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(54) **RAPID WIRING DEVICE**

(57) A rapid wiring device includes a junction box provided with a limiting groove of which the bottom surface is provided with the tip portions (21) of two conductors (20). A wire box (40) fixing a second electric wire (60) is set in the limiting groove (11), then it is combined on the junction box (100) through a tightening cover (50), which is used to push the wire box (40) to move towards the bottom of the limiting groove (11), so that the tip portions (21) of the two conductors (20) pass through the wire box (40) and penetrate the insulating layer (61) of the second electric wire (60) to touch the core wire (62) of the second electric wire (60), so that the first electric wire (30) and the second electric wire (60) are quickly connected.

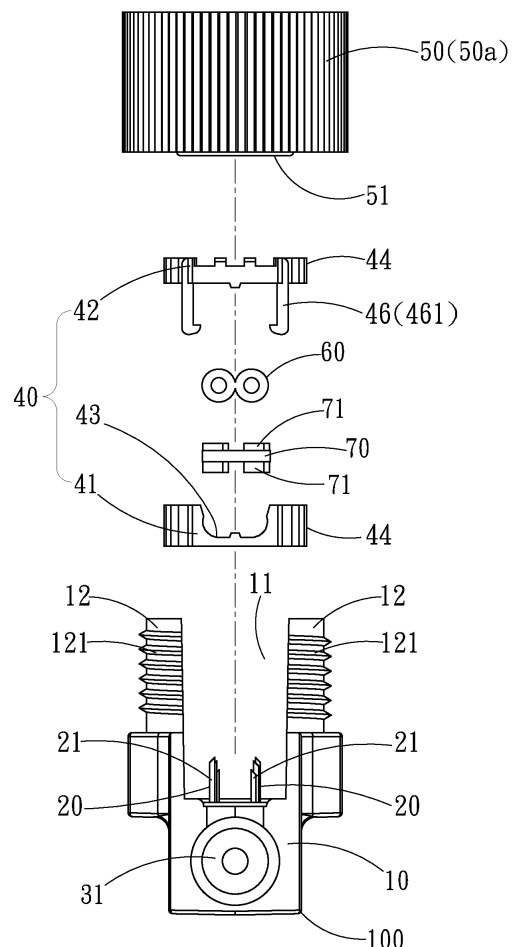


FIG. 4

Description

BACKGROUND OF THE INVENTION

(a) Field of the Invention

[0001] The present invention relates to the technical field of rapid wiring devices, more particularly to a rapid wiring device capable of wiring at multiple arbitrary positions on a power supply line, which is suitable for parallel installation of many garden lights, track lights or other electrical appliances.

(b) Description of the Prior Art

[0002] Regarding the combined connection of two wires, the conventional common way is to peel off the insulating adhesive layer at the joint ends of the two wires, and then entangle the exposed metal wires to form a connection, and then use insulating tape to wrap the connection to complete the combined connection of the two wires. For this reason, the inventor once proposed a technology of a watertight junction box, US081 01 874B2, which overcomes the shortcomings of the prior art. However, the previous US08101874B2 watertight junction box has the following problems:

(1) When the wires are put into the junction box, there is no more precise and stable fixing technology for the wires, so when the locking action of the lock cover is used to push the wires to be pierced by the copper thorns, it is prone to problems such as left and right flipping and offset of the wire, resulting in the inability of the copper thorn to penetrate correctly. Moreover, after the wire is turned left and right, if the lock cover is forcibly locked, the copper thorn may be skewed and deformed.

(2) The waterproof structure adopts jelly glue to be pre-buried under the upper floating plate. The lock cover must be completely locked to make the jelly glue overflow to produce a sealing effect. If the locking stroke is insufficient, the jelly glue may not produce the expected effect.

(3) The threaded part 11 of the above-mentioned patent is divided into two pieces, and its thread does not completely surround the threaded part 11, causing the thread of the lock cover to misalign with the threaded part 11 during the locking process, and the lock cover is easily crooked, causing inconvenience in use.

SUMMARY OF THE INVENTION

[0003] The present invention has been accomplished under the circumstances in view. It is therefore the main object of the present invention to provide a rapid wiring device, which includes a limiting groove on the upper part of the box body of a junction box, two position-limiting

portions located on both sides of the limiting groove, and two conductors connected with a first electric wire. The tip portions of the two conductors protrude from the bottom of the limiting groove. The first electric wire is used to connect to track lights, garden lights or other electrical appliances. In addition, implement a wire box consisting of a lower wire box part and an upper wire box part. There is a wire groove recessed on the lower wire box part, which is used to make a second electric wire (such as the main power supply line) be placed in the wire groove. The upper wire box part covers the lower wire box part, and covers the wire groove and second electric wire, so that the wire box can sandwich the second electric wire and put them together in the limiting groove of the junction box. Through the positioning function of the wire box, the second electric wire is accurately aligned with the tip portions of the two conductors. The wire box is set in the limiting groove of the junction box, and then combined with a tightening cover on the upper part of the junction box. The tightening cover has a push portion that can exert force on the wire box. Through the design of tightening cover screw locking or fastening on the upper part of the junction box, the push portion pushes the wire box to move towards the bottom of the limiting groove, so that the tip portions of the two conductors pass through the wire box and penetrate into the insulating layer of the second electric wire precisely until the tip portions of the two conductors touch the core wire of the second electric wire to complete the quick wiring.

[0004] It is another object of the present invention to provide a rapid wiring device, which is provided with a waterproof film inside or below the wire box, used to make the tip portions of the two conductors pass through the waterproof film, and then make the waterproof film close to the tip portions and the outer surface of the second electric wire to achieve fast wiring and also have the function of preventing water from penetrating into the second electric wire.

[0005] It is still another object of the present invention to provide a rapid wiring device, which can accurately locate the wire box and second electric wire through other structural designs of the wire box, junction box and tightening cover, and the wiring operation mode is fast and convenient, and the tightening cover can be precisely locked with the junction box.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIG. 1 is a combined schematic diagram of an embodiment of the screw-locking rapid wiring device of the present invention.

FIG. 2 is an exploded schematic diagram of the embodiment of the screw-locking rapid wiring device of FIG.1 of the present invention.

FIG. 3 is an exploded schematic view of the first embodiment of the wire box of FIG. 1 of the present

invention.

FIG. 4 is an exploded schematic diagram of the first embodiment of the rapid wiring device and wire box of FIG.2 of the present invention.

FIG. 5 is a cross-sectional schematic diagram of the tip portions of the two conductors of FIG.4 of the present invention piercing into the second electric wire.

FIG. 6 is an exploded schematic diagram of the screw locking type rapid wiring device and wire box of the present invention.

FIG. 7 is an exploded schematic view of the second embodiment of the wire box of FIG.6 of the present invention.

FIG. 8 is an exploded schematic view of the third embodiment of the wire box of the present invention.

FIG. 9 is an exploded schematic view of the fourth embodiment of the screw locking type rapid wiring device and wire box of the present invention.

FIG. 10 is an exploded schematic diagram of the open state of the fourth embodiment of the wire box of FIG.9 of the present invention.

FIG. 11 is an exploded schematic view of the fifth embodiment of the screw locking type rapid wiring device and wire box of the present invention.

FIG.12 is a schematic diagram of the combination of the embodiment of the rotary fastening type rapid wiring device of the present invention.

FIG.13 is an exploded schematic diagram of the rotary fastening type rapid wiring device of the embodiment of FIG.12 of the present invention.

FIG.14 is a combined schematic diagram of the embodiment of the clamshell type rapid wiring device of the present invention.

FIG.15 is an exploded schematic diagram of the embodiment of the clamshell type rapid wiring device of FIG.14 of the present invention.

FIG.16 is a schematic diagram of the embodiment of the combination of the clamshell type rapid wiring device and the screw post of the present invention.

FIG.17 is a schematic diagram of the embodiment of the combination of the flip-type quick wiring device and the screw post of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0007] A rapid wiring device of the present invention is a rapid wiring device used for wiring at multiple arbitrary positions on a power supply line, so as to connect multiple garden lights, track lights or other electrical appliances in parallel on the power supply line. As shown in FIGS. 1 to 5, the rapid wiring device comprises a junction box 100, a wire box 40 and a tightening cover 50.

[0008] The junction box 100 comprises a box body 10, two conductors 20 and a first electric wire 30. The box body 10 is a box body or other structure made of insulating material, its appearance and shape are not limited,

mainly a limiting groove 11 is implemented on its upper part, and two position-limiting portion 12 are located on both sides of the limiting groove 11. The limiting groove 11 is recessed from the upper end of the box body 10 to the lower end, and communicates with both sides or both ends of the box body 10, so a position-limiting portion 12 is formed on each of both sides of the limiting groove 11. The two conductors 20 are copper sheets or other metal sheets, which are respectively arranged in the box body 10. Each conductor 20 has a tip portion 21 protruding from the bottom surface of the limiting groove 11, and the tip portion 21 extends into the limiting groove 11 for piercing into a second electric wire 60 to form a conductive connection. One end of the first electric wire 30 is respectively connected to the two conductors 20, and the other end can be connected to a quick connector 31.

[0009] The wire box 40 is a small box made of insulating material, which comprises a lower wire box part 41 and an upper wire box part 42 that can be covered together. The upper part of the lower wire box part 41 is recessed with a wire groove 43, the wire groove 43 extends to both ends of the lower wire box part 41, and its width is the same as or slightly smaller than that of the wire, so that when the user installs the rapid wiring device of the present invention on a second electric wire 60 (such as the main power supply line), first place the selected position of the second electric wire 60 in the wire groove 43 for positioning (as shown in FIG. 4). The upper wire box part 42 is covered on the lower wire box part 41 by snap-fitting and other structures, and is used to cover the wire groove 43 and the second electric wire 60, forming a state where the lower wire box part 41 and the upper wire box part 42 sandwich the second electric wire 60 (as shown in FIG. 2). Then put the wire box 40 sandwiching the second electric wire 60 into the limiting groove 11 of the junction box 100, and then use the tightening cover 50 described below to pressurize. Similarly, the upper wire box part 42 can also be provided with a wire groove 43 (as shown in FIG. 8 and FIG. 10), and the second electric wire 60 can be fixed together by the lower wire box part 41 and the wire groove 43 of the upper wire box part 42.

[0010] The tightening cover 50 can be implemented in various forms, and it is mainly used to provide users with DIY operation, which can push the above-mentioned wire box 40 to sink into the bottom surface of the limiting groove 11 of the junction box 100, so that the tip portions 21 of the two conductors 20 can be inserted into the second electric wire 60.

[0011] The tightening cover 50 is detachably combined on the upper part of the junction box 100, and is characterized in that a push portion 51 for applying a thrust to the wire box 40 is implemented. The push portion 51 can push the wire box 40 sandwiching the second electric wire 60 to move towards the bottom surface of the limiting groove 11, and during the movement, the tip portions 21 of the two conductors 20 will pass through the wire box 40, and then penetrate the insulating layer 61 of the sec-

ond electric wire 60 until they touch the core wire 62 of the second electric wire (as shown in FIG. 5). This provides the user with a quick connection between the first electric wire 30 and the second electric wire 60 through the two conductors 20.

[0012] Referring to FIG. 3, the wire box 40 can implement a waterproof film 70. The waterproof film 70 is arranged on the bottom surface of the wire groove 43 of the lower wire box part 41, or arranged under the lower wire box part 41 (as shown in FIG. 7), for making the tip portions 21 of the two conductors 20 pass through the waterproof film 70, so that the waterproof film 70 is tightly attached to the periphery of the tip portions 21 and the outer surface of the second electric wire 60. More specifically, the lower wire box part 41 is provided with a first perforation 411 connecting the wire groove 43 and the lower wire box part 41. The material of the waterproof film 70 can be silicone, rubber or jelly glue, and one or both sides of the waterproof film 70 have a bump 71 corresponding to the first perforation. The bump 71 is provided with a second perforation 72 connected to the other side of the waterproof film 70. The waterproof film 70 is set in the lower wire box part 41 so that the bump 71 can be embedded in the first perforation 411. Thereby, when the above-mentioned tightening cover 50 pushes the wire box 40 to sink, the tip portions 21 of the above-mentioned two conductors 20 can pass through the second perforation 72 of the waterproof film 70, and then penetrate into the insulating layer 61 of the second electric wire 60, thus achieving the dual functions of quick wiring and waterproofing.

[0013] Referring to FIG. 2 and FIG. 3, FIG. 6 and FIG. 7, in order to ensure that the wire box 40 can accurately align the second electric wire 60 with the tip portion 21 of each conductor 20, and prevent the wire box 40 from flipping or shifting its position when the tightening cover 50 pushes the wire box 40, in the present invention, a first guide portion 13 is integrally formed on the inner side walls of the two position-limiting portions 12 of the box body 10, and a second guide portion 44 is implemented on both sides of the lower wire box part 41 and the upper wire box part 42 of the wire box 40. When the wire box 40 is inserted into the limiting groove 11 through the opening, the first guide portion 13 of the box body 10 is positioned on the second guide portion 44 on both sides of the wire box 40.

[0014] Referring again to FIG. 2 and FIG. 3, FIG. 6 and FIG. 7, in one embodiment, the above-mentioned first guide portion 13 comprises a plurality of first guide strips 131 protruding from the inner side walls of the two position-limiting portions 12 into the limiting groove 11, and the second guide portion 44 comprises a plurality of second guide strips 441 and guide grooves 442 protruding from both sides of the lower wire box part 41 and the upper wire box part 42. The first guide strips 131 extend into the guide grooves 442 to guide the movement of the wire box 40, and prevent the wire box 40 from flipping or shifting when moving. Referring to FIG. 8 and FIG. 9, in

another embodiment, the above-mentioned first guide portion 13 comprises concave arc surfaces 132 formed on the inner side walls of the two position-limiting portions 12, and the second guide portion 44 of the wire box 40 comprises semicircular bumps 443 protruding from both sides of the lower wire box part 41 and the upper wire box part 42. When the wire box 40 is inserted into the limiting groove 11 through the opening of the limiting groove 11, the semicircular bumps 443 on both sides fit the concave arc surfaces 132, so that the same function and effect can be achieved.

[0015] Referring again to FIG. 3, FIG. 7 and FIG. 8, one embodiment of the combination of the lower wire box part 41 and the upper wire box part 42 of the wire box 40 of the present invention comprises that they are fastened together through a buckle structure. The buckle structure comprises at least one first fastening portion 45 on both sides of the lower wire box part 41, and one embodiment of the first fastening portion 45 can be a fastening groove 451; and the both sides of the upper wire box part 42 are respectively provided with at least one second fastening portion 46, and the second fastening portion 46 can be a fastening elastic piece 461. When the user covers the upper wire box part 42 on the lower wire box part 41 to clamp the second electric wire 60, the fastening elastic piece 461 of the second fastening portion 46 is fastened to the fastening groove 451 of the first fastening portion 45 to prevent the lower wire box part 41 from separating from the upper wire box part 42, and maintain the role of firmly clamping the second electric wire 60. In addition, referring to FIG. 10 and FIG. 11, another embodiment of the combination of the lower wire box part 41 and the upper wire box part 42 of the wire box 40 comprises: one side of the lower wire box part 41 and the upper wire box part 42 are connected together through an integral molding structure or a pivot structure, so that the lower wire box part 41 and the upper wire box part 42 can be flipped open and closed. The lower wire box part 41 and the other side of the upper wire box part 42 are fastened together through the above-mentioned buckle structure, that is, only the other side implements the above-mentioned structure of the first fastening portion 45 and the second fastening portion 46.

[0016] Referring again to FIG. 3, FIG. 7 and FIG. 8, the bottom surface of the wire groove 43 of the wire box 40 of the present invention can be further implemented with a first convex strip 47, and the lower surface of the upper wire box part 42 has a second convex strip 48. The first convex strip 47 and the second convex strip 48 can be used to clamp the central recesses on the upper and lower sides of the second electric wire 60, so that the second electric wire 60 can be positioned in the wire groove 43 more precisely.

[0017] A kind of rapid wiring device of the present invention, according to the different embodiments of the tightening cover 50, specifically, the following rapid wiring devices can be subdivided, which are described as follows:

[Screw locking type rapid wiring device]

[0018] Referring to FIG. 1 to FIG. 5, it is a screw locking type rapid wiring device of the present invention, wherein the tightening cover 50 is a rotating cover 50a that can be twisted manually. The lower end of the rotating cover 50a has an internally threaded hole 53. The above-mentioned push portion 51 is implemented in the center of the internally threaded hole 53 and constituted by a push post, so that the internally threaded hole 53 of the rotating cover 50a can be locked to the external threads 121 of the two position-limiting portions 12 of the box body 10. In this way, the user manually locks the rotating cover 50a, so that the push portion 51 pushes the above-mentioned wire box 40 (as shown in FIG. 5) to move toward the bottom in the limiting groove 11, so that the tip portions 21 of the two conductors 20 pierce the insulating layer 61 of the second electric wire 60.

[0019] In the screw locking type rapid wiring device embodiment, the limiting groove 11 is between the two position-limiting portions 12 of the box body 10, so the external threads 121 of the two position-limiting portions 12 are not a completely circled spiral. In this way, when the user rotates the rotating cover 50a manually, the internal thread of the internally threaded hole 53 cannot be correctly matched with the external threads 121 of the two position-limiting portions 12, which causes the rotating cover 50a to be skewed and crooked when locked in. In order to overcome the above-mentioned problem of easy crookedness during locking, as shown in FIG. 6 and FIG. 7 or FIG. 11, a positioning column 49 can be implemented on the upper wire box part 42 of the wire box 40 of the present invention, and on the push portion 51 of the above-mentioned rotating cover 50a is concavely provided with a positioning hole 52. The positioning column 49 is encased by the positioning hole 52 of the rotating cover 50a. When the user rotates the rotating cover 50a manually, the push portion 51 is pushed to the top of the upper wire box part 42 or the positioning column 49, so that the wire box 40 has the function of guiding and locking the rotating cover 50a on the box body 10.

[Rotary fastening type rapid wiring device]

[0020] Referring to FIG. 12 and FIG. 13, it is a rotary fastening type rapid wiring device of the present invention, wherein the tightening cover 50 is also a rotating cover 50b that can be manually twisted. The difference from the rotating cover 50a described above is that in this embodiment, a non-threaded first fastening portion 122 is respectively implemented on the inner surface or the outer surface of each position-limiting portion 12 of the junction box 100. The first fastening portion 122 can be an L-shaped groove recessed into each position-limiting portion 12. The circumferential surface of the rotating cover 50b is provided with a second fastening portion 54, and the second fastening portion 54 is a post or bump. When the user combines the rotating cover 50b with the

two position-limiting portions 12, the second fastening portion 54 and the first fastening portion 122 can be fastened together by inserting and rotating the rotating cover 50b to make the push portion 51 of the rotating cover 50b push the wire box 40 with a rotating action, so that the tip portions 21 of the above-mentioned conductors 20 pass through the wire box 40 and then penetrate into the insulating layer 61 of the second electric wire 60. Wherein, the top surface of the rotating cover 50b can protrude a force application convex portion 55, so that the user can manually rotate the rotating cover 50b.

[Clamshell type rapid wiring device]

[0021] Referring to FIG. 14 and FIG. 15, it is an example of a clamshell type rapid wiring device of the present invention, which implements the above-mentioned tightening cover 50 into a flip cover 50c. The center below the flip cover 50c forms a push portion 51, and one side of the flip cover 50c is pivotally connected to one side of the box body 10 of the junction box 100 through a pivot structure. The other side of the flip cover 50c can be fastened to the other side of the box body 10, and the fastening structure is the same as the above wire box 40. Thus, when the user puts the wire box 40 into the limiting groove 11 on the box body 10, and then closes the flip cover 50c to cover the wire box 40, the pressure of closing and pressing down the flip cover 50c is utilized, so that the push portion 51 pushes the wire box 40, so that the tip portions 21 of the above-mentioned conductors 20 pass through the wire box 40 and then penetrate into the insulating layer 61 of the second electric wire 60.

[0022] Referring to FIG. 16 and FIG. 17, it is another example of a clamshell type rapid wiring device of the present invention. The flip cover 50c comprises a screw hole 56 and a screw post 57. The screw hole 56 communicates with the upper and lower sides of the center of the flip cover 50c, the screw post 57 is locked into the screw hole 56, and the end of the screw post 57 constitutes the push portion 51. The user puts the above-mentioned wire box 40 into the limiting groove 11 on the box body 10, and then closes the flip cover 50c to cover the wire box 40, and then locks the screw post 57 with a tool or by hand, so that the push portion 51 of the screw post 57 can push the wire box 40, and then the tip portions 21 of the above-mentioned conductors 20 pass through the wire box 40 and then penetrate into the insulating layer 61 of second electric wire 60.

[0023] Although a particular embodiment of the invention has 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 rapid wiring device, comprising:

a junction box (100) comprising a box body (10),
two conductors (20) and a first electric wire (30),
said box body (10) comprising a limiting groove
(11) located on an upper part thereof and two
position-limiting portions (12) located on both
sides of said limiting groove (11), said two con-
ductors (20) being set in said box body (10),
each said conductor (20) having a tip portion
(21) protruding from a bottom surface of said
limiting groove (11) and extending to said limit-
ing groove (11), said first electric wire (30) being
respectively connected to said two conductors
(20);
a wire box (40) comprising a lower wire box part
(41) and an upper wire box part (42) capable of
being closed together, said lower wire box part
(41) comprising a wire groove (43) located on
an upper part thereof, said wire groove (43) ex-
tending to both ends of said lower wire box part
(41) for the placement of a second electric wire
(60) in said wire groove (43), said upper wire
box part (42) covering said lower wire box part
(41) and covering said wire groove (43) and said
second electric wire (60), said wire box (40) be-
ing able to sandwich said second electric wire
(60) and put said second electric wire (60) into
said limiting groove (11) of said junction box
(100); and
a tightening cover (50) is detachably combined
on an upper part of said junction box (100), said
tightening cover (50) comprising a push portion
(51) capable of exerting thrust on said wire box
(40), said push portion (51) pushing said wire
box (40) to move towards a bottom of said limit-
ing groove (11), so that said tip portions (21)
of said two conductors (20) pass through said
wire box (40) and penetrate an insulating layer
(61) of said second electric wire (60) until said
tip portions (21) touch a core wire (62) of said
second electric wire (60).

2. The rapid wiring device as claimed in claim 1, further
comprising a waterproof film (70) selectively set on
a bottom surface of said wire groove (43) of said
lower wire box part (41) or under said lower wire box
part (41), said waterproof film (70) being used to
make said tip portions (21) of said two conductors
(20) pass through said waterproof film (70), so that
said waterproof film (70) is tightly bonded to said tip
portions (21) and an outer surface of said second
electric wire (60).

3. The rapid wiring device as claimed in claim 2, where-
in said lower wire box part (41) is provided with a

first perforation (411) connecting said wire groove
(43) and said lower wire box part (41); said water-
proof film (70) comprising a bump (71) located on
one or both sides thereof corresponding to said first
perforation (411), said bump (71) being provided with
a second perforation (72) connected to the other side
of said waterproof film (70), said waterproof film (70)
being set on said lower wire box part (41) so that
said bump (71) is embedded in said first perforation
(411); said tip portions (21) of said two conductors
(20) pass through said second perforation (72) of
said waterproof film (70), and then penetrate into the
insulating layer (61) of said second electric wire (60).

4. The rapid wiring device as claimed in any of the
claims 1 to 3, wherein said box body (10) comprises
a first guide portion (13) located on an inner wall of
said two position-limiting portions (12); said wire box
(40) comprises a second guide portion (44) located
on both sides of said lower wire box part (41) and
said upper wire box part (42); said wire box (40) is
placed in said limiting groove (11), so that said first
guide portion (13) locates said second guide portion
(44).

5. The rapid wiring device as claimed in claim 4, where-
in said first guide portion (13) comprises a plurality
of first guide strips (131) protruding from inner side
walls of said two position-limiting portions (12) into
said limiting groove (11), and said second guide por-
tion (44) comprises a plurality of second guide strips
(441) and guide grooves (442) protruding from both
sides of said lower wire box part (41) and said upper
wire box part (42).

6. The rapid wiring device as claimed in claim 4 or 5,
wherein said first guide portion (13) comprises a con-
cave arc surface (132) formed on an inner wall there-
of, and said second guide portion (44) comprises a
plurality of semicircular bumps (443) protruding from
both sides of comprises lower wire box part (41) and
comprises upper wire box part (42); when said wire
box (40) is placed in said limiting groove (11), said
semicircular bumps (443) fit said concave arc sur-
face (132).

7. The rapid wiring device as claimed in any of the
claims 1 to 6, wherein said wire box (40) further com-
prises a buckle structure used to fasten said lower
wire box part (41) and said upper wire box part (42)
together.

8. The rapid wiring device as claimed in claim 7, where-
in said buckle structure comprises at least one first
fastening portion (45) on both sides of said lower
wire box part (41), at least one second fastening por-
tion (46) on both sides of said upper wire box part
(42), and said at least one second fastening portion

(46) on said upper wire box part (42) is fastened to said at least one first fastening portion (45) on said lower wire box part (41).

9. The rapid wiring device as claimed in claim 7, wherein said lower wire box part (41) of said wire box (40) and one side of said upper wire box part (42) are connected together through an integral molding structure or a pivot structure, so that said lower wire box part (41) and said upper wire box part (42) are able to be flipped open and closed; said lower wire box part (41) of said wire box (40) and the other side of said upper wire box part (42) are fastened together through said buckle structure.
10. The rapid wiring device as claimed in any of the claims 1 to 9, wherein said wire box (40) further comprises a first convex strip (47) located on a bottom surface of said wire groove (43) and a second convex strip (48) located on a bottom of said upper wire box part (42), said first convex strip (47) and said second convex strip (48) clamping opposing upper and lower sides of said second electric wire (60).
11. The rapid wiring device as claimed in any of the claims 1 to 10, wherein the circumference of said two position-limiting portions (12) of said junction box (100) is provided with external threads (121), and said tightening cover (50) is a rotating cover (50a) having an internally threaded hole (53) on a lower end thereof; said push portion (51) comprises a push post located in the center of said internally threaded hole (53), and said internally threaded hole (53) of said rotating cover (50a) is lockable to said external threads (121) of said two position-limiting portions (12).
12. The rapid wiring device as claimed in claim 11, wherein said upper wire box part (42) of said wire box (40) comprises a positioning column, and said push portion (51) of said tightening cover (50) comprises a positioning hole (52), said positioning hole (52) of said tightening cover (50) covering said positioning column, and then said push portion (51) pushing said upper wire box part (42) or said positioning column.
13. The rapid wiring device as claimed in any of the claims 1 to 12, wherein said junction box (100) further comprises a first fastening portion (122) located on an inner side of each of said two position-limiting portions (12); said tightening cover (50) is a rotating cover (50b), said rotating cover (50b) comprising a second fastening portion (54) on the circumference thereof, said rotating cover (50b) being combined on said two position-limiting portions (12), said second fastening portion (54) and said first fastening portion (122) being fastened together through a rotating ac-

tion.

14. The rapid wiring device as claimed in any of the claims 1 to 13, wherein said tightening cover (50) is a flip cover (50c), said flip cover (50c) having one side thereof pivotally connected to one side of said box body (10) of said junction box (100) through a pivot structure, and the other side of said flip cover (50c) being fastenable to the other side of said box body (10).
15. The rapid wiring device as claimed in claim 14, wherein said flip cover (50c) comprises a screw hole (56) and a screw post (57), said screw hole (56) connecting opposing top and bottom of said flip cover (50c), said screw post (57) being locked into said screw hole (56), said screw post (57) having a distal end thereof constituting said push portion (51).

Amended claims in accordance with Rule 137(2) EPC.

1. A rapid wiring device, comprising:
 - a junction box (100) comprising a box body (10), two conductors (20) and a first electric wire (30), said box body (10) comprising a limiting groove (11) located on an upper part thereof and two position-limiting portions (12) located on both sides of said limiting groove (11), said two conductors (20) being set in said box body (10), each said conductor (20) having a tip portion (21) protruding from a bottom surface of said limiting groove (11) and extending to said limiting groove (11), said first electric wire (30) being respectively connected to said two conductors (20);
 - a wire box (40) comprising a lower wire box part (41) and an upper wire box part (42) capable of being closed together, said lower wire box part (41) comprising a wire groove (43) located on an upper part thereof, said wire groove (43) extending to both ends of said lower wire box part (41) for the placement of a second electric wire (60) in said wire groove (43), said upper wire box part (42) covering said lower wire box part (41) and covering said wire groove (43) and said second electric wire (60), said wire box (40) being able to sandwich said second electric wire (60) and put said second electric wire (60) into said limiting groove (11) of said junction box (100); and
 - a tightening cover (50) is detachably combined on an upper part of said junction box (100), said tightening cover (50) comprising a push portion (51) capable of exerting thrust on said wire box (40), said push portion (51) pushing said wire

box (40) to move towards a bottom of said limiting groove (11), so that said tip portions (21) of said two conductors (20) pass through said wire box (40) and penetrate an insulating layer (61) of said second electric wire (60) until said tip portions (21) touch a core wire (62) of said second electric wire (60), characterized, wherein said wire box (40) further comprises a buckle structure used to fasten said lower wire box part (41) and said upper wire box part (42) together:

wherein said buckle structure comprises at least one first fastening portion (45) on both sides of said lower wire box part (41), at least one second fastening portion (46) on both sides of said upper wire box part (42), and said at least one second fastening portion (46) on said upper wire box part (42) is fastened to said at least one first fastening portion (45) on said lower wire box part (41), or wherein said lower wire box part (41) of said wire box (40) and one side of said upper wire box part (42) are connected together through an integral molding structure or a pivot structure, so that said lower wire box part (41) and said upper wire box part (42) are able to be flipped open and closed; said lower wire box part (41) of said wire box (40) and the other side of said upper wire box part (42) are fastened together through said buckle structure.

2. The rapid wiring device as claimed in claim 1, further comprising a waterproof film (70) selectively set on a bottom surface of said wire groove (43) of said lower wire box part (41) or under said lower wire box part (41), said waterproof film (70) being used to make said tip portions (21) of said two conductors (20) pass through said waterproof film (70), so that said waterproof film (70) is tightly bonded to said tip portions (21) and an outer surface of said second electric wire (60).
3. The rapid wiring device as claimed in claim 2, wherein said lower wire box part (41) is provided with a first perforation (411) connecting said wire groove (43) and said lower wire box part (41); said waterproof film (70) comprising a bump (71) located on one or both sides thereof corresponding to said first perforation (411), said bump (71) being provided with a second perforation (72) connected to the other side of said waterproof film (70), said waterproof film (70) being set on said lower wire box part (41) so that said bump (71) is embedded in said first perforation (411); said tip portions (21) of said two conductors (20) pass through said second perforation (72) of

said waterproof film (70), and then penetrate into the insulating layer (61) of said second electric wire (60).

4. The rapid wiring device as claimed in any of the claims 1 to 3, wherein said box body (10) comprises a first guide portion (13) located on an inner wall of said two position-limiting portions (12); said wire box (40) comprises a second guide portion (44) located on both sides of said lower wire box part (41) and said upper wire box part (42); said wire box (40) is placed in said limiting groove (11), so that said first guide portion (13) locates said second guide portion (44).
5. The rapid wiring device as claimed in claim 4, wherein said first guide portion (13) comprises a plurality of first guide strips (131) protruding from inner side walls of said two position-limiting portions (12) into said limiting groove (11), and said second guide portion (44) comprises a plurality of second guide strips (441) and guide grooves (442) protruding from both sides of said lower wire box part (41) and said upper wire box part (42).
6. The rapid wiring device as claimed in claim 4 or 5, wherein said first guide portion (13) comprises a concave arc surface (132) formed on an inner wall thereof, and said second guide portion (44) comprises a plurality of semicircular bumps (443) protruding from both sides of said lower wire box part (41) and said upper wire box part (42); when said wire box (40) is placed in said limiting groove (11), said semicircular bumps (443) fit said concave arc surface (132).
7. The rapid wiring device as claimed in any of the claims 1 to 6, wherein said wire box (40) further comprises a first convex strip (47) located on a bottom surface of said wire groove (43) and a second convex strip (48) located on a bottom of said upper wire box part (42), said first convex strip (47) and said second convex strip (48) clamping opposing upper and lower sides of said second electric wire (60).
8. The rapid wiring device as claimed in any of the claims 1 to 7, wherein the circumference of said two position-limiting portions (12) of said junction box (100) is provided with external threads (121), and said tightening cover (50) is a rotating cover (50a) having an internally threaded hole (53) on a lower end thereof; said push portion (51) comprises a push post located in the center of said internally threaded hole (53), and said internally threaded hole (53) of said rotating cover (50a) is lockable to said external threads (121) of said two position-limiting portions (12).
9. The rapid wiring device as claimed in claim 80,

wherein said upper wire box part (42) of said wire box (40) comprises a positioning column, and said push portion (51) of said tightening cover (50) comprises a positioning hole (52), said positioning hole (52) of said tightening cover (50) covering said positioning column, and then said push portion (51) pushing said upper wire box part (42) or said positioning column. 5

10. The rapid wiring device as claimed in any of the claims 1 to 9, wherein said junction box (100) further comprises a first fastening portion (122) located on an inner side of each of said two position-limiting portions (12); said tightening cover (50) is a rotating cover (50b), said rotating cover (50b) comprising a second fastening portion (54) on the circumference thereof, said rotating cover (50b) being combined on said two position-limiting portions (12), said second fastening portion (54) and said first fastening portion (122) being fastened together through a rotating action. 10 15 20

11. The rapid wiring device as claimed in any of the claims 1 to 12, wherein said tightening cover (50) is a flip cover (50c), said flip cover (50c) having one side thereof pivotally connected to one side of said box body (10) of said junction box (100) through a pivot structure, and the other side of said flip cover (50c) being fastenable to the other side of said box body (10). 25 30

12. The rapid wiring device as claimed in claim 11, wherein said flip cover (50c) comprises a screw hole (56) and a screw post (57), said screw hole (56) connecting opposing top and bottom of said flip cover (50c), said screw post (57) being locked into said screw hole (56), said screw post (57) having a distal end thereof constituting said push portion (51). 35 40

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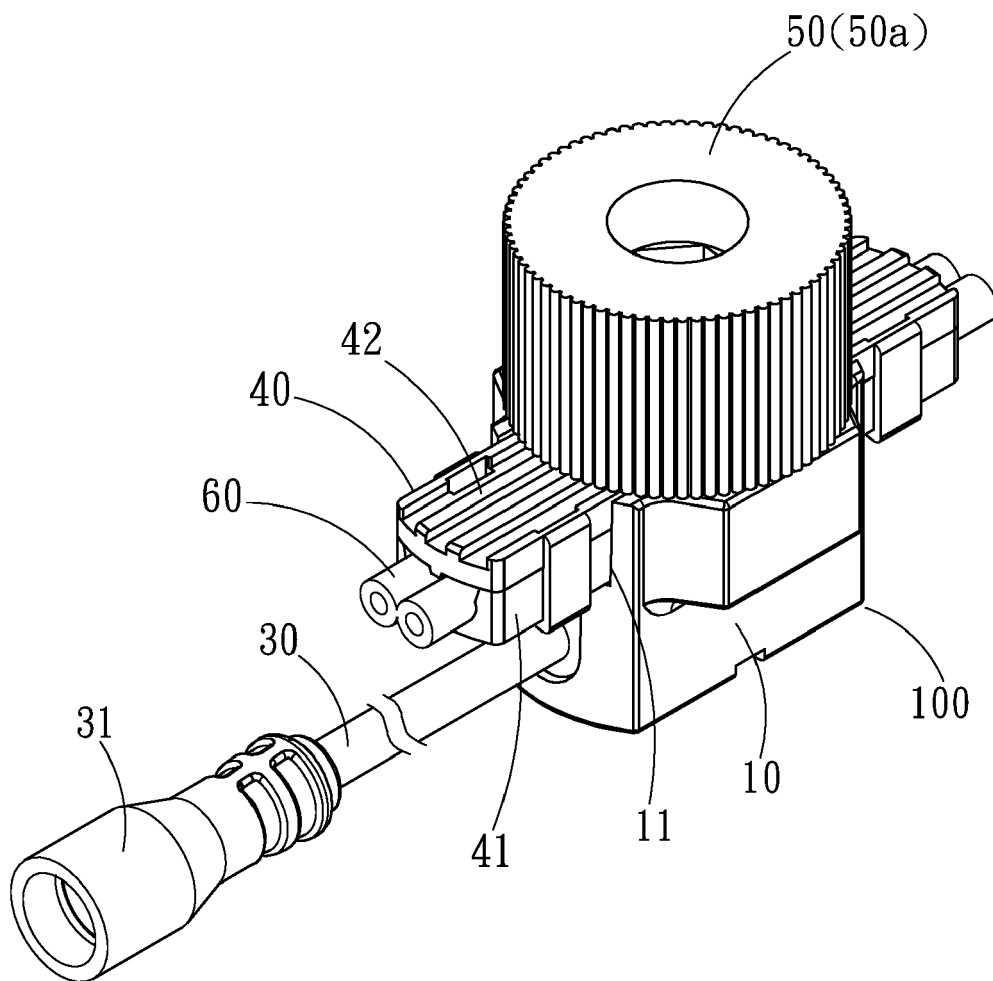


FIG. 1

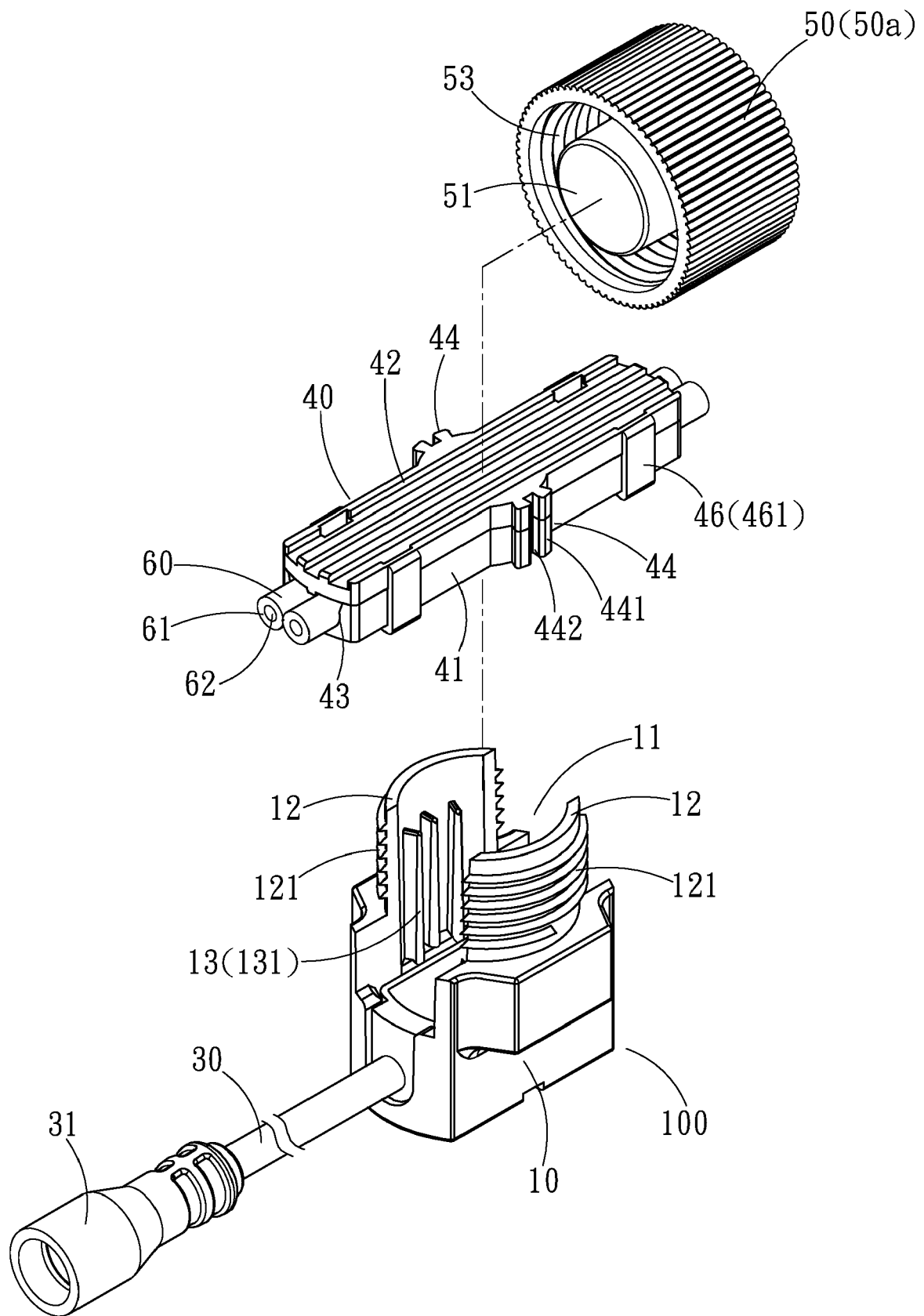


FIG. 2

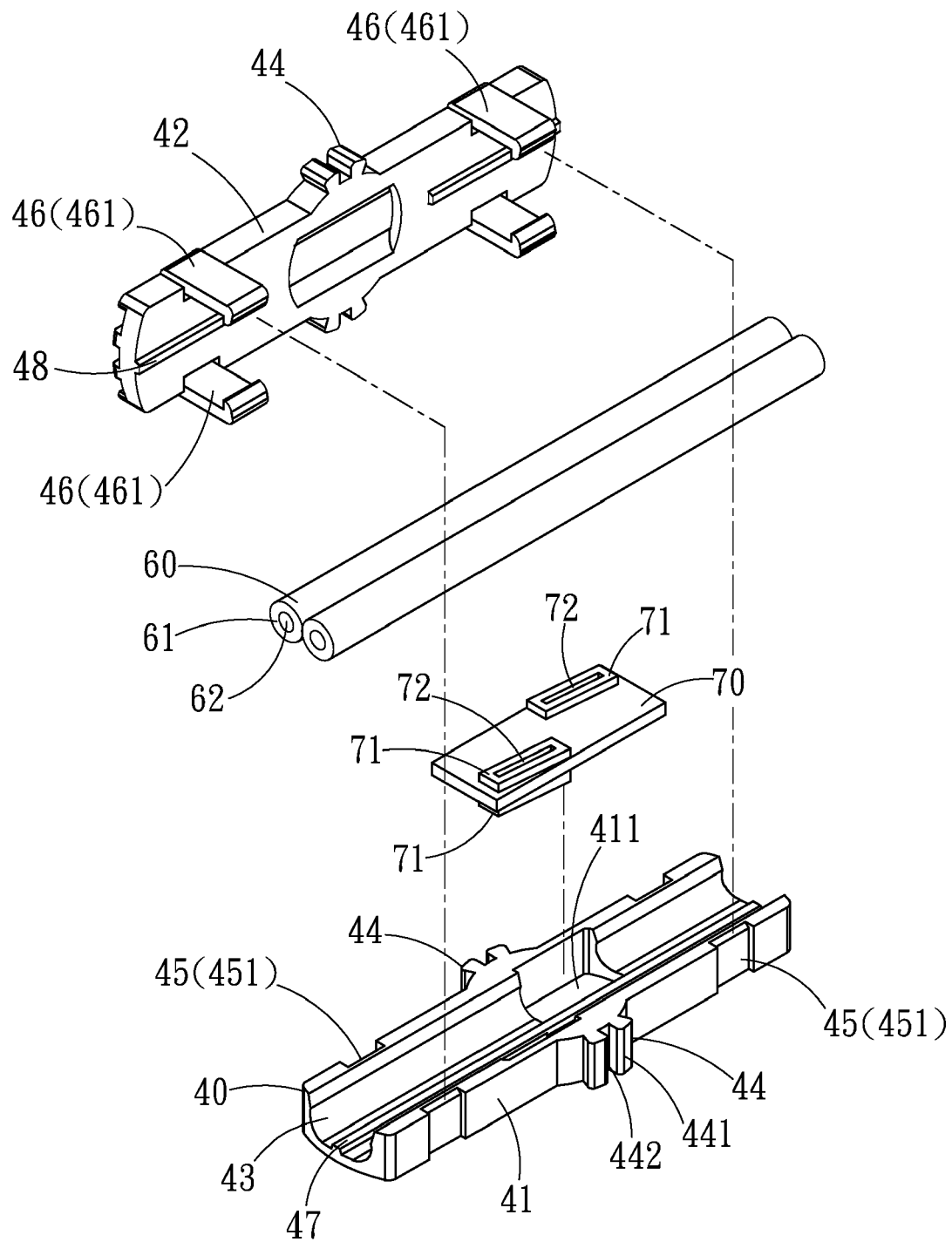


FIG. 3

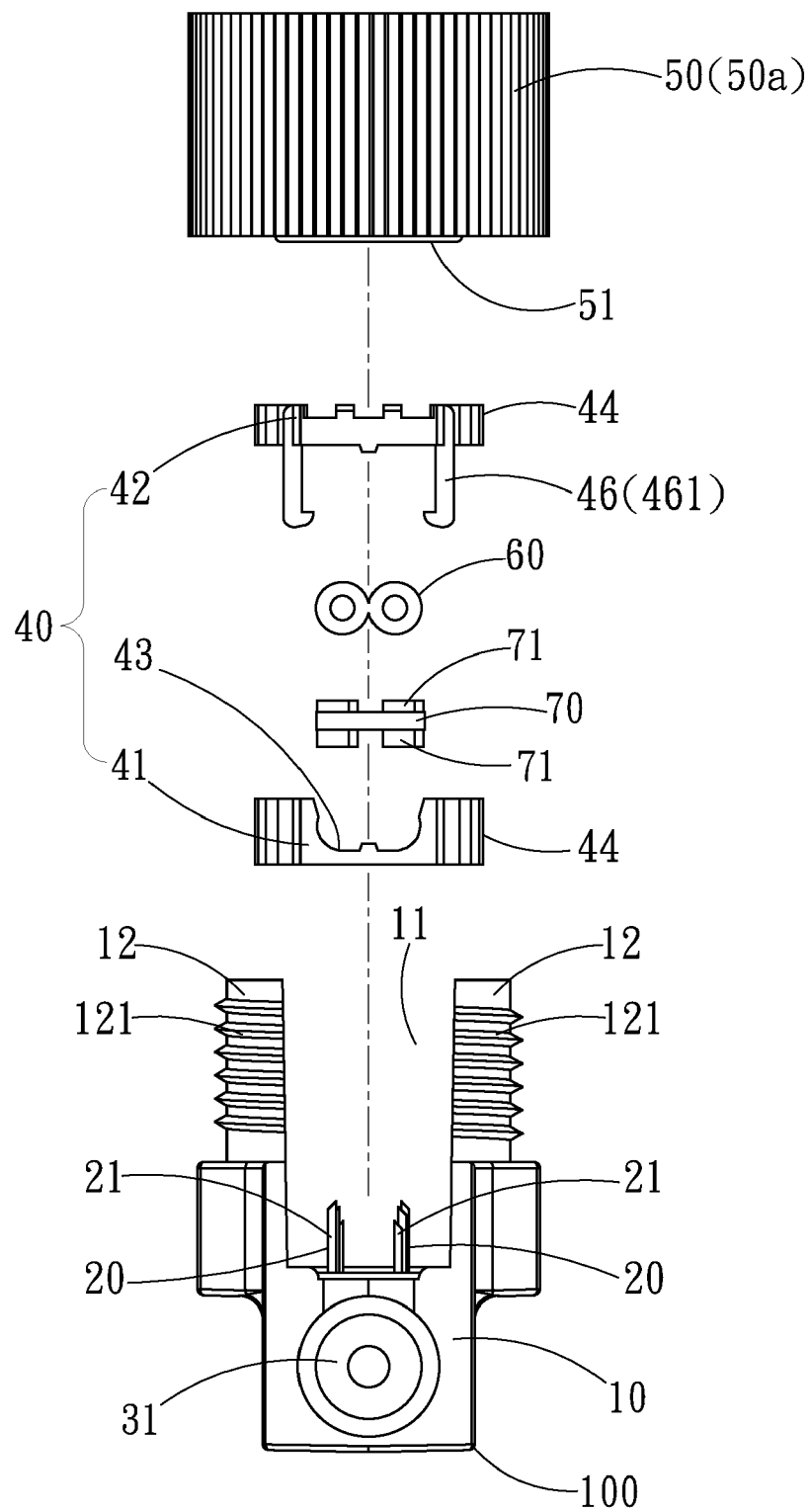


FIG. 4

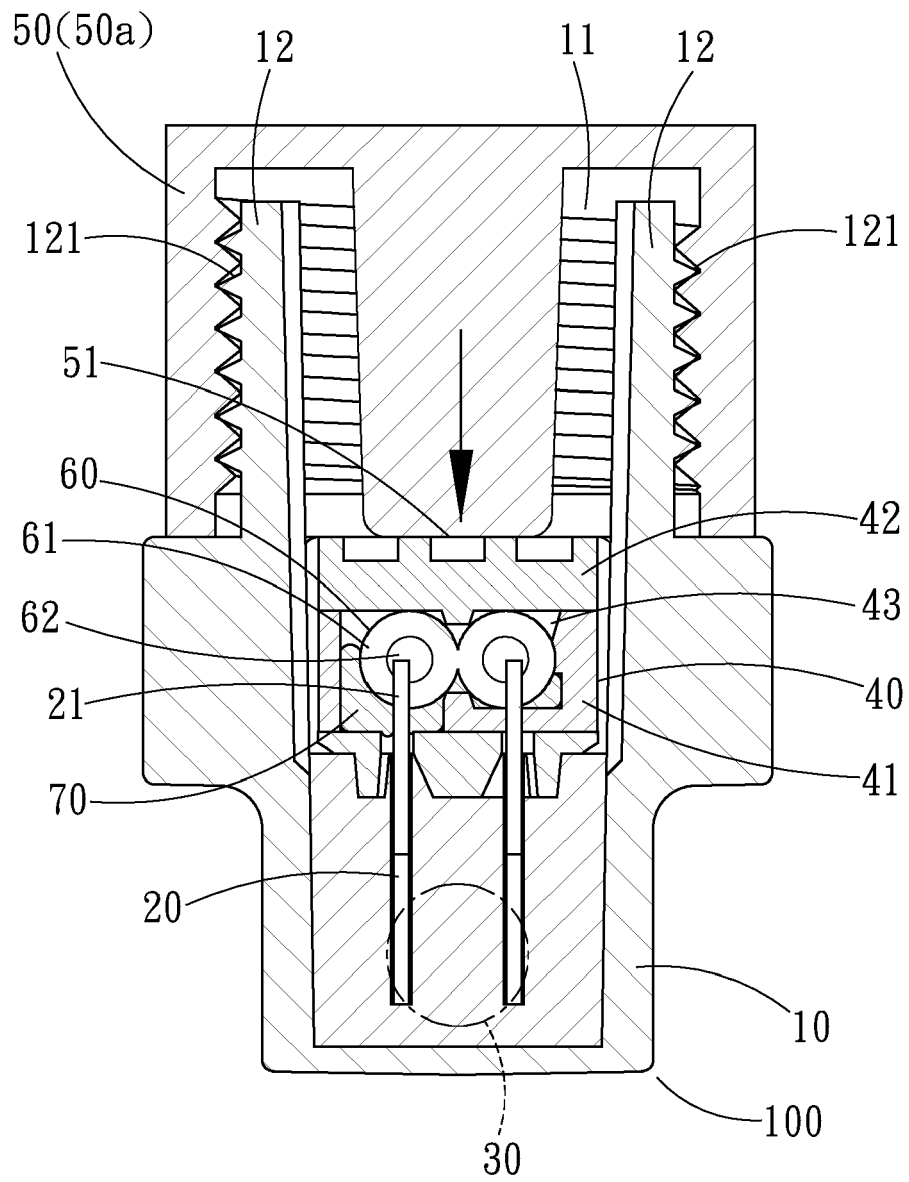


FIG. 5

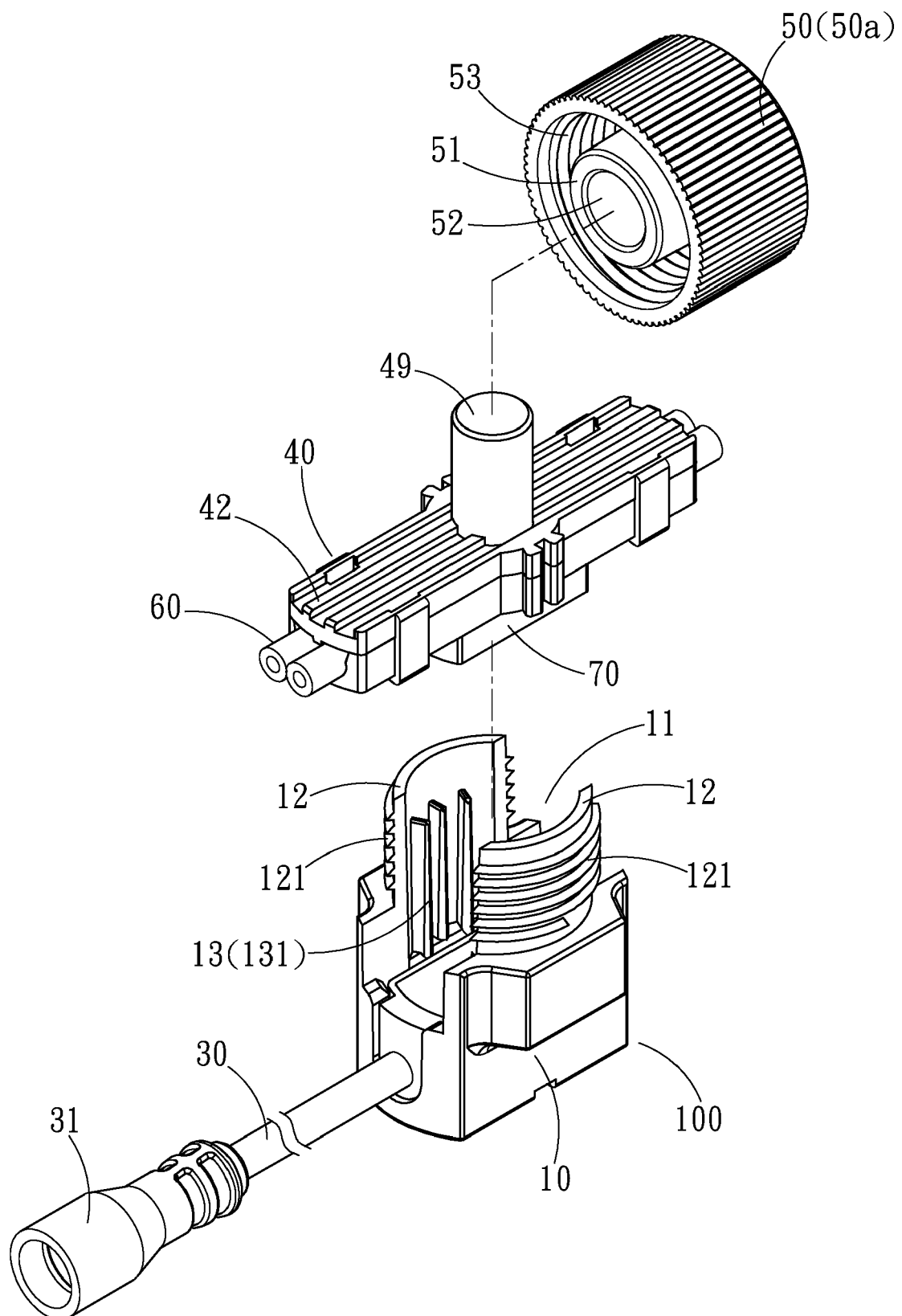


FIG. 6

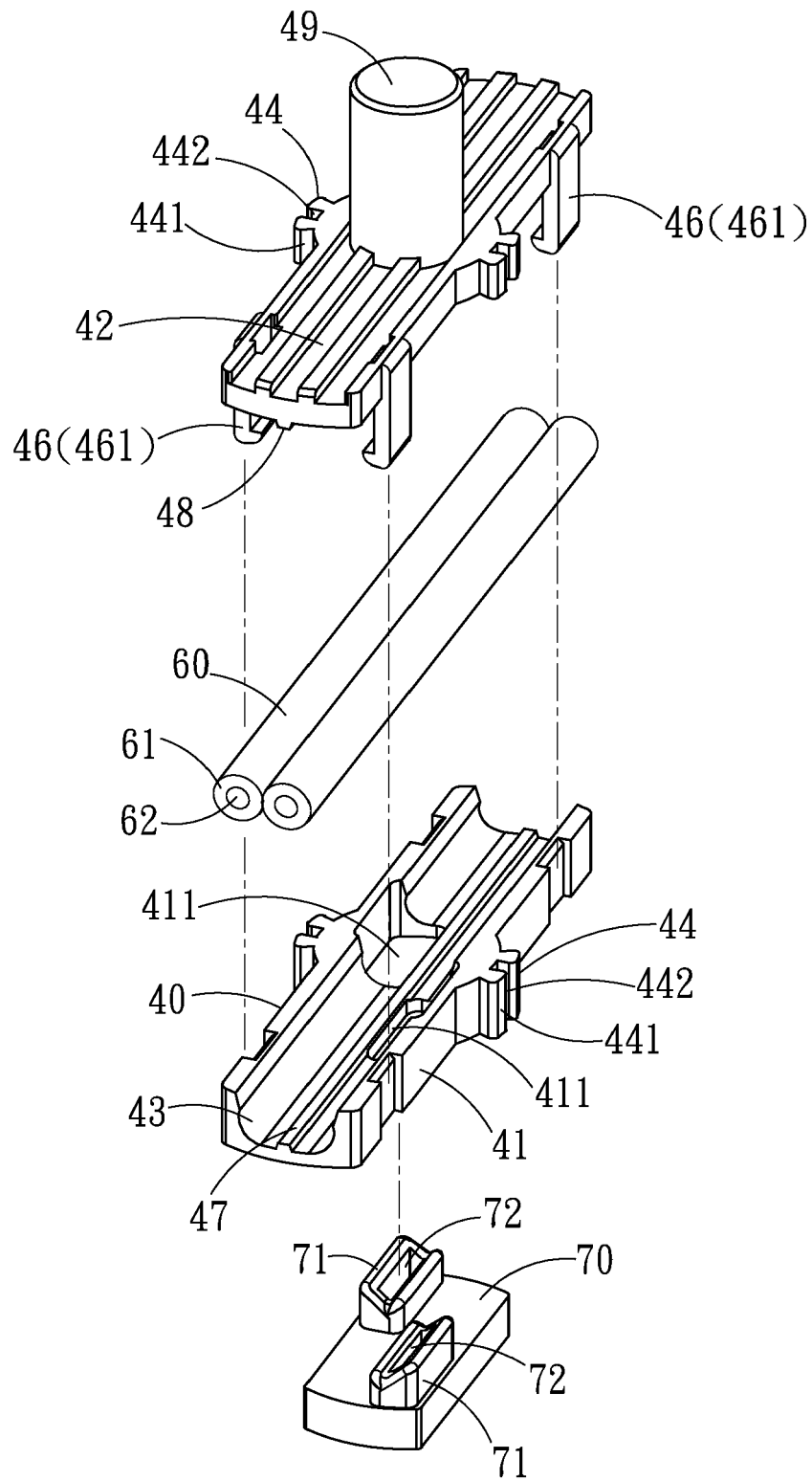


FIG. 7

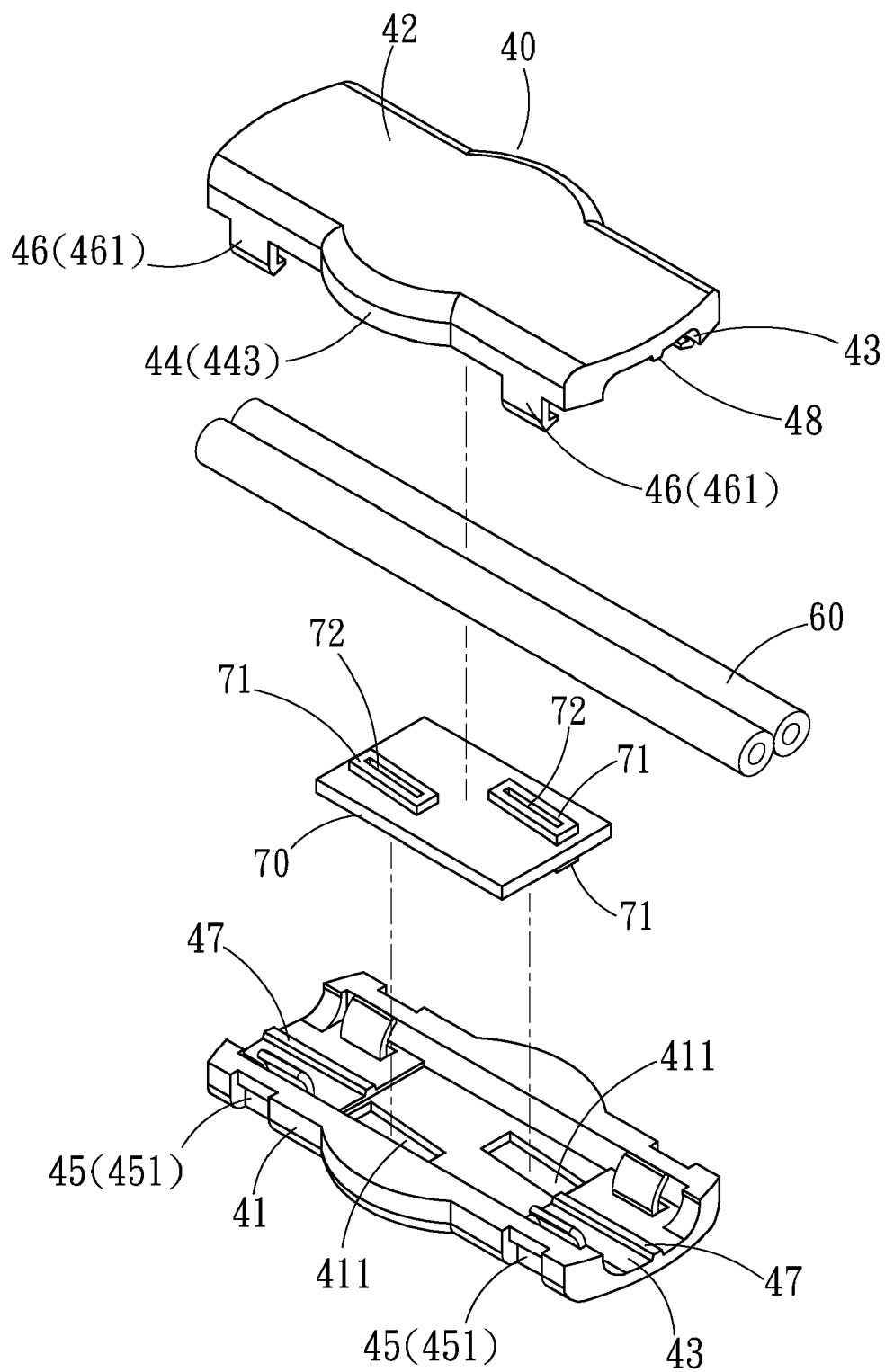


FIG. 8

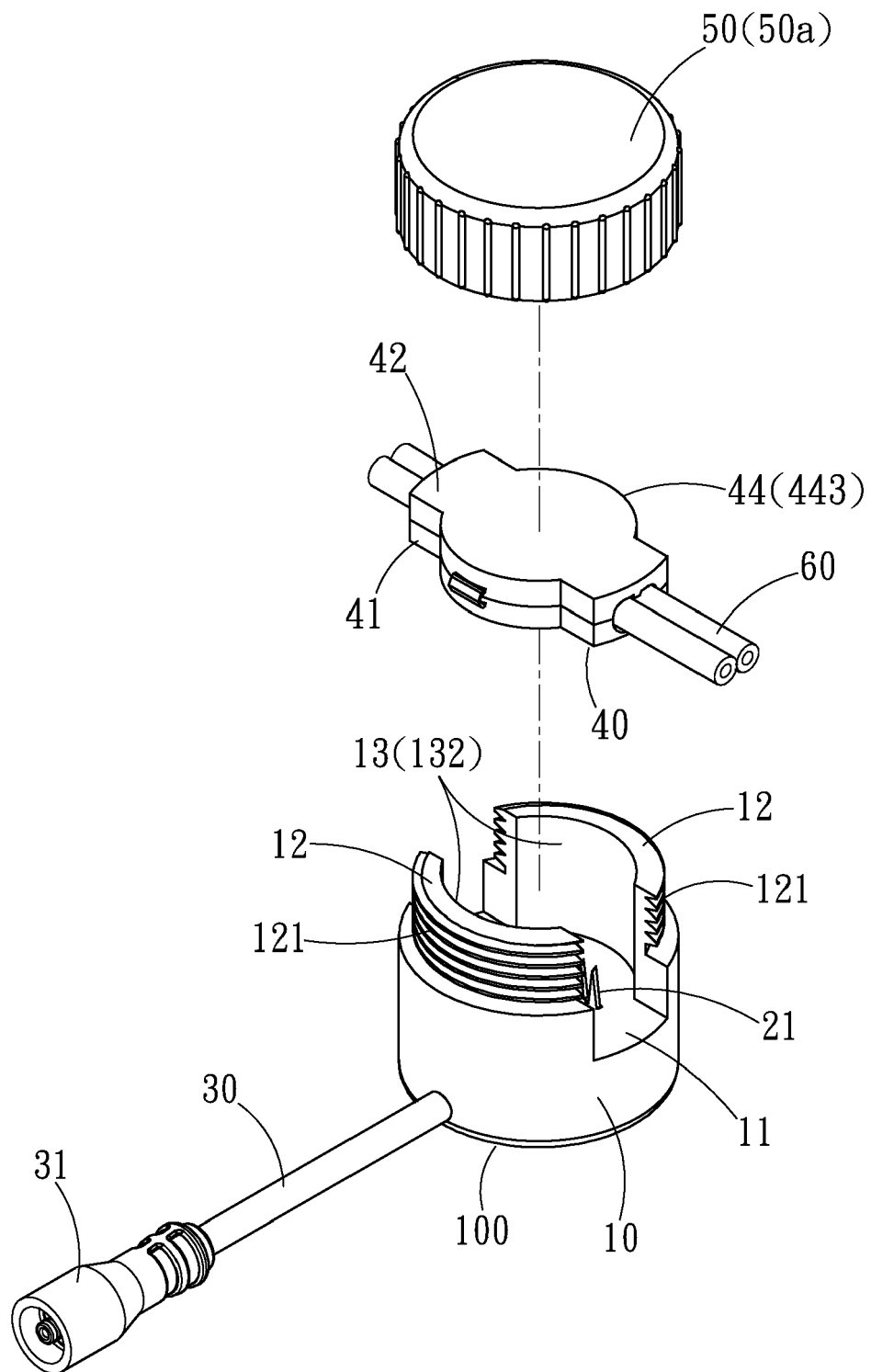


FIG. 9

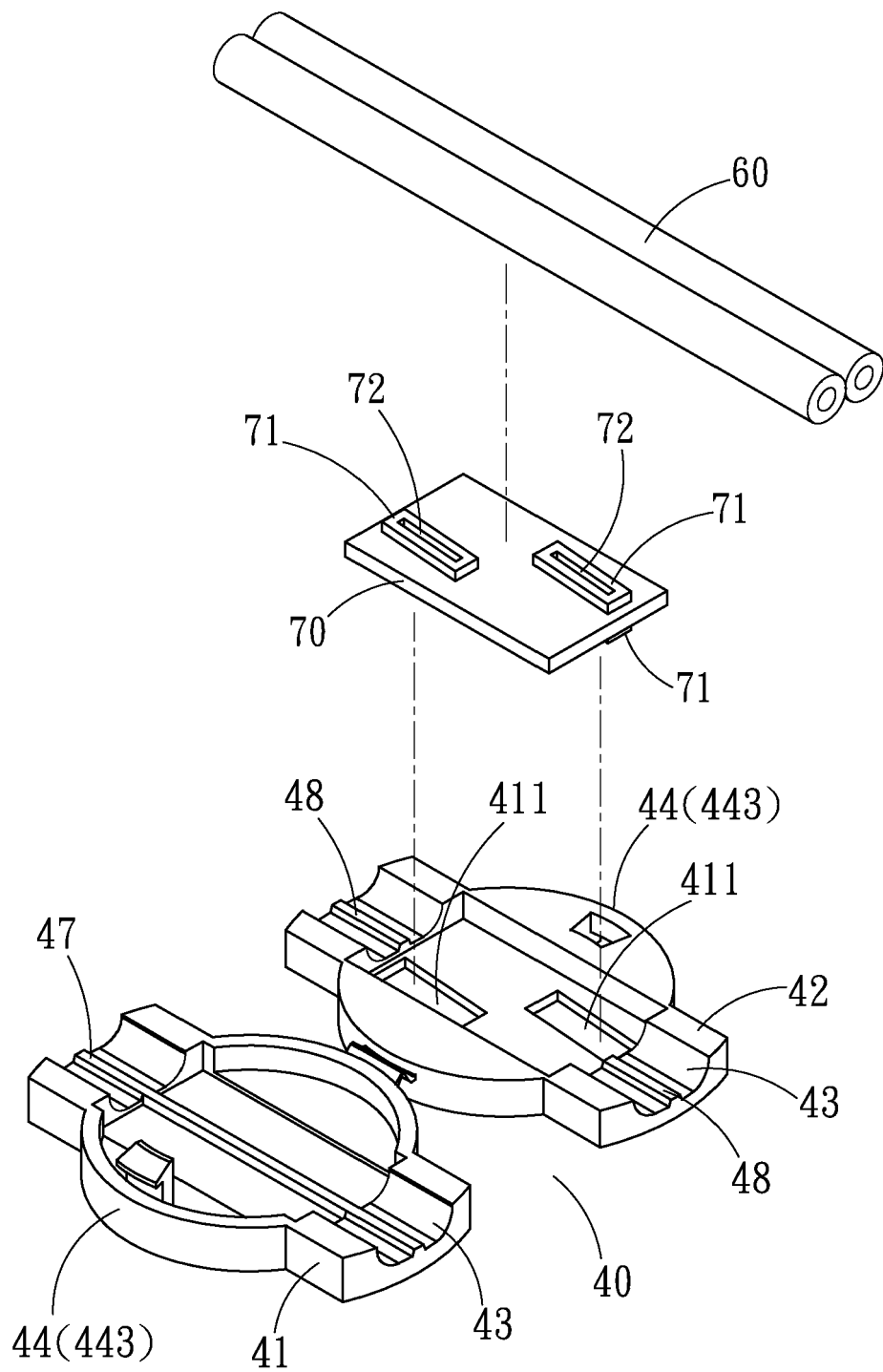


FIG. 10

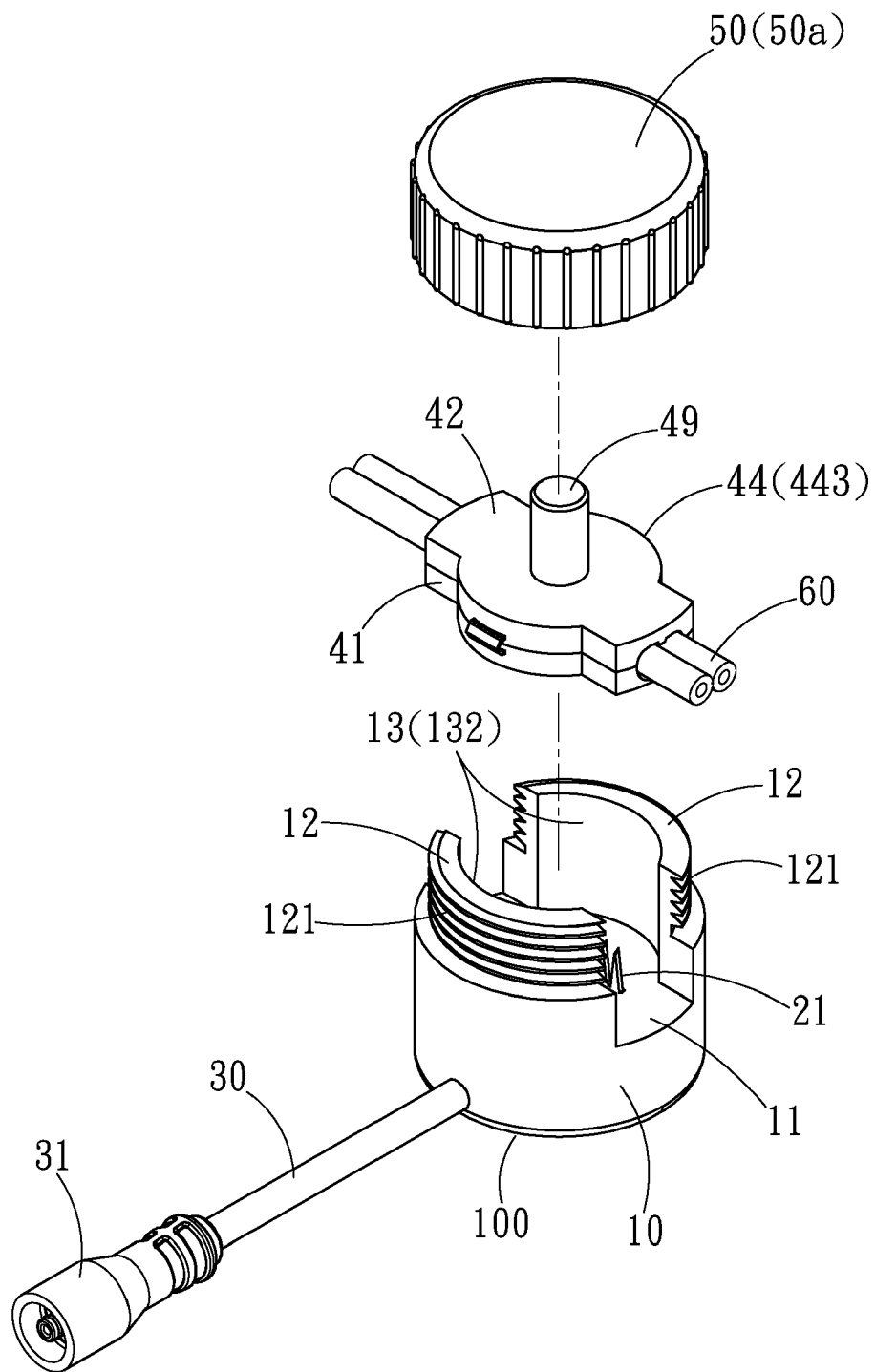


FIG. 11

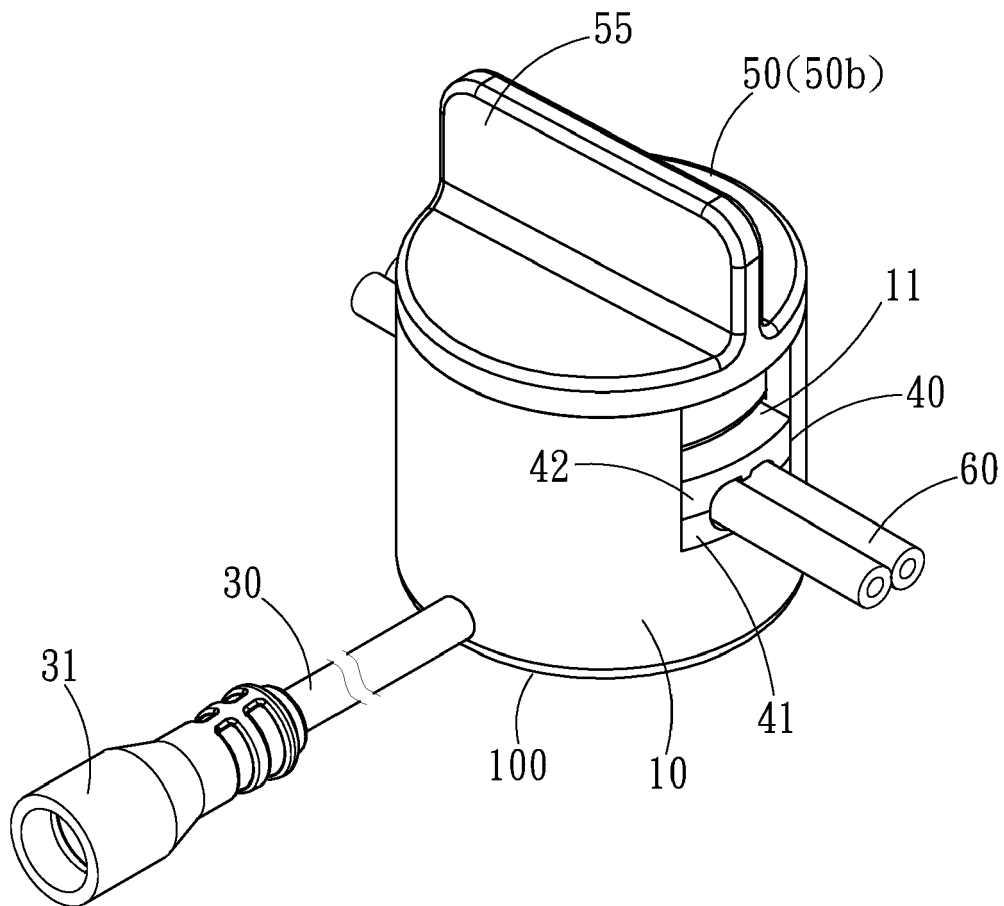


FIG. 12

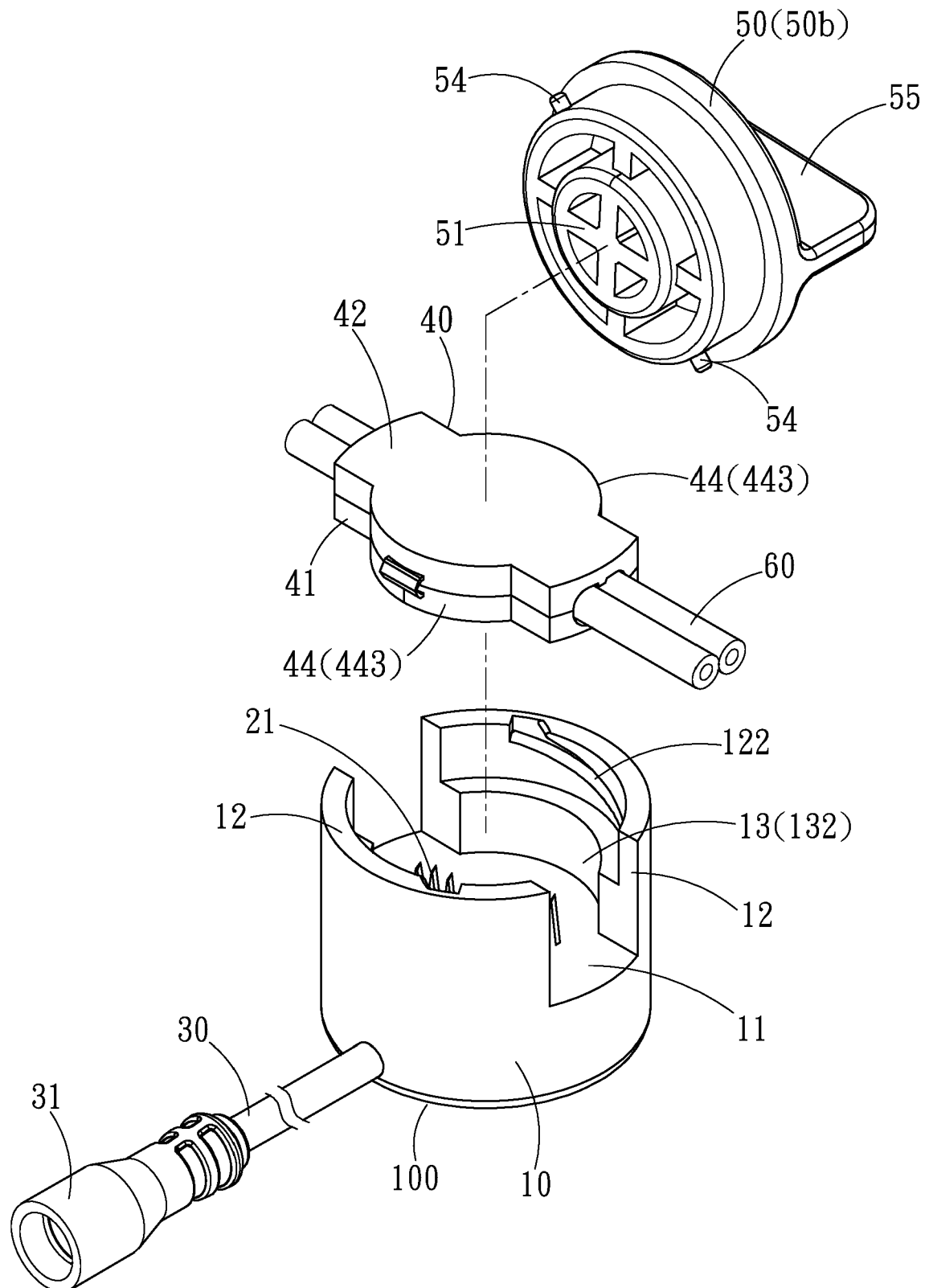


FIG. 13

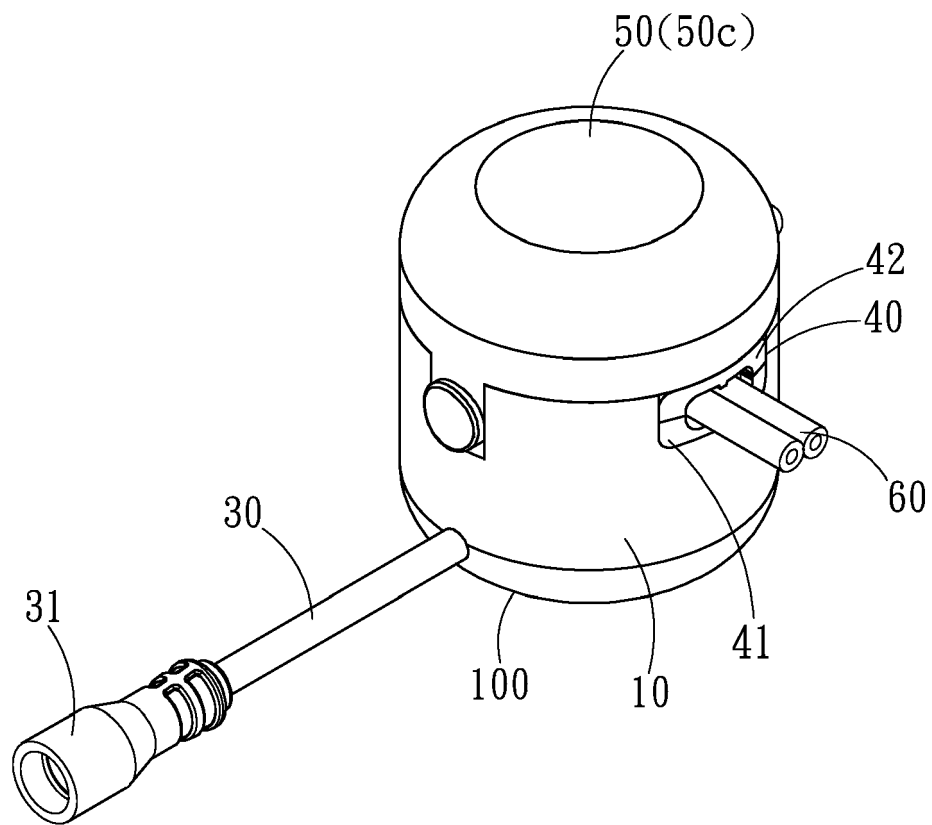


FIG. 14

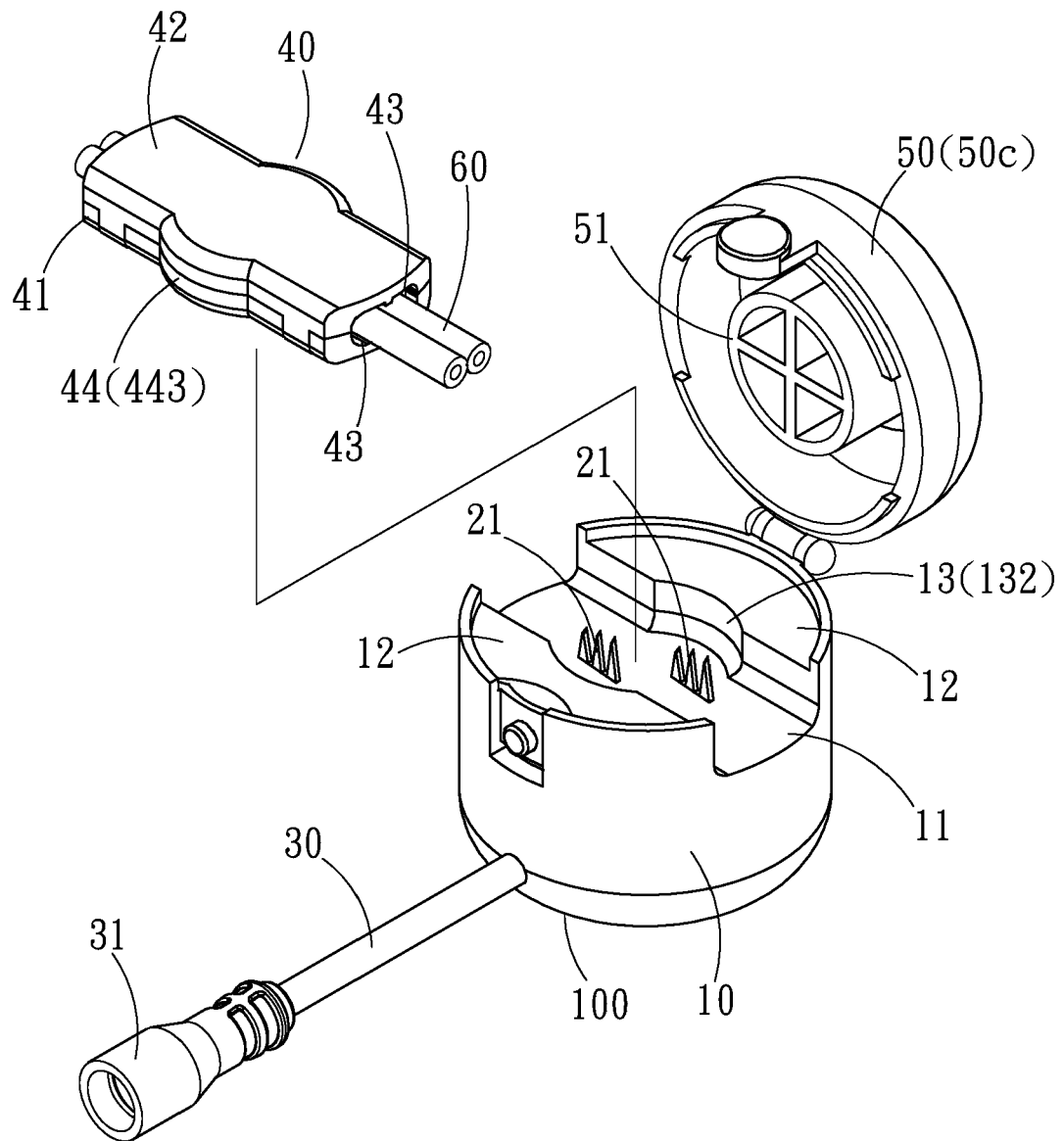


FIG. 15

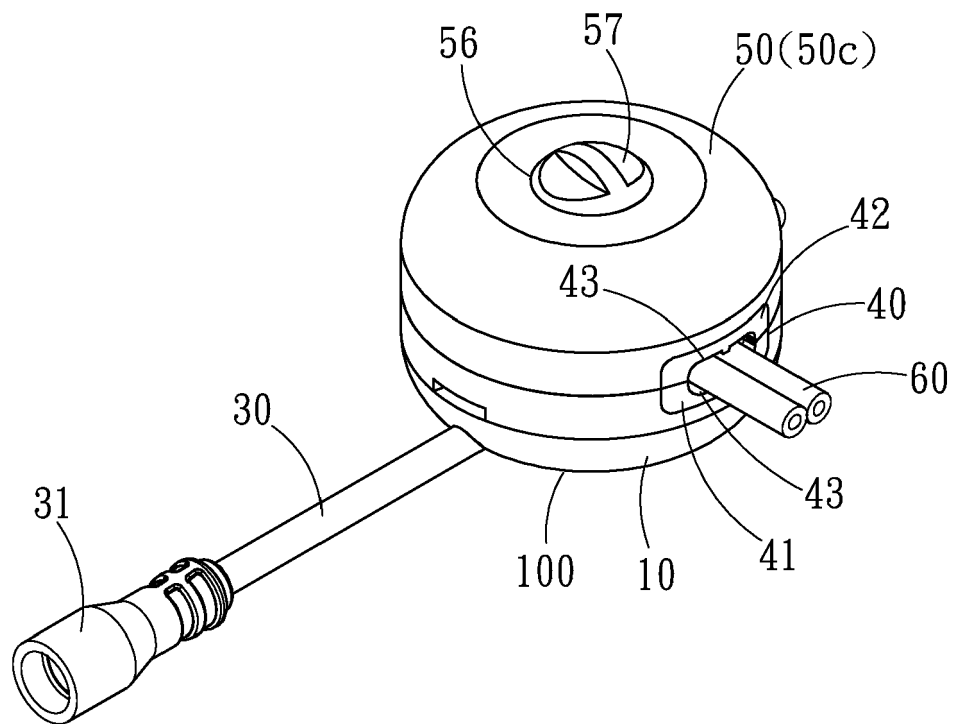


FIG. 16

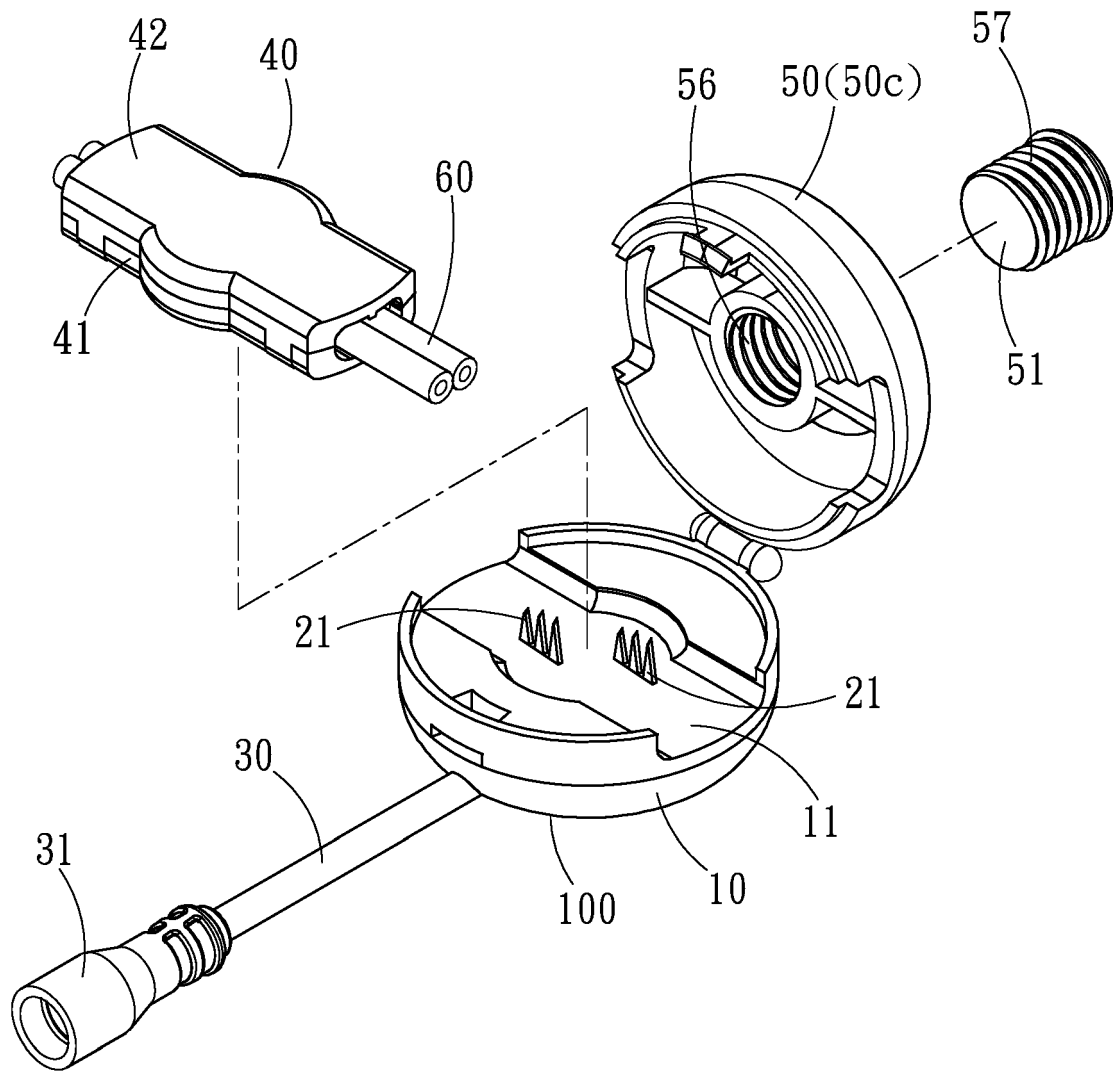


FIG. 17



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 1112

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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	CN 201 689 987 U (LTW TECHNOLOGY INC) 29 December 2010 (2010-12-29) * figures 1,2,3 *	1-15	INV. H01R4/2433 H01R11/20
X	EP 0 726 623 B1 (LUMBERG KARL GMBH & CO [DE]) 17 March 1999 (1999-03-17) * paragraph [0019] - paragraph [0028]; figures 1,3,4,6 *	1,2,4-10	ADD. H01R4/70 H01R101/00
X	US 2011/095020 A1 (YANG JERRY S C [TW]) 28 April 2011 (2011-04-28) * paragraph [0002] - paragraph [0023]; figures 1,2, 4,7 *	1,2,4-7, 11,13-15	
A	CN 211 456 090 U (SHENZHEN MERRYTEK TECH CO LTD) 8 September 2020 (2020-09-08) * abstract; figure 5 *	13	
A	US 5 779 497 A (HALE SCOT J [US] ET AL) 14 July 1998 (1998-07-14) * abstract; figure 16 *	14,15	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) H01R

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Place of search

The Hague

Date of completion of the search

10 August 2023

Examiner

Mateo Segura, C

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 201689987 U	29-12-2010	NONE	
EP 0726623 B1	17-03-1999	DE 19504013 C1	18-07-1996
		EP 0726623 A2	14-08-1996
US 2011095020 A1	28-04-2011	NONE	
CN 211456090 U	08-09-2020	NONE	
US 5779497 A	14-07-1998	CA 2219386 A1	28-04-1998
		US 5779497 A	14-07-1998
		US 5954534 A	21-09-1999

EPO FORM P0459

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Patent documents cited in the description

- US 08101874 B2 [0002]