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(54) INSTALLATION STRUCTURE OF LEAKY CABLE CONNECTOR, AND LEAKY CABLE CONNECTOR

(57) The present application relates to the technical field of cable connectors, and specifically to a mounting structure for a leaky cable connector and a leaky cable connector. The mounting structure for a leaky cable connector includes: a first shell and a second shell that are sleeved with each other, where the first shell is disposed inside, the second shell is disposed outside, and a mounting space allowing a leaky cable to pass through is provided in each of the first shell and the second shell; and a cable clamp, disposed at a connection between the first shell and the second shell, where a gap allowing insertion of an external conductor of the leaky cable is provided between the cable clamp and the first shell, and when the leaky cable is inserted in the mounting spaces, the cable clamp is subjected to a force to move toward the first shell to fasten the external conductor of the leaky cable. The present application provides a mounting structure for a leaky cable connector and a leaky cable connector that have reliable connection and adequate use performance.

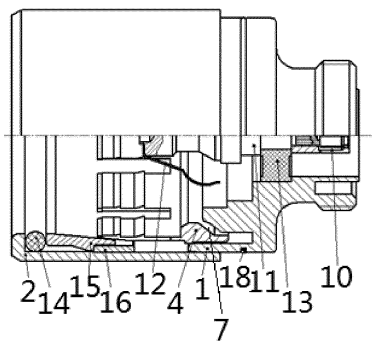

Fig 1

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Description

TECHNICAL FIELD

[0001] The present application relates to the technical field of cable connectors, and specifically to a mounting structure for a leaky cable connector and a leaky cable connector.

BACKGROUND

[0002] Due to the special structural constraints of leaky cables, at present, quick installation is seldom considered in the design of existing commercially available leaky cable connectors, and shells of a radio frequency leaky cable connector in the industry are usually screwed and fixed on a leaky cable by threads. In one method, a copper sheet of an external conductor of a leaky cable is flanged. An outer copper sheet on an end surface of the flanged leaky cable is clamped within a pressure surface of front and rear shells of the connector. The copper sheet is fixed by forces of the tightened front and rear shells, to transfer electrical properties. This mounting method is more complex. The separate rear shell needs to be mounted first, a flange is made on the structure of the rear shell, and then the front shell is mounted and tightened. This manner is non-integral mounting. In another method, a contact member structure with an embedded spring coil is used at a contact position of a copper sheet of a leaky cable. However, the spring coil is an elastic slotted structure and is prone to deformation. After coming into radial contact, the contact member with the spring coil and an external conductor of a cable cannot be compressed. A 360-degree reliable contact cannot be achieved to obtain high contact pressure. The connection tends to fail. The stability of dynamic intermodulation is poor in special application environments. The contact member with the spring coil tends to deviate from the normal value and cannot be used repeatedly. After a mounting failure occurs, the spring coil is prone to damage when the contact member is pulled out and as a result can no longer be used. In still another method, a slotted cable clamp with a closed ring or a C-shaped opening is used. The method has low stability, and the connector tends to fall off.

SUMMARY

[0003] Therefore, a technical problem to be resolved by the present application is to provide a mounting structure for a leaky cable connector and a leaky cable connector that have reliable connection and adequate use performance to overcome the disadvantage that a leaky cable connector and a leaky cable in the prior art have low connection stability and tend to fall off to affect the use performance.

[0004] To resolve the foregoing technical problems, the present application provides a mounting structure for a leaky cable connector, including:

a first shell and a second shell that are sleeved with each other, where the first shell is disposed inside, the second shell is disposed outside, and a mounting space allowing a leaky cable to pass through is provided in each of the first shell and the second shell; and

a cable clamp, disposed at a connection between the first shell and the second shell, where a gap allowing insertion of an external conductor of the leaky cable is provided between the cable clamp and the first shell, and when the leaky cable is inserted in the mounting spaces, the cable clamp is subjected to a force to move toward the first shell to fasten the external conductor of the leaky cable.

[0005] Optionally, an end surface of at least one of the cable clamp or the first shell facing the gap is a tapered surface.

[0006] Optionally, an end surface of the cable clamp facing the gap is a tapered surface with an inner diameter gradually increasing from one end close to the second shell to the other end close to the first shell, and an end surface of the first shell facing the gap is formed by at least two partial inclined surfaces.

[0007] Optionally, the first shell is formed with an assembly space allowing insertion of the cable clamp under the action of an external force, and correspondingly, the cable clamp is formed with a protrusion adapting to the assembly space.

[0008] Optionally, the other end of the cable clamp opposite to the protrusion is provided with a first limiting member, the first shell is provided with a second limiting member matching the first limiting member, and the first limiting member climbs over the second limiting member under the action of an external force to insert the protrusion in the assembly space for fastening.

[0009] Optionally, a third limiting member and a fourth limiting member are disposed at an interval in an axial direction in the second shell, a first sealing member, a housing, and a pressure ring are sequentially disposed between the third limiting member and the fourth limiting member, the pressure ring abuts against the fourth limiting member, the first sealing member abuts against the third limiting member, and the housing abuts against both the first sealing member and the pressure ring.

[0010] Optionally, the housing is provided with a tapered surface matching the cable clamp, to apply a radial pressing force to the cable clamp under the action of an external force.

[0011] Optionally, an annular groove is provided in a contact surface between the first shell and the second shell, and a second sealing member is disposed inside the annular groove.

[0012] Optionally, the first shell and the second shell are assembled by interference fit.

[0013] Further provided is a leaky cable connector, in-

cluding the mounting structure for a leaky cable connector of the present application.

[0014] The technical solution of the present application has the following advantages:

1. By the mounting structure for a leaky cable connector provided in the present application, when a leaky cable sequentially passes through the mounting spaces in the second shell and the first shell, under the action of an external force, the external conductor of the leaky cable is inserted in the space between the cable clamp and the first shell, and is fastened by an applied force on the cable clamp toward the first shell. The gap is provided to increase a contact area between the external conductor of the leaky cable and the mounting structure and a positive pressure, so that the connection becomes more reliable and stable, thereby ensuring the use performance.
2. By the mounting structure for a leaky cable connector provided in the present application, the end surface of the cable clamp facing the gap is a tapered surface with an inner diameter gradually increasing from one end close to the second shell to the other end close to the first shell, and the end surface of the first shell facing the gap is formed by at least two partial inclined surfaces. The tapered surface and the at least two partial inclined surfaces are provided to further increase the contact area between the mounting structure and the external conductor of the leaky cable, thereby improving the reliability and stability of the connection, and resolving the problems of inadequate contact on a contact bonding surface through which a radio frequency current flows and poor intermodulation of a transmission system caused by a nonlinear characteristic.
3. By the mounting structure for a leaky cable connector provided in the present application, the first sealing member in the second shell and the second sealing member on the contact surface between the first shell and the second shell are provided, so that the problem of water leakage in waterproofing using a conventional mastic tape is resolved, thereby improving waterproof sealing performance.
4. By the mounting structure for a leaky cable connector provided in the present application, the first shell and the second shell are assembled by interference fit, so that fast installation is implemented, a conventional tool such as a spanner or a utility knife is not required, the labor intensity is reduced, and the mounting efficiency is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] To describe the technical solutions in specific embodiments of the present application or the prior art more clearly, the following briefly introduces the accompanying drawings required for describing the specific embodiments or the prior art. Apparently, the accompanying drawings in the following description show some embodiments of the present application, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a schematic half sectional view of a mounting structure for a leaky cable connector according to the present application;
FIG. 2 is a partial schematic enlarged view of FIG. 1;
FIG. 3 is a partial schematic diagram when a leaky cable and a mounting structure are assembled; and
FIG. 4 is a schematic diagram of another mounting manner of a pressure ring and a shell.

[0016] Reference numerals:
1. first shell; 2. second shell; 3. leaky cable; 4. cable clamp; 5. assembly space; 6. protrusion; 7. gap; 8. first limiting member; 9. second limiting member; 10. jack socket; 11. central conductor; 12. riveting tube; 13. insulator; 14. first sealing member; 15. housing; 16. pressure ring; 17. annular groove; and 18. second sealing member.

DETAILED DESCRIPTION

[0017] The following clearly and completely describes the technical solutions of the present application with reference to the accompanying drawings. Apparently, the described embodiments are some rather than all of the embodiments of the present application. All other embodiments obtained by persons of ordinary skill in the art based on the embodiments of the present application without creative efforts shall fall within the protection scope of the present application.

[0018] In addition, the technical features involved in different embodiments of the present application described below can be combined with each other as long as they do not constitute a conflict between them.

[0019] FIG. 1 to FIG. 3 show a specific embodiment of a mounting structure for a leaky cable connector, including a first shell 1 and a second shell 2 that are sleeved with each other in an axial direction. The first shell 1 and the second shell 2 are assembled by interference fit. The first shell 1 is disposed inside. The second shell 2 is disposed outside. A mounting space allowing a leaky cable 3 to pass through is provided in each of the first shell 1 and the second shell 2.

[0020] A cable clamp 4 is disposed at a connection between the first shell 1 and the second shell 2. An inner circumference of the first shell 1 is formed with an assembly space 5 allowing insertion of the cable clamp 4 under the action of an external force. Correspondingly, the cable clamp 4 is formed with a protrusion 6 adapting to the assembly space 5, and extends in a direction of the assembly space 5 away from the first shell 1. A gap 7 allowing insertion of an external conductor of the leaky cable 3 is provided between a main body of the cable

clamp 4 and the first shell 1. When no leaky cable 3 passes through the mounting spaces in the first shell 1 and the second shell 2, the other end of the cable clamp 4 opposite to the protrusion 6 is provided with a step used as a first limiting member 8, and the first shell 1 is provided with a bump used as a second limiting member 9 matching the first limiting member 8. Therefore, the cable clamp 4 is limited at a current position. When the leaky cable 3 and the mounting structure are assembled, that is, as the leaky cable 3 gradually passes through the mounting spaces in the second shell 2 and the first shell 1, the first limiting member 8 climbs over the second limiting member 9 under the action of an external force to insert the protrusion 6 in the assembly space 5 for fastening, and at the same time the cable clamp 4 is subjected to a force to move toward the first shell 1 to fasten the external conductor of the leaky cable 3.

[0021] A plurality of channels are provided in the cable clamp 4, and a barb is disposed on an inner wall of the cable clamp 4. When the cable clamp 4 is subjected to a force to fasten the external conductor of the leaky cable 3, the barb is clamped in an outer sheath of the leaky cable 3, thereby improving the stability of mounting. A stepped surface is provided on a side of the barb. During the mounting of the leaky cable 3, the stepped surface abuts against the outer sheath of the leaky cable 3, to limit a mounting size of the leaky cable 3.

[0022] Specifically, an end surface of the cable clamp 4 facing the gap 7 is a tapered surface with an inner diameter gradually increasing from one end close to the second shell 2 to the other end close to the first shell 1, and an end surface of the first shell 1 facing the gap 7 is formed by two partial inclined surfaces. The two partial inclined surfaces form an arc-shaped surface protruding outward away from the gap 7.

[0023] A radial end surface of the first shell 1 located in the second shell 2 contacts an end surface of a foaming layer of the leaky cable 3, to limit the movement of the leaky cable 3. An internal conductor is disposed in an axial direction in the first shell 1. The internal conductor includes a jack socket 10, a central conductor 11, and a riveting tube 12 that are sequentially disposed. A first step is disposed on one side of the central conductor 11 close to the riveting tube 12. A blind hole is provided at a central position. A through hole matching the first step is provided in the riveting tube 12. The blind hole is expanded to fasten the riveting tube 12 on the central conductor 11 in a riveting manner. The other side of the central conductor 11 close to the jack socket 10 is provided with a second step. The second step is provided with an insulator 13, and the jack socket 10 and the central conductor 11 are fastened by interference fit. The jack socket 10 further limits the axial movement of the insulator 13. The insulator 13 matches the first shell 1, to fasten the internal conductor inside the first shell 1.

[0024] A third limiting member and a fourth limiting member are disposed at an interval in an axial direction in the second shell 2. The third limiting member and the fourth limiting member are respectively stepped surfaces formed in the middle of the second shell 2 and at an end of the second shell 2 away from the first shell 1. A first sealing member 14, a housing 15, and a pressure ring 16 are sequentially disposed between the third limiting member and the fourth limiting member. The pressure ring 16 abuts against the fourth limiting member, to position the pressure ring 16, and the pressure ring 16 is assembled with the second shell 2 by interference fit. The first sealing member 14 abuts against the third limiting member. The housing 15 abuts against both the first sealing member 14 and the pressure ring 16. The pressure ring 16 limits that the first sealing member 14 and the housing 15 can only move between the third limiting member and a left end of the pressure ring 16. It is avoided that the housing 15 moves rightward in a free state to apply a force to the cable clamp 4, and as a result the gap between the cable clamp 4 and the first shell 1 is reduced to affect the insertion of the external conductor of the leaky cable 3. When moving in a direction away from the first shell 1, the housing 15 presses the first sealing member 14 to implement sealing and waterproofing.

[0025] To further improve the stability of the connection, an end surface of the cable clamp 4 away from the axis of the first shell 1 is also a tapered surface. The housing 15 is provided with a tapered surface matching the cable clamp 4, to apply a radial pressing force to the cable clamp 4 under the action of an external force, so that the diameter of the cable clamp 4 decreases, and the barb inside is clamped in the outer sheath of the leaky cable 3, to further lock the leaky cable 3.

[0026] To further improve the sealing and waterproof performance, an annular groove 17 is provided in a contact surface between the first shell 1 and the second shell 2, and a second sealing member 18 is disposed inside the annular groove 17.

[0027] Further provided is a leaky cable connector, including the mounting structure for a leaky cable connector.

[0028] Before the leaky cable 3 is assembled, the connector is preassembled to form a whole. The leaky cable 3 requires foaming and coring. During mounting, the prepared leaky cable 3 is inserted in the connector from the second shell 2, until the leaky cable 3 abuts against the first shell 1 and can be no longer pushed. With the unique design of the first shell 1, the second shell 2, and the cable clamp 4, the leaky cable 3 may be smoothly inserted in the connector, and does not cause the movement of any part. After the leaky cable 3 is pushed to position, an assembly is placed in a dedicated fixture for press fit. With the press fit, the slotted position of the cable clamp 4 is pressed to deform, and the barb is clamped in the outer sheath of the leaky cable 3. The external conductor of the leaky cable 3 is pressed on the tapered surfaces of the cable clamp 4 and the first shell 1, to complete mounting.

[0029] In an alternative embodiment, end surfaces of

the cable clamp 4 and the first shell 1 facing the gap 7 may also be tapered surfaces. In this case, the cable clamp 4 and the first shell 1 form the annular gap 7.

[0030] In an alternative embodiment, as shown in FIG. 4, an end surface of the pressure ring 16 facing the housing 15 is formed with a wedged surface. Correspondingly, an end surface of the housing 15 facing the pressure ring 16 is formed with a wedged protrusion adapting to the wedged surface, so that a limiting function can be implemented.

[0031] Obviously, the foregoing embodiments are merely examples for clear description, rather than a limitation to implementations. For a person of ordinary skill in the art, other changes or variations in different forms may also be made based on the foregoing description. All implementations cannot and do not need to be exhaustively listed herein. Obvious changes or variations that are derived there from still fall within the protection scope of present application.

Claims

1. A mounting structure for a leaky cable connector, comprising:

a first shell (1) and a second shell (2) that are sleeved with each other, wherein the first shell (1) is disposed inside, the second shell (2) is disposed outside, and a mounting space allowing a leaky cable (3) to pass through is provided in each of the first shell (1) and the second shell (2); and

a cable clamp (4), disposed at a connection between the first shell (1) and the second shell (2), wherein a gap (7) allowing insertion of an external conductor of the leaky cable (3) is provided between the cable clamp (4) and the first shell (1), and when the leaky cable (3) is inserted in the mounting spaces, the cable clamp (4) is subjected to a force to move toward the first shell (1) to fasten the external conductor of the leaky cable (3).

2. The mounting structure for a leaky cable connector according to claim 1, wherein an end surface of at least one of the cable clamp (4) or the first shell (1) facing the gap (7) is a tapered surface.

3. The mounting structure for a leaky cable connector according to claim 2, wherein an end surface of the cable clamp (4) facing the gap (7) is a tapered surface with an inner diameter gradually increasing from one end close to the second shell (2) to the other end close to the first shell (1), and an end surface of the first shell (1) facing the gap (7) is formed by at least two partial inclined surfaces.

4. The mounting structure for a leaky cable connector according to any one of claims 1 to 3, wherein the first shell (1) is formed with an assembly space (5) allowing insertion of the cable clamp (4) under the action of an external force, and correspondingly, the cable clamp (4) is formed with a protrusion (6) adapting to the assembly space (5).

5. The mounting structure for a leaky cable connector according to claim 4, wherein the other end of the cable clamp (4) opposite to the protrusion (6) is provided with a first limiting member (8), the first shell (1) is provided with a second limiting member (9) matching the first limiting member (8), and the first limiting member (8) climbs over the second limiting member (9) under the action of an external force to insert the protrusion (6) in the assembly space (5) for fastening.

6. The mounting structure for a leaky cable connector according to any one of claims 1 to 5, wherein a third limiting member and a fourth limiting member are disposed at an interval in an axial direction in the second shell (2), a first sealing member (14), a housing (15), and a pressure ring (16) are sequentially disposed between the third limiting member and the fourth limiting member, the pressure ring (16) abuts against the fourth limiting member, the first sealing member (14) abuts against the third limiting member, and the housing (15) abuts against both the first sealing member (14) and the pressure ring (16).

7. The mounting structure for a leaky cable connector according to claim 6, wherein the housing (15) is provided with a tapered surface matching the cable clamp (4) to apply a radial pressing force to the cable clamp (4) under the action of an external force.

8. The mounting structure for a leaky cable connector according to any one of claims 1 to 7, wherein an annular groove (17) is provided in a contact surface between the first shell (1) and the second shell (2), and a second sealing member (18) is disposed inside the annular groove (17).

9. The mounting structure for a leaky cable connector according to any one of claims 1 to 8, wherein the first shell (1) and the second shell (2) are assembled by interference fit.

10. A leaky cable connector, comprising the mounting structure for a leaky cable connector according to any one of claims 1 to 9.

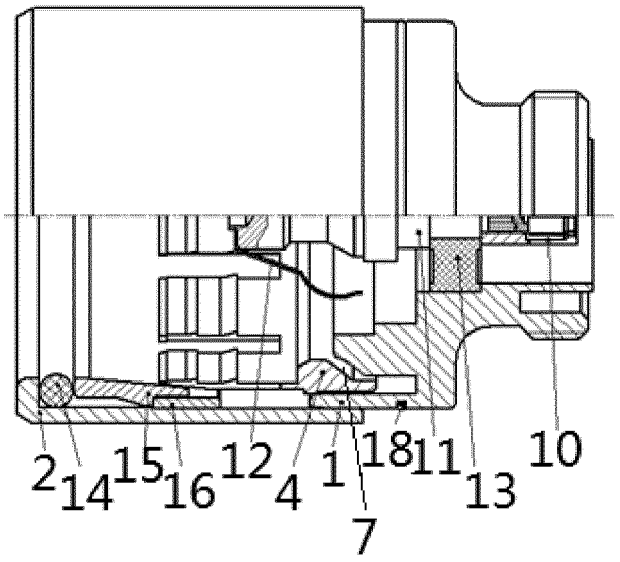

Fig 1

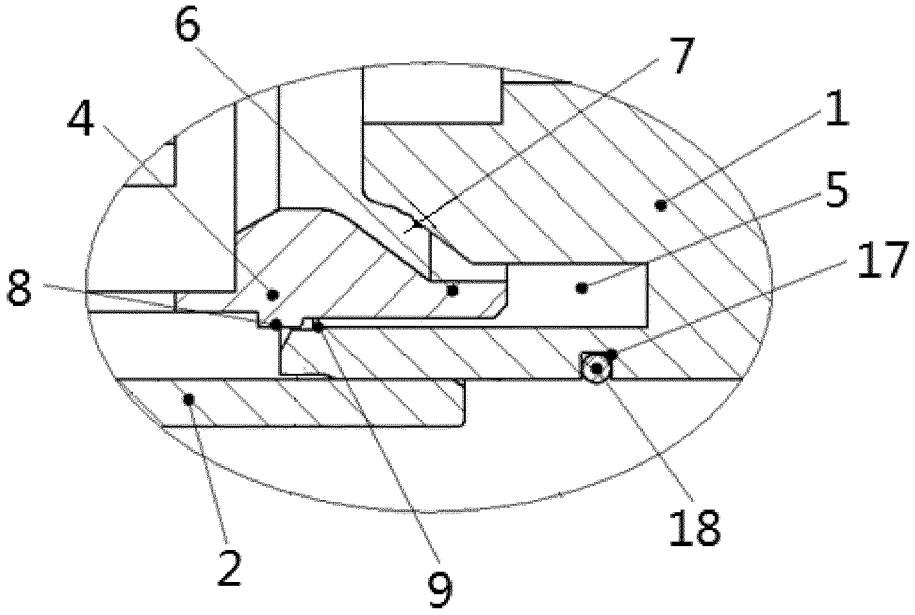

Fig 2

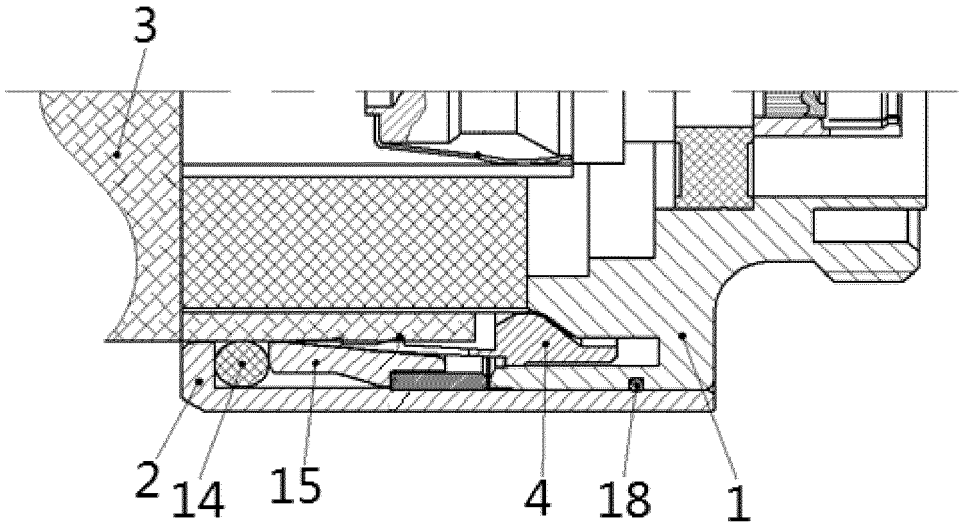

Fig 3

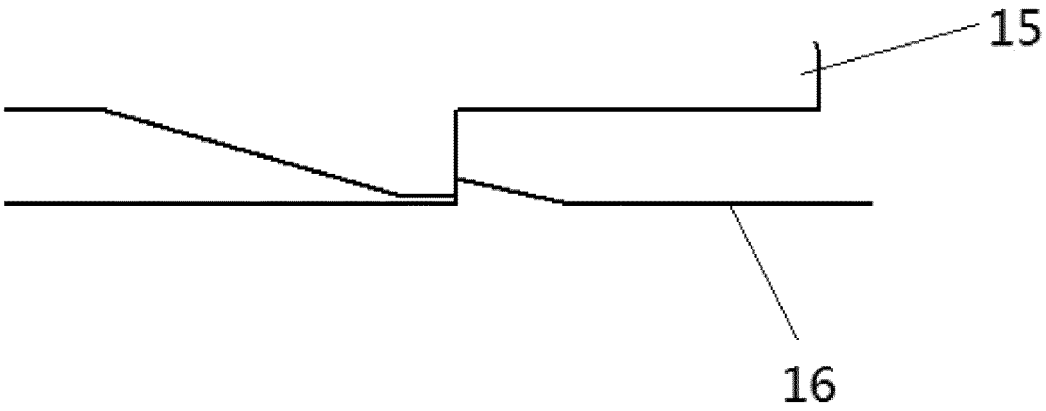

Fig 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/092288

A. CLASSIFICATION OF SUBJECT MATTER

H01R 13/02(2006.01)i; H01R 13/506(2006.01)i; H01R 13/52(2006.01)i; H01R 13/58(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01R

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

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

CNABS, CNTXT, DWPI, SIPOABS, CNKI, IEEE: 漏缆, 电缆, 同轴, 连接器, 外导体, 线夹, 夹紧, 夹持, cable, coaxial, connector, outer conductor, clamp, grasp, grip

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 101075707 A (ROSENBERGER ASIA PACIFIC ELECTRONIC CO., LTD.) 21 November 2007 (2007-11-21) description page 3 paragraph 8 to page 6 paragraph 4, figure 3	1-10
PX	CN 112201977 A (ZHONGTIAN RADIO FREQUENCY CABLE CO., LTD.) 08 January 2021 (2021-01-08) claims 1-10	1-10
A	CN 101106222 A (ROSENBERGER ASIA PACIFIC ELECTRONIC CO., LTD.) 16 January 2008 (2008-01-16) entire document	1-10
A	CN 101841108 A (ZHENJIANG ZHENGKAI ELECTRONICS CO., LTD.) 22 September 2010 (2010-09-22) entire document	1-10
A	US 5938465 A (PALCO CONNECTOR, INC.) 17 August 1999 (1999-08-17) entire document	1-10

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"O" document referring to an oral disclosure, use, exhibition or other means
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 July 2021	**04 August 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/092288

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 101075707 A	21 November 2007	CN 100502148 C	17 June 2009
CN 112201977 A	08 January 2021	None	
CN 101106222 A	16 January 2008	CN 100502149 C	17 June 2009
CN 101841108 A	22 September 2010	CN 101841108 B	14 September 2011
US 5938465 A	17 August 1999	None	

Form PCT/ISA/210 (patent family annex) (January 2015)