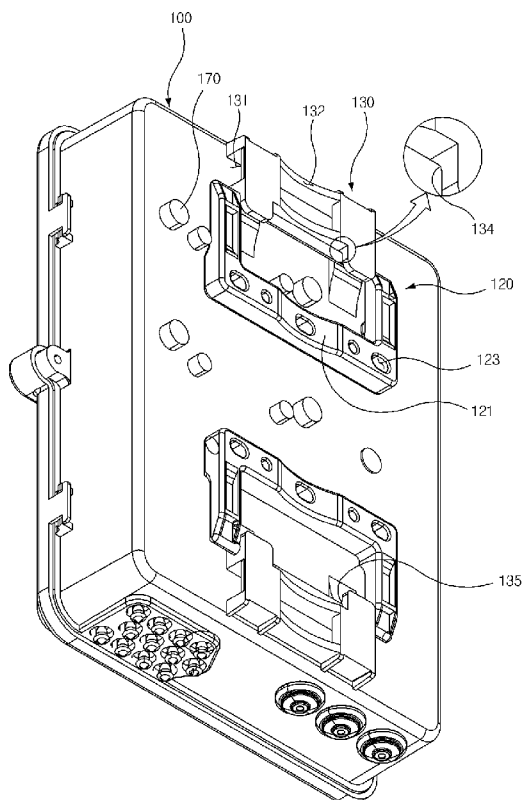




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- (71) **Applicant: A.J. WORLD CO., LTD.** [KR/KR]; A.J. WORLD BLDG., 725-26, Yeoksam-dong, Gangnam-gu, Seoul 135-080 (KR).
- (72) **Inventor: CHOI, An Joon;** 6-1 104, Asia Seonsuchon Apt., Jamsil-dong, Songpa-gu, Seoul 138-797 (KR).
- (74) **Agent: DARAE IP FIRM;** (KIPS, Yeoksam-dong), 10th Floor, 131, Teheran-ro, Gangnam-gu, Seoul 135-080 (KR).
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[Continued on nextpage]

(54) **Title:** OPTICAL CABLE TERMINAL BOX



(57) **Abstract:** Disclosed herein is an optical cable terminal box. The optical cable terminal box includes a terminal box body and a mounting loop which is rotatably provided on a rear surface of the terminal box body. A curved portion is formed in a rear surface of the mounting loop when the mounting loop is folded onto the terminal box body. Thus, the optical cable terminal box can be easily installed not only on the planar wall but also on the round telegraph pole without special measures being taken.

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
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Description

Title of Invention: OPTICAL CABLE TERMINAL BOX

Technical Field

- [1] The present invention relates, in general, to optical cable terminal boxes and, more particularly, to an optical cable terminal box which includes a terminal box body and a mounting loop which is rotatably provided on a rear surface of the terminal box body, wherein a curved portion is formed in a rear surface of the mounting loop when the mounting loop is folded onto the terminal box body.

Background Art

- [2] Generally, optical cable terminal boxes (FTTH optical terminal boxes) are used for connection, branching and arrangement of optical fibers. Optical cable terminal boxes are typically fastened to telegraph poles or indoor/outdoor walls rather than being laid under the ground. Optical adaptors, connectors, cables, etc. are installed in such an optical cable terminal box. The optical cable terminal box performs a connection function, such as fusion connection or mechanical connection of optical cables, or connection of cables to the connectors, a connection part protection function and a cable leading in/out function.
- [3] As shown in FIG. 1, an optical cable terminal box basically includes a box body 10 which is fixed to a telegraph pole or an indoor/outdoor wall.
- [4] An optical cable lead-in hole 11 is formed in a side surface of the box body 10, and an optical cable CI is inserted into the optical cable lead-in hole 11. A plurality of optical external wire lead-in holes 12 are formed in a portion opposite to the optical cable lead-in hole 11 so that optical external wires C2 which are connected to final subscribers are inserted into the wire lead-in holes 12.
- [5] Furthermore, a cover 20 is hinged to a front end of the box body 10 so that the box body 10 is openably closed by the cover 20. Support pieces 13 extend outward from a rear surface of the box body 10. A coupling hole 14 is formed through in each support piece 13.
- [6] To fix the optical cable terminal box to a telegraph pole or indoor/outdoor wall, after the box body 10 is brought into close contact with the telegraph pole or indoor/outdoor wall such that the cover 20 is oriented forward, fastening bolts are tightened into the telegraph pole or indoor/outdoor wall through the coupling holes 14 of the support pieces 13. Thereby, the optical cable terminal box can be reliably fixed to the telegraph pole or indoor/outdoor wall.
- [7] An optical adapter panel 30 is installed in the box body 10. A plurality of optical adaptors 31 which have optical adaptor input terminals 31a and output terminals 31b at

oppositesides thereof are installed in the optical adapter panel 30.

[8] After the box body 10 has been fixed to the telegraph pole or indoor/outdoor wall, the optical cable CI is inserted into the optical cable lead-in hole 11 so that it leads into the box body 10. Thereafter, a covering is removed from the portion of the optical cable CI that has lead in the box body 10, and then the portion is branched into a plurality of optical fiber clusters (hereinafter referred to as "optical fibers"). Each optical fiber is branched oncemore into eight strands of optical fibers by a splitter. The branched optical fibers are connected to the corresponding optical adaptor input terminals 31a by connectors 32a. Then, the connection of the optical cable CI is completed.

[9] Subsequently, the optical external wires C2 are inserted into the optical external wire lead-in holes 12 formed in the box body 10. The optical external wires C2 are connected to the corresponding optical adaptor output terminals 31b by connectors 32b. Then, connection of the optical cable CI to the optical external wires C2 is completed.

[10] Here, an arrangement member 40 which supports the branched optical fibers is disposed in the box body 10 at a position adjacent to the optical adapter panel 30. The arrangementmember 40 functions to prevent the optical fibers from tangling during a process in which the optical cable CI that has lead into the box body 10 through the optical cable lead-in hole 11 is branched into optical fibers and the optical fibers are connected to the corresponding optical adaptor input terminals 31a.

[11] However, the conventional optical cable terminal box is problematic in that it is not easy to install the terminal box on a round telegraph pole or planar wall using bolts.

Disclosure of Invention

Technical Problem

[12] Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide an optical cable terminal box which can be easily installed not only on the planar wall but also on the round telegraph pole without special measures.

Solution to Problem

[13] In order to accomplish the above object, the present invention provides an optical cable terminal box, including: a terminal box body; and a mounting loop rotatably installed on a rear surface of the terminal box body, wherein a first curved portion is formed in a rear surface of the mounting loop when the mounting loop is folded onto the terminal box body.

[14] Furthermore, a protruding part may be provided on the rear surface of the terminal box body, with a through hole formed in the protruding part so that a fasteningband is

inserted into the through hole, wherein a second curved portion may be formed in a surface of the protruding part, and the mounting loop may be coupled to the protruding part.

Advantageous Effects of Invention

- [15] An optical cable terminal box according to the present invention has the following effects.
- [16] The optical cable terminal box includes a mounting loop which is rotatably installed on a rear surface of a terminal box body. A first curved portion is formed in a rear surface of the mounting loop when the mounting loop is folded onto the terminal box body. Thus, the optical cable terminal box can be easily installed not only on the planar wall but also on the round telegraph pole without special measures being taken.
- [17] A protruding part is provided on the rear surface of the terminal box body. A through hole is formed in the protruding part so that a fastening band is inserted into the through hole. A second curved portion is formed in a surface of the protruding part. The mounting loop is coupled to the protruding part. Therefore, when the terminal box is installed on the telegraph pole, a contact area between the terminal box body and the telegraph pole increases so that the terminal box can be reliably maintained in the installed state. Further, the installation of the mounting loop can be facilitated. Of course, in the case where the terminal box is installed on a planar wall using the mounting loop, the contact area between the wall and the terminal box also increases, whereby the terminal box can be stably maintained without moving.

Brief Description of Drawings

- [18] FIG. 1 is a front view showing a conventional optical cable terminal box;
- [19] FIG. 2 is a front perspective view of an optical cable terminal box, according to a preferred embodiment of the present invention;
- [20] FIG. 3 is a rear perspective view of the optical cable terminal box according to the embodiment of the present invention;
- [21] FIG. 4 is a rear perspective view illustrating the optical cable terminal box installed on a telegraph pole according to the embodiment of the present invention;
- [22] FIG. 5 is a front perspective view illustrating the optical cable terminal box installed on a wall according to the embodiment of the present invention;
- [23] FIG. 6 is an exploded perspective view illustrating the optical cable terminal box according to the embodiment of the present invention;
- [24] FIG. 7 is a partial sectional view of a bolt coupling part of the optical cable terminal box according to the embodiment of the present invention;
- [25] FIG. 8 is an assembled perspective view of the optical cable terminal box according to the embodiment of the present invention;

[26] FIG. 9 is a perspective view showing optical cables connected to the optical cable terminal box according to the embodiment of the present invention; and

[27] FIG. 10 is a perspective view showing the optical cable terminal box when conducting repair or maintenance work according to the embodiment of the present invention.

Mode for the Invention

[28] Hereinafter, a preferred embodiment of the present invention will be described in detail with reference to the attached drawings.

[29] For reference, among components or structures of the present invention to be described herein below, the explanation of the same components or structures as those of the above-described conventional art refers to an explanation of the conventional art, and further detailed explanation thereof will be omitted.

[30] As shown in FIGS. 2 through 10, an optical cable terminal box according to the embodiment of the present invention includes a terminal box body 100 and a mounting loop 120 which is rotatably installed on a rear surface of the terminal box body 100. A first curved portion 121 is formed in a rear surface of the mounting loop 120 when the mounting loop 120 is folded onto the terminal box body 100.

[31] As shown in FIG. 2, the terminal box body 100 has a hollow rectangular box shape. A door 110 is provided on a front end of the terminal box body 100 so that the front of the terminal box body 100 can be opened when necessary.

[32] The entirety of the terminal box body 100 is made of synthetic resin.

[33] The door 110 is connected at a first edge thereof to the terminal box body 100 by a hinge 160.

[34] Furthermore, a locking unit 140 is provided on a second edge of the door 110 so that the door 110 can be maintained in a closed state. The locking unit 140 allows a worker to check the interior of the terminal box only when necessary. The locking unit 140 comprises a bolt or the like so that the locked state of the door 110 can be reliably maintained.

[35] Moreover, locking protrusions 150 are respectively provided on the second edge of the door 110 above and below the locking unit 140.

[36] Each locking protrusion 150 has hooks on upper and lower ends thereof, and stoppers 190 are provided on the terminal box body 100. Thus, the hooks of each locking protrusion 150 are locked to the corresponding stopper 190.

[37] As such, because the locking protrusions 150 and the stoppers 190 are provided, when performing the operation of locking the door 110 to the terminal box body 100, the locking protrusions 150 can be primarily locked to the stoppers 190. Then, the locking operation can be facilitated because the door 110 is prevented from opening by

itself.

- [38] Cable lead-in/out holes 180 are formed in both sides of a lower surface of the terminal box body 100 so that optical cables or the like lead out from the terminal box through the cable lead-in/out holes 180.
- [39] As shown in FIG. 3, the mounting loop 120 is rotatably provided on the rear surface of the terminal box body 100.
- [40] The mounting loop 120 includes vertical parts which are disposed at opposite sides, and a horizontal part which connects the vertical parts to each other, thus forming an overall 'U' shape. Opposite ends of the mounting loop 120 are connected to each other by a rotating shaft 122.
- [41] The mounting loop 120 is configured such that the horizontal part is thicker than the vertical parts so that the strength of the mounting loop 120 can be enhanced despite reducing the weight of the mounting loop 120.
- [42] The first curved portion 121 having an arc shape is formed in a rear surface of the mounting loop 120 when the mounting loop 120 is folded onto the terminal box body 100. The first curved portion 121 is formed in a medial portion of the horizontal part.
- [43] A plurality of insert holes 123 are formed in the horizontal part in the front-rear direction.
- [44] The insert holes 123 can reduce the weight of the terminal box. In the case where the terminal box is installed on the wall, the insert holes 123 make it possible to easily hang the terminal box on a peg or the like that is pegged in the wall.
- [45] Moreover, a protruding part 130 is provided on the rear surface of the terminal box body 100. A through hole 131 is formed in the protruding part 130 in the left-right direction so that a fastening band B can be inserted into the through hole 131.
- [46] A second curved portion 132 is formed in a medial portion of a rear surface of the protruding part 130. The second curved portion 132 is formed to be aligned with the first curved portion 121.
- [47] The protruding part 130 is configured such that the thickness of opposite ends thereof is equal to or similar to that of the horizontal part so that the terminal box can be stably installed.
- [48] Shaft seating depressions 134 into which the rotating shaft 122 of the mounting loop 120 is inserted are formed in opposite ends of a lower portion of the protruding part 130 in such a way that the shaft seating depressions 134 are open downward. A shaft locking protrusion 135 is formed in each shaft seating depression 134 so that the rotating shaft 122 can be retained in the shaft seating depression 134.
- [49] When the rotating shaft 122 of the mounting loop 120 is pushed into the shaft seating depressions 134 of the protruding part 130, the lower portion of the protruding part 130 is elastically changed in shape such that the widths of the shaft seating depressions 134

increase, and then the rotating shaft 122 is completely inserted into the shaft seating depressions 134. In this way, the mounting loop 120 is rotatably installed in the protruding part 130. As such, after the mounting loop 120 has been installed in the protruding part 130, the rotating shaft 122 is blocked by the locking protrusions 135 and prevented from being removed from the protruding part 130.

[50] The mounting loop 120 and the protruding part 130 that have the above-mentioned construction may be provided on each of upper and lower portions of the rear surface of the terminal box body 100.

[51] As shown in FIG. 4, to install the terminal box of this embodiment on a telegraph pole, after the mounting loop 120 has been folded onto the terminal box body 100, a fastening band B is inserted into the through holes 131, and the terminal box body 100 is disposed such that the first curved portion 121 and the second curved portion 132 come into contact with a round surface of the telegraph pole. Thereby, the terminal box can be stably installed on the telegraph pole that has the round surface.

[52] Furthermore, as shown in FIG. 5, in the case where the terminal box of this embodiment is installed on a planar wall W, the mounting loop 120 is rotated and unfolded from the terminal box body 100 and then hung on a peg that has been pegged in the wall. In this way, the terminal box can be stably installed on the planar wall W.

[53] As such, the terminal box according to the present invention can be easily installed not only on the planar wall W but also on the round telegraph pole without a special measure.

[54] Furthermore, thanks to the construction of the protruding part 130 and the mounting loop 120, when the terminal box is installed on the telegraph pole, a contact area between the terminal box body 100 and the telegraph pole increases so that the terminal box can be reliably maintained in the installed state. Further, the installation of the mounting loop 120 can be facilitated. Of course, in the case where the terminal box is installed on the planar wall W using the mounting loop 120, the contact area between the wall W and the terminal box also increases, whereby the terminal box can be stably maintained without moving.

[55] In addition, auxiliary protrusions 170 are provided on the rear surface of the terminal box body 100. The auxiliary protrusions 170 are disposed at positions corresponding to bolts tightened in the terminal box. Nuts 900 are formed in the respective auxiliary protrusions 170 by insert-molding.

[56] As such, the nuts 900 are embedded in the terminal box body 100 without being exposed to the outside so that they can be prevented from corroding. A groove is formed in a circumferential outer surface of each nut 900 along the circumferential direction, and a longitudinal groove is formed in the circumferential outer surface of each nut 900, whereby the nut 900 can be prevented from being undesirably removed

or rotated.

[57] Thanks to the structure having these auxiliary protrusions 170, the terminal box body 100 can be formed to be reduced in weight, and elements can be reliably fixed in the terminal box by bolts or the like. Moreover, when the terminal box is installed on the wall W or the telegraph pole, the auxiliary protrusions 170 function to increase the contact area so that the installed state of the terminal box can remain stable.

[58] As shown in FIG. 6, a bracket 200 is provided in the terminal box body 100. As shown in this embodiment, the bracket 200 may be manufactured separately from the terminal box body 100 and then installed in the terminal box body 100. Alternatively, the bracket 200 may be integrally formed in the terminal box body 100.

[59] An arrangement member 500 which is used to arrange optical fibers or optical cables is disposed in a first side portion of the terminal box body 100. The bracket 200 is disposed in a second side portion of the terminal box body 100.

[60] A guide loop 600 which guides optical cables or the like is provided in a lower portion of the second side portion of the terminal box body 100. A slit is formed in a portion of the guide loop 600 so that the optical cables or the like can be easily inserted into the guide loop 600.

[61] The bracket 200 is installed on a mounting panel 400 provided in the terminal box body 100. The mounting panel 400 may be omitted.

[62] The bracket 200 includes opposite side plates, an upper plate which connects the opposite side plates to each other, and a rear plate which comes into contact with the mounting panel 400.

[63] Guide slots are formed in each of the opposite side plates of the bracket 200.

[64] Each guide slot includes a first guide slot 221 which is formed in the front-rear direction, and a second guide slot 222 which extends from the first guide slot 221 and is formed in the vertical direction.

[65] The guide slots are respectively formed in upper and lower portions of the opposite side plates of the bracket 200. An auxiliary guide slot is formed below each guide slot in the opposite side plates.

[66] The auxiliary guide slot also includes a first auxiliary guide slot 231 which is formed in the front-rear direction, and a second guide slot 232 which extends from the first auxiliary guide slot 231 and is formed in the vertical direction.

[67] Support plates 233 are respectively provided above and below the auxiliary guide slot.

[68] Slots 210 are formed in oppositeside portions of the upper plate of the bracket 200. Each slot 210 is increased in width from the rear end to the front end thereof.

[69] An optical adapter panel 300 is installed in the bracket 200 so as to be slidable in the front-rear direction.

- [70] The optical adapter panel 300 includes side plates which are disposed at opposite sides, a front connection part which connects upper portions of front edges of the side plates to each other, and a rear connection part which connects rear edges of the side plates to each other.
- [71] Rack protrusions 340 are vertically provided on inner surfaces of the opposite side plates of the optical adapter panel 300.
- [72] Optical adaptors 330 are installed in a front portion of one side plate of the optical adapter panel 300. The location at which the optical adaptors 330 are installed can be variously changed depending on conditions.
- [73] Coupling parts to which other parts are coupled are provided on lower ends of outer surfaces of the opposite side plates of the optical adapter panel 300. A nut may be formed in each coupling part by insert-molding.
- [74] Guide protrusions 310 which are inserted into the corresponding guide slots are provided at predetermined positions on the outer surfaces of the side plates of the optical adapter panel 300.
- [75] Auxiliary protrusions 320 are provided on the outer surfaces of the side plates of the optical adapter panel 300 below the respective guide protrusions 310. The auxiliary protrusions 320 are inserted into the corresponding guide slots.
- [76] As shown in FIG. 7, a bolt insert hole 321 is formed in each auxiliary protrusion 320. A bolt 700 is inserted into the bolt insert hole 321. A spring 800 is installed in the bolt insert hole 321.
- [77] As shown in FIG. 8, after the bracket 200 is placed in the terminal box body 100, the auxiliary protrusions 320 of the optical adapter panel 300 are inserted the corresponding auxiliary guide slots of the bracket 200. Subsequently, as shown in FIG. 7, the bolts 700 are inserted into the respective bolt insert holes 321 and tightened into the corresponding nuts 900 provided in the auxiliary protrusions 170, thus completing the coupling of the bracket 200 to the optical adapter panel 300.
- [78] When work for repair or replacement is required, even though each bolt 700 is slightly released, the bolt 700 comes out by the elastic force of the spring 800, thus facilitating the work. This structure using the spring 800 can also be applied to the locking unit 140 of the door 110.
- [79] Furthermore, because the slots 210 are formed in the opposite side portions of the upper plate of the bracket 200, the distance between the opposite side plates of the bracket 200 can be easily varied. Thereby, the guide protrusions 310 and the auxiliary protrusions 320 can be easily inserted into the guide slots and auxiliary guide slots, respectively.
- [80] As shown in FIG. 9, while the terminal box is being used, a plurality of optical cables are connected to the optical adapter panel 300. Therefore, when therepair or re-

placement work is required, space for the work cannot be sufficiently formed in the terminal box body 100.

[81] To overcome the above problem, in the present invention, when the repair or replacement work is required, the optical adapter panel 300 is moved forward with respect to the terminal box body 100 and the bracket 200. Thereby, ample space can be provided to the worker who carries out the work. As a result, work such as work for connecting the cables to the optical adaptors 330 or repair work can be facilitated.

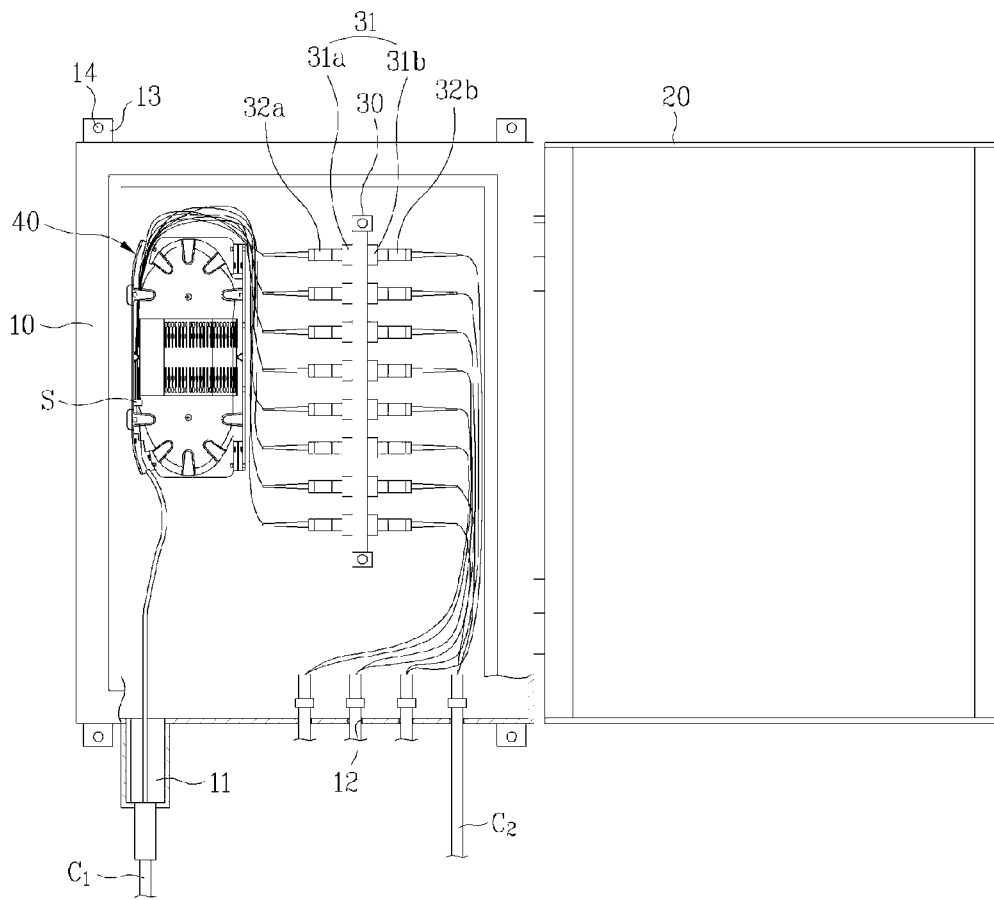
[82] In detail, after the bolts 700 are released such that the optical adapter panel 300 becomes slidable, the guide protrusions 310 and the auxiliary protrusions 320 are slid forward along the corresponding guide slots and auxiliary guide slots and then moved downward. Then, the optical adapter panel 300 that has been moved forward is fixed so that it can be prevented from being undesirably moved forward or rearward. As such, despite the simple structure, the optical adapter panel 300 can be reliably fixed in place during work so that the worker can more easily carry out the work.

[83] Although the preferred embodiment of the present invention has been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

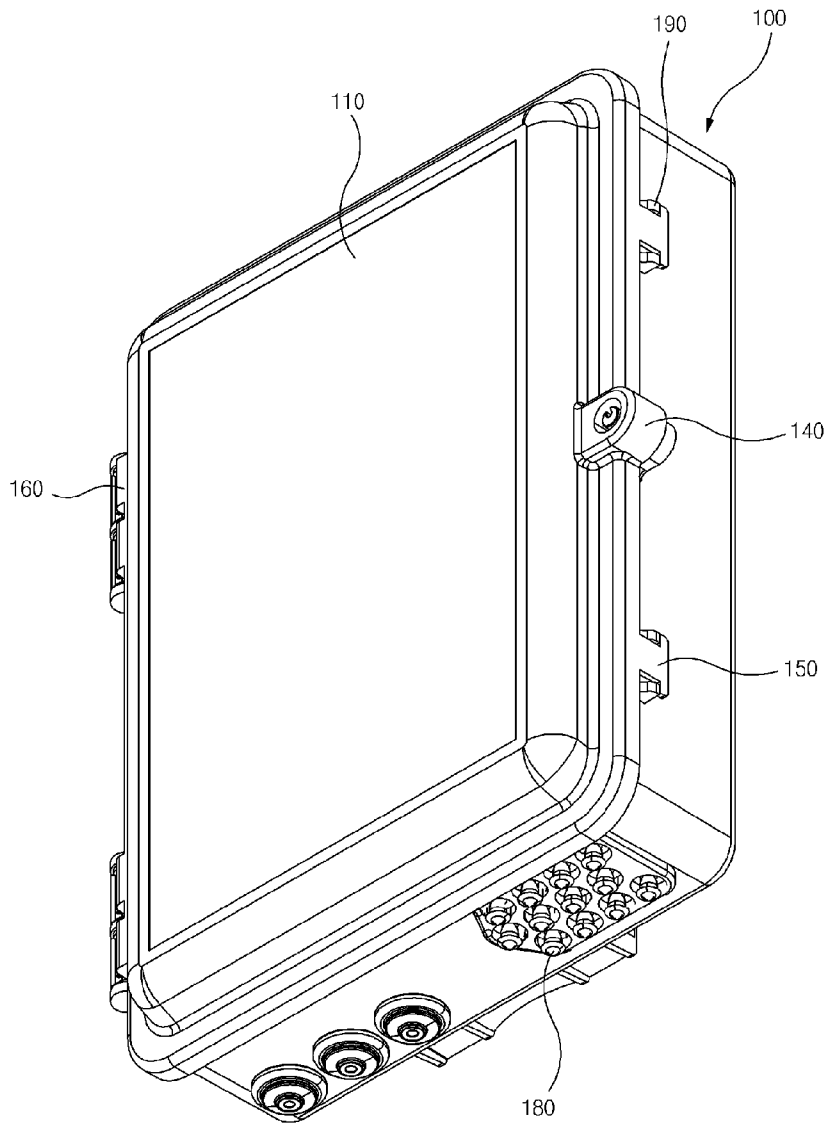
Claims

- [Claim 1] An optical cable terminal box, comprising:
a terminal box body; and
a mounting loop rotatably installed on a rear surface of the terminal box body,
wherein a first curved portion is formed in a rear surface of the mounting loop when the mounting loop is folded onto the terminal box body.
- [Claim 2] The optical cable terminal box according to claim 1, wherein a protruding part is provided on the rear surface of the terminal box body, with a through hole formed in the protruding part so that a fastening band is inserted into the through hole,
wherein a second curved portion is formed in a surface of the protruding part, and the mounting loop is coupled to the protruding part.

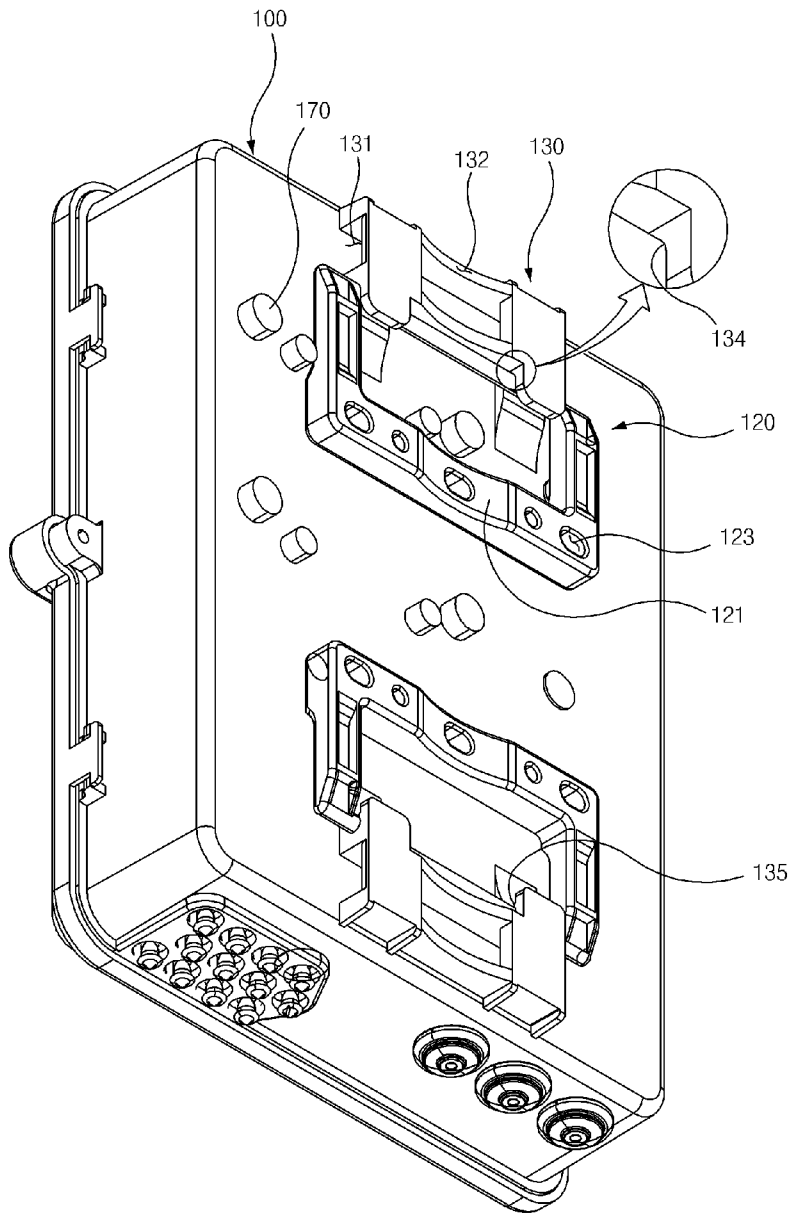
[Fig. 1]



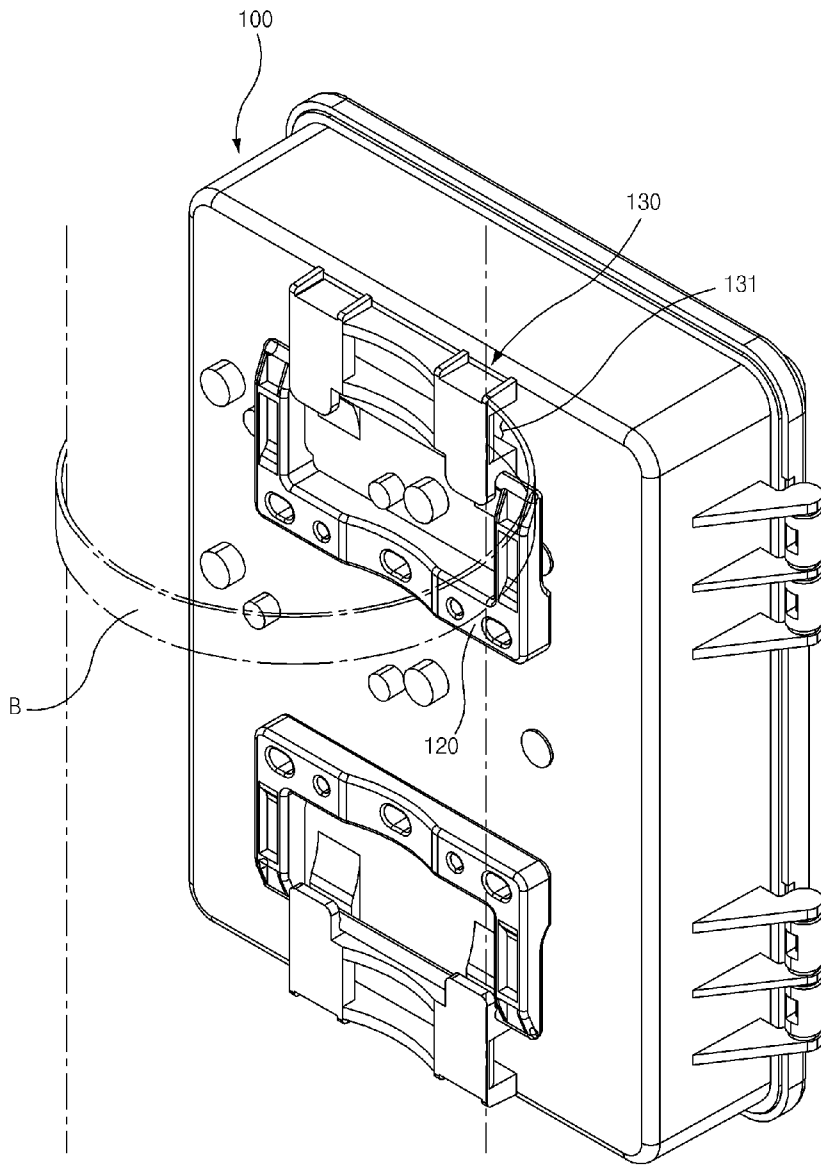
[Fig. 2]



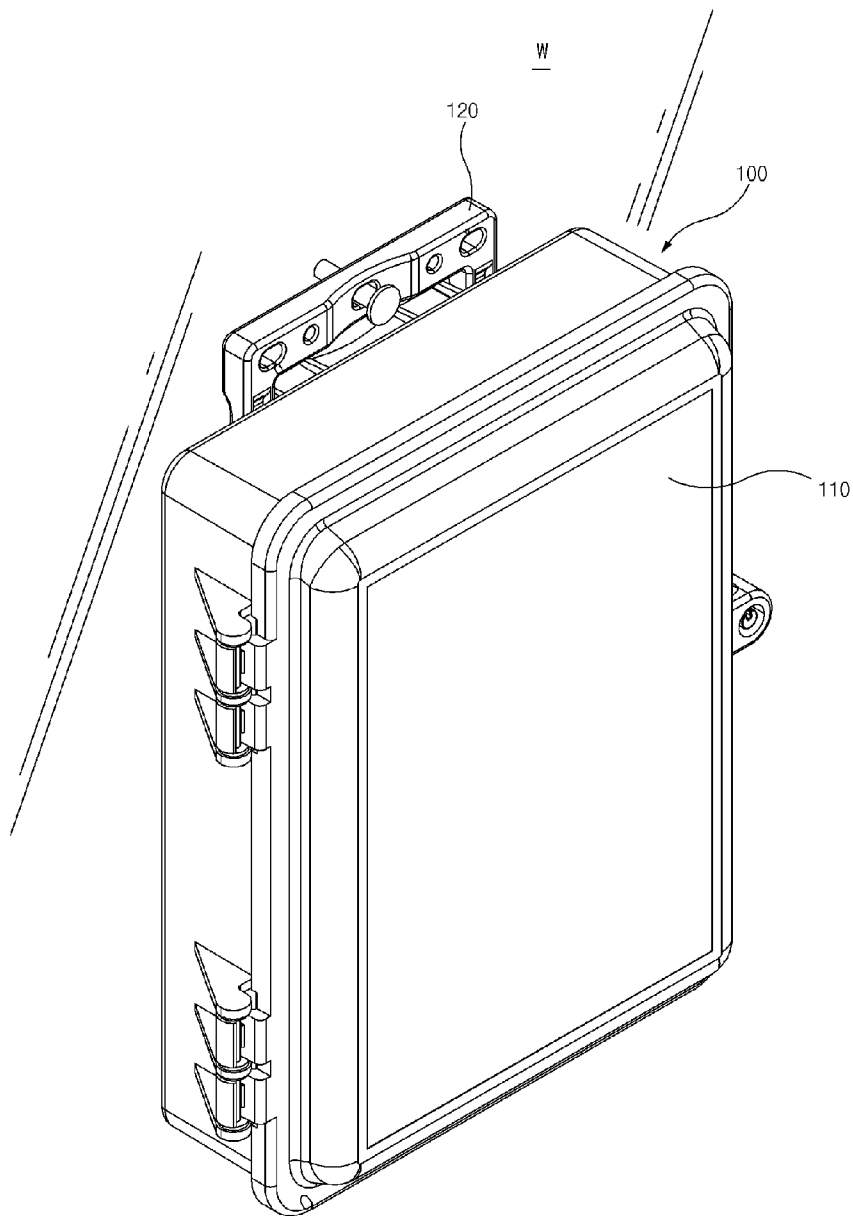
[Fig. 3]



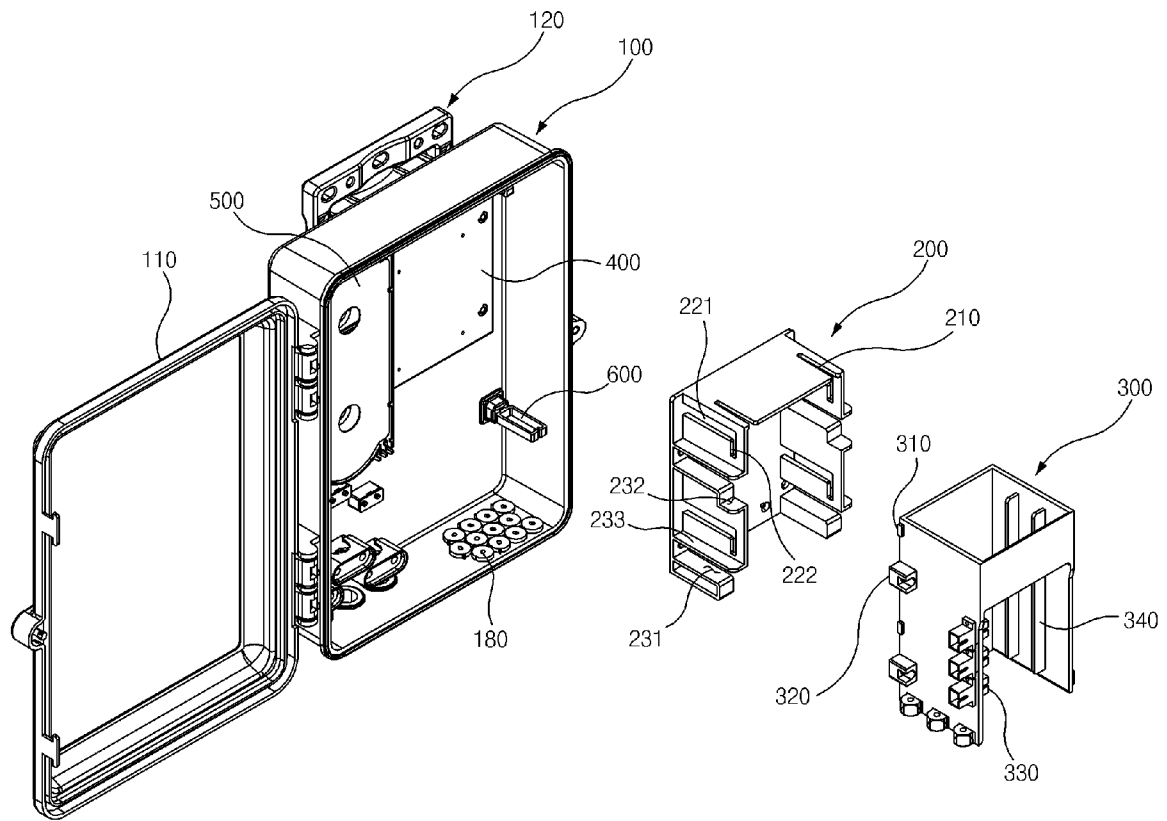
[Fig. 4]



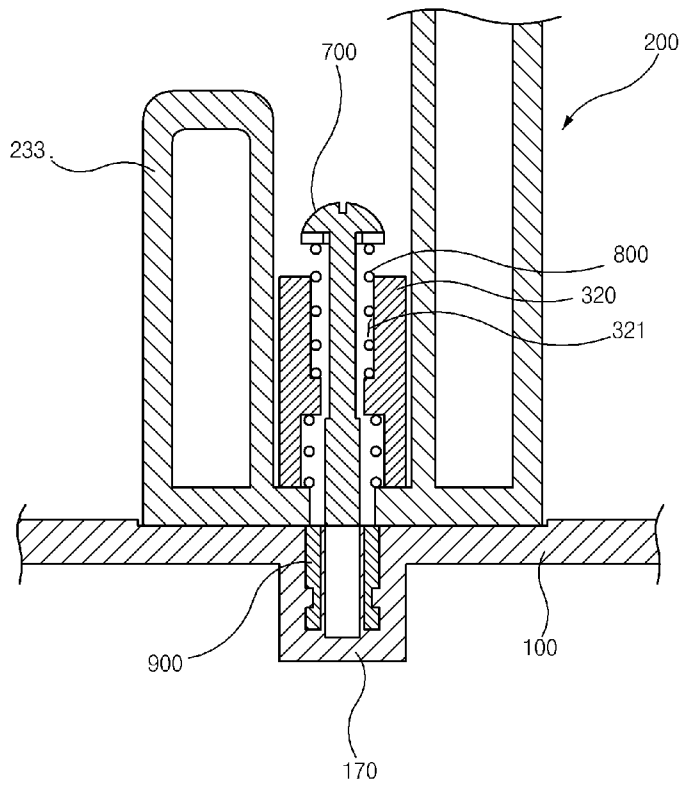
[Fig. 5]



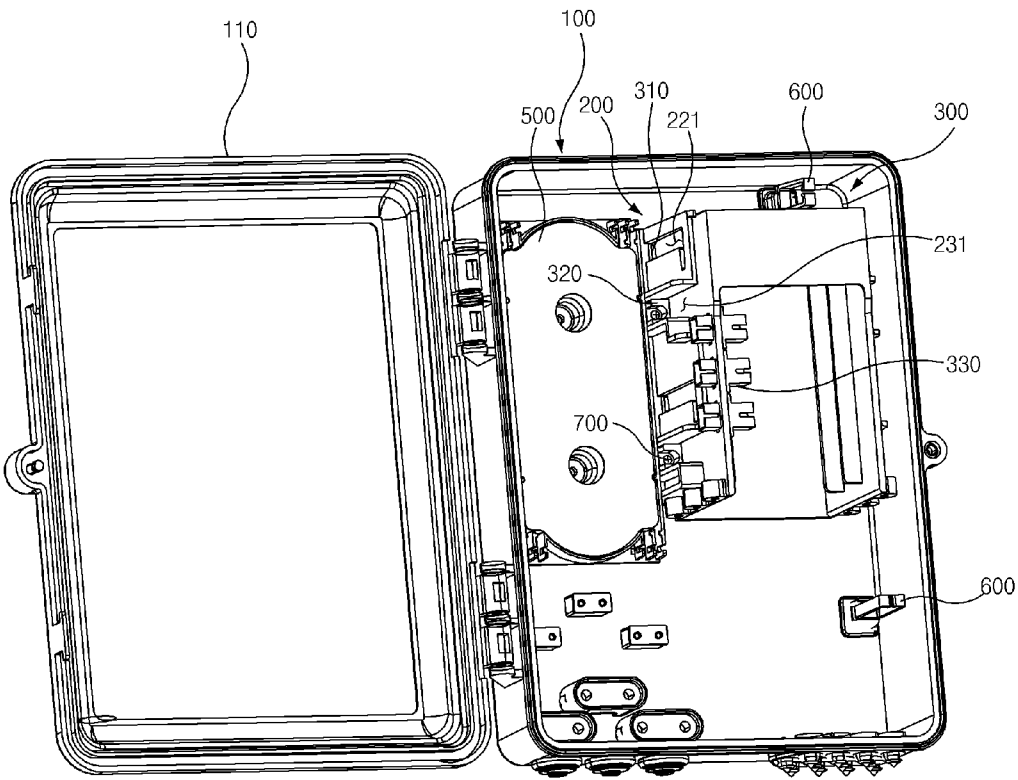
[Fig. 6]



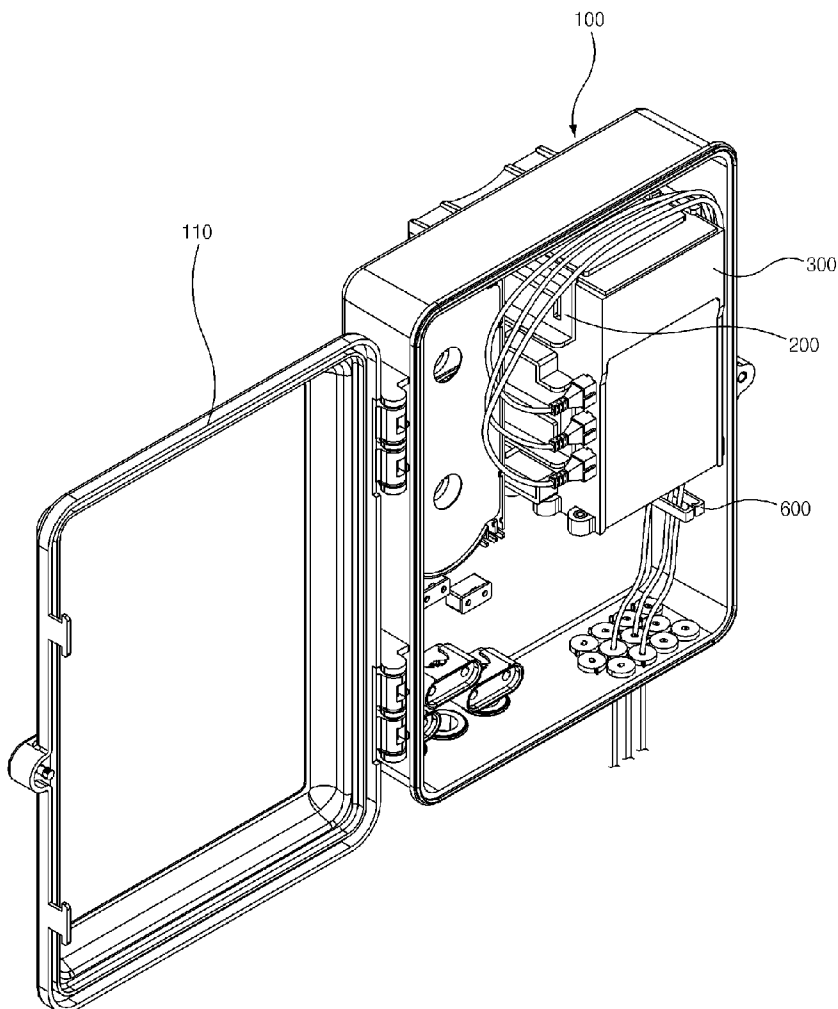
[Fig. 7]



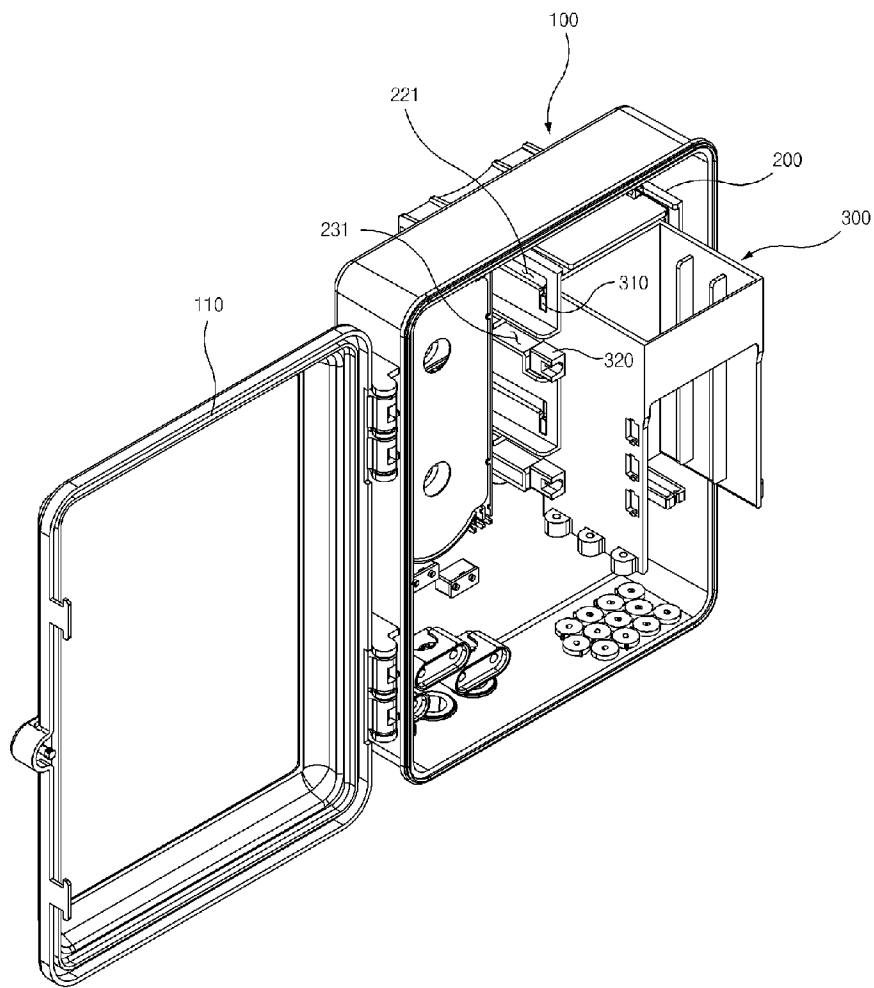
[Fig. 8]





[Fig. 9]



[Fig. 10]



A. CLASSIFICATION OF SUBJECT MATTER		
<i>G02B 6/46(2006.01)i</i>		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) G02B 6/46; G02B 6/48; G02B 6/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models Japanese utility models and applications for utility models		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: optical cable, terminal, bracket, rotatably, fold, curve		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20-2009-0002595 U (MYONG SUNG NETWORK COMMUNICATION) 16 March 2009	1
Y	see paragraphs [0022], claim 2 and figure 1-3.	2
Y	KR 10-2011-0117639 A (YANG, DU YOUNG) 27 October 2011 see paragraphs [0037]-[0040], claim 3 and figure 2.	2
A	US 2009-0074370 A1 (KOIALCZYK SCOTT c. et al.) 19 March 2009 see paragraphs [0046]-[0058] and figure 17.	1-2
A	KR 20-0396499 Y1 (KIM, SANG GI et al.) 23 September 2005 see claims 1-5 and figure 3.	1-2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 05 April 2013 (05.04.2013)		Date of mailing of the international search report 08 April 2013 (08.04.2013)
Name and mailing address of the ISA/KR  Korean Intellectual Property Office 189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan City' 302-70 1' Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer LEE, Seon Hee Telephone No. 82-42-481-8531 

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2012/011370

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20-2009-0002595 U	16.03.2009	None	
KR 10-2011-0117639 A	27. 10.2011	None	
US 2009-0074370 A 1	19.03.2009	AR067819A1	21. 10.,,2009
		AU 2008-311242 A 1	16. 04.,,2009
		CN 101802672 A	11. 08.,,2010
		EP 2176696 A 1	21. 04.,,2010
		MX 2010001388 A	31. 03.,,2010
		TW 200931092 A	16. 07.,,2009
		US 2010-0310224 A 1	09. 12.,,2010
		US 2011-0158599 A 1	30. 06.,,2011
		US 7756379 B2	13. 07.,,2010
		US 7894701 B2	22. 02.,,2011
		US 8189984 B2	29. 05.,,2012
		W0 2009-048680 A 1	16. 04.,,2009
		W0 2009-048680 A9	11. 06.,,2009
		w0 2009-048680 A9	16. 04.,,2009
KR 20-0396499 Y 1	23.09.2005	None	