG. 4 is an exploded view of the first embodiment of the present invention, illustrating the structure of the electrical box and the control circuit board.

FIG. 5 is a cross-sectional view of the LED lamp assembly in accordance with the first embodiment of the present invention.

FIG. 6 is an elevational assembly view of a LED lamp assembly in accordance with a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Referring to FIGS. 2-5, a LED lamp assembly **100** in accordance with a first embodiment of the present invention generally is shown. The LED lamp assembly **100** comprises an electrical box **11**, a back cover plate **12**, a bracket **13**, and a light source unit **14**.

[0012] The electrical box **11** comprises two symmetrical U-shaped frame panels **111** that are fastened together to exhibit a rectangular configuration, and a control circuit board **119** mounted in between the two U-shaped frame panels **111**. Each U-shaped frame panel **111** comprises a horizontal wall **112**, a first upright wall **113**, and a second upright wall **114**. The first upright wall **113** and second upright wall **114** are respectively perpendicularly extended from two opposite lateral sides of the horizontal wall **112** in a parallel manner. The first upright wall **113** has a coupling groove **115** located on the bottom edge thereof, as shown in FIG. 2A. The second upright wall **114** has a coupling flange **116** located on the bottom edge thereof, as shown in FIG. 2B. By means of fastening the coupling groove **115** and coupling flange **116** of one U-shaped frame panel **111** to the coupling flange **116** and coupling groove **115** of the other U-shaped frame panel **111**, the two U-shaped frame panels **111** are fastened together, as shown in FIG. 5. The horizontal wall **112** of each U-shaped frame panel **111** has two mounting grooves **117** located on the inside wall thereof in a parallel manner. The control circuit board **119** is affixed to the mounting grooves **117** of one U-shaped frame panel **111** by screw nails **118**, as shown in FIGS. 4 and 5. Each U-shaped frame panel **111** further comprises two elongated screw seats **110** respectively located on the inside wall thereof at the junction between the horizontal wall **112** and each of the first upright wall **113** and second upright wall **114**.

[0013] The back cover plate **12** covers one end of the electrical box **11**, having installed therein a power input connector **121** to which a power cable **122** is electrically connected to provide power supply to the control circuit board **119**.

[0014] The bracket **13** comprises a front cover panel **131** that covers the opposite end of the electrical box **11**, a round hole **132** located on the front cover panel **131** for the passing of an electrical wire **119a** of the control circuit board **119**, an extension panel **134** extended from the front cover panel **131** at right angles, and a plurality of mounting through holes **133** located on the extension panel **134** for the mounting of fastening members (not shown) to affix the LED lamp assembly **100** to a mount (not shown) in a subway tunnel or a wind tower of a wind turbine generating system (not shown) in a parallel manner or at any desired inclined angle. Further, the back

cover plate **12** and the front cover panel **131** are affixed to the screw seats **110** of the U-shaped frame panels **111** of the electrical box **11** by screws **118**.

[0015] Further, the aforesaid mounting through holes **133** are elongated and smoothly curved through holes equiangularly located on the extension panel **134**.

[0016] The light source unit **14** exhibits a rectangular configuration, having a light-transmissive surface **141** located on one side thereof, and a LED circuit board (not shown) mounted therein and carrying a plurality of LEDs (light-emitting devices) **142**. The electrical wire **119a** of the control circuit board **119** is electrically connected with the LED circuit board for driving the LEDs (light-emitting devices) **142** to emit light through the light-transmissive surface **141**. Further, the light source unit **14** is fixedly fastened to the front cover panel **131** of the bracket **13** by screws **118**. Thus, the light source unit **14** is joined to the electrical box **11**.

[0017] As stated above, the electrical box **11** consists of the two symmetrical U-shaped frame panels **111** and the control circuit board **119**. If the control circuit board **119** fails, loosen some of the screws **118** for allowing removal of one U-shaped frame panel **111** from the other, as shown in FIG. 4, and then repair or replace the control circuit board **119**. Thus, the invention facilitates dismounting of the control circuit board **119** for maintenance or repair.

[0018] Further, modifications can be made to fit different requirements. FIG. 6 illustrates a LED lamp assembly **200** in accordance with a second embodiment of the present invention. According to this second embodiment, the LED lamp assembly **200** comprises an electrical box **21**, a back cover plate **22**, a front cover plate **231**, a bracket **232**, and a light source unit **24**.

[0019] Similar to the aforesaid first embodiment, the electrical box **21** consists of two symmetrical U-shaped frame panels **211** and the control circuit board (not shown). The light source unit **24** of this second embodiment is same as that of the aforesaid first embodiment. Further, the back cover plate **22** covers one end of the electrical box **21**, having a power input connector **221** installed therein. The power input connector **221** is openably covered with a round cap **224** for protection. When opened the round cap **224** from the power input connector **221**, a power cable (not shown) can be plugged into the power input connector **221** to provide power supply to the control circuit board. Further, the back cover plate **22** has an extension panel **223** extended from the bottom side thereof at right angles, and two mounting through holes **222** located on the first extension panel **223**.

[0020] The front cover plate **231** covers the opposite end of the electrical box **21**. The bracket **232** is affixed to one end of the light source unit **24** opposite to the front cover plate **231**, having an extension panel **234** extended from the bottom side thereof at right angles and a plurality of mounting through holes **233** located on the extension panel **234**. Fastening members (not shown) are mounted in the mounting through holes **222** of the back cover plate

22 and the mounting through holes **233** of the bracket **232** to affix the LED lamp assembly **200** to a mount (not shown) in a subway tunnel or a wind tower of a wind turbine generating system (not shown).

[0021] Further, a power output connector **212** is mounted at the outside wall of one U-shaped frame panel **211** of the electrical box **21** for power output. The power output connector **212** is openably covered with a round cap **213** for protection.

[0022] In the aforesaid second embodiment, the mounting through holes **222** and **233** are respectively located on the back cover plate **22** and the bracket **232** at two distal ends of the LED lamp assembly **200** to fit a different installation requirement.

[0023] Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.

Claims

1. A LED lamp assembly (100), comprising:

an electrical box (11) comprising two symmetrical U-shaped frame panels (111) fastened together to exhibit a rectangular configuration and a control circuit board (119) mounted in between said two U-shaped frame panels (111), each said U-shaped frame panel (111) comprising a horizontal wall (112), a first upright wall (113) and a second upright wall (114), said first upright wall (113) and said second upright wall (114) being respectively perpendicularly extended from two opposite lateral sides of said horizontal wall (112) in a parallel manner, said first upright wall (113) comprising a coupling groove (115) located on a bottom edge thereof, said second upright wall (114) comprising a coupling flange (116) located on a bottom edge thereof, the coupling flange (116) and coupling groove (115) of one said U-shaped frame panel (111) being respectively fastened to the coupling groove (115) and coupling flange (116) of the other said U-shaped frame panel (111), the horizontal wall (112) of each said U-shaped frame panel (111) comprising two mounting grooves (117) located on an inside wall thereof in a parallel manner, said control circuit board (119) being affixed to the mounting grooves (117) of one said U-shaped frame panel (111) by screw nails (118), said control circuit board (119) comprising an electrical wire (119a) electrically connectable to a light source unit (14);
a back cover plate (12) covering one end of said electrical box (11), said back cover plate (12)

having installed therein a power input connector (121) electrically connected to said control circuit board (119) of said electrical box (11) for input of an external power supply;

a bracket (13) comprising a front cover panel (131) covering an opposite end of said electrical box (11), a round hole (132) located on said front cover panel (131) for the passing of the electrical wire (119a) of said control circuit board (119), an extension panel (134) extended from said front cover panel (131) at right angles, and a plurality of mounting through holes (133) located on said extension panel (134) for fastening to an external mount; and
a light source unit (14) affixed to said front cover panel of said bracket by screws, said light source unit (14) comprising a rectangular configuration, a light-transmissive surface (141) located on one side thereof, and a LED (142) circuit board mounted therein and carrying a plurality of light-emitting devices, said LED (142) circuit board being electrically connected with the electrical wire (119a) of said control circuit board (119) for enabling said control circuit board (119) to control said light-emitting devices to emit light through said light-transmissive surface (141).

2. The LED lamp assembly (100) as claimed in claim 1, wherein each said U-shaped frame panel (111) further comprises two elongated screw seats (110) respectively located on an inside wall thereof at the junction between the horizontal wall (112) and each of the first upright wall (113) and second upright wall (114) thereof; said front cover panel (131) of said bracket (13) and said back cover plate (12) are respectively affixed to the screw seats (110) of said U-shaped frame panels (111) of said electrical box (11) by screws (118).
3. The LED lamp assembly (100) as claimed in claim 1, wherein the mounting through holes (133) of said bracket (13) are elongated and smoothly curved through holes equiangularly located on the extension panel (134) of said bracket (13).
4. A LED lamp assembly (200), comprising:

an electrical box (21) comprising two symmetrical U-shaped frame panels (211) fastened together to exhibit a rectangular configuration and a control circuit board (119) mounted in between said two U-shaped frame panels (211), each said U-shaped frame panel (211) comprising a horizontal wall (112), a first upright wall (113) and a second upright wall (114), said first upright wall (113) and said second upright wall (114) being respectively perpendicularly extended from two opposite lateral sides of said horizontal

wall (112) in a parallel manner, said first upright wall (113) comprising a coupling groove (115) located on a bottom edge thereof, said second upright wall (114) comprising a coupling flange (116) located on a bottom edge thereof, the coupling flange (116) and coupling groove (115) of one said U-shaped frame panel (211) being respectively fastened to the coupling groove (115) and coupling flange (116) of the other said U-shaped frame panel (211), the horizontal wall (112) of each said U-shaped frame panel (211) comprising two mounting grooves (117) located on an inside wall thereof in a parallel manner, said control circuit board (119) being affixed to the mounting grooves (117) of one said U-shaped frame panel (211) by screw nails (118), said control circuit board (119) comprising an electrical wire (119a) electrically connectable to a LED (142) circuit board;

a back cover plate (22) covering one end of said electrical box (21), said back cover plate (22) having installed therein a power input connector (221) electrically connected to said control circuit board (119) of said electrical box (21) for input of an external power supply, said back cover plate (22) comprising an extension panel (234) extended from a bottom side thereof at right angles and a plurality of mounting through holes (233) located on the extension panel (234) for fastening to an external mount;

a front cover plate (231) covering an opposite end of said electrical box (21);
a light source unit (24) affixed to said front cover plate (231), said light source unit (24) comprising a light-transmissive surface (141) located on one side thereof, and a LED (142) circuit board mounted therein and carrying a plurality of light-emitting devices, said LED (142) circuit board being electrically connected with the electrical wire (119a) of said control circuit board (119) for enabling said control circuit board (119) to control said light-emitting devices to emit light through said light-transmissive surface (141); and

a bracket (232) affixed to one end of said light source unit (24) opposite to said front cover plate (231) and said electrical box (21), said bracket (232) comprising an extension panel (234) extended from a bottom side thereof at right angles and a plurality of mounting through holes (233) located on the extension panel (234) for fastening to the external mount to which the extension panel (234) of said back cover plate (22) is affixed.

5. The LED lamp assembly (200) as claimed in claim 4, wherein said electrical box (21) further comprises a power output connector (212) mounted at an out-

side wall of one said U-shaped frame panel (211) for power output, and a round cap (213) for closing said power output connector (212).

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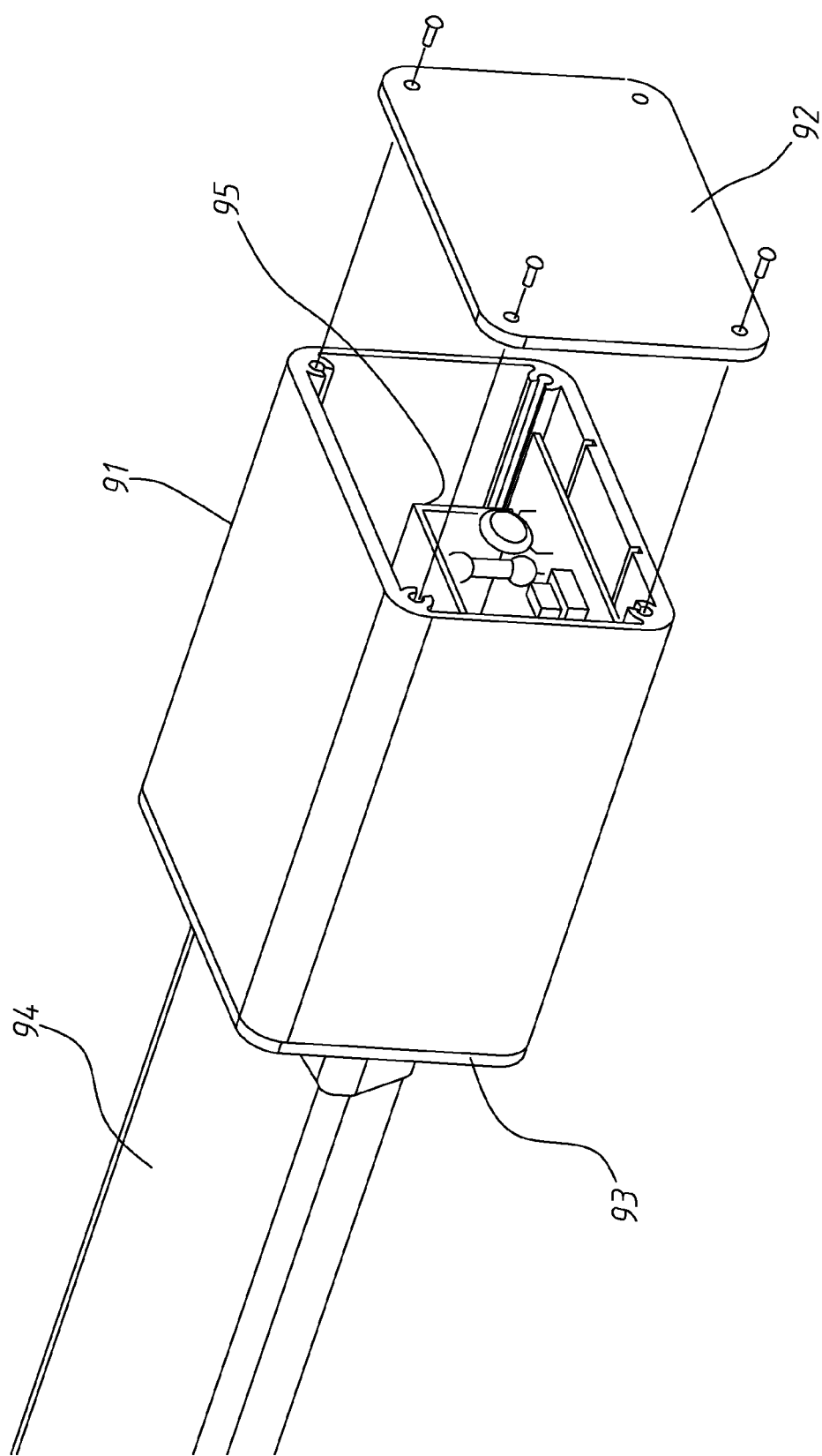
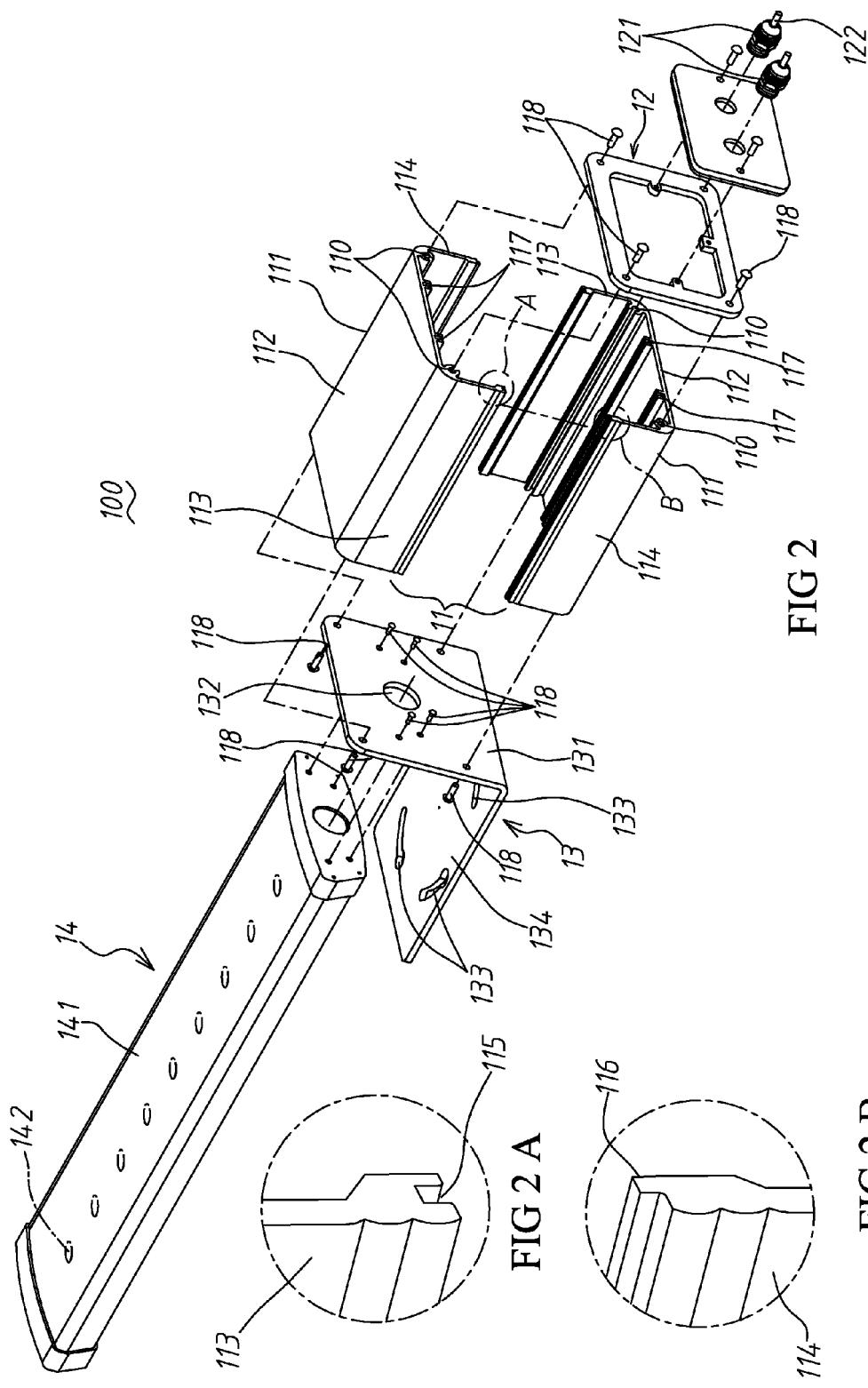


FIG 1



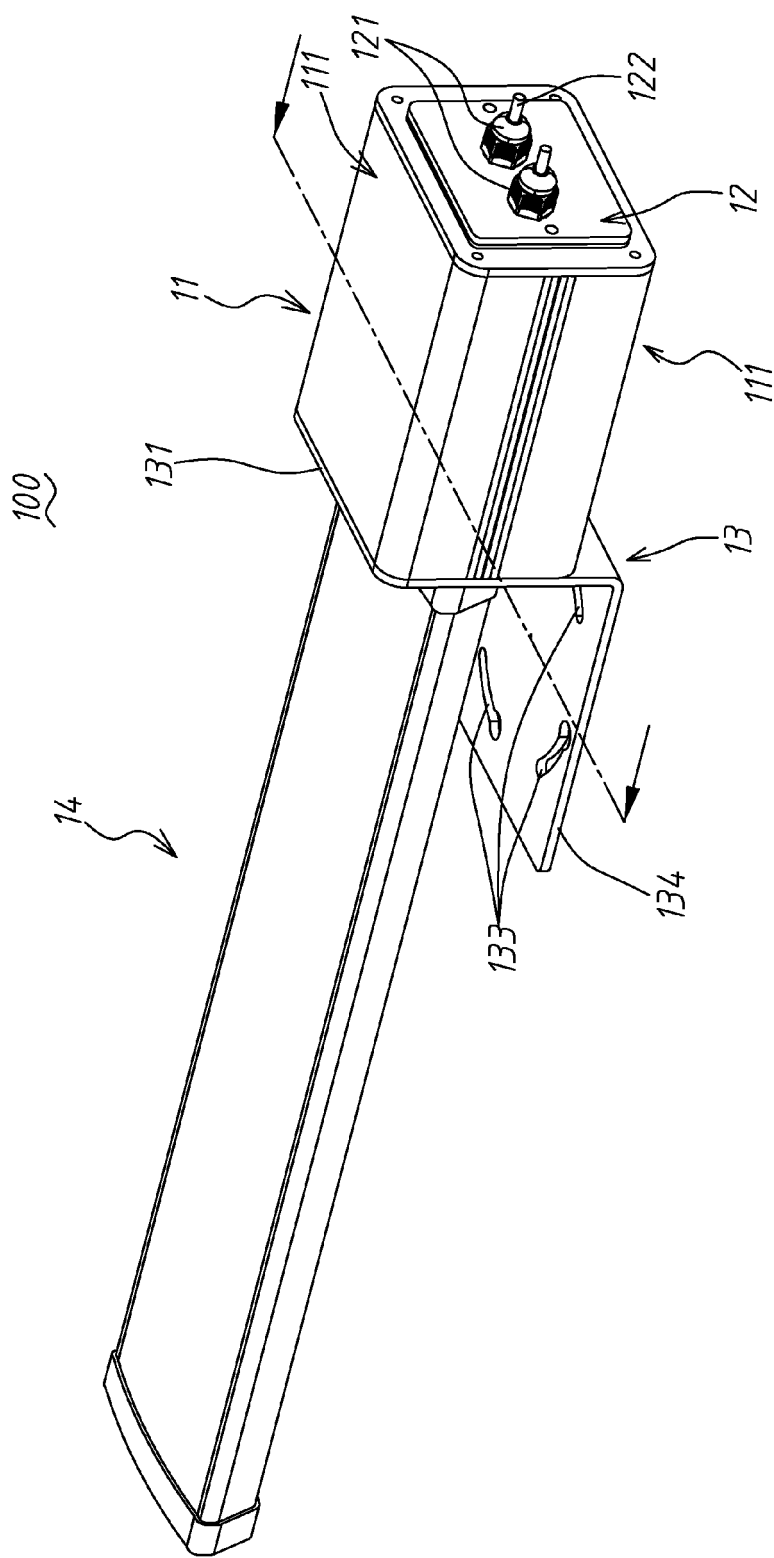


FIG 3

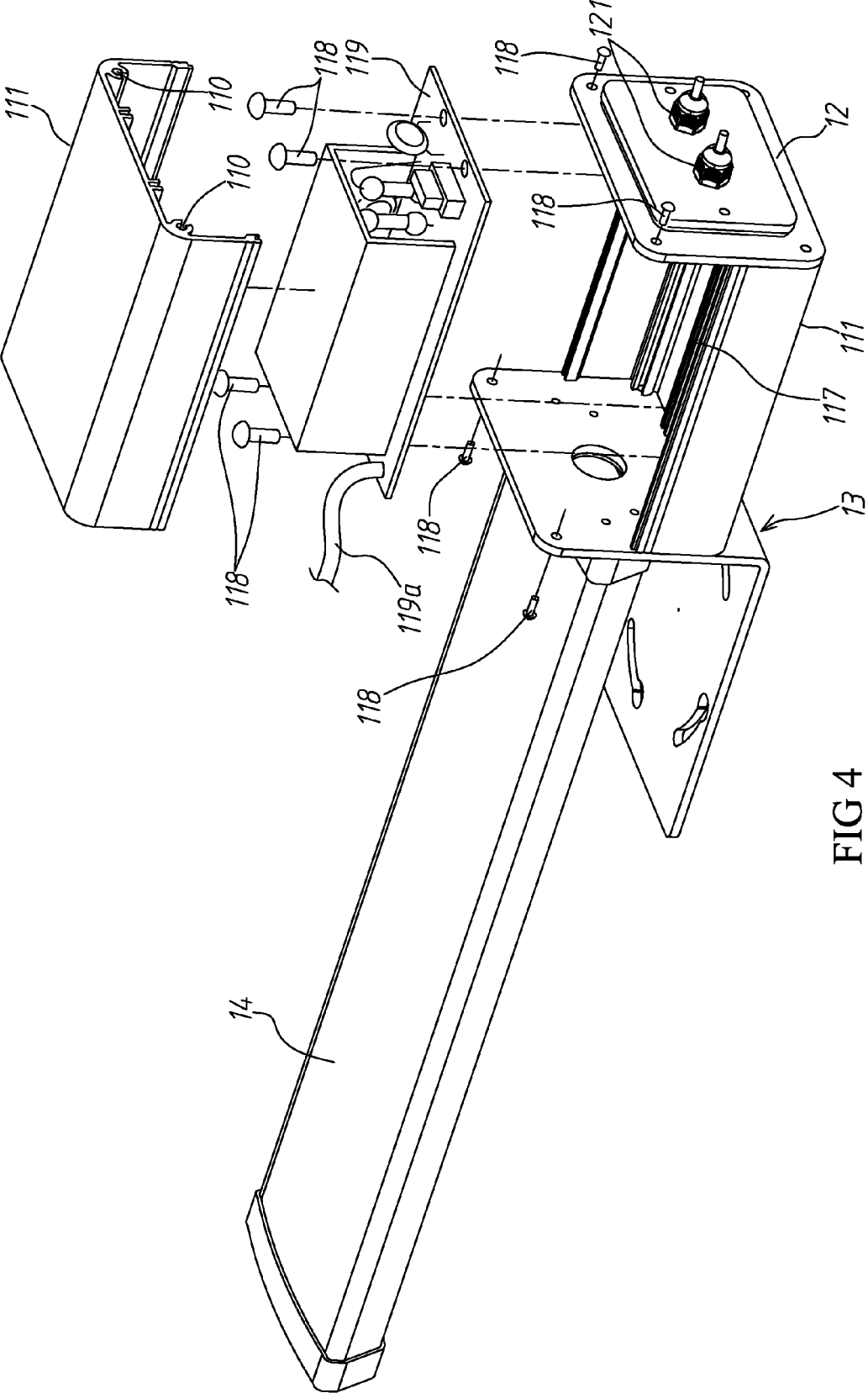


FIG 4

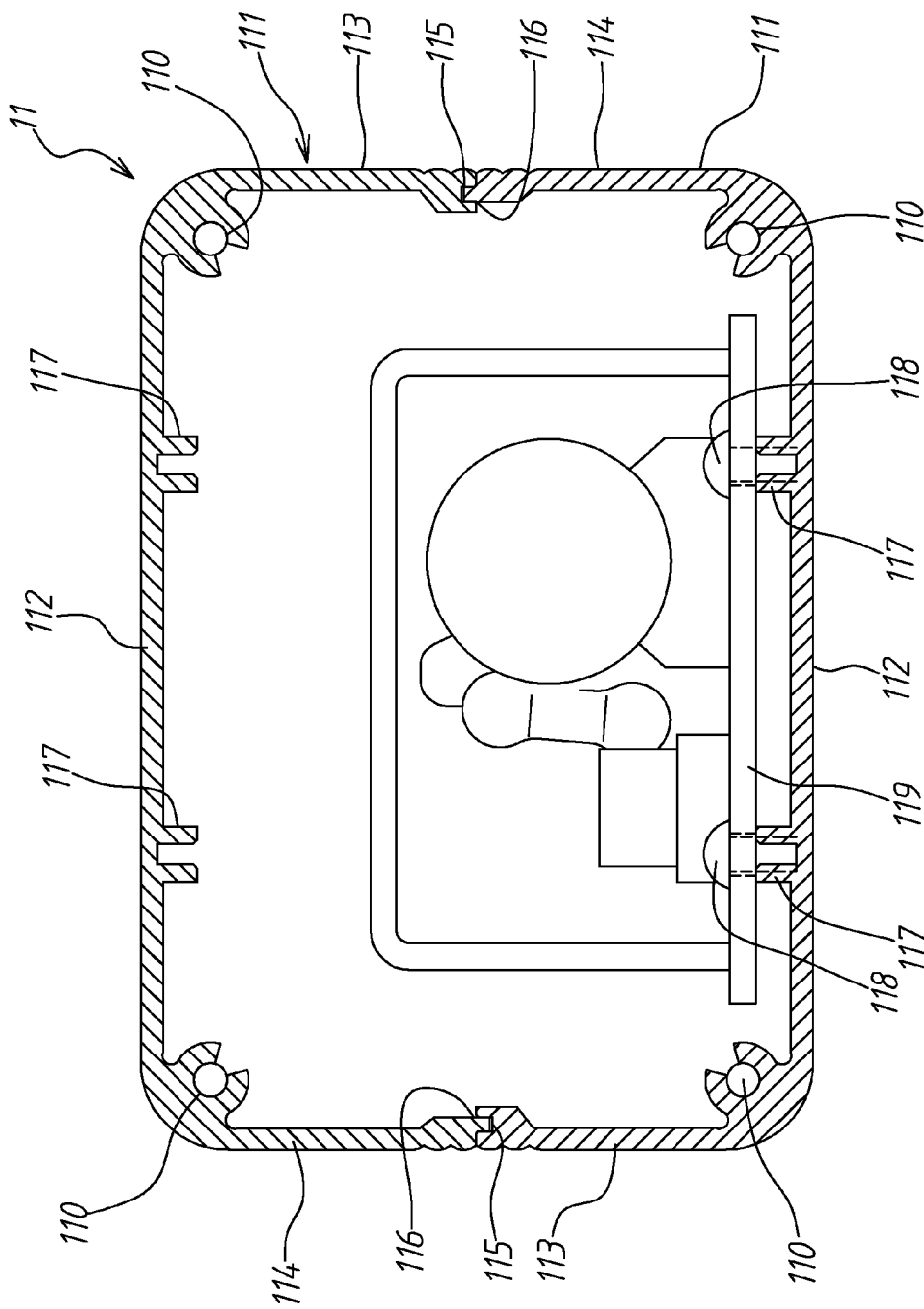
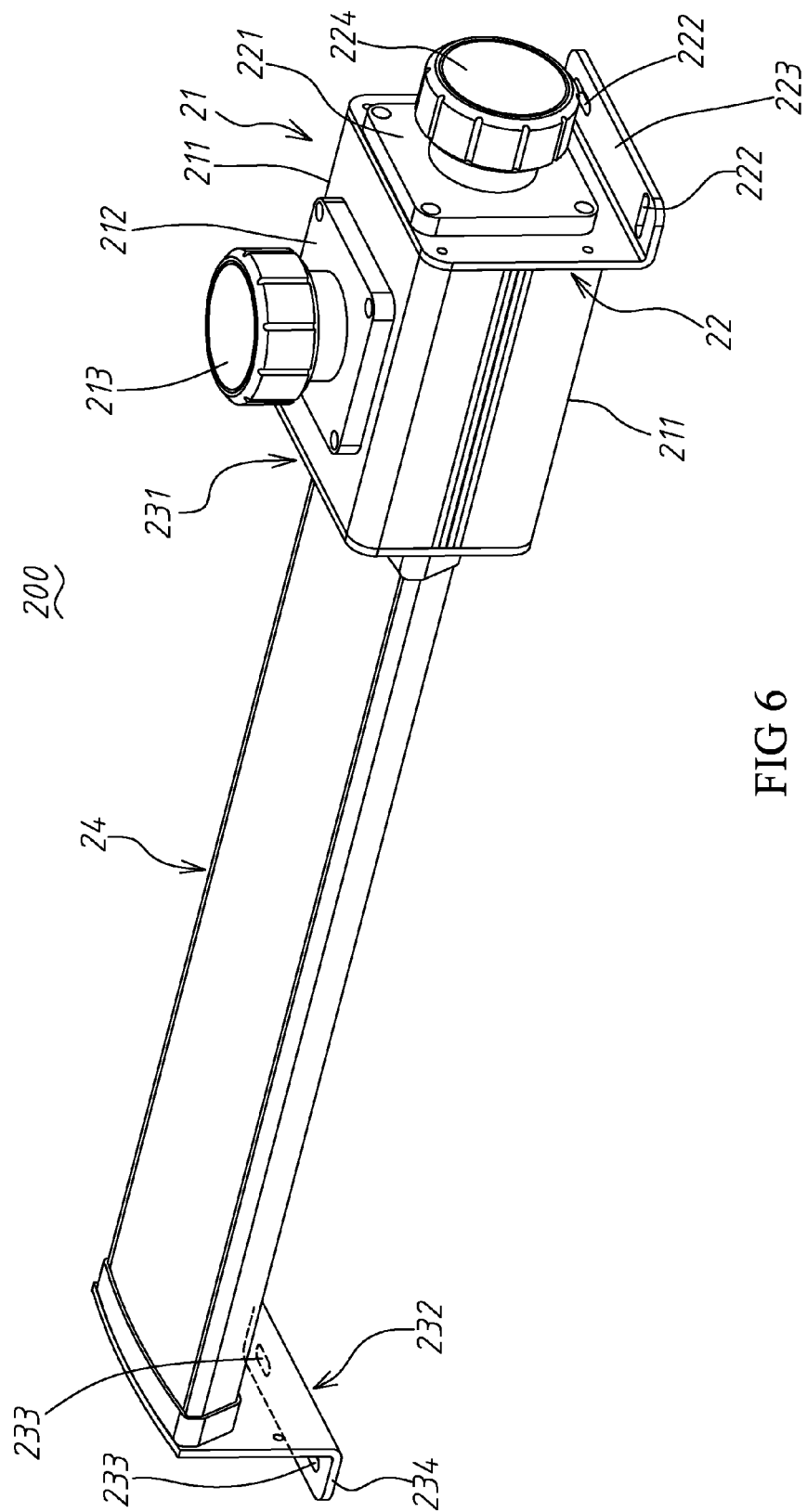


FIG 5





EUROPEAN SEARCH REPORT

Application Number
EP 12 17 9144

DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
			F21V
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 November 2012	Examiner Amerongen, Wim
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			

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EPO FORM 1503 03/82 (F04C01)

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

EP 12 17 9144

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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REFERENCES CITED IN THE DESCRIPTION

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