

WIRING TERMINAL AND LIGHTING DEVICE

FIELD

[0001] Embodiments of the present disclosure relate to a wiring terminal and a corresponding lighting device.

BACKGROUND

[0002] For some lighting devices, safety standards require that wire connection ends should have protective structures to prevent users from touching the wire connection ends. A protective structure that matches with a wiring terminal of a lighting device is often fixed to the wiring terminal by fasteners. In the actual installation process, the fasteners may be lost or not carried by operators. At this time, there may be a situation where the protective structure is not installed. Moreover, users may not be aware of requirements of the safety standards and therefore do not realize that the protective structure is not installed. Therefore, it is desired that the protective structure can be reliably installed to the wiring terminal or the lighting device.

[0003] Therefore, there is a need for an improved structure to ensure the wiring terminal and/or the lighting device meet safety standards.

SUMMARY

[0004] Traditional wiring terminals have disadvantages, such as has no protective structures and missing protective structures. The embodiments of the present disclosure provide an improved wiring terminal to solve or at least partially solve the above or other potential problems.

[0005] According to the first aspect of the present disclosure, a wiring terminal is provided. The wiring terminal comprises a housing comprising a coupling hole and at least one port adapted to electrically connect to a wire; a protective cover adapted to accommodate a part of the wire, the protective cover (20) comprising a first through hole having a first diameter; a fastener passing through the first through hole and is configured to couple the protective cover to the housing, the fastener comprising: a stem section having a diameter smaller than the first diameter; a threaded section adapted to threadedly connect to the coupling hole, and a root diameter of a thread of the threaded section being smaller than the first diameter, and a crest diameter of the thread being larger than the first diameter.

[0006] According to the wiring terminal provided by the present disclosure, since the crest diameter of the threaded section of the fastener is larger than the first diameter, in the assembled state, the threaded section is blocked by the first through hole and cannot fall off from the protective cover and thereby the fastener remains coupled or attached to the protective cover. With such arrangement, the fastener and the protective cover are kept in a coupled or attached state, so that the fastener will not be lost, and the users or operators can easily assemble the protective cover to the wiring terminal to ensure safety of the terminal.

[0007] In some embodiments, the protective cover further comprises a second through hole arranged coaxially with the first through hole, and the second through hole has a second diameter larger than the crest diameter. The threaded section of the fastener can be accommodated in the second through hole, thereby reducing the overall size of the fastener and the protective cover.

[0008] In some embodiments, at least a part of the stem section is received in the first through hole, and the threaded section is blocked by a step wall formed by the first through hole and the second through hole such that the fastener will not fall off from the protective cover. With the step wall formed by the first through hole and the second through hole, the threaded section is blocked, thereby the fastener can be attached to the protective cover, avoiding losing the fastener.

[0009] In some embodiments, the wiring terminal further comprises an elastic member, two ends of the elastic member respectively abutting against a tool head of the fastener and the protective cover. On the one hand, the elastic member can ensure connection strength between the fastener and the housing so as to prevent loosening of the fastener relative to the housing; on the other hand, the elastic member can move a tool head of the fastener away from the protective cover, thereby indicating users or operators that the fastener is not tightened, i.e., the protective cover is not installed.

[0010] In some embodiments, the protective cover further comprises a third through hole arranged coaxially with the first through hole, and the third through hole has a third diameter larger than the crest diameter; and wherein the first through hole is arranged between the second through hole and the third through hole; and wherein two ends of the elastic member respectively abut against the tool head and an end wall of the third through hole. Using the third through hole to accommodate a part of the elastic element,

the overall size of the fastener, the protective cover and the elastic member can be reduced, and accurate positioning of the elastic member can be ensured.

[0011] In some embodiments, the protective cover further comprises a pivot; and the housing further comprises a hole receiving the pivot so that the protective cover can rotate relative to the housing. As such, the protective cover is coupled to the housing, whereby avoiding a problem of missing installation of the protective cover. In this way, the protective cover can be reliably installed to the wiring terminal, and the rotatable protective cover will not obstruct the connection operation of the wire and the port.

[0012] In some embodiments, the wiring terminal further comprises a torsion spring arranged on the pivot, the torsion spring being adapted to enable rotation of the protective cover relative to the housing when the threaded section is disconnected from the coupling hole. After the disconnection between the threaded section and the coupling hole, the torsion spring will cause the protective cover to rotate relative to the housing. On the one hand, the rotation of the protective cover facilitates connection, disassembly or maintenance of the wire and the port; on the other hand, the rotation of the protective cover also indicates to users or operators that the protective cover is not installed to the wiring terminal.

[0013] In some embodiments, the housing comprises a plurality of the ports; and the protective cover comprises a plurality of openings corresponding to the plurality of ports.

[0014] In some embodiments, the wiring terminal further comprises an isolation plate arranged to separate wires connected to adjacent ports from each other. The isolation plate separates adjacent wires from each other, which can further improve safety level of the wiring terminal.

[0015] According to the second aspect of the present disclosure, a lighting device is provided. The lighting device described herein comprises the wiring terminal according to the first aspect of the present disclosure; and a lighting unit electrically connected to the port of the wiring terminal to draw electric power from the wire connected to the port.

[0016] Since the wiring terminal of the first aspect of the present disclosure can ensure the protective structure to be reliably installed, the lighting device has the protective structure that prevents users from touching the wire and is able to meet requirements of the safety standards.

[0017] It should be understood that the Summary is not intended to identify the key features or main features of the present disclosure, nor is it intended to limit the scope of the present disclosure. Through the following description, other features of the present invention will become easy to understand.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Through the following detailed embodiments with reference to the accompanying drawings, the above and other objectives, features, and advantages of the present disclosure will become more apparent. In the example embodiments of the present disclosure, the same reference signs usually refer to the same components.

[0019] FIG. 1 is a three-dimensional diagram of a lighting device according to an embodiment of the present disclosure;

[0020] FIG. 2 is a three-dimensional diagram of the lighting device according to an embodiment of the present disclosure in another viewing angle;

[0021] FIG. 3 is a cross-sectional view of the lighting device according to an embodiment of the present disclosure.

[0022] FIG. 4 is a cross-sectional view of the lighting device according to an embodiment of the present disclosure.

[0023] FIG. 5 is a three-dimensional diagram of a wiring terminal according to an embodiment of the present disclosure; and

[0024] FIG. 6 is a three-dimensional diagram of a wiring terminal according to an embodiment of the present disclosure.

[0025] In the various figures, the same or corresponding reference numerals indicate the same or corresponding parts.

DETAILED DESCRIPTION OF EMBODIMENTS

[0026] Embodiments of the present disclosure will be described below with reference to the drawings.

[0027] The disclosure will be described below with reference to the embodiments. It should be understood that these embodiments are intended to enable those skilled in the art to better understand and thereby realize the present disclosure, and are not intended to impose any limitation on the scope of the technical solutions of the present disclosure.

[0028] As used herein, the term “includes” and its variants are to be read as open-ended terms that mean “includes, but is not limited to.” The term “based on” is to be read as “based at least in part on.” The terms “one example embodiment” and “one embodiment” are to be read as “at least one example embodiment.” The term “a further embodiment” is to be read as “at least a further embodiment.” The terms “first”, “second” and so on can refer to same or different objects. The following text also can include other explicit and implicit definitions. Unless the context clearly indicates; otherwise, the definitions of terms are consistent throughout the specification.

[0029] Traditional wiring terminals have disadvantages such as having no protective structures or missing protective structures. Therefore, an improved lighting device or wiring terminal is required.

[0030] As shown in FIG. 1, a lighting device includes a wiring terminal and a lighting unit 60. In some embodiments, the lighting unit 60 may be a night light, and a specific light-emitting element may be, for example, an energy-saving lamp, an LED lamp, an incandescent lamp, a lamp bead, a halogen lamp tube, a fluorescent lamp tube, and the like.

[0031] The lighting unit 60 is electrically connected to the wiring terminal, in particular, to a port 12 of the wiring terminal so as to draw electric power from a wire connected to the port 12. For safety reasons, it is required that the wire connected to the wiring terminal needs to be protected to prevent users from touching it. The wiring terminal of an embodiment of the present disclosure can ensure the protective structure to be reliably installed, thereby improving a safety level of the wiring terminal.

[0032] As shown in FIGS. 1 to 2, the wiring terminal includes a housing 10, a protective cover 20, and a fastener 30. The housing 10 includes a coupling hole 11 and at least one port 12. Each of the at least one port 12 is adapted to be electrically connected to the wire.

[0033] In some embodiments, the housing 10 may include a plurality of ports 12, and the protective cover 20 may include a plurality of openings 26 corresponding to the plurality of ports 12. In this way, the protective cover 20 can protect the wires connected to the ports 12 so as to prevent the user from touching the wires by mistake.

[0034] In some embodiments, as shown in FIGS. 1-2, the housing 10 may include two ports 12, and the coupling hole 11 is located between the two ports 12. In other embodiments, there may be more than one coupling hole 11 (for example, two), and the number of the fastener 30 and the first through hole 21 may correspond to the number of the coupling hole

11.

[0035] As shown in FIGS. 3 to 4, the protective cover 20 includes a first through hole 21 having a first diameter, and in a case where the wire is connected to the housing 10, the protective cover 20 is configured to accommodate a part of the wire. In this way, the protective cover 20 isolates the wire from the outside, thereby avoiding accidental touch from users and improving safety of the wiring terminal.

[0036] In order to install the protective cover 20, a fastener 30 passing through the first through hole 21 for coupling the protective cover 20 to the housing 10 is provided. The fastener 30 includes a stem section 31 and a threaded section 32. The diameter of the stem section 31 is smaller than the first diameter, while a root diameter of a thread of the threaded section 32 is smaller than the first diameter, and a crest diameter of the thread is larger than the first diameter.

[0037] Based on the sizes of the threaded section 32 and the first diameter, when assembling the fastener 30 and the protective cover 20, operators can screw the threaded section 32 of the fastener 30 into the first through hole 21 and then screw out the first through hole 21. Thus, the threaded section 32 is blocked by the first through hole 21 and cannot fall off from the protective cover 20. As such, the fastener 30 remains coupled or attached to the protective cover 20. When the protective cover 20 needs to be installed, the threaded section 32 of the fastener 30 is threadedly connected to the coupling hole 11 such that the protective cover 20 is coupled to the housing 10. Thanks to this configuration, users or operators can easily assemble the protective cover 20 to the wiring terminal, ensuring safety of the wiring terminal.

[0038] In some embodiments, the protective cover 20 may further include a second through hole 22, the second through hole 22 is arranged coaxially with the first through hole 21, and the second through hole 22 has a second diameter larger than the crest diameter. In this way, the threaded section 32 of the fastener 30 can be received in the second through hole 22, thereby reducing the overall size of the fastener 30 and the protective cover 20.

[0039] In some embodiments, the first through hole 21 and the second through hole 22 form a step wall 212. In the state where the fastener 30 is assembled to the protective cover 20, at least a part of the stem section 31 is received in the first through hole 21. At the same time, the threaded section 32 is blocked by the step wall 212 such that the fastener 30 will not fall off from the protective cover 20 and the fastener 30 is kept attached to the protective

cover 20.

[0040] In some embodiments, the protective cover 20 may further include a third through hole 23. The third through hole 23 is arranged coaxially with the first through hole 21, and the third through hole 23 has a third diameter larger than the crest diameter. As shown in FIGS. 3 to 4, the first through hole 21 is arranged between the second through hole 22 and the third through hole 23.

[0041] It should be understood that, although FIGS. 3 to 4 show a structure having three through holes, other structures are also possible. For example, in the case where the protective cover 20 only has the first through hole 21, the end of the first through hole 21 will block the threaded section 32, and the entire first through hole 21 is used to accommodate at least a part of the stem section 31.

[0042] In order to improve the connection reliability of the protective cover 20 and to indicate whether the protective cover 20 is installed, in some embodiments, the wiring terminal may further include an elastic member 40, and two ends of the elastic member 40 respectively abut against a tool head 33 of the fastener 30 and the protective cover 20.

[0043] With this embodiment, the elastic member 40 can not only ensure connection strength between the fastener 30 and the housing 10 so as to prevent loosening of the fastener relative to the housing, but also can move the tool head 33 of the fastener 30 away from the protective cover 20, thereby indicating to users or operators that the fastener 30 is not tightened (i.e., the protective cover 20 is not installed), as shown in FIGS. 3 to 4.

[0044] Alternatively, two ends of the elastic member 40 respectively abut against the tool head 33 and an end wall of the third through hole 23. As such, the overall size of the fastener 30, the protective cover 20, and the elastic member 40 can be reduced, and the accurate positioning of the elastic member 40 can be ensured as well.

[0045] In order to further improve the safety level of the wiring terminal and to ensure the reliable installation of the protective cover 20, in some embodiments, a pivot 25 may be provided on the protective cover 20, and a hole 13 may also be provided on the housing 10. The pivot 25 is received in the hole 13 so that the protective cover 20 can rotate relative to the housing 10, for example, rotate from the connection state shown in FIG. 5 to the disconnection state shown in FIG. 6.

[0046] In this way, the protective cover 20 is attached or coupled to the wiring terminal as a part of the wiring terminal. This can avoid a missing installation of the protective cover 20

and improve safety level of the wiring terminal. In addition, the rotatable protective cover 20 will not affect the connection, detachment or maintenance operations of the wire and the port 12.

[0047] In some embodiments, the wiring terminal may further include a torsion spring 50. The torsion spring 50 is arranged on the pivot 25. When the threaded section 32 is disconnected from the coupling hole 11, an elastic restoring force of the torsion spring 50 will cause the protective cover 20 to rotate relative to the housing 10, for example, rotate from the connection state as shown in FIGS. 4-5 to the disconnection state as shown in FIG. 6.

[0048] In some embodiments, the protective cover 20 may further include an isolation plate 27. The isolation plate 27 is used to separate the wire connected to adjacent ports 12 from each other. As a result, a protection level of the protective cover 20 for the wiring terminal is further improved, and thus the safety level of the wiring terminal is improved.

[0049] It should be understood that the housing 10 of the wiring terminal can be attached to the lighting device, or can be attached to housings of other devices such as wall switches and sockets.

[0050] It should be understood that the above detailed embodiments of the present disclosure are only for illustrating or explaining the principles of the present disclosure, rather than limiting the scope of the present disclosure. Therefore, any modification, equivalent substitution, and improvement made within the spirit and principle of the present disclosure should be comprised in the protection scope of the present disclosure. At the same time, the appended claims of the present disclosure are intended to cover all changes and modifications within the scope and borders of equivalent replacements that fall within the scope of the claims.

I/We Claim:

1. A wiring terminal comprising:
 - a housing (10) comprising a coupling hole (11) and at least one port (12) adapted to electrically connect to a wire;
 - a protective cover (20) adapted to accommodate a part of the wire, the protective cover (20) comprising a first through hole (21) having a first diameter;
 - a fastener (30) passing through the first through hole (21) and is configured to couple the protective cover (20) to the housing (10), the fastener (30) comprising:
 - a stem section (31) having a diameter smaller than the first diameter;
 - a threaded section (32) adapted to threadedly connect to the coupling hole (11), and a root diameter of a thread of the threaded section (32) being smaller than the first diameter, and a crest diameter of the thread being larger than the first diameter.
2. The wiring terminal according to claim 1, wherein the protective cover (20) further comprises a second through hole (22) arranged coaxially with the first through hole (21), and the second through hole (22) has a second diameter larger than the crest diameter .
3. The wiring terminal according to claim 2, wherein at least a part of the stem section (31) is received in the first through hole (21), and the threaded section (32) is blocked by a step wall (212) formed by the first through hole (21) and the second through hole (22) such that the fastener (30) will not fall off from the protective cover (20).
4. The wiring terminal according to claim 3, further comprising:
 - an elastic member (40), two ends of the elastic member (40) respectively abutting against a tool head (33) of the fastener (30) and the protective cover (20).

5. The wiring terminal according to claim 4, wherein the protective cover (20) further comprises a third through hole (23) arranged coaxially with the first through hole (21), and the third through hole (23) has a third diameter larger than the crest diameter; and

wherein the first through hole (21) is arranged between the second through hole (22) and the third through hole (23); and

wherein two ends of the elastic member (40) respectively abut against the tool head (33) and an end wall of the third through hole (23).

6. The wiring terminal according to claim 1, wherein:

the protective cover (20) further comprises a pivot (25); and

the housing (10) further comprises a hole (13) receiving the pivot (25) so that the protective cover (20) can rotate relative to the housing (10).

7. The wiring terminal according to claim 6, further comprising a torsion spring (50) arranged on the pivot (25), the torsion spring (50) being adapted to enable rotation of the protective cover (20) relative to the housing (10) when the threaded section (32) is disconnected from the coupling hole (11).

8. The wiring terminal according to claim 1 or 2, wherein:

the housing (10) comprises a plurality of the ports (12); and

the protective cover (20) comprises a plurality of openings (26) corresponding to the plurality of ports (12).

9. The wiring terminal according to claim 8, further comprising an isolation plate (27) arranged to separate wires connected to adjacent ports (12) from each other.

10. A lighting device, comprising:

the wiring terminal according to any one of claims 1-9; and

a lighting unit (60) electrically connected to the port (12) of the wiring terminal to draw electric power from the wire connected to the port (12).