

GROUND PROTECTION EXPLOSION-PROOF PLUG

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

5 [0002] The invention relates to the technical field of electrical connectors, in particular to an explosion-proof plug with a grounding protection function that can be used in inflammable gas and dust environments.

[0003] 2. Description of Related Art

[0004] With the continuous development of electrical connectors, their
10 functions are improved gradually. Electrical connectors used in petroleum and chemical fields have particularly complex functions. Such connectors and assemblies should satisfy the requirements for airtightness and watertightness, and the connectors should be fool-proof and explosion-proof and have the electromagnetic shielding capacity and the grounding protection capacity. All
15 these are key problems to be solved in the prior art.

[0005] The connectors will produce a certain amount of static electricity in long-term use, and in case of a fault of the connectors, the housings of the connectors may be energized. In order to prevent the housings of the connectors from being energized, the grounding protection design of explosion-proof
20 connectors become extremely important for effectively protecting operators against electric shocks and guaranteeing safe use of products and the safety of operators.

BRIEF SUMMARY OF THE INVENTION

[0006] To overcome the defects in the prior art, the invention provides an explosion-proof plug with a grounding protection function, which expands the grounding protection form of connectors and solves the technical problem that electrical connector assemblies in the prior art cannot be grounded easily and stably in a small space.

[0007] To fulfill the above objective, the technical solution adopted by the invention is as follows: an explosion-proof plug with a grounding protection function comprises a hollow housing assembly, a base assembly is arranged in the housing assembly, and a plurality of crimping assemblies are arranged in the base assembly; the base assembly comprises a mounting base inlaid in the housing assembly, the plurality of crimping assemblies penetrate through and are fixed on the mounting base and comprise a plurality of connecting pins and grounding pin assemblies, and each grounding pin assembly comprises a grounding pin and a grounding reed arranged on the grounding pin; and the grounding reed abuts against the housing assembly.

[0008] In a preferred embodiment of the invention, the housing assembly comprises an upper housing and a lower housing which are assembled together; one end of the base assembly penetrates into the upper housing, and at least part of the mounting base is limited and inlaid in the upper housing; the other end of the base assembly penetrates into the lower housing, and at least part of the mounting base is inlaid in the lower housing; and ends, where the mounting base is inlaid, of the upper housing and the lower housing are assembled in a sleeved manner.

[0009] In a preferred embodiment of the invention, the connecting pin or

the grounding pin comprises a sealed section, and an elastic contact section and a cable crimping section connected with a cable are arranged at two ends of the sealed section respectively.

[0010] In a preferred embodiment of the invention, the mounting base
 5 comprises an upper base and a lower base which are disposed around the crimping assemblies, and a rubber base is arranged between the upper base and the lower base; the crimping assemblies penetrate through the upper base, the rubber base and the lower base and are limited and fixed on the upper base, the rubber base and the lower base;

10 [0011] the rubber base is disposed around the sealed section, and the upper base is disposed around an end, connected to the rubber base, of the elastic contact section; and the lower base is disposed around an end, connected to the rubber base, of the cable crimping section.

[0012] In a preferred embodiment of the invention, a multi-lobed groove
 15 is formed in a top of the elastic contact section of the connecting pin and the grounding pin and divides the elastic contact section into a plurality of elastic pieces, and a cross-sectional structure of the elastic pieces is fan-shaped; and the elastic contact section is configured as a flared structure.

[0013] In a preferred embodiment of the invention, the grounding reed
 20 comprises a mounting end, a grounding piece is arranged on an outer edge of the mounting end, and the mounting end and the grounding piece are configured as arc-shaped bent structures.

[0014] Specifically, the elastic contact section has the maximum outer diameter at the top, and the multi-lobed groove of the connecting pin and the

grounding pin is formed by multiple groove segment structures. For example, the multi-lobed groove may be, but is not limited to, a three-lobed groove or a four-lobed groove, and the number of the groove segment structures of the multi-lobed groove may be changed. More specifically, a slope is arranged at the top of the elastic contact section, the slope of the elastic contact section is in R-angle transition with a linear section of the elastic contact section, the rubber sealed section is in slope transition with the elastic contact section through, the slope is in R-angle transition with the rubber sealed section and the elastic contact section, and a sealed groove allowing the rubber base to be limited and assembled therein is formed in the middle of the rubber sealed section. A blind hole is arranged in the cable crimping section of the connecting pin and the grounding pin and is machined from the tail of the pin. A rectangular structure penetrates through one side of a wall of a cable crimping hole, and transition regions are arranged on the rectangular structure through arc sections to avoid vertical angles and sharp angles, such that a groove similar to half of a playground, namely a crimping groove, is formed. The width of the crimping groove is slightly greater than that of a cable crimping plate of a crimp terminal.

[0015] Further, the grounding pin of the grounding pin assembly is similar to the connecting pin in structure. A semicircular weld groove is formed in the sealed section of the grounding pin. The length of the elastic contact section of the grounding pin is greater than that of the elastic contact section of the connecting pin, the maximum outer diameter of the elastic contact section of the grounding pin is less than that of the elastic contact section of the connecting pin, the length of the rubber sealed section of the grounding pin is equal to the

sum of the length of the sealed section of the connecting pin and the thickness of the grounding reed, the semicircular weld groove is formed in the tail of the sealed section of the grounding pin, and the width of the weld groove is slightly greater than the thickness of the grounding reed.

5 [0016] Specifically, the grounding reed comprises a mounting end, a grounding piece is arranged on an outer edge of the mounting end, and the mounting end and the grounding piece are configured as arc-shaped bent structures. The maximum diameter of the grounding reed is equal to or slightly greater than the diameter of a grounding circular groove in the tail of the upper
10 housing, thus ensuring elastic contact between the grounding reed and the grounding circular groove in the tail of the upper housing. The mounting end of the grounding reed is a weld end, a semicircular notch is formed in the weld end, and the diameter of the semicircular notch is the same as that of the semicircular weld groove in the grounding pin. The grounding piece adopts a groove-piece
15 structure. More specifically, the grounding piece adopts a three-groove four-piece structure. The three grooves of the grounding pieces are rectangular grooves.

[0017] The combination of the grounding pin and the grounding reed is the grounding pin assembly, and the grounding pin assembly is matched with
20 the semicircular weld groove formed in the sealed groove of the grounding pin through the semicircular notch of the grounding reed. The mounting end of the grounding reed is partially inlaid in the semicircular weld groove of the grounding pin, and an upper surface of the grounding reed is matched with a lower surface of the rubber sealed section of the grounding pin and is connected

to the lower surface of the rubber sealed section of the grounding pin by soldering.

[0018] In a preferred embodiment of the invention, a crimp terminal is arranged on the connecting pin or/and the grounding pin of the crimping assembly. A crimping groove is formed in the cable crimping section, the crimp terminal is disposed outside the cable crimping section and comprises a sheath, a rivet and a cable crimping plate; the sheath is at least partially disposed around the crimping groove, a through-hole corresponding to the crimping groove is formed in the sheath, the rivet is arranged in the through-hole, one end of the rivet penetrates through the through-hole to be connected to an outer side of the cable crimping plate movably inlaid in the through-hole, and an inner side of the cable crimping plate is an abutting side.

[0019] Specifically, the tail of the cable crimping section of the connecting pin or the grounding pin is arranged in the sheath, the cable crimping plate is arranged in a cable pressing section at the tail of the pin and is driven by the rivet to move in a radial direction of the cable pressing section at the tail of the pin; and when a cable needs to be crimped, the cable is placed in the cable crimping hole of the pin and is pressed by the cable crimping plate, the rivet is screwed with a hex wrench until the threaded step surface of the rivet abuts against the upper surface of the cable crimping plate and a thread of the rivet abuts against the sheath, and with the increase of the torque, the toothed surface of the cable crimping plate continuously presses the cable, thus effectively guaranteeing the crimping strength of the cable. The crimp terminal is matched with an internal thread on the sheath through an external thread of the rivet, and

the cable crimping plate and the rivet are turned to be riveted together. After being riveted together, the cable crimping plate and the rivet can rotate freely and are assembled in the sheath via the through-hole of the sheath, and the rivet is screwed out of an inner threaded hole of the through-hole of the sheath.

5 [0020] In a preferred embodiment of the invention, the upper housing and the lower housing are configured as hollow tube structures; a lower end of the upper housing is inlaid in an upper end of the lower housing, and the mounting base is inlaid in a joint of the upper housing and the lower housing; an end, connected with the upper housing, of the lower housing is disposed around
10 the mounting base; the housing assembly further comprises a locking sleeve limited and disposed outside the upper housing and the lower housing; the elastic contact sections of the crimping assemblies of the base assembly are inlaid in the upper housing, and the cable crimping sections of the crimping assemblies of the base assembly are inlaid in the lower housing.

15 [0021] In a preferred embodiment of the invention, the base assembly is inlaid in one end of the lower housing, a tail cable clip is arranged at the other end of the lower housing, a locking tail hood is arranged between the tail cable clip and the lower housing, and a cable connected with the cable crimping sections penetrates through the tail cable clip.

20 [0022] In a preferred embodiment of the invention, a connecting gap is reserved between the upper housing and the locking sleeve; the base assembly is inlaid in one end of the upper housing, and a dust cover capable of being opened and closed with respect to the upper housing and the base assembly is arranged at the other end of the upper housing; the dust cover is provided with a blind

hole capable of receiving the upper housing, and a hole wall of the dust cover is inserted and inlaid in the connecting gap between the upper housing and the locking sleeve; and a fastening member is arranged at an outer end of the dust cover.

5 [0023] Specifically, the upper housing is a round tube housing, an inner slope is arranged on an inner side of the top of an upper portion of the upper housing, first long convex keys are arranged on an upper surface of the upper housing, a first circular groove is arranged between the first long convex keys and a first circular protrusion of the upper housing and is configured to receive a
10 sealing outer ring, an inner protrusion and a second circular groove are arranged in a hollow inner hole of the upper housing, two second long convex keys spaced apart from each other are arranged at the tail of the inner hole and are adjacent to a sloping circular groove in the tail of the upper housing, and an explosion-proof external thread is arranged at the tail of an outer surface of the
15 upper housing. The explosion-proof external thread of the upper housing has a tooth pitch being equal to or greater than 1.25 mm, a tooth angle being $60^{\circ} \pm 5^{\circ}$, and 7 or more effective teeth, and the explosion-proof external thread is connected to the first circular protrusion through a first relief groove. Wherein, the inner slope at the top end, the first relief groove, the explosion-proof
20 external thread, a lower surface of the first circular protrusion, the second circular groove, and an end face of the tail of the upper housing are conducting areas, and the other surfaces of the upper housing are sprayed or chemically processed into non-conducting areas through an existing technique.

[0024] Specifically, the lower housing is a round tube housing, and an

explosion-proof internal thread, a second relief groove, a second circular protrusion, a second inner groove, a second slope, an inner circular surface, a first slope and a second slope are sequentially arranged at the top of a hollow inner hole of the lower housing. A first step, a second step and a tail external

5 thread are sequentially arranged on an outer surface of the lower housing from top to bottom. Wherein, the circumference of the second step is knurled and milled to be flat. The inner diameter of the second circular protrusion is less than that of the explosion-proof internal thread. The explosion-proof internal thread has a tooth pitch being equal to or greater than 1.25 mm, a tooth angle

10 being $60^{\circ} \pm 5^{\circ}$, and 7 or more effective teeth. The second circular protrusion is configured to support a support ring, a support ring gasket is arranged in the support ring and the second relief groove, and a flame-retardant plastic tube is arranged in the second inner groove. The explosion-proof internal thread, the

15 tail external thread of the lower housing are conducting areas, and the surfaces of the other areas of the lower housing are processed to be non-conducting.

[0025] Specifically, a circular sloping protrusion is arranged at the bottom of a blind hole of a dust cover along the root of the blind hole, a third circular groove is formed in the middle of a wall of the blind hole, a third inner

20 groove is formed in a joint surface from the third circular groove to the dust cover, and angles between the third inner groove and the two first long convex keys of the upper housing are symmetrical in the axial direction and radial direction. Wherein, the axis is located in the middle of the third inner groove of the dust cover, and the width and depth of the third inner groove of the dust

cover are greater than those of the first long convex keys of the upper housing, an ACME thread or a rectangular thread is arranged outside the dust cover, and a fastening member to be connected to a rope is arranged in an end face of the dust cover. The fastening member is in arc transition with the end face of the dust cover. A fourth circular groove is formed in the middle of the fastening member, and the top of the fastening member is designed into a spherical surface. Wherein, a slope of the circular sloping protrusion of the dust cover is a conducting area, and the other surfaces are sprayed or chemically processed into non-conducting areas.

10 [0026] A manufacturing method for an explosion-proof plug with a grounding protection function comprises the following steps:

 [0027] Step 1: assembling a base assembly; welding together a grounding pin and a grounding reed to form a grounding pin assembly; assembling crimp terminals on a plurality of connecting pins and grounding pin assemblies to form a plurality of crimping assemblies, and fixing and assembling the plurality of crimping assemblies on a mounting base to form the base assembly;

 [0028] Step 2: assembling together the base assembly, an upper housing, a lower housing and a locking sleeve;

20 [0029] inlaying the base assembly in the upper housing, connecting a cable led into the lower housing to the connecting pins and the grounding pin assemblies of the base assembly, and connecting and assembling together the lower housing and the upper housing;

 [0030] Step 3: disposing the locking sleeve around the upper housing

and the lower housing, and connecting and fixing the locking sleeve to a joint of the upper housing and the lower housing; and

[0031] Step 4: when a connector does not work, locking a dust cover and the locking sleeve to form an explosion energy dissipation passage by clearance
5 fit between an explosion-proof surface of the dust cover and an explosion-proof surface of the upper housing; and/or, when the connector works, forming an explosion energy dissipation passage by stationary clearance fit between an explosion-proof surface formed by a circumferential surface from first long convex keys on a periphery of the upper housing to an end face and an
10 explosion-proof surface of a corresponding socket, such that electric sparks and high temperature-ignited explosions in the plug and the corresponding socket are prevented from being transmitted to the outside through the housing assembly.

[0032] An upper surface and a lower surface of a rubber base are
15 correspondingly clamped and limited in mounting circular grooves in two sides of sealed grooves of the connecting pins and the grounding pin assemblies respectively, an upper base is assembled from tops of the connecting pins and the grounding pin assemblies, a lower surface of the upper base is matched with an upper surface of the rubber base, a lower base is assembled from tails of the
20 connecting pins and the grounding pin assemblies, and an upper surface of the lower base is matched with a lower surface of the rubber base, such that the base assembly is formed; and the crimp terminals are fixed in cable crimping holes in tails of the pins to form the crimping assemblies.

[0033] A corrugated retaining ring is arranged in a second circular

groove in the upper housing, the base assembly is assembled in the upper housing, the corrugated retaining ring is matched with an end face of a circumferential step of the upper base of the base assembly, the upper base and the upper housing are matched through long key grooves and convex keys to be prevented from rotating with respect to each other, the grounding reeds of the grounding pin assemblies are clamped a sloping circular groove in a tail of the upper housing, and the grounding pin assemblies and the upper housing are electrically connected; and the upper housing and the lower housing are matched through explosion-proof threads and are connected through an explosion-proof and electrical structure. Meanwhile, a tail surface of an explosion-proof external thread of the upper housing compresses a support ring gasket to seal the upper housing and the lower housing and realize threaded explosion prevention of the upper housing and the lower housing; a conducting bevel is arranged at a top of the upper housing and is matched with a conducting bevel in the dust cover, and an upper surface of a protrusion in the locking sleeve is matched with a lower surface of a protrusion outside the upper housing to realize electrical connection; and the grounding pin assemblies, the upper housing, the lower housing, the dust cover and the locking sleeve are electrically connected.

[0034] A support ring and the support ring gasket are arranged in a second relief groove formed in a top of the lower housing, the support ring gasket is located between the support ring and the second relief groove of the lower housing, a tail surface of the upper housing and an end face of the support ring gasket compress the support ring, and the support ring supports a

circumferential protrusion of the lower base, such that the base assembly, the upper housing and the lower housing are fixed in an axial direction.

[0035] A flame-retardant plastic tube is assembled in a second inner groove of the lower housing to electrically isolate the crimp terminals from the lower housing, an electrical insulation gap between the crimping terminals and the lower housing is added in the second inner groove of the lower housing, a tail rubber sleeve is assembled in a tail hole of the lower housing, a tail external thread of the lower housing and an internal thread of a locking tail hood are matched and locked together, and a tail cable clip is fixed with a locking screw and a locking nut.

[0036] The locking sleeve is in threaded fit with the dust cover, an upper step surface of an inner protrusion of the locking sleeve is in mating contact with a lower step surface of an outer protrusion of the upper housing, a top surface of the dust cover and an upper surface of the outer protrusion on the upper housing are matched and sealed through a sealing outer ring, and a stop screw arranged on the locking sleeve makes contact with the lower housing to prevent the lower housing from moving.

[0037] The invention overcomes the defects in the prior art and has the following beneficial effects:

[0038] The explosion-proof plug with a grounding protection function expands the grounding protection form of connectors and solves the technical problem that electrical connector assemblies in the prior art cannot be grounded easily and stably due to a small space. In addition, all parts are detachable and can be detached to be replaced in case of a fault, thus reducing the production

cost.

[0039] 1. The housings and the grounding pins of the grounding pin assemblies are electrically connected through the grounding reeds, such that electricity on the housings can be conducted to the grounding pins. The housings of the plug are completely sealed metal housings and have a shielding function. An electrical connection closed-loop flexibly extending to the periphery of the grounding pins is formed through the grounding pins and the grounding reeds, thus improving the convenience and stability of electrical contact.

10 [0040] 2. Different from traditional contact parts that use outlets as elastic contact elements, the grooved connecting pins and grounding pins are used as elastic contact elements, and according to the electrical contact principle, under the condition where materials with the same hardness are used, the effective contact area between contact parts will be enlarged with the increase of the positive pressure generated by the contact parts, and the contact resistance will be decreased, so the invention can effectively decrease the contact resistance generated when the contact parts are connected.

15 [0041] 3. Outer contact surfaces of a connector are electrically insulated to prevent a conductor against direct contact with users, and contact and joint portions of parts are conducting to ensure that housing parts of the connector can be electrically connected through threads and end-to-end contact.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0042] The invention will be further described below in conjunction

with accompanying drawings and embodiments.

[0043] FIG. 1 is a schematic exploded structural view of an explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

5 [0044] FIG. 2 is a schematic sectional view of a plug structure of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0045] FIG. 3 is a schematic sectional view of a connecting pin structure of the explosion-proof plug with a grounding protection function according to a
10 preferred embodiment of the invention;

[0046] FIG. 4 is a schematic axial view of the connecting pin structure of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0047] FIG. 5 is a schematic front view of a grounding pin of the
15 explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0048] FIG. 6 is a schematic diagram of a grounding reed of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

20 [0049] FIG. 7 is a schematic diagram of a grounding pin assembly of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0050] FIG. 8 is a schematic sectional view of a crimp terminal of the explosion-proof plug with a grounding protection function according to a

preferred embodiment of the invention;

[0051] FIG. 9 is a schematic sectional view of a dust cover of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

5 [0052] FIG. 10 is a schematic axial view of the dust cover of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0053] FIG. 11 is a schematic sectional view of an upper housing of the explosion-proof plug with a grounding protection function according to a
10 preferred embodiment of the invention;

[0054] FIG. 12 is a schematic axial view of the upper housing of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0055] FIG. 13 is a schematic sectional view of a lower housing of the
15 explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

[0056] FIG. 14 is a schematic axial view of the lower housing of the explosion-proof plug with a grounding protection function according to a preferred embodiment of the invention;

20 [0057] FIG. 15 is a schematic axial view of the explosion-proof plug with a grounding protection function when the upper housing, the lower housing and a locking sleeve are assembled together according to a preferred embodiment of the invention;

[0058] In the FIGS: 1, connecting pin; 101, first elastic contact section;

102, first sealed section; 103, first cable crimping section; 2, grounding pin assembly; 201, grounding pin; 2011, second elastic contact section; 2012, second sealed section; 2013, weld groove; 2014, second cable crimping section; 202, grounding reed;

5 [0059] 3, upper housing; 301, inner slope; 302, first long convex key; 303, first circular protrusion; 304, first circular groove; 305, inner protrusion; 306, second circular groove; 307, second long convex key; 308, tail sloping circular groove; 309, explosion-proof external thread; 310, first relief groove;

10 [0060] 4, lower housing; 401, explosion-proof internal thread; 402, second relief groove; 403, second circular protrusion; 404, second inner groove; 405, first slope; 406, inner circular surface; 407, second slope; 408, first step; 409, second step; 410, tail external thread;

15 [0061] 5, upper base; 6, lower base; 7, rubber base; 8, crimp terminal; 801, sheath; 802, rivet; 803, cable crimping plate; 9, dust cover; 901, circular sloping protrusion; 902, third circular groove; 903, third inner groove; 904, connecting thread; 905, fastening member; 10, locking sleeve;

20 [0062] 11, locking tail hood; 12, tail rubber sleeve; 13, tail cable clip; 14, corrugated retainer ring; 15, stop screw; 16, locking screw; 17, locking nut; 18, support ring; 19, support ring gasket; 20, sealing outer ring; 21, tail gasket; 22, flame-retardant plastic tube.

DETAILED DESCRIPTION OF THE INVENTION

[0063] The invention will be described in further detail below in conjunction with accompanying drawings and embodiments. These

accompanying drawings are all simplified illustrative drawings for illustrating the basic structure of the invention, and thus only show components related to the invention.

[0064] It should be noted that directional indications (such as “upper”, “lower”, “bottom” and “top”), if any, involved in the embodiments of the invention are merely used to explain relative positional relations or motion states between components in a specific pose, and if the specific pose changes, the directional indications will change accordingly. Terms “first” and “second” are merely used for the purpose of description, and should not be construed as indicating or implying relative importance or implicitly indicting the number of technical features referred to. Therefore, a feature defined by “first” or “second” may explicitly or implicitly indicate the inclusion of one or more said feature. Unless otherwise expressly stated and defined, terms “arrange”, “join” and “connect” should be broadly understood. For example, “connect” may refer to fixed connection, detachable connection or integrated connection; or, direct connection, indirect connection through an intermediate medium or internal connection of two elements. Those ordinarily skilled in the art can appreciate the specific meanings of these terms in the invention as the case may be.

[0065] Embodiment 1

[0066] As shown in FIGS. 1-15, an explosion-proof plug with a grounding protection function comprises a hollow housing assembly, wherein a base assembly is arranged in the housing assembly, and the housing assembly comprises an upper housing 3 and a lower housing 4 which are connected and assembled together; and ends, where a mounting base is inlaid, of the upper

housing 3 and the lower housing 4 are assembled in a sleeved manner.

[0067] Specifically, as shown in FIGS. 1, 2, 11 and 12, the upper housing 3 is a round tube housing, an inner slope 301 is arranged on an inner side of the top of an upper portion of the upper housing 3, first long convex keys 302 are arranged on an upper surface of the upper housing 3, a first circular groove 304 is arranged between the first long convex keys 302 and a first circular protrusion 303 of the upper housing 3 and is configured to receive a sealing outer ring 20, an inner protrusion 305 and a second circular groove 306 are arranged in a hollow inner hole of the upper housing 3, two second long convex keys 307 spaced apart from each other are arranged at the tail of the inner hole and are adjacent to a sloping circular groove 308 in the tail of the upper housing 3, and an explosion-proof external thread 309 is arranged at the tail of an outer surface of the upper housing 3. The tooth pitch of the explosion-proof external thread 309 of the upper housing 3 is equal to or greater than 1.25 mm, the tooth angle is $60^{\circ} \pm 5^{\circ}$, the number of effective teeth is equal to or greater than 7, and the explosion-proof external thread 309 is connected to the first circular protrusion 303 through a first relief groove 310. Wherein, the inner slope 301 at the top end, the first relief groove 310, the explosion-proof external thread 309, a lower surface of the first circular protrusion 303, the second circular groove 306, and an end face of the tail of the upper housing 3 are conducting areas, and the other surfaces of the upper housing 3 are sprayed or chemically processed into non-conducting areas through an existing technique.

[0068] Specifically, as shown in FIGS. 1, 2 and 13-15, the lower housing

4 is a round tube housing, and an explosion-proof internal thread 401, a second relief groove 402, a second circular protrusion 403, a second inner groove 404, a second slope 407, an inner circular surface 406, a first slope 405 and a second slope 407 are sequentially arranged at the top of a hollow inner hole of the lower housing 4. A first step 408, a second step 409 and a tail external thread 410 are sequentially arranged on an outer surface of the lower housing 4 from top to bottom. Wherein, the circumference of the second step 409 is knurled and milled to be flat. The inner diameter of the second circular protrusion 403 is less than that of the explosion-proof internal thread 401. The tooth pitch of the explosion-proof internal thread 401 is equal to or greater than 1.25 mm, the tooth angle is $60^{\circ} \pm 5^{\circ}$, and the number of effective teeth is equal to or greater than 7. The second circular protrusion 403 is configured to support a support ring 18, a support ring gasket 19 is arranged in the support ring 18 and the second relief groove 402, and a flame-retardant plastic tube 22 is arranged in the second inner groove 404. The explosion-proof internal thread 401, the second relief groove 402, an upper surface of the second circular protrusion 403 and the tail external thread 410 of the lower housing 4 are conducting areas, and the surfaces of the other areas of the lower housing 4 are processed to be non-conducting.

[0069] Specifically, as shown in FIGS. 1, 2, 9 and 10, a circular sloping protrusion 901 is arranged at the bottom of a blind hole of a dust cover 9 along the root of the blind hole, a third circular groove 902 is formed in the middle of a wall of the blind hole, a third inner groove 903 is formed in a joint surface from the third circular groove 902 to the dust cover 9, and angles between the

third inner groove 903 and the two first long convex keys 302 of the upper housing 3 are symmetrical in the axial direction and radial direction. Wherein, the axis is located in the middle of the third inner groove 903 of the dust cover 9, and the width and depth of the third inner groove 903 of the dust cover 9 are greater than those of the first long convex keys 302 of the upper housing 3, an ACME thread or a rectangular thread is arranged outside the dust cover 9, and a fastening member 905 to be connected to a rope is arranged in an end face of the dust cover 9. The fastening member 905 is in arc transition with the end face of the dust cover 9. A fourth circular groove is formed in the middle of the fastening member 905, and the top of the fastening member 905 is designed into a spherical surface. Wherein, a slope of the circular sloping protrusion 901 of the dust cover 9 is a conducting area, and the other surfaces are processed into non-conducting areas through a spraying or chemical process.

[0070] Specifically, as shown in FIGS. 1 and 2, the base assembly comprises the mounting base inlaid in the housing assembly, and a plurality of crimping assemblies penetrating through and fixed to the mounting base. The mounting base comprises an upper base 5 and a lower base 6 which are disposed around the crimping assemblies, and a rubber base 7 is arranged between the upper base 5 and the lower base 6. The crimping assemblies penetrate through the upper base 5, the rubber base 7 and the lower base 6 and are limited and fixed on the upper base 5, the rubber base 7 and the lower base 6. One end of each of the crimping assemblies penetrates into the upper housing 4, and at least part of the mounting base is limited and inlaid in the upper housing 3; and the other end of each of the crimping assemblies penetrates into the lower housing 4,

and at least part of the mounting base is inlaid in the lower housing 4.

[0071] Specifically, as shown in FIGS. 1-8, the plurality of crimping assemblies comprise a plurality of connecting pins 1 and grounding pin assemblies 2. The grounding pin assembly 2 comprises a grounding pin 201 and
 5 a grounding reed 202 arranged on the grounding pin 201, and the grounding reed 202 abuts against the housing assembly. The connecting pin 1 and the grounding pin 201 both comprise a sealed section, and an elastic contact section and a cable crimping section to be connected to a cable are arranged at two ends of the sealed section respectively.

10 [0072] Specifically, as shown in FIGS.1-8, a multi-lobed groove is formed in the top of the elastic contact section of the connecting pin 1 and the grounding pin 201 and divides the elastic contact section into a plurality of elastic pieces, and the cross-sectional structure of the elastic pieces is fan-shaped; and the elastic contact section is configured as a flared structure. The grounding
 15 reed 202 comprises a mounting end, a grounding piece is arranged on an outer edge of the mounting end, and the mounting end and the grounding piece are configured as arc-shaped bent structures. More specifically, as shown in FIGS. 3 and 4, the top of the elastic contact section has the maximum outer diameter, and the multi-lobed groove of the connecting pin 1 and the grounding pin 2 is
 20 formed by multiple groove segment structures. The top of the multi-lobed groove is machined by flaring. For example, the multi-lobed groove may be, but is not limited to, a three-lobed groove or a four-lobed groove, and the number of the groove segment structures of the multi-lobed groove may be changed. A slope is arranged at the top of the elastic contact section, the slope of the elastic

contact section is in R-angle transition with a linear section of the elastic contact section, the rubber sealed section is in slope transition with the elastic contact section, the slope is in R-angle transition with the rubber sealed section and the elastic contact section, and the fourth circular groove allowing the rubber base 7

5 to be limited and assembled therein is formed in the middle of the rubber sealed section. A blind hole is arranged in the cable crimping section of the connecting pin 1 and the grounding pin 201 and is machined from the tail of the pin. A rectangular structure penetrates through one side of a wall of a cable crimping hole, and transition regions are arranged on the rectangular structure through arc

10 sections to avoid vertical angles and sharp angles, such that a groove similar to half of a playground, namely a crimping groove, is formed. The width of the crimping groove is slightly greater than that of a cable crimping plate 803 of a crimp terminal 8. The maximum outer diameter of the elastic contact section is greater than the diameter of a corresponding connecting hole. In order to design

15 the elastic contact section into a flared structure with a certain angle, the maximum outer diameter of the elastic contact section should be greater than the diameter of the corresponding connection hole, and the elastic contact section may be machined by forming an opening in the top of the pin or be integrally machined.

20 [0073] Specifically, as shown in FIGS. 1, 2 and 4-7, the grounding pin 201 of the grounding pin assembly 2 is similar to the connecting pin 1 in structure. A semicircular weld groove 2013 is formed in the sealed section of the grounding pin 201. The length of the elastic contact section of the grounding pin 201 is greater than that of the elastic contact section of the connecting pin 1, the

maximum outer diameter of the elastic contact section of the grounding pin 201 is less than that of the elastic contact section of the connecting pin 1, the length of the rubber sealed section of the grounding pin 201 is equal to the sum of the length of the sealed section of the connecting pin 1 and the thickness of the

5 grounding reed 202, the semicircular weld groove 2013 is formed in the tail of the sealed section of the grounding pin 201, and the width of the weld groove 2013 is slightly greater than the thickness of the grounding reed 202. More specifically, as shown in FIG. 5, the grounding reed 202 of the grounding pin assembly 2 comprises a mounting end, a grounding piece is arranged on an outer

10 edge of the mounting end, and the mounting end and the grounding piece are configured as arc-shaped bent structures. The maximum diameter of the grounding reed 202 is equal to or slightly greater than the diameter of a grounding circular groove in the tail of the upper housing 3, thus ensuring elastic contact between the grounding reed 202 and the grounding circular

15 groove in the tail of the upper housing 3. The mounting end of the grounding reed 202 is a weld end, a semicircular notch is formed in the weld end, and the diameter of the semicircular notch is the same as that of the semicircular weld groove 2013 in the grounding pin 201. The grounding piece adopts a groove-piece structure. The grounding piece adopts a three-groove four-piece

20 structure. The three grooves of the grounding pieces are rectangular grooves. Further, as shown in FIG. 6, the grounding pin assembly 2 is matched with the semicircular weld groove 2013 in the sealed section of the grounding pin 201 through the semicircular notch of the grounding reed 202, and the sealed section is a circular groove. The mounting end of the grounding reed 202 is partially

inlaid in the semicircular weld groove 2013 of the grounding pin 201, and an upper surface of the grounding reed 202 is matched with a lower surface of the rubber sealed section of the grounding pin 201 and is connected to the lower surface of the rubber sealed section of the grounding pin 201 by soldering.

5 [0074] Here, in order to distinguish different parts in the drawings of the specification, the sealed section, elastic contact section and cable crimping section of the connecting pin 1 and the grounding pin 201 are expressed separately. The connecting pin 1 comprises a first sealed section 102, and a first elastic contact section 101 and a first cable crimping section 103 to be
10 connected to a cable are arranged at two ends of the first sealed section 102 respectively. The grounding pin 201 comprises a second sealed section 2012, and a second elastic contact section 2011 and a second cable crimping section 2014 to be connected to the cable are arranged at two ends of the second sealed section 2012 respectively. Further, the rubber base 7 is disposed around the first
15 sealed section 102 and the second sealed section 2012, the upper base 5 is disposed around ends, connected to the rubber base 7, of the first elastic contact section 101 and the second elastic contact section 2011, and the lower base 6 is disposed around ends, connected to the rubber base 7, of the first cable crimping section 103 and the second cable crimping section 2014.

20 [0075] Further, a crimp terminal 8 is arranged on the connecting pin 1 or/and the grounding pin 201 of the crimping assembly. A crimping groove is formed in the cable crimping section, the crimp terminal 8 is disposed outside the cable crimping section and comprises a sheath 801, a rivet 902 and a cable crimping plate 803; the sheath 801 is at least partially disposed around the

crimping groove, a through-hole corresponding to the crimping groove is
 formed in the sheath 801, the rivet 802 is arranged in the through-hole, one end
 of the rivet 802 penetrates through the through-hole to be connected to an outer
 side of the cable crimping plate 803 movably inlaid in the through-hole, and an
 5 inner side of the cable crimping plate 803 is an abutting side. When assembled,
 the tail of the cable crimping section of the connecting pin 1 or the grounding
 pin 201 is arranged in the sheath 801, the cable crimping plate 803 is arranged in
 a cable pressing section at the tail of the pin and is driven by the rivet 802 to
 move in a radial direction of the cable pressing section at the tail of the pin; and
 10 when a cable needs to be crimped, the cable is placed in the cable crimping hole
 of the pin and is pressed by the cable crimping plate 803, the rivet 802 is
 screwed with a hex wrench until the threaded step surface of the rivet 802 abuts
 against the upper surface of the cable crimping plate 803 and a thread of the
 rivet 802 abuts against the sheath 801, and with the increase of the torque, the
 15 toothed surface of the cable crimping plate 803 continuously presses the cable,
 thus effectively guaranteeing the crimping strength of the cable. The crimp
 terminal 8 is matched with an internal thread on the sheath 801 through an
 external thread of the rivet 802, and the cable crimping plate 803 and the rivet
 802 are turned to be riveted together. After being riveted together, the cable
 20 crimping plate 803 and the rivet 802 can rotate freely and are assembled in the
 sheath 801 via the through-hole of the sheath 801, and the rivet 802 is screwed
 out of an inner threaded hole of the through-hole of the sheath 801.

[0076] As shown in FIG. 8, the crimp terminal 8 is matched with the
 internal thread of the sheath 801 through an external thread of the rivet 802, and

the cable crimping plate 803 and the rivet 802 are turned to be riveted together. After being riveted together, the cable crimping plate 803 and the rivet 802 can rotate freely and are assembled in the sheath 801 via the through-hole of the sheath 801, and the rivet 802 is screwed out of an inner threaded hole of the through-hole of the sheath 801. The crimping assembly is formed by the
5 connecting pin 1 or the grounding pin 201 and the crimp terminal 8, the cable pressing section at the tail of the pin is placed in the sheath 801, the cable crimping plate 803 is arranged in the cable pressing section at the tail of the pin and is driven by the rivet 802 to move in a radial direction of the cable pressing
10 section at the tail of the pin. When a cable needs to be crimped, the cable is placed in the through-hole of the sheath 801 (the crimping groove of the cable crimping section), the cable crimping plate 803 presses the cable, the rivet 802 is turned with a hex wrench until the threaded step surface of the rivet 802 abuts against the upper surface of cable crimping plate 803 and the thread of the rivet
15 803 abuts against the sheath 801, and with the increase of the torque, the toothed surface of the cable crimping plate 803 continuously presses the cable, thus effectively guaranteeing the crimping strength of the cable.

[0077] The upper housing 3 and the lower housing 4 are configured as hollow tube structures; a lower end of the upper housing 3 is inlaid in an upper
20 end of the lower housing 4, and the mounting base is inlaid in a joint of the upper housing 3 and the lower housing 4; the end, connected to the upper housing 3, of the lower housing 4 is disposed outside the mounting base; and the housing assembly further comprises a locking sleeve 10 limited and disposed outside the upper housing 3 and the lower housing 4. The elastic contact

sections of the crimping assemblies in the base assembly are inlaid in the upper housing 3, and the cable crimping sections of the crimping assemblies in the base assembly are inlaid in the lower housing 4. The base assembly is inlaid in one end of the lower housing 4, a tail cable clip 13 is arranged at the other end of the lower housing 4, a locking tail hood 11 is arranged between the tail cable clip 13 and the lower housing 4, and a cable connected to the cable crimping sections penetrates through the tail cable clip 13. A connecting gap is reserved between the upper housing 3 and the locking sleeve 10; the base assembly is inlaid in one end of the upper housing 3, and the dust cover 9 capable of being opened and closed with respect to the upper housing 3 and the base assembly is arranged at the other end of the upper housing 3; the dust cover 9 is provided with a blind hole capable of receiving the upper housing 3, and a hole wall of the dust cover 9 is inserted and inlaid in the connecting gap between the upper housing 3 and the locking sleeve 10; and a fastening member 905 is arranged at an outer end of the dust cover 9.

[0078] Embodiment 2

[0079] A manufacturing and assembling method for an explosion-proof plug with a grounding protection function comprises the following steps:

[0080] Step 1: a base assembly is assembled.

[0081] A grounding pin 201 and a grounding reed 202 are welded together to form a grounding pin assembly 2; crimp terminals 8 are arranged on a plurality of connecting pins 1 and grounding pin assemblies 2 to form a plurality of crimping assemblies, and the plurality of crimping assemblies are fixed and assembled on a mounting base to form the base assembly.

[0082] Further, specifically, an upper surface and a lower surface of a rubber base 7 are correspondingly clamped and limited in mounting circular grooves in two sides of fourth circular grooves of the connecting pins 1 and the grounding pin assemblies 2 respectively, an upper base 5 is assembled from tops
 5 of the connecting pins 1 and the grounding pin assemblies 2, a lower surface of the upper base 5 is matched with an upper surface of the rubber base 7, a lower base 6 is assembled from tails of the connecting pins 1 and the grounding pin assemblies 2, and an upper surface of the lower base 6 is matched with a lower surface of the rubber base 7, such that the base assembly is formed; and the
 10 crimp terminals 8 which are composed of a sheath 801, a cable crimping plate 803 and a rivet 802 are fixed in cable crimping holes in tails of the pins through mortise-tenon joints to form the crimping assemblies.

[0083] Step 2, the base assembly, an upper housing 3 and a lower housing 4 are assembled together.

15 [0084] The base assembly is inlaid in the upper housing 3, a cable led into the lower housing 4 is connected to the connecting pins 1 and the grounding pin assemblies 2 of the base assembly, and the lower housing and the upper housing are connected and assembled together.

[0085] Further, a corrugated retaining ring 14 is arranged in a second
 20 circular groove 306 in the upper housing 3, the base assembly is assembled in the upper housing 3, the corrugated retaining ring 14 is matched with an end face of a circumferential step of the upper base 5 of the base assembly, the upper base 5 and the upper housing 3 are matched through long key grooves and convex keys to be prevented from rotating with respect to each other, the

grounding reeds 202 of the grounding pin assemblies 2 are clamped a sloping circular groove 308 in the tail of the upper housing 3, and the grounding pin assemblies 2 and the upper housing 3 are electrically connected; and the upper housing 3 and the lower housing 4 are matched through explosion-proof threads and are connected through an explosion-proof and electrical structure. A tail surface of an explosion-proof external thread 309 of the upper housing 3 compresses a support ring gasket 19 to seal the upper housing 3 and the lower housing 4 and realize threaded explosion prevention of the upper housing 3 and the lower housing 4; a conducting bevel is arranged at the top of the upper housing 3 and is matched with a conducting bevel in a dust cover 9, and an upper surface of a protrusion in a locking sleeve 10 is matched with a lower surface of a protrusion outside the upper housing 3 to realize electrical connection; and the grounding pin assemblies 2, the upper housing 3, the lower housing 4, the dust cover 9 and the locking sleeve 10 are electrically connected.

[0086] Specifically, a support ring 18 and the support ring gasket 19 are arranged in a second relief groove 401 formed in the top of the lower housing 4, the support ring gasket 19 is located between the support ring 18 and the second relief groove 402 of the lower housing 4, a tail surface of the upper housing 3 and an end face of the support ring gasket 19 compress the support ring, and the support ring 18 supports a circumferential protrusion of the lower base 6, such that the base assembly, the upper housing 3 and the lower housing 4 are fixed in an axial direction.

[0087] Specifically, a flame-retardant plastic tube 22 is assembled in a second inner groove 404 of the lower housing 4 to electrically isolate the crimp

terminals 8 from the lower housing 4, an electrical insulation gap between the crimping terminals 8 and the lower housing 4 is added through the design of the second inner groove 404 of the lower housing 4, a tail rubber sleeve 12 is assembled in a tail hole of the lower housing 4, a tail external thread 410 of the lower housing 4 and an internal thread of a locking tail hood 11 are matched and locked together, and a tail cable clip 13 is fixed with a locking screw 16 and a locking nut 17.

[0088] Step 3, the locking sleeve 10 is disposed around the upper housing 3 and the lower housing, 4 and is connected and fixed to a joint of the upper housing 3 and the lower housing 4;

[0089] the locking sleeve 10 is in threaded fit with the dust cover 9, an upper step surface of an inner protrusion of the locking sleeve 10 is in mating contact with a lower step surface of an outer protrusion of the upper housing 3, a top surface of the dust cover 9 and an upper surface of the outer protrusion on the upper housing 3 are matched and sealed through a sealing outer ring 20, and a stop screw 15 arranged on the locking sleeve 10 makes contact with the lower housing 4 to prevent the lower housing 4 from moving.

[0090] Step 4: when a connector does not work, the dust cover 9 and the locking sleeve 10 are locked to form an explosion energy dissipation passage by clearance fit between an explosion-proof surface of the dust cover 9 and an explosion-proof surface of the upper housing 3; and/or, when the connector works, an explosion energy dissipation passage is formed by stationary clearance fit between an explosion-proof surface formed by a circumferential surface from first long convex keys on the periphery of the upper housing to an

end face and an explosion-proof surface of a corresponding socket, such that electric sparks and high temperature-ignited explosions in the plug and the corresponding socket are prevented from being transmitted to the outside through the housing assembly.

5 [0091] Operating principle:

 [0092] As shown in FIFS. 1-15, all parts of the invention are detachable, and when one part breaks down, it can be detached to be replaced, thus reducing the production cost. Meanwhile, outer contact surfaces of a connector are electrically insulated to prevent a conductor against direct contact with users,
10 and contact and joint portions of parts are conducting to ensure that housing parts of the connector can be electrically connected through threads and end-to-end contact. Different from traditional contact parts that use outlets as elastic contact elements, the grooved connecting pins 1 and grounding pins 201 are used as elastic contact elements. According to the electrical contact principle,
15 under the condition where materials with the same hardness are used, the effective contact area between contact parts will be enlarged with the increase of the positive pressure generated by the contact parts, and the contact resistance will be decreased, so the invention can effectively decrease the contact resistance generated when the contact parts are connected. The housings and the
20 grounding pins 201 of the grounding pin assemblies 2 are electrically connected through the grounding reeds 202, such that electricity on the housings can be conducted to the grounding pins 201. The upper housing and the lower housing of the housing assembly of the plug are completely sealed metal housings and have a shielding function. An electrical connection closed-loop flexibly

extending to the periphery of the grounding pins 201 is formed through the grounding pins 201 and the grounding reeds 202, thus improving the convenience and stability of electrical contact.

[0093] The explosion-proof plug provided by the invention is mainly
5 used in explosive gas and dust environments. The dust cover 9 and the upper housing 3 are sealed by the sealing outer ring 20. When the plug is not used, the dust cover 9 is not detached, the locking sleeve 10 and the dust cover 9 are locked by knurling, and two stop screws are arranged on the locking screw 10 and make contact with the lower housing to prevent the lower housing from
10 moving. When the plug is used, the dust cover 9 is detached to connect the explosion-proof plug to a corresponding socket.

[0094] The explosion-proof surface formed by a circumferential surface from the first long convex keys 302 on the periphery of the upper housing 3 to an end face is in stationary clearance fit with the explosion-proof surface of the
15 corresponding socket to form an explosion energy dissipation passage, such that electric sparks and high temperature-ignited explosions in the plug and the corresponding socket will not be transmitted to the outside through the housing assembly; in addition, the circumferential surface from a circumferential groove in the dust cover 9 to the bottom of the dust cover 9 is another explosion-proof
20 surface, and when a connector does not work, the dust cover 9 and the locking sleeve 10 are locked, and the explosion-proof surface of the dust cover is in clearance fit with the explosion-proof surface of the upper housing to form an explosion energy dissipation passage, which together with the sealing outer ring 20 outside the upper housing 3, prevents explosion energy in the housing

assembly from being transmitted to the outside, which may otherwise lead to an explosion in the outside, thus fulfilling an explosion prevention effect. The connecting pins 201 and the grounding reeds 202 are connected to the upper housing 3, and the upper housing 3 is electrically connected to the locking sleeve 10 and the lower housing through threads and end faces, such that static electricity on the housings of the housing assembly is taken away. The plug in the invention has a three-phase AC grounding protection function, and uses aluminum alloy as the structural material, thus also fulfilling an electromagnetic shielding function. The all-metal structure can shield internal and external electromagnetic interference; the grounding pins 201 are connected to the upper housing 3 to take away static electricity on the housing, thus guaranteeing the safety of operators; and the connecting pins 1 are connected to a signal source or a power source.

[0095] The above ideal embodiments of the invention are enlightenments, and related personnel can make various modifications and amendments according to the above description without departing from the technical concept and scope of the invention. The technical scope of the invention is not limited to the above description, and should be defined according to the scope of the claims.

CLAIMS

What is claimed is:

1. An explosion-proof plug with a grounding protection function, comprising a hollow housing assembly, a base assembly being arranged in the housing assembly, and a plurality of crimping assemblies being arranged in the base assembly, wherein the base assembly comprises a mounting base inlaid in the housing assembly, the plurality of crimping assemblies penetrate through and are fixed on the mounting base and comprise a plurality of connecting pins and grounding pin assemblies, and each said grounding pin assembly comprises a grounding pin and a grounding reed arranged on the grounding pin; and the grounding reed abuts against the housing assembly.

2. The explosion-proof plug with a grounding protection function according to Claim 1, wherein the housing assembly comprises an upper housing and a lower housing which are assembled together;

one end of the base assembly penetrates into the upper housing, and at least part of the mounting base is limited and inlaid in the upper housing;

the other end of the base assembly penetrates into the lower housing, and at least part of the mounting base is inlaid in the lower housing;

and ends, where the mounting base is inlaid, of the upper housing and the lower housing are assembled in a sleeved manner.

3. The explosion-proof plug with a grounding protection function according to Claim 1, wherein the connecting pin or the grounding pin comprises a sealed section, and an elastic contact section and a cable crimping section connected with a cable are arranged at two ends of the sealed section respectively; a

multi-lobed groove is formed in a top of the elastic contact section of the connecting pin and the grounding pin and divides the elastic contact section into a plurality of elastic pieces, and a cross-sectional structure of the elastic pieces is fan-shaped; and the elastic contact section is configured as a flared structure.

- 5 4. The explosion-proof plug with a grounding protection function according to Claim 1, wherein the mounting base comprises an upper base and a lower base which are disposed around the crimping assemblies, and a rubber base is arranged between the upper base and the lower base; the crimping assemblies penetrate through the upper base, the rubber base and the lower base and are
10 limited and fixed on the upper base, the rubber base and the lower base;

the rubber base is disposed around sealed sections, and the upper base is disposed around ends, connected to the rubber base, of elastic contact sections; and the lower base is disposed around ends, connected to the rubber base, of cable crimping sections.

- 15 5. The explosion-proof plug with a grounding protection function according to Claim 4, wherein the grounding reed comprises a mounting end, a grounding piece is arranged on an outer edge of the mounting end, and the mounting end and the grounding piece are configured as arc-shaped bent structures.

- 20 6. The explosion-proof plug with a grounding protection function according to Claim 5, wherein crimp terminals are arranged on the connecting pins or/and the grounding pins of the crimping assemblies; crimping grooves are formed in the cable crimping sections, and the crimp terminals are disposed outside the cable crimping sections and each comprise a sheath, a rivet and a cable crimping plate; the sheaths are at least partially disposed around the crimping grooves,

through-holes corresponding to the crimping grooves are formed in the sheaths, the rivets are arranged in the through-holes, one end of each said rivet penetrates through the corresponding through-hole to be connected to an outer side of the cable crimping plate movably inlaid in the corresponding through-hole, and an
 5 inner side of each said cable crimping plate is an abutting side.

7. The explosion-proof plug with a grounding protection function according to Claim 6, wherein

the upper housing and the lower housing are configured as hollow tube structures;

10 a lower end of the upper housing is inlaid in an upper end of the lower housing, and the mounting base is inlaid in a joint of the upper housing and the lower housing;

an end, connected with the upper housing, of the lower housing is disposed around the mounting base;

15 the housing assembly further comprises a locking sleeve limited and disposed outside the upper housing and the lower housing; the elastic contact sections of the crimping assemblies of the base assembly are inlaid in the upper housing, and the cable crimping sections of the crimping assemblies of the base assembly are inlaid in the lower housing;

20 the base assembly is inlaid in one end of the lower housing, a tail cable clip is arranged at the other end of the lower housing, a locking tail hood is arranged between the tail cable clip and the lower housing, and a cable connected with the cable crimping sections penetrates through the tail cable clip.

8. The explosion-proof plug with a grounding protection function according

to Claim 7, wherein a connecting gap is reserved between the upper housing and the locking sleeve; the base assembly is inlaid in one end of the upper housing, and a dust cover capable of being opened and closed with respect to the upper housing and the base assembly is arranged at the other end of the upper housing;

5 the dust cover is provided with a blind hole capable of receiving the upper housing, and a hole wall of the dust cover is inserted and inlaid in the connecting gap between the upper housing and the locking sleeve; and a fastening member is arranged at an outer end of the dust cover.

9. A manufacturing method for an explosion-proof plug with a grounding protection function, wherein the manufacturing method for the explosion-proof plug with a grounding protection function according to any one of Claims 1-8 comprises:

10

step 1: assembling a base assembly;

welding together a grounding pin and a grounding reed to form a grounding pin assembly; assembling crimp terminals on a plurality of connecting pins and grounding pin assemblies to form a plurality of crimping assemblies, and fixing

15 and assembling the plurality of crimping assemblies on a mounting base to form the base assembly;

step 2: assembling together the base assembly, an upper housing, a lower housing and a locking sleeve;

20

inlaying the base assembly in the upper housing, connecting a cable led into the lower housing to the connecting pins and the grounding pin assemblies of the base assembly, and connecting and assembling together the lower housing and the upper housing;

step 3: disposing the locking sleeve around the upper housing and the lower housing, and connecting and fixing the locking sleeve to a joint of the upper housing and the lower housing; and

step 4: when a connector does not work, locking a dust cover and the locking sleeve to form an explosion energy dissipation passage by clearance fit between an explosion-proof surface of the dust cover and an explosion-proof surface of the upper housing; and/or, when the connector works, forming an explosion energy dissipation passage by stationary clearance fit between an explosion-proof surface formed by a circumferential surface from first long convex keys on a periphery of the upper housing to an end face and an explosion-proof surface of a corresponding socket, such that electric sparks and high temperature-ignited explosions in the plug and the corresponding socket are prevented from being transmitted to the outside through the housing assembly.

10. The manufacturing method for an explosion-proof plug with a grounding protection function according to Claim 9, wherein

an upper surface and a lower surface of a rubber base are correspondingly clamped and limited in mounting circular grooves in two sides of sealed grooves of the connecting pins and the grounding pin assemblies respectively, an upper base is assembled from tops of the connecting pins and the grounding pin assemblies, a lower surface of the upper base is matched with an upper surface of the rubber base, a lower base is assembled from tails of the connecting pins and the grounding pin assemblies, and an upper surface of the lower base is matched with a lower surface of the rubber base, such that the base assembly is

formed; the crimp terminals are fixed in cable crimping holes in tails of the pins to form the crimping assemblies;

or/and, a corrugated retaining ring is arranged in a second circular groove in the upper housing, the base assembly is assembled in the upper housing, the
 5 corrugated retaining ring is matched with an end face of a circumferential step of the upper base of the base assembly, the upper base and the upper housing are matched through long key grooves and convex keys to be prevented from rotating with respect to each other, the grounding reeds of the grounding pin assemblies are clamped a sloping circular groove in a tail of the upper housing,
 10 and the grounding pin assemblies and the upper housing are electrically connected; the upper housing and the lower housing are matched through explosion-proof threads and are connected through an explosion-proof and electrical structure;

a tail surface of an explosion-proof external thread of the upper housing
 15 compresses a support ring gasket to seal the upper housing and the lower housing and realize threaded explosion prevention of the upper housing and the lower housing; a conducting bevel is arranged at a top of the upper housing and is matched with a conducting bevel in the dust cover, and an upper surface of a protrusion in the locking sleeve is matched with a lower surface of a protrusion
 20 outside the upper housing to realize electrical connection; the grounding pin assemblies, the upper housing, the lower housing, the dust cover and the locking sleeve are electrically connected;

or/and, a support ring and the support ring gasket are arranged in a second relief groove formed in a top of the lower housing, the support ring gasket is

located between the support ring and the second relief groove of the lower housing, a tail surface of the upper housing and an end face of the support ring gasket compress the support ring, and the support ring supports a circumferential protrusion of the lower base, such that the base assembly, the
5 upper housing and the lower housing are fixed in an axial direction;

or/and, a flame-retardant plastic tube is assembled in a second inner groove of the lower housing to electrically isolate the crimp terminals from the lower housing, an electrical insulation gap between the crimping terminals and the lower housing is added in the second inner groove of the lower housing, a tail
10 rubber sleeve is assembled in a tail hole of the lower housing, a tail external thread of the lower housing and an internal thread of a locking tail hood are matched and locked together, and a tail cable clip is fixed with a locking screw and a locking nut;

or/and, the locking sleeve is in threaded fit with the dust cover, an upper step
15 surface of an inner protrusion of the locking sleeve is in mating contact with a lower step surface of an outer protrusion of the upper housing, a top surface of the dust cover and an upper surface of the outer protrusion on the upper housing are matched and sealed through a sealing outer ring, and a stop screw arranged on the locking sleeve makes contact with the lower housing to prevent the lower
20 housing from moving.