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(54) **FUSE BASE CONNECTION TERMINAL APPARATUS**

(57) A fuse base connection terminal apparatus comprises a base (1). At least one conductive copper bar (2) is arranged on the base (1). A connection bolt (3) and a connection nut (4) used for selectively connecting to an external cable are arranged in the base. A groove (12) used for mounting the connection nut (4) is arranged under the conductive copper bar (2) on the base. The connection nut (4) is mounted in the groove (12). The connection bolt (3) passes, under the groove (12), through the connection nut (4) and the conductive copper bar (2) sequentially. A top end of the connection bolt (3) extends above the conductive copper bar (2). The apparatus has a simple structure, is convenient and practical, and can provide two different types of cable connection manners, thereby meeting different requirements, saving materials, and reducing costs.

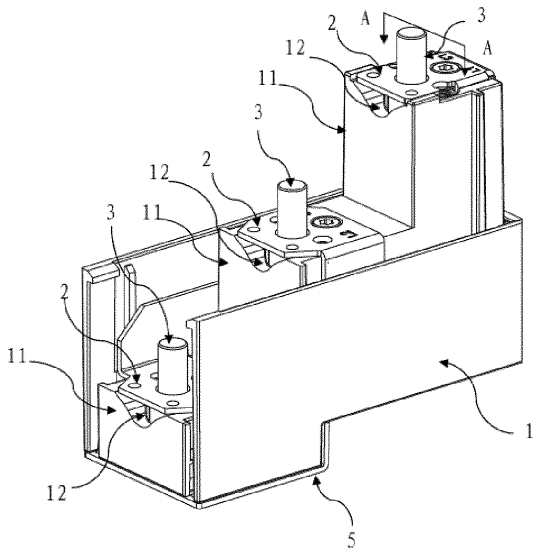

Fig. 1

EP 3 125 269 A1

Description

Technical field

[0001] The present invention relates to a technical field of fuse base, and in particular, to a fuse base connection terminal apparatus.

Background

[0002] In prior art, there are two ways to connect a fuse base connection terminal to a cable. One is to secure a nut on the terminal, and the terminal is connected with an external cable via the nut. The other is to secure a bolt on the terminal, and the terminal is connected with the external cable via the bolt. With the prior art product, a user cannot flexibly choose a suitable connecting way on site according to his/her demand, and he/she can only choose one connecting way when purchasing a fuse base. If the user cannot determine which connecting way he/she needs, he/she has to purchase fuse bases with the two different connecting ways, which increases the cost.

Summary

[0003] An object of the invention is to overcome the deficiency in prior art, so as to provide a fuse base connection terminal apparatus, which is adapted for two connecting ways, has simple structure, and can be operated conveniently.

[0004] The technical solution of the invention provides a fuse base connection terminal apparatus, comprising a base, wherein at least one conductive copper bar is arranged on the base, a connection bolt and a connection nut for selectively being connected with an external cable are arranged within the base, a groove for mounting the connection nut is arranged on the base and below the conductive copper bar, wherein the connection nut is mounted within the groove, the connection bolt passes upwardly and successively through the connection nut and the conductive copper bar from the groove, and a top end of the connection bolt protrudes beyond the conductive copper bar.

[0005] Further, the connection bolt is removably connected with the connection nut.

[0006] Further, a bolt mounting hole in communication with the groove is arranged within the base and below the groove, wherein a bottom end of the connection bolt is located within the bolt mounting hole, and a body portion of the connection bolt is in threaded connection with the connection nut.

[0007] Further, a hollow space is arranged within the base and below the bolt mounting hole.

[0008] Further, the connection nut comprises a nut body portion and a nut connection portion formed by extending from the nut body portion, wherein a groove supporting portion is arranged on the groove, and the nut connection portion is mounted within the groove supporting portion.

[0009] Further, a spring washer is arranged between the connection bolt and the connection nut.

[0010] Further, three steps are arranged on upper surface of the base in step-like manner, with one conductive copper bar being arranged on each of the steps, and the connection bolt and the connection nut being arranged within each of the steps.

[0011] Further, a protective cap is arranged on a bottom of the base, and the protective cap is buckled on the bottom of the base.

[0012] By adopting the above technical solutions, the following benefit effects are achieved: by providing a combination of nut and bolt above the base, specifically by providing the connection nut being mounted within the groove and the connection bolt cooperating with the connection nut, the connection bolt and connection nut can be selectively connected with the external cable. That is, if a user needs a connection via nut, the user can dismantle the connection bolt, place the external cable on the conductive copper bar, then fasten the connection bolt or an external bolt to the connection nut downwardly, so as to achieve conduction between the cable and the conductive copper bar, and thus realize a connecting way for cable; if the user needs a connection via bolt, the user can sleeve a cable lug of the external cable over the top of the connection bolt, and then use an external nut to fasten the cable lug on the bolt, so as to achieve conduction between the external cable and the conductive copper bar, and thus realize another connecting way for cable.

[0013] Therefore, the fuse base connection terminal apparatus according to the invention provides two different cable connecting ways for a user, such that the user can choose different connecting ways to meet different requirements. A user does not need to purchase two types of switch to meet requirements, which lowers the cost; and the terminal connection apparatus has simple structure, is easy to operate, and has good practicability.

Brief description of the drawings

[0014]

Fig. 1 is a diagram of a fuse base connection terminal apparatus of the invention, wherein the way to connect a cable via a bolt is adopted.

Fig. 2 is an exploded diagram of the fuse base connection terminal apparatus shown in Fig. 1.

Fig. 3 is a diagram of the fuse base connection terminal apparatus shown in Fig. 1 with the connection bolt being removed, wherein the way to connect a cable via a nut is adopted.

Fig. 4 is a section view of the fuse base connection

terminal apparatus shown in Fig. 1 along A-A.

Fig. 5 is a diagram showing internal structure of the fuse base connection terminal apparatus shown in Fig. 4.

Fig. 6 is a structural diagram of the connection nut shown in Fig. 2;

Fig. 7 is a structural diagram of a groove above the base.

List of reference sign

[0015]

1-base

11-step

12-groove

121-groove supporting portion

13-bolt mounting hole

14-hollow space

2-conductive copper bar

21-copper bar through hole

3-connection bolt

31-bottom end

32-body portion

33-top end

4-connection nut

41-nut body portion

42-nut connection portion

43-connection hole

44-mounting hole

5-protective cap

51-buckle

6-spring washer

Detailed description of the embodiments

[0016] Embodiments of the invention are described below in connection with the accompanying drawings.

[0017] A fuse switch or fuse switch disconnector is generally used together with a fuse. By taking full advantage of protection characteristic curve of the fuse, protection for cables and apparatuses in circuit is achieved; personal safety of staff can be ensured by proving obvious cut-off points during maintenance; and switch apparatuses of other intelligence systems can be extended.

[0018] As shown in Figs. 1-7, a fuse base connection terminal apparatus of the invention comprises a base 1, wherein at least one conductive copper bar 2 is arranged on the base, and a connection bolt 3 and a connection nut 4 for selectively being connected with an external cable are arranged within the base 1. A groove 12 for mounting the connection nut 4 is located on the base 1 and below the conductive copper bar 2, wherein the connection nut 4 is mounted within the groove 12. The connection bolt 3 passes upwardly and successively through the connection nut 4 and the conductive copper bar 2 from the groove 12, and a top end 33 of the connection bolt 3 protrudes beyond the conductive copper bar 2.

[0019] That is, the fuse base connection terminal apparatus comprises the base 1, and the conductive copper bar 2, the connection bolt 3 and the connection nut 4 are arranged on the base 1. The base 1 is used to be mounted with the conductive copper bar 2, the connection bolt 3, and the connection nut 4 and other components. The conductive copper bar 2 is mounted over the base 1 via a screw, wherein one or more conductive copper bars 2 can be arranged as required. The conductive bar 2 is used to carry current to a desired location.

[0020] The connection bolt 3 and connection nut 4 for selectively being connected with the external cable are also arranged within the base 1. That is, the connection bolt 3 and the connection nut 4 are also arranged within the base 1, and the connection bolt 3 and the connection nut 4 is used for selectively being connected with the external cable. The connection bolt 3 and the connection nut 4 can be respectively connected with the external cable as required, that is, the external cable is selectively connected with the connection nut 4 or the connection bolt 3 as required, so as to achieve different cable connecting ways. The connecting ways mentioned above to selectively connect the external cable to the connection bolt 3 or the connection nut 4 is referred to as being selectively connected with the external cable.

[0021] The aforesaid connection nut 4 may be a standard hexagonal nut or a profiled nut, and the features with regard to the profiled nut are described in detail below.

[0022] The groove 12 for mounting the connection nut 4 is arranged on the base 1. The conductive bar 2 is fastened onto the base 1 after the connection nut 4 is mounted in the groove 12, and a connection hole 43 on the connection nut 4 are maintained to be aligned with a copper bar through hole 21 on the conductive copper bar

2, to facilitate the connection bolt 3 to pass therethrough, wherein the conductive copper bar 2 is located above the connection nut 4.

[0023] After the connection nut 4 is mounted in the groove 12, the connection bolt 3 successively passes through the connection hole 43 on the connection nut 4 and the copper bar through hole 21 on the conductive copper bar 2 from the bottom of the groove 12, and the top end 33 of the connection bolt 3 protrudes beyond the conductive copper bar 2, for being connected with the external cable.

[0024] The manufactured fuse base connection terminal apparatus according to the present invention is shown in Fig. 1. If a user needs to connect the cable via the bolt, he/she may sleeve a cable lug of the external cable directly over a top portion 33 of the connection bolt 3, then fasten the cable lug onto the conductive copper bar 2 by the cooperation between an external nut and the connection bolt 3, such that the conduction between the external cable and the conductive copper bar 2 (one way to connect the cable) is achieved.

[0025] If the user needs to connect the cable via the nut, as shown in Fig. 3 along with Figs. 2 and 4, he/she may dismantle the connection bolt 3 from the connection nut 4, place the cable lug of the external cable above the conductive copper bar 2 such that the cable lug is aligned with the connection nut 4 of the terminal, make the dismantled connection bolt 3 or an external bolt downwardly pass through the cable lug and screw into the connection nut 4, and finally fasten the cable lug to the conductive copper bar 2, such that the conduction between the external cable and the conductive copper bar 2 (another way to connect the cable) is achieved.

[0026] Therefore, the fuse base connection terminal apparatus proposed by the invention provides two different cable connecting ways for users, and facilitates users to choose different connecting way(s) as required, so as to meet different requirements. Thus, a user does not need to purchase two types of switch to meet different requirements, which lowers the cost, and the terminal connection apparatus has a simple structure, is convenience to operate, and thus has good practicability.

[0027] Preferably, the connection bolt 3 and the connection nut 4 are removably connected together. That is, the connection bolt 3 and the connection nut 4 are connected together, and can be dismantled from each other as required, so as to achieve different cable connecting ways. By the arrangement that the above mentioned connection bolt 3 and connection nut 4 are removably connected, the connection bolt 3 and connection nut 4 can be selectively connected with the external cable, and the operation of connection is convenience. Thus, different cable connection ways are achieved, which meets different requirements of users, and saves the cost.

[0028] Preferably, as shown in Figs. 4-5, a bolt mounting hole 13, which is in communication (occupies a common center) with the groove 12, is arranged within the base 1 and below the groove 12, and a bottom end 31 of the connection bolt 3 is located within the bolt mounting hole 13. A body portion 32 of the connection bolt 3 is in threaded connection with the connection nut 4. The connection bolt 3 comprises the bottom end 31 serving as a mounting end, the body portion 32, and the top end 33 successively connected together, and the aforesaid bottom end 31, body portion 32 and top end 33 are formed as one piece.

[0029] The bolt mounting hole 31 arranged within the base 1 and below the groove 12, is in communication (occupies a common center) with the groove 12 to facilitate installation of connection bolt 3, and provides a guide for mounting the connection bolt 3, so as to avoid the offset of the connection bolt 3. After the installation, the top end 31 of the connection bolt 3 is fastened in the bolt mounting hole 13, and the body portion 32 is in threaded connection with the connection nut 4 with the top end 33 protruding beyond the conductive copper bar 2, which achieves a detachable combination.

[0030] Preferably, as shown in Figs. 4-5, a hollow space 14 is arranged within the base 1 and below the bolt mounting hole 13. A bottom of the hollow space 14 is an opening portion arranged below the base 1. By providing the hollow space 14, on the one hand, a user can access the hollow space by hands or a tightening tool, to assembly the connection bolt 3 on the connection nut 4, or to remove the connection bolt 3 from the connection nut 4; on the other hand, the weight of the fuse base connection terminal apparatus can be decreased, which saves material, and lowers the cost.

[0031] Preferably, as shown in Figs. 6-7, the connection nut 4 comprises a nut body portion 41 and a nut connection portion 42 extending from the nut body portion 41. A groove supporting portion 121 is arranged on the groove 12, and the nut connection portion 42 is mounted in the groove supporting portion 121.

[0032] The connection nut 4 comprises the nut body portion 41 and the nut connection portion 42, and at least one nut connection portion 42 extends from the nut body portion 41. Such connection nut can be referred to as a profiled nut.

[0033] The connection hole 43 is arranged on the nut body portion 41, to connect the body portion 32 of the connection bolt 3 by thread. A mounting hole 44 is arranged on the nut connection portion 42, and a corresponding hole can be arranged on the conductive bar 2, wherein the connection bolt passes through the corresponding hole, and is connected to the mounting hole 44, to achieve a conductive installation.

[0034] Preferably, as shown in Figs. 6-7, one nut connection portion 42 is respectively formed by extending from each of both sides of the nut body portion 41. The two nut connection portions 42 are symmetrically arranged on the both sides of the nut body portion 41, but they are not in a same straight line. Correspondingly, one groove supporting 121 corresponding to the respective nut connection portion 42 is arranged on each of both sides of the groove 12, with each of the two nut connec-

tion portions 42 being mounted in the respective groove supporting portion 121.

[0035] The two nut connection portions 42 are not in the same straight line, that is, the connecting lines between each terminal end of the two nut connection portions 42 and the nut body portion 41 form a triangle, such that the connecting lines between each of the two mount holes 44 and the connection hole 43 also form a triangle, enhancing the strength of the structure.

[0036] Preferably, as shown in Fig. 2, a spring washer 6 is arranged between the connection bolt 3 and the connection nut 4, to improve the connection stability between the connection bolt 3 and the connection nut 4 and thus to avoid loosening.

[0037] Preferably, as shown in Figs. 1-3, three steps 11 are arranged on top surface of the base 1 in step-like manner. One conductive copper bar 2 is arranged on each step 11, and the connection bolt 3 and the connection nut 4 are arranged within each step 11.

[0038] That is, there are three steps 11 arranged on the upper surface of the base 1, and the steps 11 are arranged in step-like manner. One conductive copper bar 2 is arranged on top surface of each step 11, and one pair of detachable connection bolt 3 and connection nut 4 is arranged within each step 11, so as to achieve two different cable connecting ways. The step-like arrangement of the three steps 11 ensures sufficient electric clearance and the creepage distance between different phrases of the terminal end, and facilitates to connect more cables.

[0039] Preferably, as shown in Figs. 1-5, a protective cap 5 is arranged on the bottom of the base 1, and the protective cap 5 is buckled on the bottom of the base 1. Buckles 51 are arranged on the protective cap 5, and the protective cap 5 is mounted by buckling the buckles 51 on the bottom of the base 1. When the connection bolt 3 needs to be dismantled, the protective cap 5 is taken down first, so as to accomplish dismantling of the connection bolt 3. The protective cap 5 mainly functions as IP protection, preventing body of an operator or a conductive tool from contacting the connection bolt or the connection nut from back during operator's operation, to ensure personal safety.

[0040] The above mentioned technical solutions can be combined as required, to achieve the best technical effect.

[0041] Therefore, the fuse base connection terminal apparatus proposed by the invention has simple structure, is convenient and practical, and can achieve two different cable connecting ways, meet different requirements, save material, and lower the cost.

[0042] The content set forth above merely comprises the principle and preferred embodiments of the invention. It should be noted that, for those skilled in the art, various modifications can be made to the present invention based on the principle of the invention, and the modifications should be considered as falling into the protection scope of the invention.

Claims

1. A fuse base connection terminal apparatus, comprising a base (1), wherein at least one conductive copper bar (2) is arranged on the base (1),
characterized in that, a connection bolt (3) and a connection nut (4) for selectively being connected with an external cable are arranged within the base (1),
a groove (12) for mounting the connection nut (4) is arranged on the base (1) and below the conductive copper bar (2), wherein the connection nut (4) is mounted within the groove (12),
the connection bolt (3) passes upwardly and successively through the connection nut (4) and the conductive copper bar (2) from the groove (12), and a top end (33) of the connection bolt (3) protrudes beyond the conductive copper bar (2).

2. The fuse base connection terminal apparatus according to claim 1, **characterized in that**, the connection bolt (3) is removably connected with the connection nut (4).

3. The fuse base connection terminal apparatus according to claim 2, **characterized in that**, a bolt mounting hole (13) in communication with the groove (12) is arranged within the base (1) and below the groove (12),
Wherein a bottom end (31) of the connection bolt (3) is located within the bolt mounting hole (13), and a body portion (32) of the connection bolt (3) is in threaded connection with the connection nut (4).

4. The fuse base connection terminal apparatus according to claim 3, **characterized in that**, a hollow space (14) is arranged within the base (1) and below the bolt mounting hole (13).

5. The fuse base connection terminal apparatus according to claim 2, **characterized in that**, the connection nut (4) comprises a nut body portion (41) and a nut connection portion (42) formed by extending from the nut body portion (41),
wherein a groove supporting portion (121) is arranged on the groove (12), and the nut connection portion (42) is mounted within the groove supporting portion (121).

6. The fuse base connection terminal apparatus according to claim 2, **characterized in that**, a spring washer (6) is arranged between the connection bolt (3) and the connection nut (4).

7. The fuse base connection terminal apparatus according to claim 2, **characterized in that**, three steps (11) are arranged on upper surface of the base (1) in step-like manner, with one conductive copper bar

(2) being arranged on each of the steps (11), and the connection bolt (3) and the connection nut (4) being arranged within each of the steps (11).

8. The fuse base connection terminal apparatus according to anyone of claims 1-7, **characterized in that**, a protective cap (5) is arranged on a bottom of the base (1), and the protective cap (5) is buckled on the bottom of the base (1).

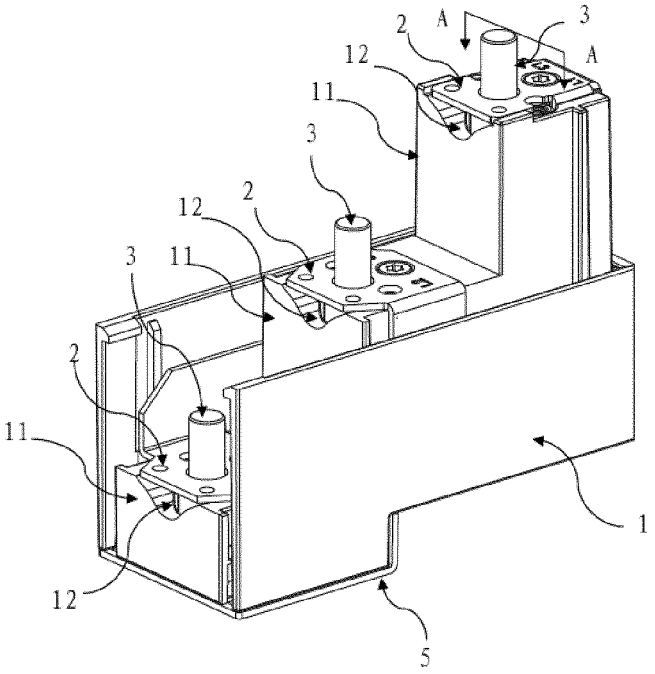

Fig. 1

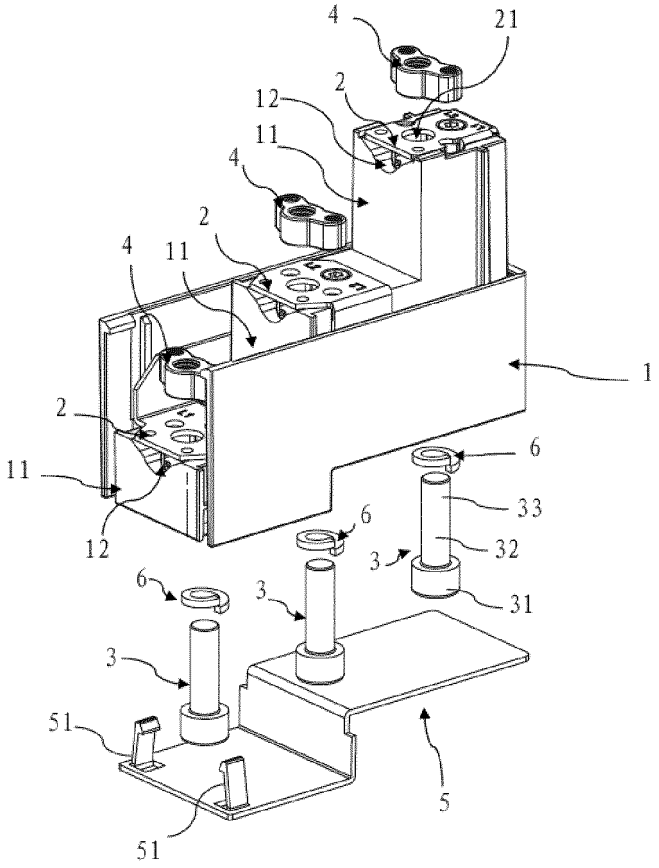

Fig. 2

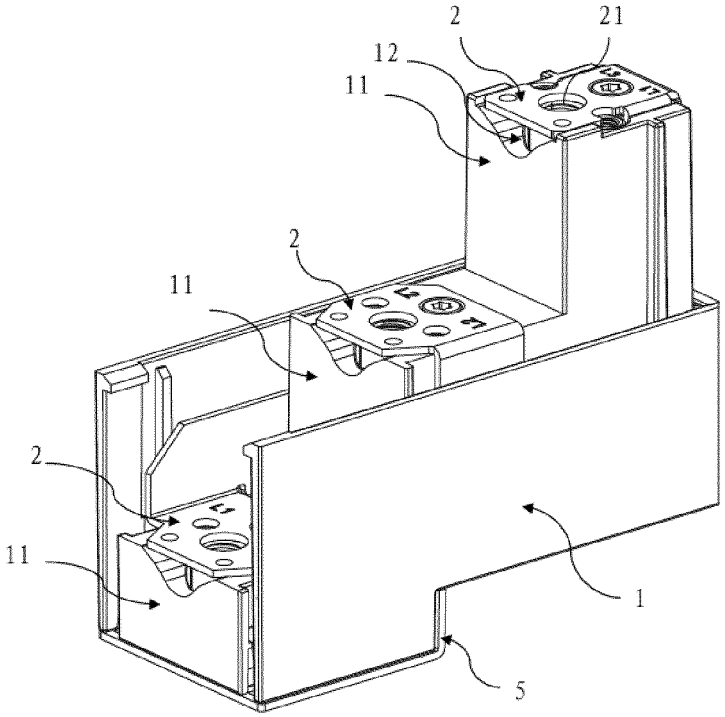

Fig. 3

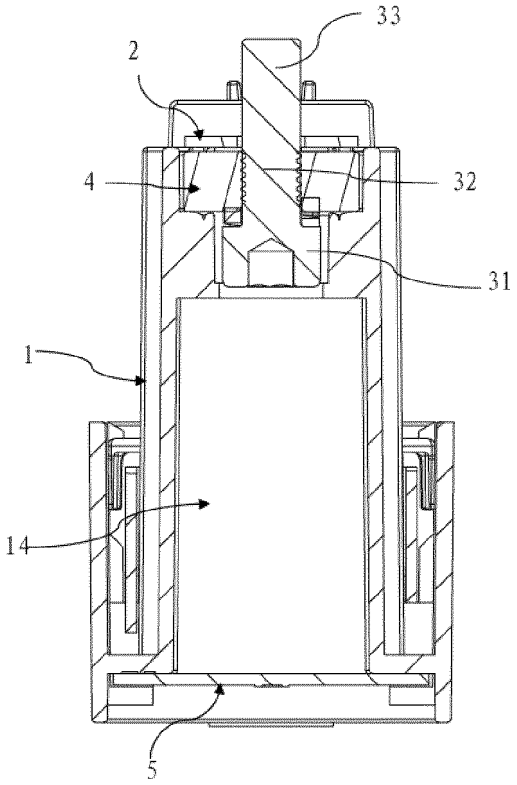

Fig. 4

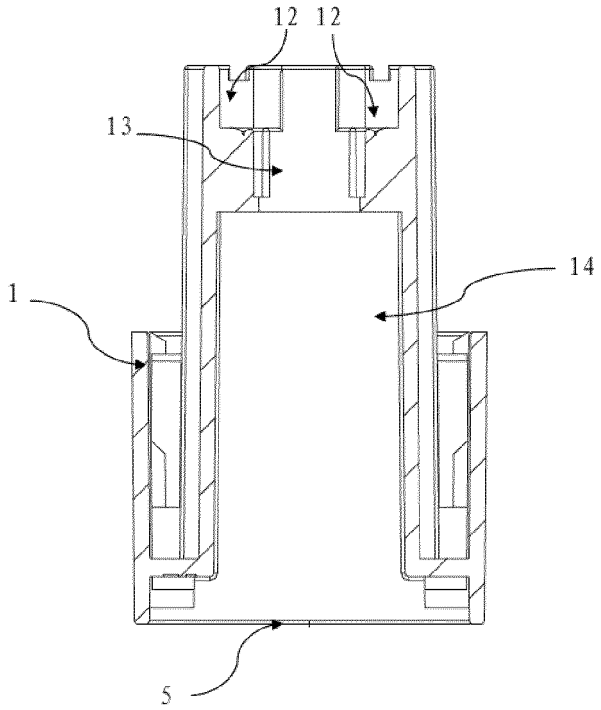

Fig. 5

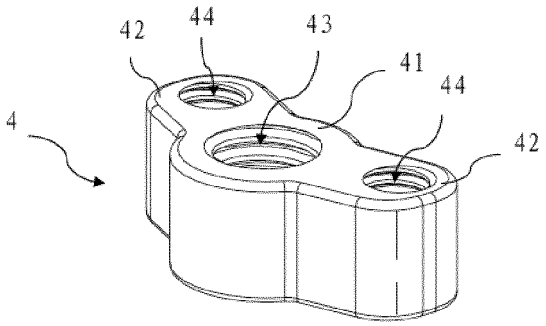

Fig. 6

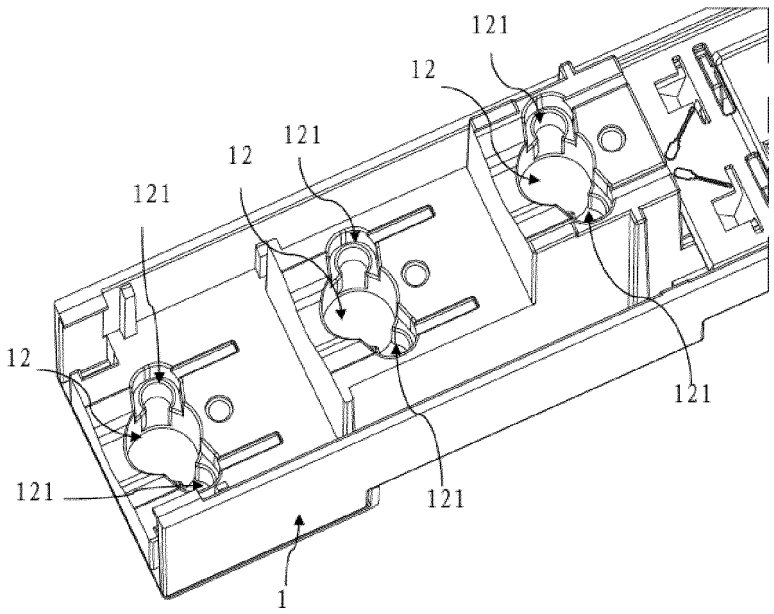

Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2015/075059

A. CLASSIFICATION OF SUBJECT MATTER

H01H 85/20 (2006.01) 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)

H01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS, VEN, CNKI: connector, bolt, fuse, base, terminal, connector bolt, screw, nut

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 203839323 U (ABB AS), 17 September 2014 (17.09.2014), claims 1-8	1-8
A	CN 203398070 U (ZHEJIANG XINLI FUSE CO., LTD.), 15 January 2014 (15.01.2014), the whole document	1-8
A	JP 2012003905 A (SUMITOMO DENSO KK et al.), 05 January 2012 (05.01.2012), the whole document	1-8
A	CN 101661856 A (PEOPLE ELE. APPLIANCES GROUP CO., LTD.), 03 March 2010 (03.03.2010), the whole document	1-8
A	CN 203026474 U (XIAMEN YIXIN TECHNOLOGY CO., LTD.), 26 June 2013 (26.06.2013), the whole document	1-8

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 June 2015 (15.06.2015)	**19 June 2015 (19.06.2015)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **ZHAO, Luze** Telephone No.: (86-10) **62411760**

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2015/075059

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 203839323 U	17 September 2014	None	
CN 203398070 U	15 January 2014	None	
JP 2012003905 A	05 January 2012	JP 5505113 B2	28 May 2014
		US 2011306243 A1	15 December 2011
		US 8382525 B2	26 February 2013
CN 101661856 A	03 March 2010	CN 101661856 B	01 February 2012
CN 203026474 U	26 June 2013	None	

Form PCT/ISA/210 (patent family annex) (July 2009)