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(54) CABLE CONNECTOR

(57) A cable connector has a metal housing, a receptacle, a cable, and an inner metal shielding element. The cable has an outer insulation jacket, an outer conductor, and an inner conductor arranged in coaxial from outside to inside and is fastened in the metal housing. A front section of the cable is fastened in the metal housing and exposes the inner conductor and the outer conductor from front to rear. The inner conductor is fastened in the receptacle. The outer conductor is directly mounted in the inner metal shielding element but is not folded and is not mounted around an outer surface of the inner metal shielding element. The outer conductor and the inner metal shielding element are accommodated in the metal housing. Therefore, the assembly steps and the manufacturing process of the cable connector are simplified, and the efficiency in the high-frequency signal transmission thereof is enhanced simultaneously.

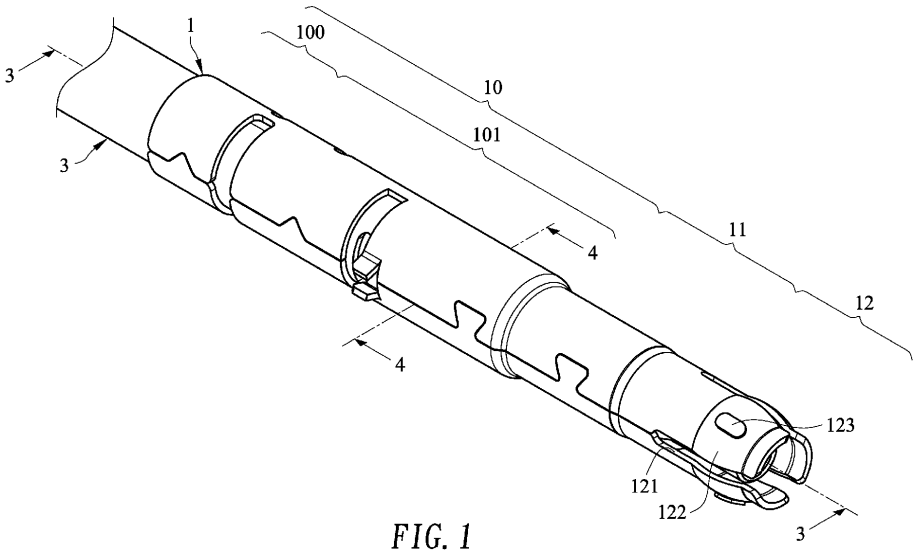

FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention is related to an electrical connector, more particularly to a cable connector.

2. Description of the Prior Arts

[0002] With reference to Figs. 10A and 10B, a conventional cable connector includes an outer housing 6, a supporting sleeve 7, and a cable 8. The outer housing 6 includes a first housing 60 and a second housing 61 mounted around the first housing 60. The first housing 60 includes a sleeve portion 601 and an indentation ring portion 602 adjacent to the second housing 61 and concavely formed. The cable 8 includes an outer insulation jacket, an outer conductor 80, an insulation layer 81, and an inner conductor 82 arranged in coaxial from outside to inside. The inner conductor 82, the insulation layer 81, and the outer conductor 80 are exposed from a front section of the cable 8 in sequence. The supporting sleeve 7 is mounted around the exposed outer conductor 80. Then, the outer conductor 80 is folded outward and backward along an outside of the supporting sleeve 7 since the outer conductor 80 is longer than the supporting sleeve 7. Next, the supporting sleeve 7 and the folded outer conductor 80 are mounted in the sleeve portion 601 of the first housing 60 together. In this case, the exposed insulation layer 81 and the inner conductor 82 mounted therein are clamped by the indentation ring portion 602.

[0003] Based on the foregoing description, the first housing 60 and the second housing 61 are combined to form the outer housing 6 of the conventional cable connector. Therefore, the two-piece first and second housings 60 and 61 need to be manufactured separately and then assembled as the outer housing 6 by an additional step thereafter to complete the conventional cable connector. Thus, after the conventional cable connector has been plugged and unplugged many times, the first and second housings 60 and 61 may separate from each other to become invalid. Furthermore, the outer conductor 80 needs to be folded outward and backward along the outside of the supporting sleeve 7 to be firmly fastened in the sleeve portion 601 of the first housing 60. The indentation ring portion 602 is required to be formed on the first housing 60 to further clamp the exposed insulation layer 81 and the inner conductor 82 mounted therein. Therefore, the assembling steps and the manufacturing process of the conventional cable connector are complicated and the conventional cable connector needs to be improved.

SUMMARY OF THE INVENTION

[0004] An objective of the present invention is to provide a cable connector.

[0005] To achieve the objection as mentioned above, the cable connector includes:

a metal housing including a sleeve portion, an intermediary portion, and a plug portion integrally formed from rear to front, wherein the sleeve portion includes a main body and an end portion integrally extends backward from the main body;

a receptacle accommodated in the intermediary portion and the plug portion of the metal housing and having an inner conductor terminal mounted through the receptacle from front to rear;

a cable including an outer insulation jacket, an outer conductor, and an inner conductor arranged in coaxial from outside to inside, wherein:

the outer insulation jacket is mounted in the end portion of the sleeve portion of the metal housing;

the outer conductor protrudes from the outer insulation jacket and is mounted in the main body of the sleeve portion; and

the inner conductor protrudes from the outer conductor, is electrically insulated with the outer conductor, and is mounted in the receptacle to be connected to the inner conductor terminal of the receptacle; and

a first inner metal shielding element accommodated in the main body of the sleeve portion to be mounted around the outer conductor and an outer surface of the first inner metal shielding element is abutted against an inner surface of the main body.

[0006] With the foregoing description, the cable connector of the present invention mainly applies the metal housing integrally formed. The first inner metal shielding element is mainly accommodated in the main body of the sleeve portion of the metal housing. The outer surface of the first inner metal shielding element is abutted against the inner surface of the main body. Thus, the outer conductor of the cable is firmly fastened in the metal housing by being clamped by the first inner metal shielding element. Therefore, the cable is fastened in the metal housing in which the outer conductor does not need to be folded outward and backward along an outside of the first inner metal shielding element. Additionally, the first inner metal shielding element may shield electromagnetic interference. The metal housing is integrally formed. Even if the cable connector has been plugged and unplugged many times, the metal housing does not separate to become invalid. Moreover, a structure for fastening the cable does not need to be additionally formed on the metal housing. Accordingly, the assembling steps and the manufacturing process of the cable connector in accordance with the present invention is effectively simplified and the efficiency in high-frequency signal trans-

mission of the cable connector is enhanced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Fig. 1 is a perspective view of a first embodiment of a cable connector in accordance with the present invention;

Fig. 2 is an exploded perspective view of the cable connector in Fig. 1;

Fig. 3 is a cross-sectional view along a 3-3 line in Fig. 1;

Fig. 4 is a cross-sectional view along a 4-4 line in Fig. 1;

Fig. 5 is a side view in a partial section of a second embodiment of a cable connector in accordance with the present invention;

Fig. 6 is a side view in a partial section of a third embodiment of a cable connector in accordance with the present invention;

Fig. 7 is a side view in a partial section of a fourth embodiment of a cable connector in accordance with the present invention;

Fig. 8 is a side view in a partial section of a fifth embodiment of a cable connector in accordance with the present invention;

Fig. 9 is a side view in a partial section of a sixth embodiment of a cable connector in accordance with the present invention;

Fig. 10A is a side plane view of a conventional cable connector; and

Fig. 10B is a side view in a partial section of the cable connector in Fig. 10A.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0008] With multiple embodiments and drawings thereof, the features of the present invention are described in detail as follows.

[0009] With reference to Figs. 1 and 2, a first embodiment of the cable connector of the present invention includes a metal housing 1, a receptacle 2, a cable 3, and a first inner metal shielding element 4 and may include an optional second inner metal shielding element 5. The receptacle 2, a front section of the cable 3, and the first and second inner metal shielding elements 4 and 5 are accommodated in the metal housing 1 together.

[0010] The metal housing 1 includes a sleeve portion 10, an intermediary portion 11, and a plug portion 12 formed integrally from rear to front. In one embodiment, the metal housing 1 is cylindrical. A length of the sleeve portion 10 may be greater than a length of the intermediary portion 11 and a length of the plug portion 12 and the length of the intermediary portion 11 is greater than the length of the plug end 12 but are not limited thereto. The sleeve portion 10 of the metal housing 1 includes an end portion 100 and a main body 101. The main body 101 is formed between the intermediary portion 11 and the end portion 100. The main body 101 has a single outer diameter. In one embodiment, the plug portion 12 includes three elongated notches 121 arranged in annular, three contacting elastic elements 122 arranged in annular, and three contacting bumps 123. Each elongated notch 121 is formed through the plug portion 12 from front to rear. Each contacting elastic element 122 is formed between two of the elongated notches 121. In the present embodiment, a front segment of each contacting elastic element 122 has a protruding part slightly protruding outward. Each contacting bump 123 is formed on the protruding part of each contacting elastic element 122. Each contacting bump 123 is outer than an outer side of a rear segment of the corresponding contacting elastic element 122. In the present embodiment, the corresponding two elongated notches 121 are arranged between 120 degrees. The corresponding two contacting bumps 123 of the contacting elastic elements 122 are also arranged between 120 degrees but are not limited thereto. In one embodiment, as shown in Fig. 3, since an outer diameter of the intermediary portion 11 is lesser than the outer diameter of the main body 101 of the sleeve portion 10, a shrinking part 13 is further concavely formed on a boundary of the intermediary portion 11 and the main body 101 of the sleeve portion 10.

[0011] With reference to Figs. 2 and 3, the receptacle 2 is accommodated in the intermediary portion 11 and the plug portion 12 of the metal housing 1. The receptacle 2 includes a front end, a rear end, and an inner conductor terminal 20. The front end corresponds to the front segment of the contacting elastic element 122. The rear end corresponds to the shrinking part 13. The inner conductor terminal 20 is mounted through the receptacle 2 from front to rear. In the present embodiment, the inner conductor terminal 20 may be a hollow terminal but is not limited thereto. In one embodiment, the receptacle 2 may further include an accommodating channel 21 formed through the first receptacle 2 from front to rear. The inner conductor terminal 20 is mounted through and accommodated in the accommodating channel 21.

[0012] The cable 3 includes an outer insulation jacket 30, an outer conductor 3 1 (such as a metal weaving net), a metal foil 34(such as an aluminum foil), an insulation layer 32, and an inner conductor 33. As shown in Fig. 3, the inner conductor 33, the insulation layer 32, the metal foil 34, the outer conductor 31, and the outer insulation jacket 30 are exposed from front to rear of the cable 3 in sequence. In this case, the outer conductor 31 and the metal foil 34 protrude from the outer insulation jacket 30. A distal end of the outer conductor 31 is flush with a distal end of the metal foil 34. A first front ring segment 321 of the insulation layer 32 protrudes from the metal foil 34. The inner conductor 33 protrudes from the first front ring segment 321 of the insulation layer 32. The front section of the cable 3 is mounted through the sleeve portion 10 of the metal housing 1. The outer insulation jacket 30 is mounted in the end portion 100 of the sleeve portion 10

and an outer surface of the outer insulation jacket 30 is abutted against an inner surface of the end portion 100. The outer conductor 31 and the first front ring segment 321 of the insulation layer 32 are located in the main body 101 of the sleeve end 10. A distance is defined between the first front ring segment 321 and the inner surface of the main body 101. The first front ring segment 321 of the insulation layer 32 may be further close to the shrinking part 13. Therefore, a lateral distance is defined between the outer conductor 31 and the shrinking part 13 of the metal housing 1. The inner conductor 33 is located in the intermediary portion 11 and mounted through the receptacle 2 to be connected to the inner conductor terminal 20.

[0013] With reference to Fig. 2 and 3, the first inner metal shielding element 4 may be a cylindrical sleeve, is accommodated in the main body 101 of the sleeve portion 10, and is mounted around the outer conductor 31 of the cable 3. In this case, the first inner metal shielding element 4 is located between the outer conductor 31 and the main body 101 of the sleeve end 10 to clamp the outer conductor 31 with the insulation layer 32. An outer surface of the first inner metal shielding element 4 is abutted against the inner surface of the main body 101 and an inner surface of the first inner metal shielding element 4 is abutted against and firmly contacts with an outer surface of the outer conductor 31. Accordingly, the outer conductor 31 of the cable 3 is firmly fastened by the first inner metal shielding element 4 in the main body 101 of the sleeve portion 10. Thus, the cable 3 is firmly fastened in the metal housing 1. As shown in Fig. 3, in one embodiment, a thickness of the first inner metal shielding element 4 matches a thickness of the outer insulation jacket 30 of the cable 3. In the present embodiment, the first inner metal shielding element 4 has a front ring portion 40 corresponding to the lateral distance defined between the outer conductor 31 and the shrinking part 13. The front ring portion 40 is formed along the inner surface of the main body 101 and is close to the shrinking part 13. The front ring portion 40 is located between the first front ring segment 321 and the main body 101 and is formed around the first front ring segment 321. A gap is defined between the front ring portion 40 and the first front ring segment 321. The metal housing 1, the first inner metal shielding element 4, and the outer conductor 31 of the cable 3 are electrically connected. The outer conductor 31 is connected to the ground to conduct the external electromagnetic interference and the noise away from the cable connector.

[0014] With further reference to Figs. 3 and 4, the second inner metal shielding element 5 is mounted in the gap defined between the front ring portion 40 and the first front ring segment 321 of the insulation layer 32. In the present embodiment, the first and second inner metal shielding elements 4 and 5 are integrally formed. The second inner metal shielding element 5 may be formed by integrally bending the front ring portion 40 inward along the inner surface of the first inner metal shielding element 4 at the shrinking part 13. As shown in Fig. 4, a plurality of bumps 50 are formed on an outer surface of the second inner metal shielding element 5. The bumps 50 are abutted against the inner surface of the first inner metal shielding element 4. In one embodiment, the second inner metal shielding element 5 may include four bumps 50 but is not limited thereto. In another embodiment, a sum of a thickness of the front ring portion 40 of the first inner metal shielding element 4 and a thickness of the second inner metal shielding element 5 matches a distance defined between an outer surface of the first front ring segment 321 of the insulation layer 32 and an outer surface of the outer insulation jacket 30 of the cable 3.

[0015] With the foregoing description, the first front ring segment 321 of the insulation layer 32 may be firmly fastened in the main body 101 of the sleeve portion 10 by being clamped between the front ring portion 40 of the first inner metal shielding element 4 and the second inner metal shielding element 5. The cable 3 may be firmly fastened in the metal housing 1. Furthermore, the second inner metal shielding element 5 is electrically connected to the first inner metal shielding element 4, the outer conductor 31 of the cable 3, and the metal housing 1. Therefore, the second inner metal shielding element 5 may shield and conduct away the electromagnetic interference at the first front ring segment 321 of the insulation layer 32 to reinforce the shielding ability instead of the absent outer conductor 31.

[0016] With reference to Fig. 5, a second embodiment of the cable connector is shown and similar to the cable connector shown in Fig. 3. In the present embodiment, a first inner metal shielding elements 4 and a second inner metal shielding elements 5 are two individual sleeves. In this case, the second inner metal shielding element 5 is first mounted around the first front ring segment 321 of the insulation layer 32. The first inner metal shielding element 4 is then mounted around the outer conductor 31 and the second inner metal shielding element 5. In another embodiment, the front ring portion 40 of the first inner metal shielding element 4 and the second inner metal shielding element 5 may be integrally formed.

[0017] With reference to Fig. 6, a third embodiment of the cable connector is shown and similar to the cable connector shown in Fig. 3. In the present embodiment, a distal end of a first inner metal shielding element 4 is flush with a distal end of the outer conductor 31 and the distal end of the metal foil 34. A gap is defined between the main body 101 of the sleeve portion 10 and the first front ring segment 321 of the insulation layer 32. Since the distal end of the first inner metal shielding element 4 is flush with the distal end of the outer conductor 31 and the distal end of the metal foil 34, the gap shown in Fig. 6 is greater than the gap shown in Fig. 3. Therefore, a second inner metal shielding element 5" is mounted in the gap defined between the main body 101 of the sleeve portion 10 and the first front ring segment 321 of the insulation layer 32. A thickness of the second inner metal

shielding element 5" shown in Fig. 6 is greater than the second inner metal shielding element 5 shown in Fig. 3. In one embodiment, the thickness of the second inner metal shielding element 5" matches the distance defined between the outer surface of the first front ring segment 321 of the insulation layer 32 and the outer surface of the outer insulation jacket 30 of the cable 3.

[0018] With reference to Figs. 7 and 8, a fourth embodiment and a fifth embodiment of the cable connector are shown and similar to the cable connector as shown in Figs. 3 and 5. In the fourth and fifth embodiments, a second front ring segment 341 of the metal foil 34 of the cable 3 protrudes from the outer conductor 31. The second front ring segment 341 of the metal foil 34 extends along the first front ring segment 321 of the insulation layer 32. A distal end of the second front ring segment 341 is flush with a distal end of the first front ring segment 321. A gap is defined between the front ring portion 40 of the first inner metal shielding element 4 and the second ring segment 341 of the metal foil 34. A second inner metal shielding element 5 is mounted in the gap defined between the front ring portion 40 of the first inner metal shielding element 4 and the second ring segment 341 of the metal foil 34. In one embodiment, the second inner metal shielding element 5 may include four bumps 50 shown in Fig. 4 but is not limited thereto. In another embodiment, a sum of a thickness of the front ring portion 40 of the first inner metal shielding element 4 and a thickness of the second inner metal shielding element 5 matches a distance defined between an outer surface of the second front ring segment 341 of the metal foil 34 and an outer surface of the outer insulation jacket 30 of the cable 3.

[0019] With reference to Fig. 9, a sixth embodiment of the cable connector is shown and similar to the cable connector shown in Fig. 6. In the present embodiment, the distal end of the first inner metal shielding element 4 is flush with the distal end of the outer conductor 31 of the cable 3. A gap is defined between the main body 101 of the sleeve portion 10 and the second front ring segment 341 of the metal foil 34. A size of the gap defined between the main body 101 and the front ring segment 341 is between a size of the gap defined between the front ring portion 40 and the first front ring segment 321 shown in Fig. 3 and a size of the gap defined between the main body 101 and the first front ring segment 321 shown in Fig. 6. In the present embodiment, a second inner metal shielding element 5a is mounted in the gap defined between the main body 101 of the sleeve portion 10 and the second front ring segment 341 of the metal foil 34. Therefore, a thickness of the second inner metal shielding element 5a is between a thickness of the second inner metal shielding element 5 shown in Figs. 3 and a thickness of the second inner metal shielding element 5" shown in Fig. 6. In one embodiment, the thickness of the second inner metal shielding element 5a matches the distance defined between the outer surface of the second front ring segment 341 of the metal foil 34 and the outer surface of the outer insulation jacket 30 of the cable 3.

[0020] With the foregoing description, the cable connector of the present invention applies the metal housing integrally formed. The first inner metal shielding element is accommodated in the main body of the sleeve portion of the metal housing. The outer surface of the first inner metal shielding element is abutted against the inner surface of the main body. Thus, the outer conductor of the cable is firmly fastened in the metal housing by being clamped by the first inner metal shielding element. Therefore, the cable is fastened in the metal housing in which the outer conductor does not need to be folded outward and backward along an outside of the first inner metal shielding element. Additionally, the second inner metal shielding element may be mounted around the different portions of the insulation layer exposed from the front section of the cable. The metal housing and/or the first inner metal shielding element may firmly clamp the different portions of the insulation layer with the second inner metal shielding element. An indented structure for fastening the front ring segment is not required to be formed on the metal housing. Accordingly, even if the cable connector has been plugged and unplugged many times, the metal housing does not separate to become invalid. The insulation layer exposed from the front section of the cable may be firmly clamped by the metal housing, the first inner metal shielding element, and/or the second inner metal shielding element. Moreover, a structure for fastening the cable does not need to be additionally formed on the metal housing. The outer conductor and the first and second inner metal shielding elements may shield the electromagnetic interference and conduct the electromagnetic interference to the ground. Accordingly, the assembling steps and the manufacturing process of the cable connector in accordance with the present invention is effectively simplified and the efficiency in high-frequency signal transmission of the cable connector is enhanced.

[0021] Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and features of the invention, the disclosure is illustrative only. Changes may be made in the details, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims

1. A cable connector comprising:

a metal housing comprising a sleeve portion, an intermediary portion, and a plug portion integrally formed from rear to front, wherein the sleeve portion includes a main body and an end portion

integrally extends backward from the main body;
a receptacle accommodated in the intermediary portion and the plug portion of the metal housing and having an inner conductor terminal mounted through the receptacle from front to rear;
a cable comprising an outer insulation jacket, an outer conductor, and an inner conductor arranged in coaxial from outside to inside, wherein:

the outer insulation jacket is mounted in the end portion of the sleeve portion of the metal housing;
the outer conductor protrudes from the outer insulation jacket and is mounted in the main body of the sleeve portion; and
the inner conductor protrudes from the outer conductor, is electrically insulated with the outer conductor, and is mounted in the receptacle to be connected to the inner conductor terminal of the receptacle; and

a first inner metal shielding element accommodated in the main body of the sleeve portion to be mounted around the outer conductor and an outer surface of the first inner metal shielding element is abutted against an inner surface of the main body.

2. The cable connector as claimed in claim 1, wherein:

the cable further comprises a metal foil and an insulation layer arranged in coaxial from outside to inside and located between the outer conductor and the inner conductor;
a distal end of the metal foil is flush with a distal end of the outer conductor;
a first front ring segment of the insulation layer protrudes from the metal foil and is located in the main body of the sleeve portion;
the first inner metal shielding element has a front ring portion formed along an inner surface of the main body; and
a second inner metal shielding element is mounted between the front ring portion of the first inner metal shielding element and the first front ring segment of the insulation layer.

3. The cable connector as claimed in claim 1, wherein:

the cable further comprises a metal foil and an insulation layer arranged in coaxial from outside to inside and located between the outer conductor and the inner conductor;
a second front ring segment of the metal foil and a first front ring segment of the insulation layer protrude together from the outer conductor and are located in the main body of the sleeve portion;
a distal end of the second front ring segment is flush with a distal end of the first front ring segment of the insulation layer;
the first inner metal shielding element has a front ring portion formed along an inner surface of the main body; and
a second inner metal shielding element is mounted between the front ring portion of the first inner metal shielding element and the second front ring segment of the metal foil.

4. The cable connector as claimed in claim 1, wherein:

the cable further comprises a metal foil and an insulation layer arranged in coaxial from outside to inside and located between the outer conductor and the inner conductor;
a distal end of the metal foil is flush with a distal end of the outer conductor;
a first front ring segment of the insulation layer protrudes from the metal foil and is located in the main body of the sleeve portion;
a distal end of the first inner metal shielding element is flush with a distal end of the outer conductor of the cable; and
a second inner metal shielding element is mounted between the main body of the sleeve portion and the first front ring segment of the insulation layer.

5. The cable connector as claimed in claim 1, wherein:

the cable further comprises a metal foil and an insulation layer arranged in coaxial from outside to inside and located between the outer conductor and the inner conductor;
a second front ring segment of the metal foil and a first front ring segment of the insulation layer protrude together from the outer conductor and are located in the main body of the sleeve portion;
a distal end of the second front ring segment is flush with a distal end of the first front ring segment of the insulation layer;
a distal end of the first inner metal shielding element is flush with a distal end of the outer conductor of the cable; and
a second inner metal shielding element is mounted between the main body of the sleeve portion and the second front ring segment of the metal foil.

6. The cable connector as claimed in claim 2 or 3, wherein the second inner metal shielding element is formed by integrally bending the front ring segment inward along an inner surface of the first inner metal shielding element.

7. The cable connector as claimed in claim 2 or 3, wherein the front ring portion of the first inner metal shielding element and the second inner metal shielding element are integrally formed.

8. The cable connector as claimed in claims 6, wherein a plurality of bumps are further integrally formed on an outer surface of the second inner metal shielding element.

9. The cable connector as claimed in any one of claims 2 to 8, wherein:

an outer diameter of the intermediary portion is less than an outer diameter of the sleeve portion;
a shrinking part is concavely formed on a boundary of the intermediary portion and the main body of the sleeve portion; and
the front ring portion of the first inner metal shielding element is formed along the inner surface of the main body and is close to the shrinking part.

10. The cable connector as claimed in any one of claims 2 to 9, wherein the metal housing, the first inner metal shielding element, the outer conductor of the cable, and the second inner metal shielding element are electrically connected.

11. The cable connector as claimed in any one of claims 1 to 10,
wherein the plug portion of the metal housing comprises three elongated notches and three contacting elastic elements, wherein

each elongated notch is formed through the plug portion from front to rear; and
each contacting elastic element is formed between two corresponding elongated notches.

12. The cable connector as claimed in claim 11, wherein:

a front segment of each contacting elastic element has a protruding part slightly protruding outward; and
a contacting bump is formed on the protruding part of each contacting elastic element.

13. The cable connector as claimed in any one of claims 1 to 12, wherein:

the main body of the sleeve portion has a single outer diameter; and
a thickness of the first inner metal shielding element matches a thickness of the outer insulation jacket of the cable.

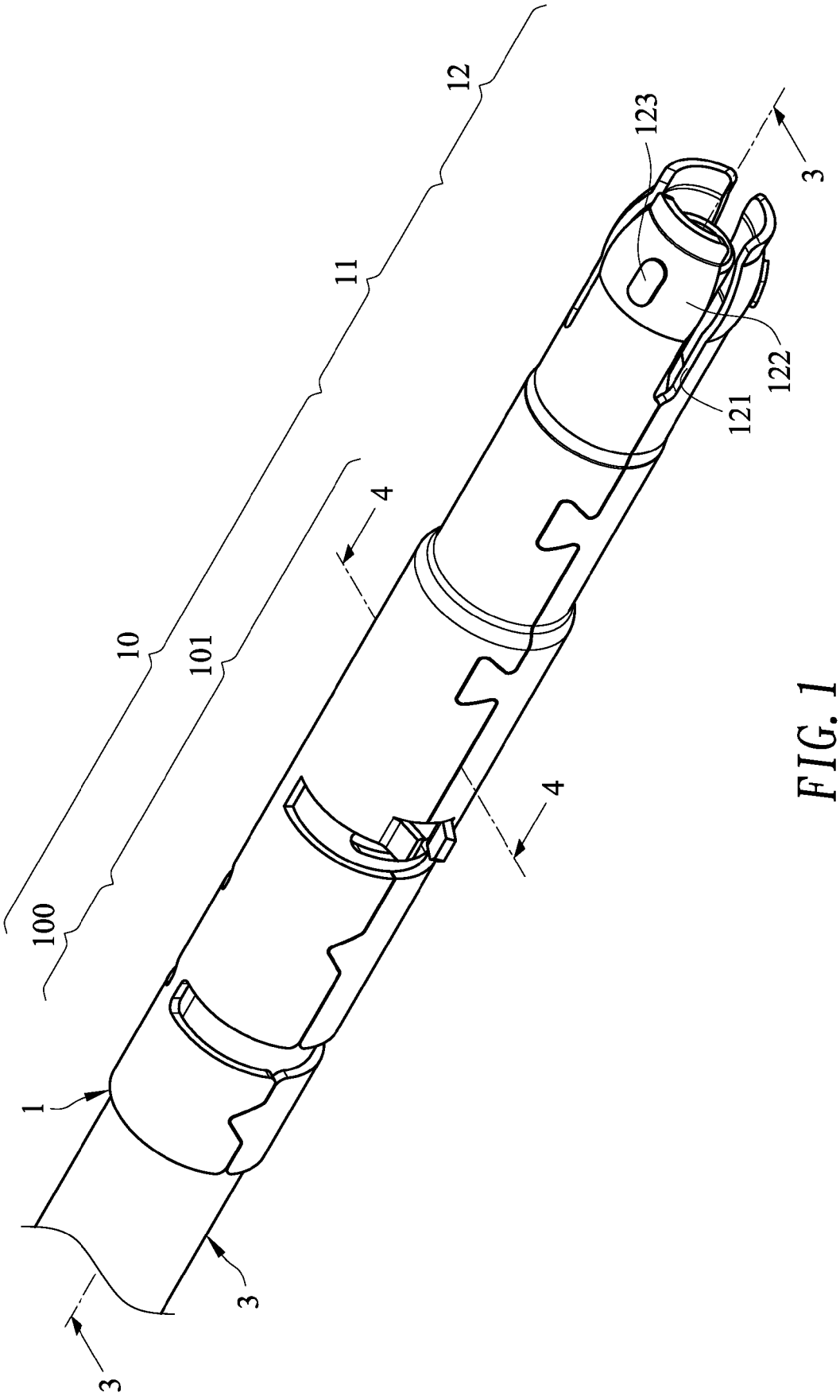

FIG. 1

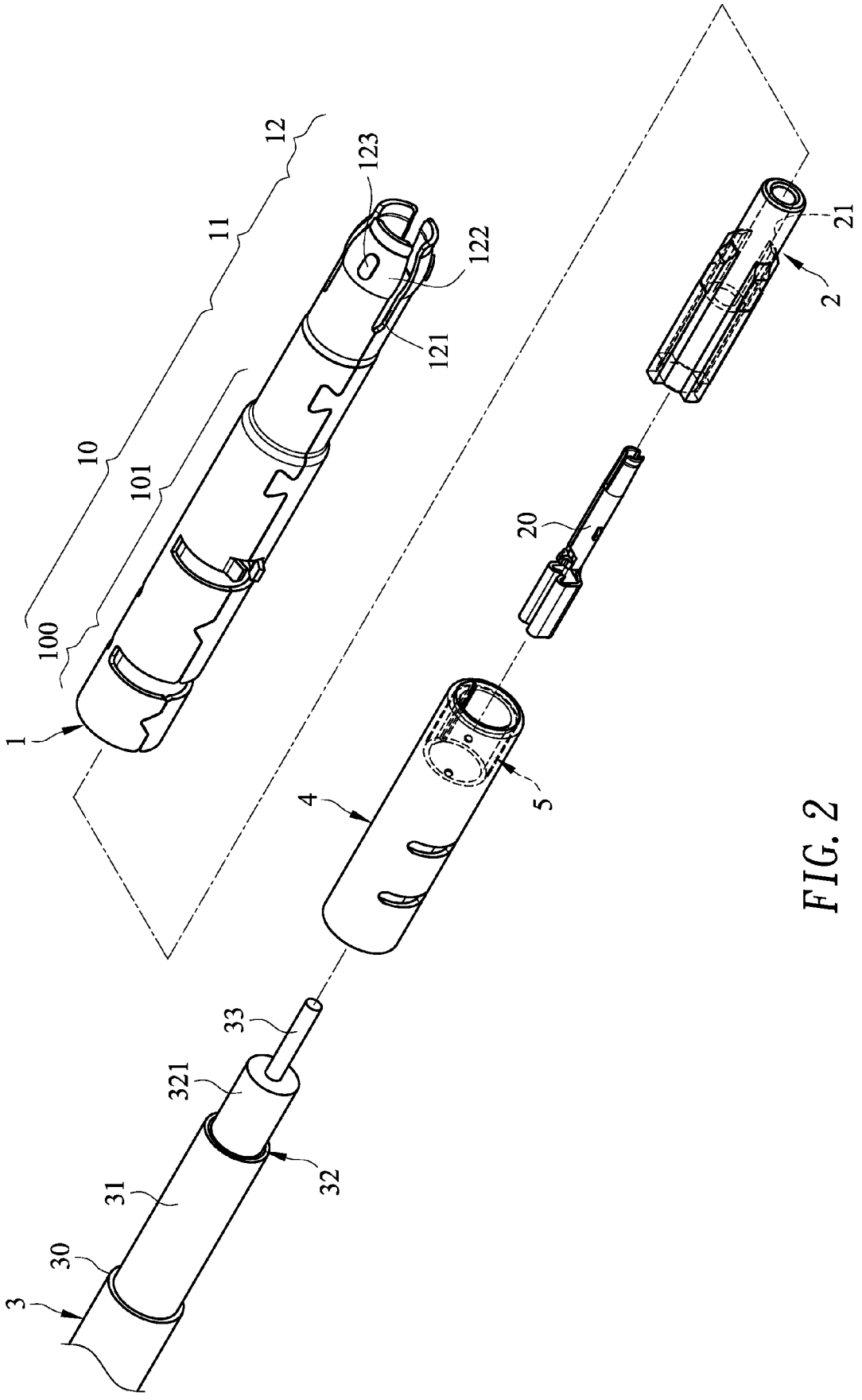

FIG. 2

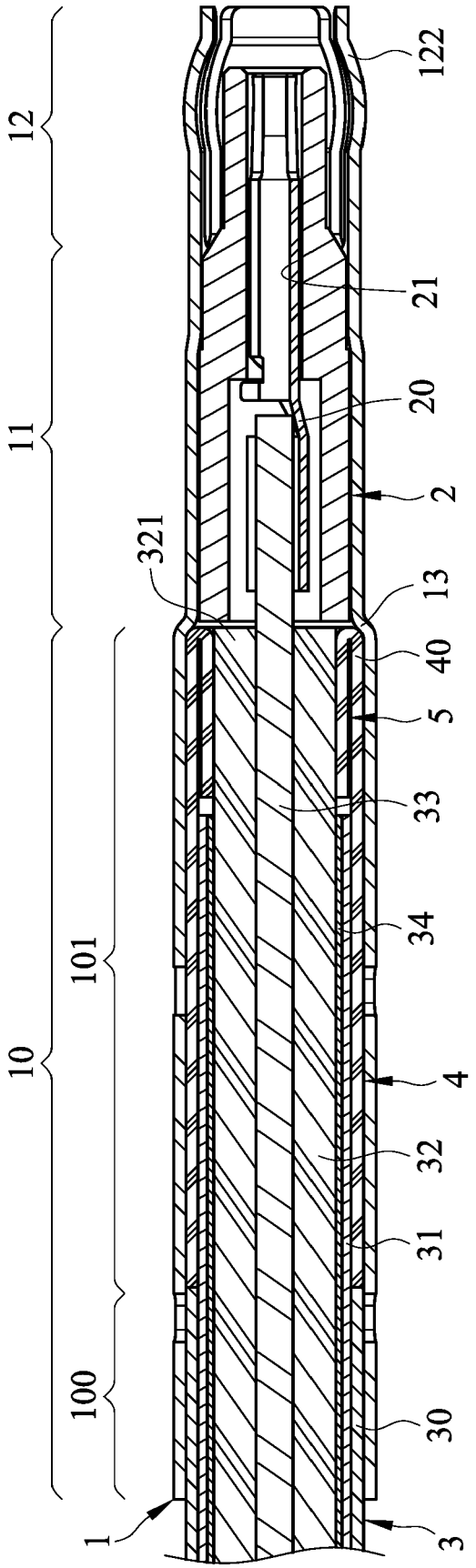

FIG. 3

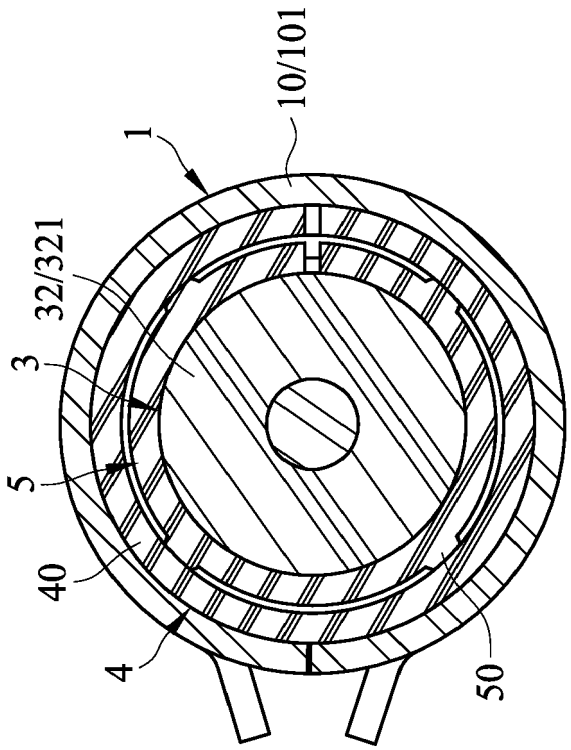

FIG. 4

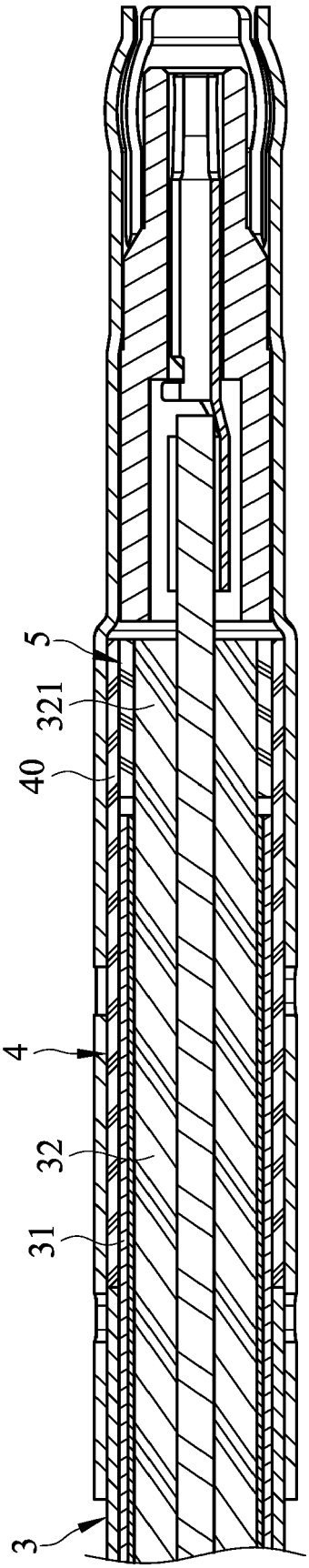

FIG. 5

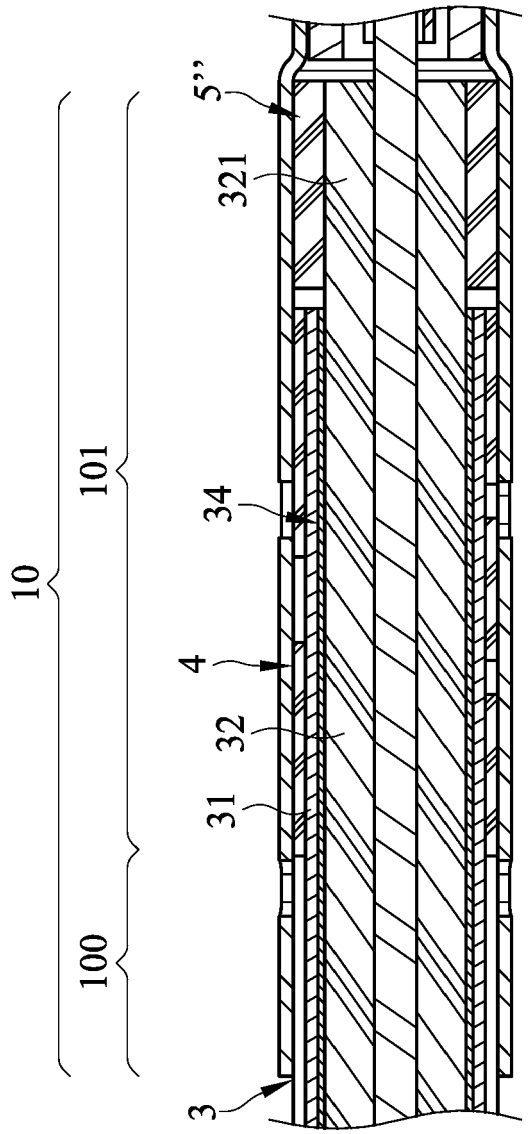

FIG. 6

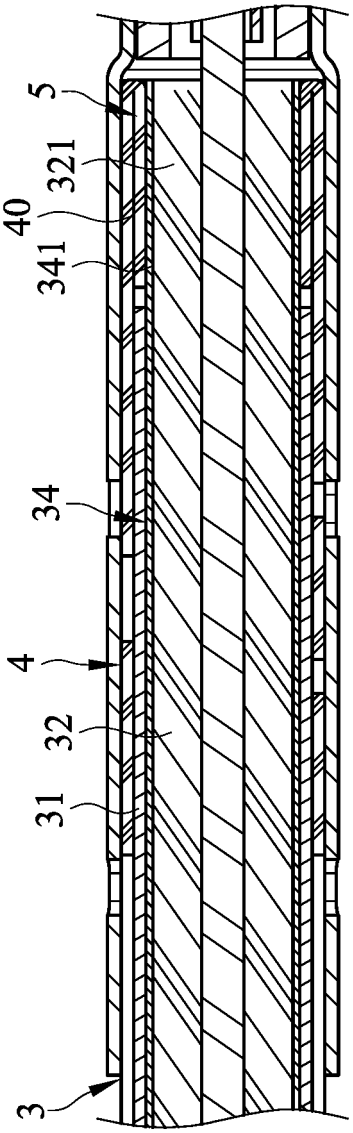

FIG. 7

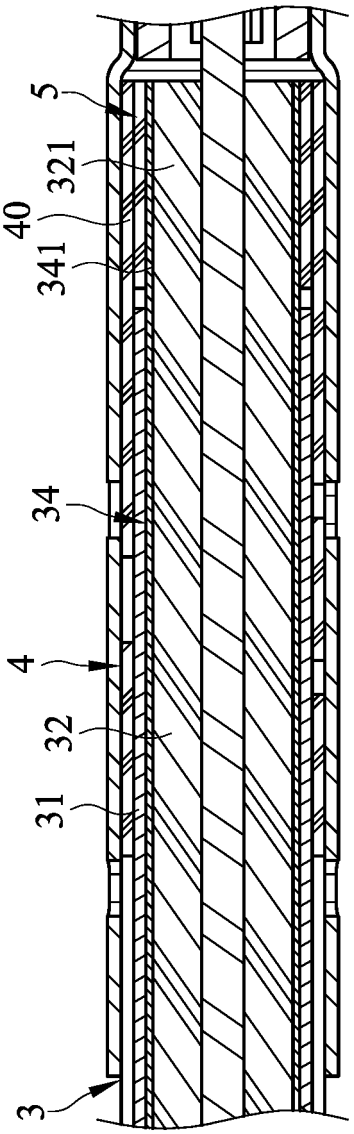

FIG. 8

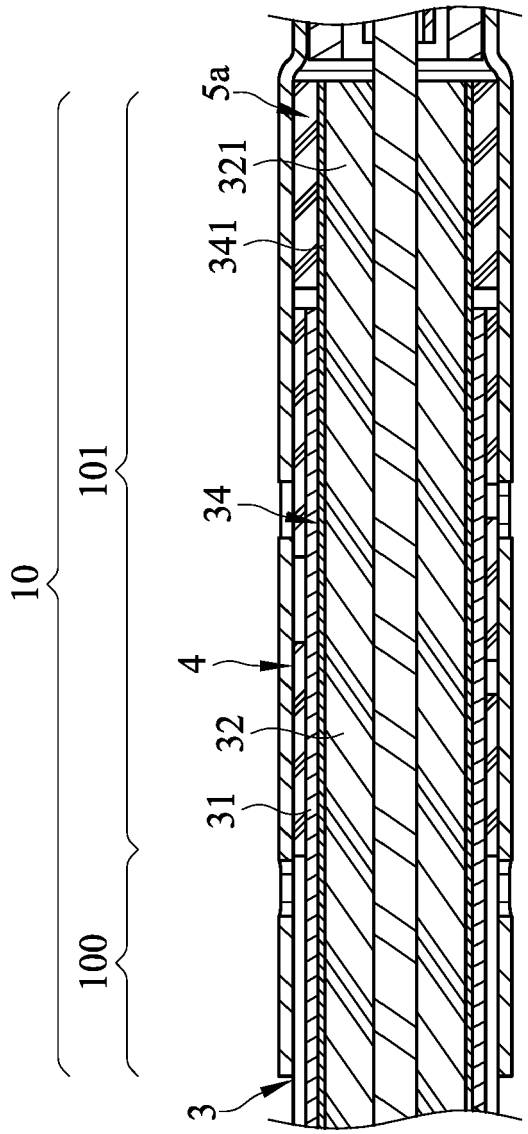

FIG. 9

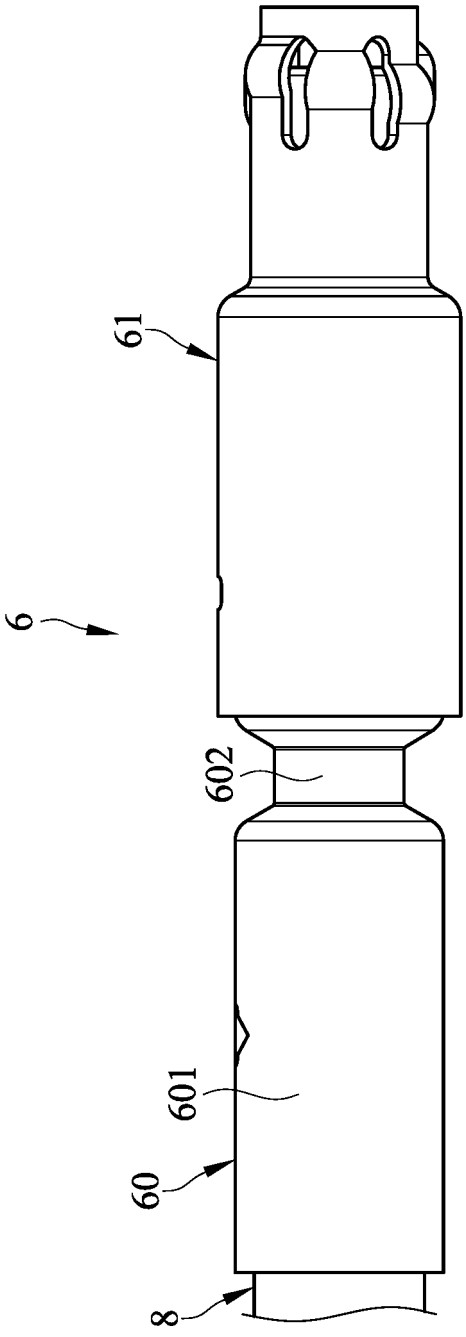

FIG. 10A
(PRIOR ART)

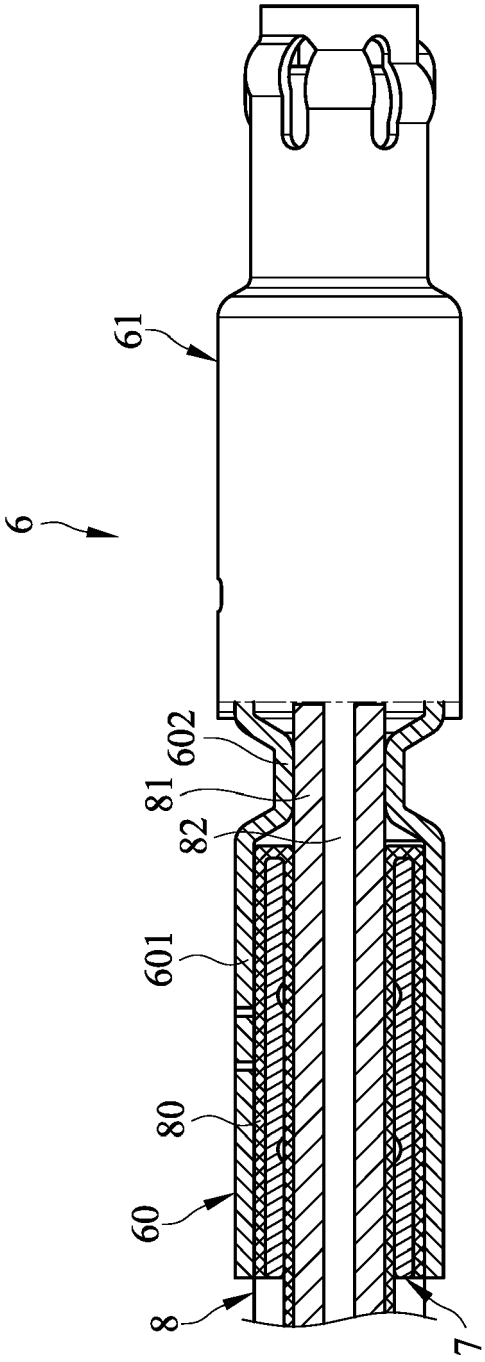

FIG. 10B
(PRIOR ART)

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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 3836

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 January 2024	Pimentel Ferreira, J

CATEGORY OF CITED DOCUMENTS

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