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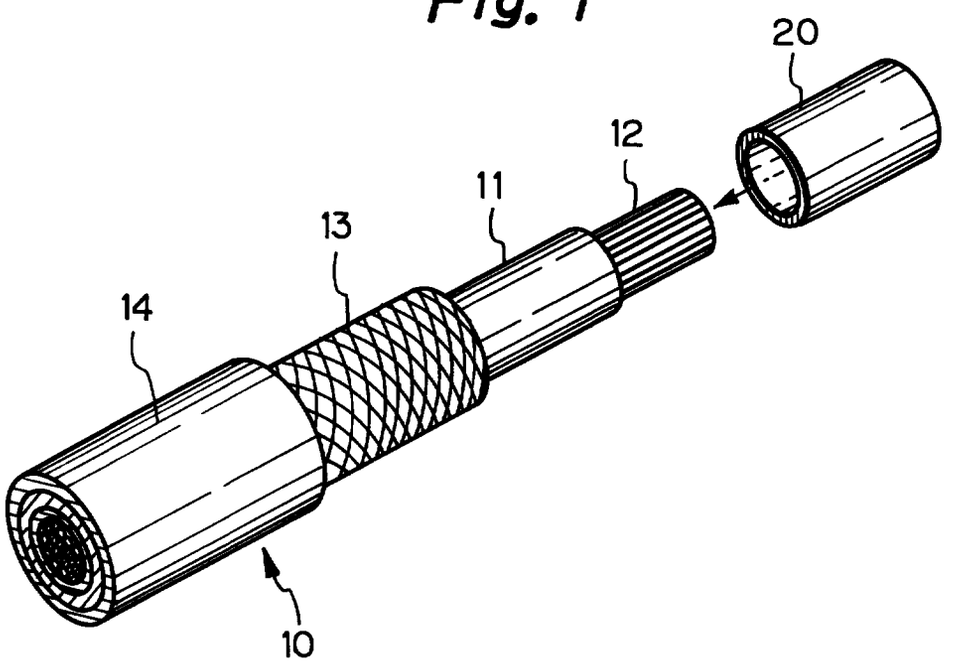
(54) Terminal-processed structure of shielded cable and terminal-processing method of the same

(57) A terminal-processed structure of a shielded cable is so simple that the shielded cable becomes easy for use. In a shielded cable (10), core wires (12) covered by a first insulating layer (11) are sheathed by braided metallic wires (13) on the outer periphery thereof and are further covered by a second insulating layer (14) on the braided metallic wires (13). The braided metallic wires (13) are exposed at one end of the shielded cable (10). A hard sleeve-like body (20) is inserted beneath the exposed, braided metallic wires (13). A conductive sleeve like body (30) is crimped onto the exposed, braided metallic wires (13) on the one end of the shielded cable (10). The conductive sleeve-like body (30) crimped on the one end of the shielded cable (10) is attached to a conductive casing (40) by a conductive band (41) or ring (42) when the shielded cable (10) is used. Thus, the braided metallic wires (13) are electrically communicated with the casing (40).

Fig. 1



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Description

This invention relates to a terminal-processed structure of a shielded cable and a terminal-processing method of the shielded cable.

Heretofore, an example of a terminal-processed structure of a shielded cable is disclosed in Japanese Patent Public Disclosure No. Hei 2-273427 (1990). For convenience of explanation, a conventional terminal-processed structure of a shielded cable will be described by referring to FIGS. 8 to 10. FIGS. 8 to 10 are perspective views of an end of each conventional shielded cable, illustrating the respective steps of processing a terminal of the shielded cable.

As shown in FIG. 8, a conventional shielded cable 1 comprises two cores 2, braided metallic wires 3 sheathing the cores 2, and an outer insulating member 4 covering the wires 3. An inner sleeve 6 which is provided with male threads is disposed on the outer insulating member 4 of the shielded cable 1.

As shown in FIG. 9, the braided metallic wires 3 are bent back on the inner sleeve 6 and core wires 5a of an external electrical cable 5 are placed on the braided metallic wires 3. Then, as shown in FIG. 10, an outer sleeve 7 which is provided with female threads is engaged with the inner sleeve 6.

In a conventional method of processing the terminal of the shielded cable, it is necessary to connect the terminal of the external electrical cable 5 to the braided metallic wires 3 of the shielded cable 1, since the braided metallic wires 3 must be electrically connected to an external conductive element through the cable 5. This requires much work. Moreover, work to interconnect the inner sleeve 6 and the outer sleeve 7 is required. This makes it difficult to automate terminal-processing.

An object of the present invention is to provide a terminal-processed structure of a shielded cable which is simple and suitable for rapid and reliable processing of a terminal.

Another object of the present invention is to provide a method for processing a terminal of a shielded cable in which the terminal is simple and suitable for rapid and reliable processing.

In order to achieve the first object, in a terminal-processed structure of a shielded cable in accordance with the present invention, core wires covered by a first insulating layer are sheathed by braided metallic wires on the outer periphery thereof and are further covered by a second insulating layer on the braided metallic wires. The braided metallic wires are exposed at one end of the shielded cable. A hard sleeve-like body is inserted beneath the exposed, braided metallic wires. A conductive sleeve-like body is crimped on the exposed, braided metallic wires on the one end of the shielded cable.

The hard sleeve-like body may be inserted between the first insulating layer and the exposed, braided metallic wires, or between the exposed, braided metallic wires bent back above the second insulating layer and the second insulating layer.

The conductive sleeve-like body is a U-shaped metallic strip at first when the body is placed on the exposed, braided metallic wires on the one end of the shielded cable, and then the strip is formed into the sleeve-like body when the strip is crimped on the metallic wires.

The hard sleeve-like body may be made of an insulative plastic material or a conductive metallic material.

The hard sleeve-like body may be provided with a plurality of circumferential grooves in the outer periphery thereof or may be provided with an enlarged portion at the opposite ends thereof and has a length slightly longer than the width of the conductive sleeve-like body.

In order to easily insert the hard sleeve-like body beneath the exposed, braided metallic wires, the hard sleeve-like body may comprise a pair of half parts divided axially or may be provided with a slit extending axially.

In order to achieve the above second object, in a method of processing a terminal of a shielded cable in accordance with the present invention, core wires covered by a first insulating layer are sheathed by braided metallic wires on the outer periphery thereof and are further covered by a second insulating layer on the braided metallic wires. The method includes the steps of: exposing said braided metallic wires at one end of said shielded cable; inserting a hard sleeve-like body beneath the exposed, braided metallic wires; and crimping a conductive sleeve-like body on the exposed, braided metallic wires on the one end of the shielded cable.

In the case that the shielded cable is used, the conductive sleeve-like body crimped on the one end of the shielded cable is attached to a conductive casing by a conductive band or ring. Thus, the braided metallic wires 13 are electrically communicated with the casing.

In the terminal-processed structure of the shielded cable as constructed above, the hard sleeve-like body is inserted beneath the braided metallic wires after the wires are exposed at one end of the shielded cable, so that the body serves to support the exposed, braided metallic wires, and the conductive sleeve-like body is put on the braided metallic wires bent back on the second insulating layer and crimped onto the metallic wires, thereby electrically communicating and holding the conductive sleeve-like body with and on the exposed, braided metallic wires. In order to electrically communicate the braided metallic wires with an external conductive element, the conductive sleeve-like body is brought into contact with a casing or the like when the shielded cable is secured to the casing.

Also, since the conductive sleeve-like body is formed into a U-shaped configuration at first, the shielded cable can be easily inserted into the sleeve-like body through an opening between legs of the U-shaped strip. Afterward, the U-shaped strip is crimped on the braided metallic wires.

Further, in the method of processing the terminal of the shielded cable, the hard sleeve-like body is inserted beneath the braided metallic wires after the wires are exposed at one end of the shielded cable, so that the

body serves to support the exposed, braided metallic wires, and the conductive sleeve-like body is put on the braided metallic wires bent on the second insulating layer and crimped onto the metallic wires, thereby electrically communicating and holding the conductive sleeve-like body with and on the exposed, braided metallic wires.

As described above, according to the present invention, it is possible to easily insert the hard sleeve-like body beneath the exposed, braided metallic wires and to readily mount the conductive sleeve-like body on the braided metallic wires merely by crimping the body on the wires. Thus, it is possible to extremely easily effect the terminal-processing. Also, electrical communication between the conductive sleeve-like body and the braided metallic wires can be positively obtained.

Since the U-shaped metallic strip can be easily put on the shielded cable, an efficiency of processing work can be enhanced.

Moreover, in the method of the present invention, a simple work can be obtained merely by inserting the hard sleeve-like body beneath the exposed, braided metallic wires and by crimping the conductive sleeve-like body onto the exposed, braided metallic wires.

FIG. 1 is a perspective view of an end of a shielded cable, illustrating a step of processing a terminal of the cable in an embodiment of the present invention;

FIGS. 2A to 2D are perspective views of various types of plastic sleeves to be used in a terminal-processed structure of the present invention;

FIG. 3 is a perspective view of an end of the shielded cable, illustrating a step of processing a terminal of the cable;

FIG. 4 is a perspective view of a terminal-processed structure of the shielded cable in accordance with the present invention;

FIG. 5 is a perspective view of an end of the shielded cable, illustrating a step of processing a terminal of the cable in another embodiment of the present invention;

FIG. 6 is a perspective view of a terminal-processed structure of the shielded cable in accordance with the embodiment shown in FIG. 5;

FIGS. 7A and 7B are front views of the terminal-processed structure of the shielded cable of the present invention, illustrating the respective examples of use of the cable; and

FIGS. 8 to 10 are perspective views of an end of a conventional shielded cable, illustrating the respective steps of processing a terminal of the cable.

By referring now to the drawings, embodiments of the present invention will be explained below.

FIGS. 1 to 4 are perspective views of an end of each shielded cable of a first embodiment in accordance with the present invention. A shielded cable 10 comprises core wires 12, a first insulating layer or an insulating member 11 which covers the core wires 12 on the outer periphery, braided metallic wires 13 which sheathe the first insulating member 11, and a second insulating layer or an outer jacket 14 which covers the braided metallic wires 13. A hard sleeve-like body or a plastic sleeve 20 is made of an insulating hard plastic material and has an inner diameter sufficient to receive the core wires 10 covered by the first insulating layer 11. The plastic sleeve 20 has a hardness enough to bear a crimping force on a conductive sleeve-like body or a U-shaped metallic strip 30 described hereinafter. Although the hard sleeve-like body 20 is made of an insulating hard plastic material in this embodiment, the body 20 may be made of a metallic material. It is for the reason that the sleeve 20 merely serves to support the braided metallic wires 13 and need not communicate electrically with the braided wires.

In order to prevent the sleeve from coming out of the shielded cable 10, the plastic sleeve 20 may be provided with a plurality of circumferential grooves 21 on its outer periphery so that the metallic wires 13 and strip 30 bite into the grooves 21 when the strip 30 is crimped onto the wires 13, as shown in FIG. 2A. Also, as shown in FIG. 2B, the plastic sleeve 20 is provided with an enlarged portion 22 at its opposite ends and has a length slightly longer than the width of the metallic strip 30 so that the metallic wires 13 and the strip 30 enter into a recess defined between the enlarged portions 22 when the metallic strip 30 is crimped onto the metallic wires 13. Thus, the sleeve 20 is prevented from coming out of the shielded cable 10.

Although the plastic sleeve 20 is formed into a complete cylindrical body from the beginning in the above embodiment, the plastic sleeve 20 may comprise a pair of half parts 23, 23 divided axially (FIG. 2D) or may be provided with a slit 24 extending axially (FIG. 2C), since the sleeve 20 can be brought into a complete sleeve from when it is assembled on the shielded cable 10, thereby simplifying the step of mounting the sleeve 20 on the cable 10.

The metallic strip or conductive sleeve-like body 30 is a U-shaped conductive metallic strip at first. The metallic strip 30 has a length slightly larger than the circumference of the plastic sleeve 20 and a width of span between the legs of U-shape which is enough to receive the sleeve 20. Although the metallic strip 30 is formed into a U-shaped configuration at first in this embodiment, the metallic strip may be formed into a complete sleeve or a substantially annular body made of a steel strip.

Next, an operation of the above embodiment of the terminal-processed structure of the shielded cable will be explained below.

As shown in FIG. 1, the shielded cable 10 is stripped at its one end so that at least a part of the outer jacket is removed to expose the braided metallic wires 13. Then, as shown in FIG. 3, the plastic sleeve 20 is inserted between the first insulating layer or insulating member 11 and the exposed, braided metallic wires 13. The U-shaped metallic strip 30 is put on the exposed, braided metallic wires 13 and crimped on the wires 13 so that the strip 30 can encircle the wires 13, as shown in FIG. 4.

In the case that the shielded cable 10 having such a terminal-processed structure is used in a conductive casing 40, the conductive sleeve-like body 30 may be held on the casing 40 to contact with it, as shown in FIGS. 7A and 7B. In order to maintain an electrical contact between the body 30 and the casing 40, the body 30 crimped on the one end of the shielded cable 10 is attached to the casing 40 by a conductive metallic band 41 (FIG. 7A) or a conductive metallic ring 42 (FIG. 7B). Consequently, it is not necessary to solder the braided metallic wires 13 to the casing 40 or to secure the wires 13 to the casing 40.

Accordingly, it is possible to electrically secure the conductive sleeve-like body 30 to the braided metallic wires 13 by inserting the plastic sleeve 20 beneath the exposed, braided metallic wires 13 so that the sleeve 20 supports the wires 13 and by crimping the metallic strip 30 on the wires 13.

FIGS. 5 and 6 show another embodiment of the terminal-processed structure of the shielded cable in accordance with the present invention.

In this embodiment, the plastic sleeve 20 has an inner diameter sufficient to receive the second insulating layer or outer jacket 14 on the shielded cable 10. The exposed, braided metallic wires 13 are loosened and bent back on the sleeve 20 after the sleeve is disposed on the outer jacket 14. Then, the metallic strip 30 which has a span slightly larger than the outer diameter of the sleeve 20 is crimped on the metallic wires 13 bent back on the sleeve 20. In this embodiment, it is possible to enlarge the outer diameter of the terminal-processed structure, since the metallic wires 13 is bent back on the sleeve 20.

The sleeve 20 may be altered to the same examples as those described above.

In the present invention, the shielded cable can be used in the casing in the same manner as those shown in FIGS. 7A and 7B.

Claims

1. A terminal-processed structure of a shielded cable wherein core wires covered by a first insulating layer are sheathed by braided metallic wires on the outer periphery thereof and are further covered by a second insulating layer on the braided metallic wires, characterized in that:

   said braided metallic wires are exposed at one end of said shielded cable;

   a hard sleeve-like body is inserted beneath the exposed, braided metallic wires; and

   a conductive sleeve-like body is crimped on the exposed, braided metallic wires on the one end of said shielded cable.

2. A terminal-processed structure of a shielded cable according to Claim 1, wherein said hard sleeve-like body is inserted between said first insulating layer and said exposed, braided metallic wires.

3. A terminal-processed structure of a shielded cable according to Claim 1, wherein said hard sleeve-like body is inserted between said exposed, braided metallic wires bent back above said second insulating layer and said second insulating layer.

4. A terminal-processed structure of a shielded cable according to Claim 1, wherein said conductive sleeve-like body is a U-shaped metallic strip at first when the body is placed on the exposed, braided metallic wires on the one end of said shielded cable, and then the strip is formed into the sleeve-like body when the strip is crimped onto the metallic wires.

5. A terminal-processed structure of a shielded cable according to Claim 1, wherein said hard sleeve-like body is provided with a plurality of circumferential grooves in the outer periphery thereof.

6. A terminal-processed structure of a shielded cable according to Claim 1, wherein said hard sleeve-like body is provided with an enlarged portion at the opposite ends thereof and has a length slightly longer than the width of said conductive sleeve-like body.

7. A terminal-processed structure of a shielded cable according to any one of Claims 1 to 6, wherein said hard sleeve-like body is made of an insulative plastic material.

8. A terminal-processed structure of a shielded cable according to Claim 7, wherein said hard sleeve-like body comprises a pair of half parts divided axially.

9. A terminal-processed structure of a shielded cable according to Claim 7, wherein said hard sleeve-like body is provided with a slit extending axially.

10. A terminal-processed structure of a shielded cable according to any one of Claims 1 to 6, wherein said hard sleeve-like body is made of a conductive metallic material.

11. A terminal-processed structure of a shielded cable according to Claim 10, wherein said hard sleeve-like body comprises a pair of half parts divided axially.

12. A terminal-processed structure of a shielded cable according to Claim 10, wherein said hard sleeve-like body is provided with a slit extending axially.

13. A method of processing a terminal of a shielded cable, wherein core wires covered by a first insulating layer are sheathed by braided metallic wires on the outer periphery thereof and are further covered by a second insulating layer on the braided metallic wires, characterized by the steps of:

    exposing said braided metallic wires at one

end of said shielded cable;

inserting a hard sleeve-like body beneath the exposed, braided metallic wires; and

crimping a conductive sleeve-like body on the exposed, braided metallic wires on the one end of said shielded cable.

14. A terminal-processed structure of a shielded cable according to Claim 13, wherein said hard sleeve-like body is inserted between said first insulating layer and said exposed, braided metallic wires.

15. A terminal-processed structure of a shielded cable according to Claim 13, wherein said hard sleeve-like body is inserted between said exposed, braided metallic wires bent back above said second insulating layer and said second insulating layer.

16. A method of processing a terminal of a shielded cable according to Claim 13, wherein said conductive sleeve-like body crimped on the one end of said shielded cable is attached to a conductive casing by a conductive band when said shielded cable is used.

17. A method of processing a terminal of a shielded cable according to Claim 13, wherein said conductive sleeve-like body crimped on the one end of said shielded cable is attached to a conductive casing by a conductive ring when said shielded cable is used.

Fig. 1

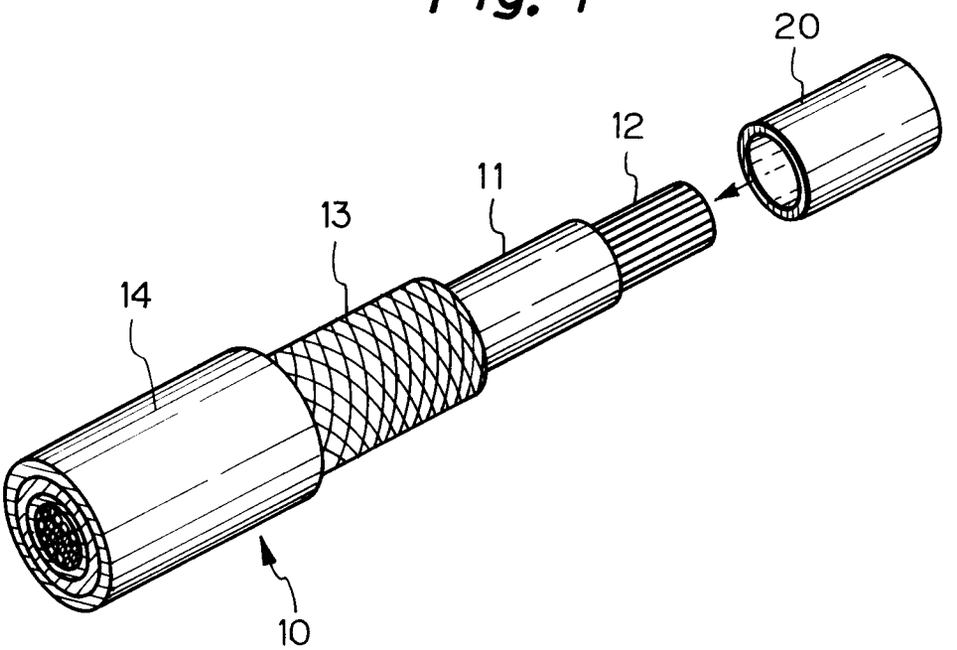

Fig. 2A

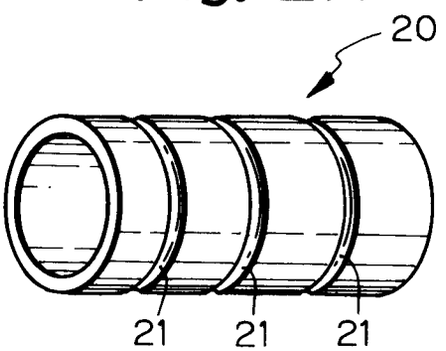

Fig. 2B

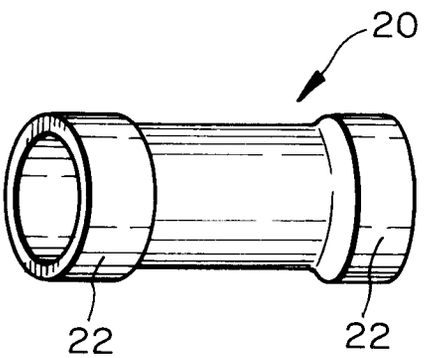

Fig. 2C

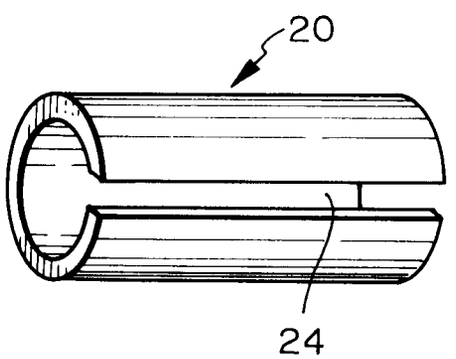

Fig. 2D

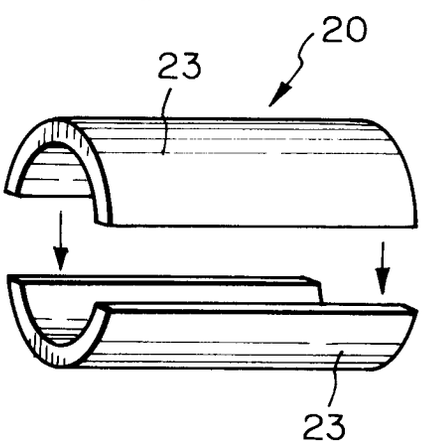

Fig. 3

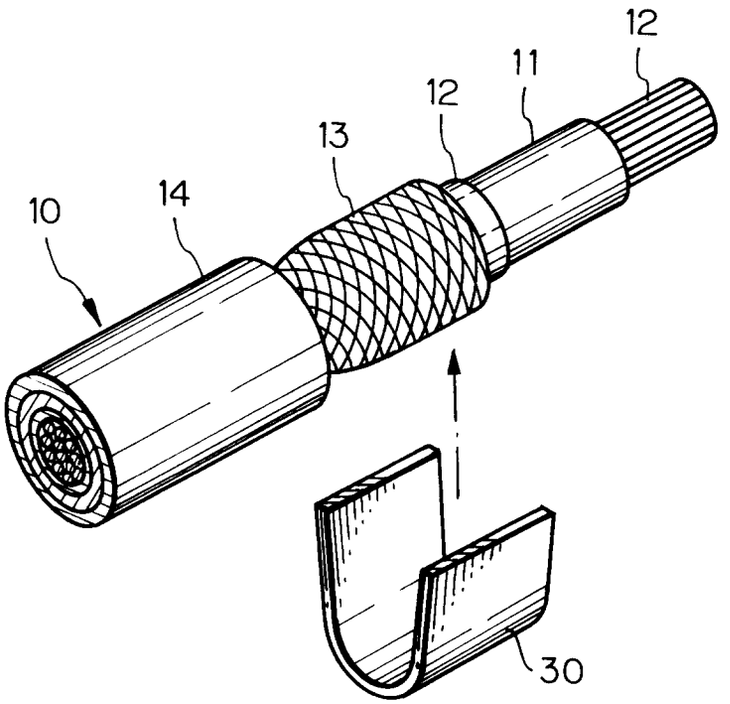

Fig. 4

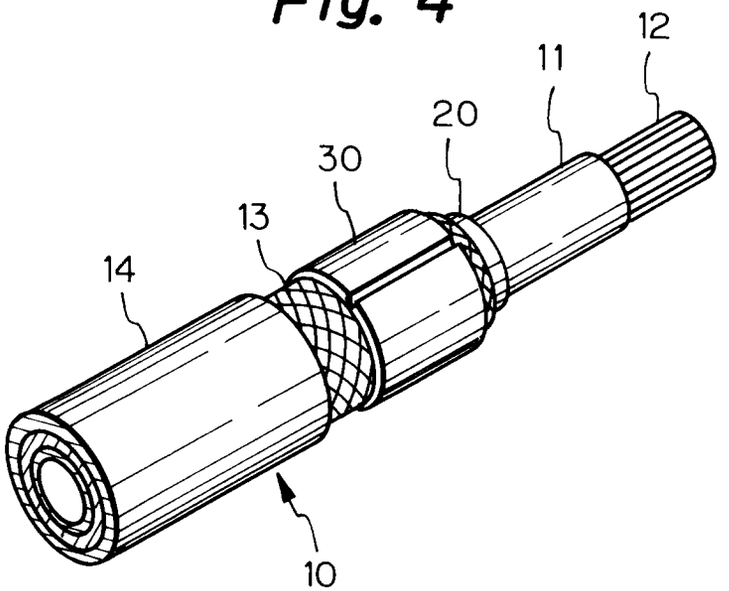

Fig. 5

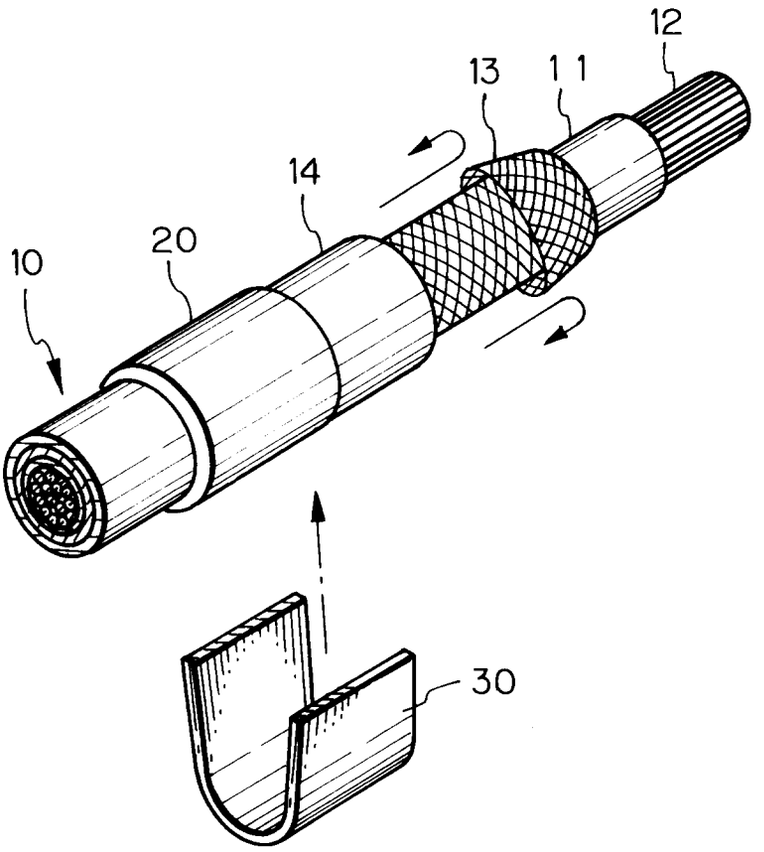

Fig. 6

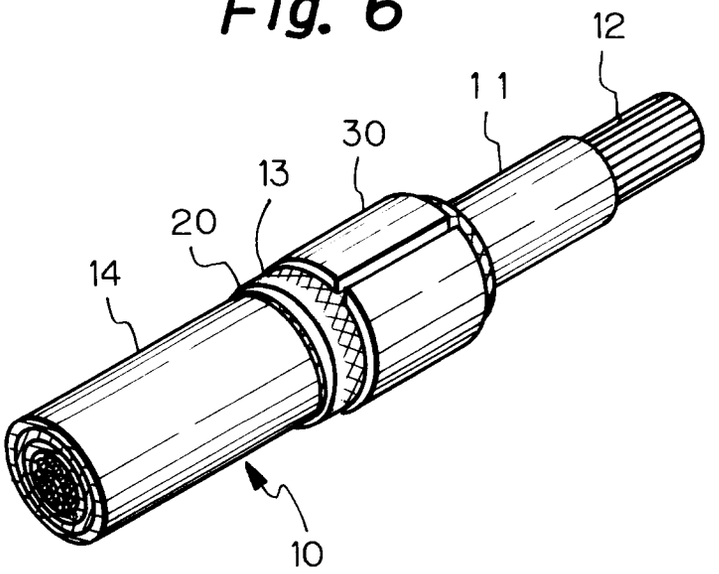

Fig. 7A

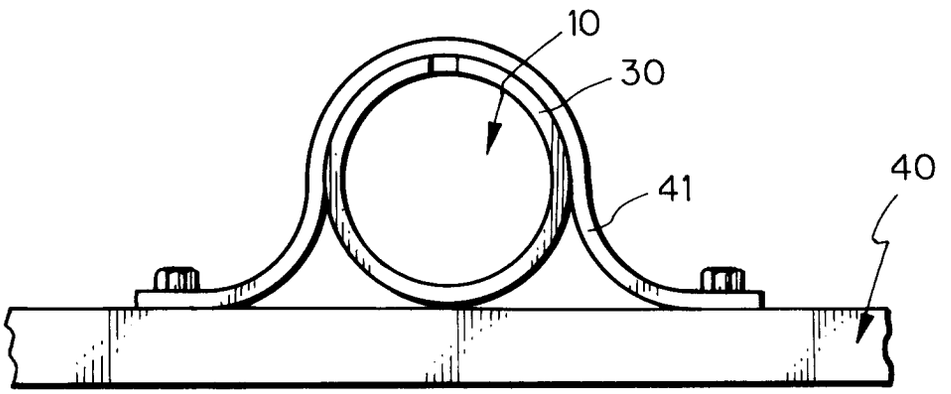

Fig. 7B

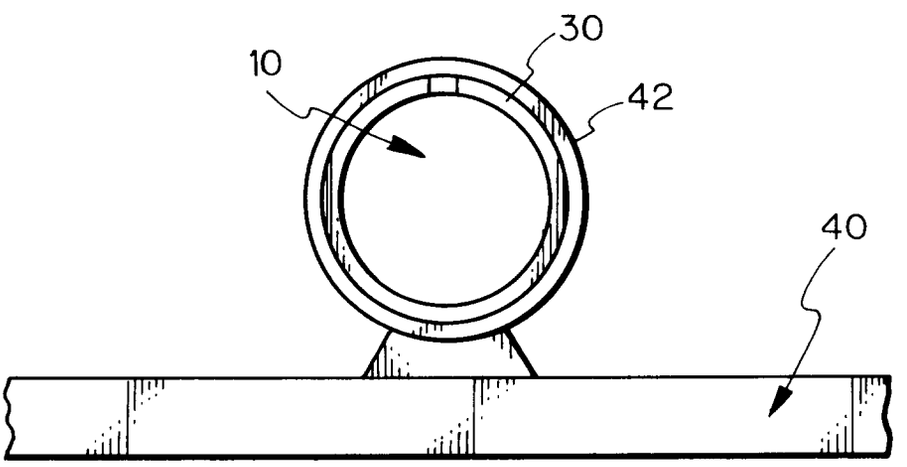

Fig. 8

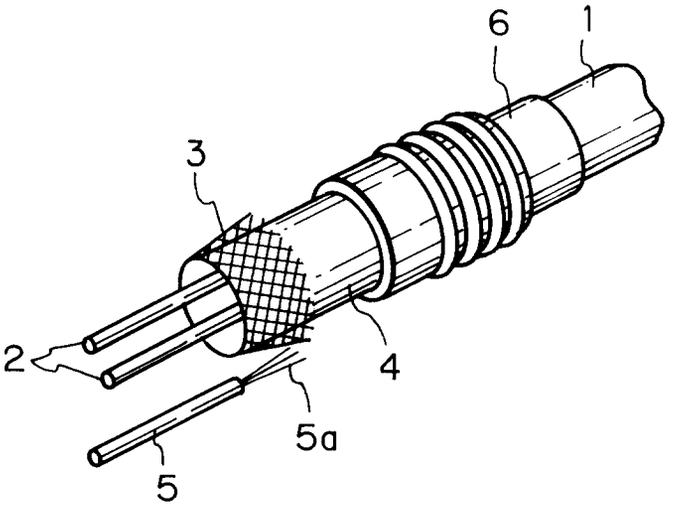

Fig. 9

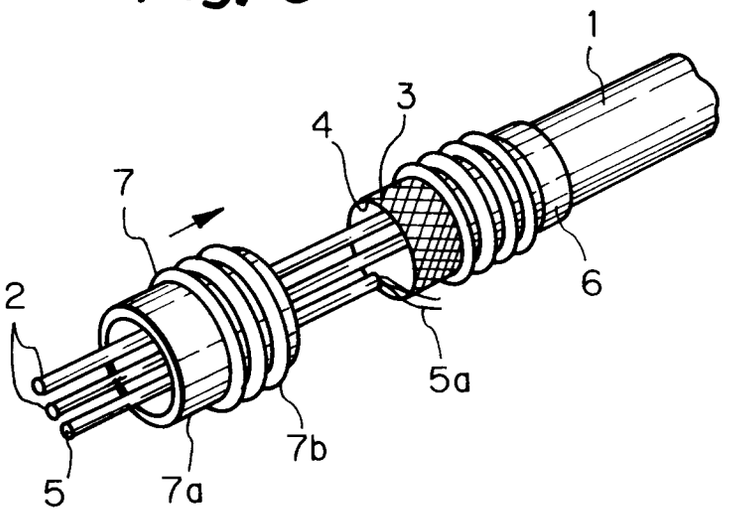

Fig. 10