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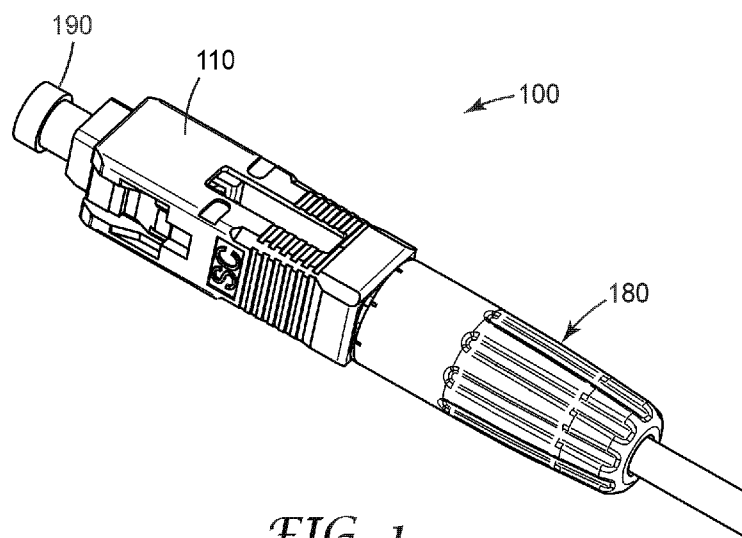


FIG. 1

(57) Abstract: An optical fiber connector(100) includes a housing(110) configured to mate with a receptacle. The optical fiber connector(100) also includes a collar body(120) formed, at least in part, from a material that is substantially transparent to at least UV light that is disposed in the housing(110), the collar body(120) including a ferrule(130) securely disposed in an opening of the collar body(120), the ferrule(130) including a central bore that defines an axis. The optical fiber connector(100) also includes a UV adhesive gel(170) disposed in a channel formed in the collar body(120). The optical fiber connector(100) also includes a backbone(160) to retain the collar body(120) within the housing(110), the backbone(160) including a fiber jacket clamping portion(169) to clamp a jacket portion(142) of the optical fiber. The optical fiber connector(100) also includes a boot(180) attachable to a portion of the backbone(160), wherein the boot(180) actuates the fiber jacket clamping portion(169) of the backbone(160) upon attachment to the backbone(160).

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FIELD TERMINABLE OPTICAL FIBER CONNECTOR

BACKGROUND

Field of the Invention

The present invention is directed to an optical fiber connector.

Related Art

Mechanical optical fiber connectors for the telecommunications industry are known. For example, LC, ST, FC, and SC optical connectors are widely used.

However, commercially available optical fiber connectors are not well suited for field installations. Typically, a hot melt adhesive is required to mount these types of connectors on to an optical fiber. This process can be awkward and time consuming to perform in the field. Also post-assembly polishing requires that the craftsman have a higher degree skill.

Also known are hybrid optical fiber splice connectors, as described in JP Patent No. 3445479, JP Application No. 2004-210251 (WO 2006/019516) and JP Application No. 2004-210357 (WO 2006/019515). However, these hybrid splice connectors are not compatible with standard connector formats and require significant piecewise assembly of the connector in the field. The handling and orientation of multiple small pieces of the connector can result in incorrect connector assembly that may either result in decreased performance or increase the chance of damaging the fiber. More recently, US Patent No. 7,369,738 describes an optical fiber connector that includes a pre-polished fiber stub disposed in a ferrule that is spliced to a field fiber with a mechanical splice. Such a connector, called an NPC, is now commercially available through 3M Company (St. Paul, MN).

SUMMARY

According to a first aspect of the present invention, an optical fiber connector is provided. The optical fiber connector includes a housing configured to mate with a receptacle. The optical fiber connector also includes a collar body formed, at least in part, from a material that is substantially transparent to UV light that is disposed in the housing, the collar body including a ferrule securely disposed in an opening of the collar body, the ferrule including a central bore that defines an axis. The optical fiber connector also includes a UV adhesive gel disposed in a channel formed in the collar body. The optical fiber connector also includes a backbone to retain the collar body within the housing, the backbone including a fiber jacket clamping portion to clamp a jacket portion of the optical fiber. The optical fiber connector also includes a boot attachable to a portion of the backbone, wherein the boot actuates the fiber jacket clamping portion of the backbone upon attachment to the backbone.

The above summary of the present invention is not intended to describe each illustrated embodiment or every implementation of the present invention. The figures and the detailed description that follows more particularly exemplify these embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be further described with reference to the accompanying drawings, wherein:

Fig. 1 is an isometric view of an optical fiber connector according to an embodiment of the present invention.

Fig. 2 is an exploded view of an optical fiber connector according to an embodiment of the present invention.

Fig. 3 is a schematic cross-sectional view of an optical fiber connector according to an embodiment of the present invention.

Fig. 4 is an isometric view of an exemplary backbone of an optical fiber connector according to an embodiment of the present invention.

Fig. 5 is a side view of an exemplary boot of an optical fiber connector according to an embodiment of the present invention.

Fig. 6 is an exploded view of an exemplary backbone of an optical fiber connector according to another embodiment of the present invention.

Fig. 7 is an isometric view of an exemplary backbone of an optical fiber connector according to an embodiment of the present invention.

Fig. 8 is an isometric view of an exemplary collar body with an exemplary ferrule of an optical fiber connector according to an embodiment of the present invention.

Fig. 9 is a cross-sectional view of an exemplary collar body with an exemplary ferrule of an optical fiber connector according to an embodiment of the present invention.

Fig. 10A-10E show isometric views of the optical fiber connector during different stages of an exemplary field termination process according to another embodiment of the present invention.

While the invention is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE EMBODIMENTS

In the following Detailed Description, reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. In this regard, directional terminology, such as "top," "bottom," "front," "back," "leading," "forward," "trailing," etc., is used with reference to the orientation of the Figure(s) being described. Because components of embodiments of the present invention can be positioned in a number of different orientations, the directional terminology is used for purposes of illustration and is in no way limiting. It is to be understood that other embodiments may be utilized and structural or logical changes may be made without departing from the scope of the present invention.

The present invention is directed to an optical fiber connector. In particular, the optical fiber connector of the exemplary embodiments is of compact length and is capable of straightforward field termination. Further, the straightforward field termination can be accomplished without the use of a connector termination platform or separate crimping tool. The exemplary connector(s) described herein can be readily installed and utilized for Fiber To The Home (FTTH) and/or Fiber To The X (FTTX) network installations. The exemplary connector(s) can be utilized in installation environments that require ease of use when handling multiple connections, especially where labor costs are more expensive.

According to an exemplary embodiment of the present invention, an optical fiber connector 100 is shown in isometric view in Fig. 1. The components of the optical fiber connector are shown in an exploded view in Fig. 2. Fig. 3 shows a section view of the optical fiber connector 100. Figs. 4-9 show different views of elements of the optical fiber connector, including the collar body 120, the backbone 160, and the boot 180.

Optical connector 100 is configured to mate with a receptacle of a corresponding format. For example, as shown in Fig. 1, exemplary optical connector 100 is configured as having an SC format. However, as would be

apparent to one of ordinary skill in the art given the present description, optical connectors having other standard formats, such as ST, FC, and LC connector formats, can also be provided.

As shown in Fig. 1, SC-type optical fiber connector 100 can include a connector body having a housing 110 and a fiber boot 180. A protective cap 190 attachable to end of the housing can be provided to protect the ferrule end and/or fiber tip, and can also provide a protrusion setting mechanism during field installation.

Connector 100 includes a housing 110 having an outer shell configured to be received in an SC receptacle (e.g., an SC coupling, an SC adapter, or an SC socket). As shown in Fig. 2, connector 100 also includes a collar body 120 (which can also be referred to as a barrel) to house a ferrule 130, a UV adhesive gel 170 disposed in a channel formed in the collar body, a multi-purpose backbone 160 that retains the collar body 120 within the connector, and a boot 180.

In this exemplary embodiment, connector 100 can be utilized to terminate a field optical fiber cable 140. In one embodiment, optical fiber cable 140 can comprise a jacketed cable that includes an outer jacket 142, a coated portion 144 (e.g., with a buffer coating or the like), a fiber portion 146 (e.g., the bare clad/core), and strength members. In one aspect, optical fiber cable 140 can be a standard cylindrically shaped cable structure including a strength members 148 comprising aramid, Kevlar, or polyester yarn or strands disposed between an inner surface of the fiber jacket 142 and an outer surface of coated portion 144 (see Fig. 3). In another embodiment, cable 140 can comprise a conventional rectangular-shaped cable, such as FRP style optical fiber cable, including the strength members (not shown) that can run lengthwise parallel to the coated fiber and are firmly secured within the cable jacket material.

In one aspect, the backbone 160 provides structural support for the connector 100. In a further aspect, the backbone 160 is an elongated structure (having a length of from about 45 mm to about 55 mm) that also provides clamping for the optical fiber being terminated in the field. Moreover, the backbone 160 can provide further axial strain relief by providing a clamping surface for the strength members of the optical fiber cable being terminated.

Backbone 160 includes a first opening 162 at a front end to allow for insertion of the collar body 120 (see e.g., Fig. 2). Backbone 160 further includes a second opening 164 formed on an outer side thereof. During field termination, this backbone side opening 164 permits the transmission of UV light from a UV light source to reach the UV adhesive gel 170 disposed in a channel formed in the collar body 120 which is installed in the backbone 160, thus curing the UV adhesive gel 170.

In another aspect, the backbone 160 comprises a backbone, without the second (side) opening, that is formed from a material that allows substantial transmission of UV light therethrough.

Backbone 160 includes an axial bore throughout to permit passage of the optical fiber being terminated. As is also shown in more detail in Fig. 4, backbone 160 can further include a mounting structure 166 that provides for coupling to the fiber boot 180. In an exemplary aspect, the mounting structure 166 comprises a threaded surface formed on an outer portion of backbone 160 that is configured to engage a corresponding threaded surface of the boot 180 (see Fig. 5). Also, the mounting structure 166 can provide a retention area for securing the strength members of the standard cylindrically shaped optical fiber cable being terminated.

In addition, the backbone 160 can include a fiber guide 168 formed in an interior portion therein to provide axial alignment support for the optical fiber cable being terminated (see Fig. 4). In an exemplary aspect, the fiber guide portion 168 is a funnel-shaped channel or groove that aligns a buffered portion of the optical fiber and guides the fiber toward the collar body 120.

The backbone 160 also includes a collar body mount structure 165 formed on an inner surface thereof.

The collar body mount structure 165 is configured to receive and secure the collar body 120 within the backbone. In a preferred aspect, collar body mount structure 165 comprises a rigid structure formed in an

interior region of backbone 160 having an axial bore therethrough. The axial bore can be of appropriate size to receive and engage raised structures 124 of the collar body 120 (see Fig. 3).

Backbone 160 can further include one or more stops 167 formed on an interior portion thereof to provide a boundary for the insertion of the jacketed portion 142 of the optical fiber cable 140 being terminated (as explained in more detail below). In addition, backbone 160 includes a clamping portion 169 formed at another end of the backbone 160 (opposite opening 162). The clamping portion 169 is configured to clamp onto the jacket portion 142 of the optical fiber cable 140 being terminated in connector 100. When actuated by installing the boot 180, this clamping operation can provide a sufficient inward radial force that secures the optical fiber cable 140 (including the jacket, coated, and fiber portions) against normal axial pulling forces. In a preferred aspect, clamping portion 169 comprises a collet-type, split body shape that is actuated when the boot is secured to mounting structure 166. The clamping portion 169 can include raised inner surfaces to permit ready clamping of the cable jacket portion 142. In an alternative aspect, the connector can also include an adapter tube to be placed over the cable jacket portion of the optical fiber cable, for example, when the optical fiber cable being clamped is of a smaller diameter. In addition, the clamping portion 169 also can provide a guide structure when inserting fiber cable 140 during the termination process. Thus, boot 180 can be utilized to clamp the fiber strength members 148 and the fiber jacket 142. The interaction of the boot 180 and the backbone 160 will be described in greater detail below.

In another exemplary aspect, backbone 160 can be divided into two pieces, front portion 161 and rear portion 163. The front portion 161 includes a slot 261 and the rear portion includes a protrusion step 263 (see Fig. 6). The rear portion 163 is configured to mate with the front portion 161 through engagement of the protrusion step mechanism into slot 261 (see e.g., Fig. 7).

According to an exemplary embodiment of the present invention, housing 110 and backbone 160 are formed or molded from a polymer material, although metal and other suitably rigid materials can also be utilized. Housing 110 is preferably secured to an outer surface of backbone 160 via snap fit (see e.g., outer engagement surface 262 shown in Fig. 4). In an exemplary aspect, the housing 110 is formed from a material which allows substantial transmission of UV light therethrough. In another exemplary aspect, the housing 110 includes an opening 112 formed on an outer side thereof (see e.g., Fig. 2). The opening 112 is proximate to the collar body when the collar body is fully inserted in the housing 110. The opening 112 of the housing allows substantial transmission of UV light therethrough. During field termination, this housing opening 112 permits the transmission of UV light from a UV light source to reach the UV adhesive gel 170 disposed in a channel formed in the collar body 120 which is installed in the backbone 160, thus curing the UV adhesive gel 170.

As mentioned above, connector 100 further includes a collar body 120 that is disposed within the connector housing and retained by the backbone. The collar body can be formed, at least in part, from a material that is substantially transparent to at least UV light. In some embodiments, the collar body may be substantially transparent to both UV and visible light. For example, in some embodiments, the collar body 120 can be formed, at least in part, from a material that allows substantial transmission of UV and visible light therethrough. In other embodiments, the collar body is substantially transparent to UV light, but is not substantially transparent to visible light. For example, in another embodiment, the collar body 120 can be formed, at least in part, from a material that allows substantial transmission of UV light therethrough but does not allow substantial transmission of visible light (i.e., it is "non-transparent" to visible light.). According to an exemplary embodiment, the whole collar body can be formed from a UV transparent material. According to exemplary embodiments, the collar body 120 can house a ferrule 130. The collar body is configured to have some limited axial movement within backbone 160. For example, the collar body 120 can include a step 122 formed on an outer surface thereof. The step 122 can be used as a flange to provide resistance against spring

150 (see Figs. 2 and 3), disposed between the step 122 of the collar body and the collar body mount structure 165 of backbone 160. The spring 150 provides and maintains an adequate contact force when two connectors are joined together. According to an exemplary embodiment of the present invention, collar body 120 can be formed or molded from a polymer material, although other suitable materials can also be utilized. For example, collar body 120 can comprise an injection-molded, integral material. In particular, collar body 120 includes a first portion 126 having an opening to receive and house a ferrule 130. The collar body also includes a second portion 128 configured to engage with the collar body mount structure 165 of backbone 160 (see Fig. 3 and 8). In a preferred aspect, second portion 128 has a raised structure portion 124 that has a sloping shape that is insertable through the bore of the collar body mount structure 165, as is shown in Fig. 3. Raised structures 124 of the second portion can be inserted into the bore and engage against backbone mount structure 165 due to the bias of the spring 150. In an exemplary aspect, the collar body 120 includes an axial funnel-shaped channel 121 formed at an end of the second portion 128 of the collar body (see Fig. 9). The funnel-shaped channel 121 formed at an end of the second portion 128 can easily guide the fiber toward the collar body 120.

The collar body 120 can house and secure the ferrule in place in the connector 100. Ferrule 130 can be formed from a ceramic, glass, plastic, or metal material to support the optical fiber being inserted and terminated. The fiber being terminated in the connector can comprise a standard single mode or multimode optical fiber. In a preferred aspect, ferrule 130 is formed from a material that is non-transparent to UV and visible light. Ferrule 130 is preferably secured within the collar body portion via an epoxy or other suitable adhesive, or, alternatively, ferrule 130 may be friction fit in the first portion 126 of the collar body 120.

The collar body 120 can also house a UV adhesive gel 170 disposed in a bore formed in the collar body 120 (see Fig. 9). The UV adhesive gel 170 is disposed in at least part of the second portion 128 of the collar body 120. The UV adhesive gel 170 is a material curable by exposure to a sufficient level of UV light and the cured UV adhesive gel bonds the fiber 140 to the collar body 120.

As mentioned above, a protective cap 190 is attachable to end of the housing. The protective cap 190 is configured to cover an exposed end of the ferrule. In an exemplary aspect, the protective cap 190 is formed from a material which does not allow substantial transmission of UV and visible light therethrough. In another exemplary aspect, the protective cap 190 is formed from a material that is non-transparent to at least UV light. In a preferred aspect, the protective cap 190 includes a protrusion control disk 192 (see e.g., Fig. 2). The protrusion control disk 192 includes a depression that can be used to help set a protrusion distance of the fiber tip from the end of the ferrule during installation. The depth of the protrusion control disk depression can be 50 μ m – 60 μ m.

As mentioned above, fiber boot 180 can be utilized for several purposes with optical connector 100. As shown in Fig. 5, boot 180 includes a tapered body 182 having an axial bore throughout. The boot 180 includes threaded grooves 184 formed on an inner surface of the body 182 at the opening 186, where the grooves are configured to engage with the correspondingly threaded mounting structure 166 of the backbone 160. In addition, the axial length of boot 180 is configured such that a rear section 188 of the boot, which has a smaller opening than at front opening 186, engages the jacket clamp portion 169 of the backbone. For example, as is explained in more detail below, as the boot 180 is secured onto the mounting structure 166 of the backbone, the axial movement of the boot relative to the backbone forces the legs of clamp portion 169 to move radially inwards so that the fiber jacket 142 is tightly gripped and an inward force is imparted on other components of the fiber cable 140 to help reduce the likelihood of disconnection when the fiber cable is subjected to an axial pulling force. Also, the strength members 148 of the standard cylindrically shaped optical fiber cable can be disposed between the boot and the threaded mounting structure 166 to secure the strength members as the boot is installed. This construction can also provide a connector termination capable of surviving rougher

handling and greater pull forces.

In an exemplary aspect, boot 180 is formed from a rigid material. For example, one exemplary material can comprise a fiberglass reinforced polyphenylene sulfide compound material. In another aspect, the materials used to form the boot 180 and the backbone 160 are the same.

An exemplary fiber cable utilized in this embodiment comprises a 3.0 mm jacketed drop cable, commercially available from Samsung Cable, Thai-han Cable, and others (all of Korea). As would be understood by one of ordinary skill in the art given the present description, the optical connector of the exemplary embodiments can be configured to terminate the fibers of other types of jacketed drop cable (FRP cable), including 3.5 mm drop cable, and others.

As mentioned above, the optical fiber connector of the exemplary embodiments is of compact length and is capable of straightforward field termination. An exemplary termination process for a standard cylindrically shaped cable is now described with reference to Figs. 10A -- 10E. Please note that reference numbers used in these figures correspond with like features from Figs. 1-9.

As shown in Fig. 10A, the optical fiber connector is partly assembled by inserting the collar body 120, with ferrule 130 secured therein, in the direction of arrow 102 into the first opening 162 of the backbone 160. This step may be performed prior to the field termination process or during the field termination process. As mentioned above, the raised structure 124 of the collar body is inserted into the bore of collar body mount structure 165 of the backbone. The spring 150 will provide some bias against axial movement after insertion.

For field termination, optical fiber cable 140 is prepared by cutting a portion of the fiber cable jacket 142 and stripping off a coated portion of the fiber near the terminating fiber end to leave a bare fiber portion 146 and cleaving (flat or angled) the fiber end to match the ferrule. In an exemplary aspect, about 65 mm of the jacket 142 can be removed, leaving about 25 mm of stripped fiber. For example, a commercial fiber cleaver such as an IIsintech MAX CI-OI or the IIsintech MAX CI-08, available from IIsintech, Korea (not shown) can be utilized to provide a flat or an angled cleave. The boot 180 can be slid over the fiber cable 140 for later use. As shown in Fig. 10B, optical fiber cable 140 can be inserted in the direction of arrow 104 through the rear end of the connector (i.e., through the clamping portion 169 of the connector backbone). The fiber cable 140 is continually inserted until the coated portion 144 of the fiber begins bowing at 144' (which occurs as the end of fiber 146 meets the protrusion control disk 192 of the protective cap 190 with sufficient end loading force). In addition, Fig. 10C shows that the stops 167 formed on an interior portion of the backbone provide a boundary to stop further insertion of the jacketed portion 142 of the optical fiber cable 140.

The UV adhesive gel 170 is pre-stored in an axial channel formed in the second portion 128 of the collar body prior to the field termination process. When the fiber cable is inserted in the collar body 120, some of UV adhesive gel 170 is taken forward until the end of fiber meets the protrusion control disk 192 of the protective cap 190. The UV adhesive gel existing on the fiber tip can be covered by protective cap 190 which does not allow substantial transmission of UV light therethrough. A specified wavelength of UV light source is given to the front portion (which is including the collar body) of the connector to activate and cure the UV adhesive gel. The UV adhesive gel can be cured in a short time and the optical fiber can be bonded and secured in the collar body. For example, a commercial UV light source 3M Elipar S10 LED (3M Company, St. Paul, MN) and a commercial UV adhesive gel 3M Filtek Z350 XT 7018 (3M Company, St. Paul, MN) can be utilized in the present invention. The wavelength of UV light source is about 380nm -- 420nm. The curing time of the UV adhesive gel is about 20-30 seconds. As the fiber tip and the front part of the ferrule is covered by protective cap 190, which is not substantially transparent to UV light, the UV adhesive gel 170 left over the fiber tip and inside the front part of the ferrule 130 is not cured. In an exemplary aspect, the UV adhesive gel 170 left inside the ferrule can be protected and is not cured within the ferrule 130, which is also formed from a material that is

non-transparent to UV light. The fiber jacket can then be released at clamping portion 169, thereby removing the fiber bow.

The boot 180 (which is previously placed over fiber cable 140) is then pushed onto the backbone 160. As is shown in Fig. 10D, the boot 180 can be pushed axially toward the backbone mounting structure 166 and then screwed onto the backbone mounting structure 166 to secure the boot 180 in place. As mentioned above, the installation of the boot 180 onto the backbone 160 tightens the collet-style clamping portion 169 onto the fiber jacket. During this installation, the user can hold the Kevlar strands 148 in place over the mounting structure 166 by application of a modest force (e.g., by thumb pressure) in the direction of arrow 106. After completion of the boot installation, the excess Kevlar can be removed (e.g., cut away). As shown in Fig. 10E, the installation can be completed by sliding the housing 110 onto the backbone. In an exemplary aspect, a UV transparent housing or a housing with the opening 112 can be secured to an outer surface of backbone 160 prior to curing the UV adhesive gel 170 disposed in the collar body 120.

The protective cap 190 can be removed and the connector can be mounted into a field polisher (not shown) so that the fiber tip can be polished. As mentioned above, the fiber will protrude from the front face of the ferrule a distance of from about 5 μ m to about 25 μ m for UPC and APC after polishing.

Thus, the above termination procedure can be accomplished.

As mentioned above, the connector 100 can also be utilized to terminate a conventional rectangular-shaped cable, such as FRP style optical fiber cable. The strength members 148 of a standard cylindrically shaped cable are disposed between an inner surface of the fiber jacket 142 and an outer surface of coated portion 144, while the strength members (not shown) of a FRP style optical fiber cable run lengthwise parallel to the coated fiber and are firmly secured within the cable jacket material. Therefore, during the termination process for a FRP style cable, no excess strength members need to be removed (e.g., cut away) after the boot 180 is installed onto the backbone. The clamping portion 169 is configured to receive and clamp an FRP style optical fiber cable being terminated in connector 100. When actuated by installing the boot 180, this clamping operation can provide a sufficient inward radial force that secures the FRP style optical fiber cable (including the jacket, strength members, and fiber portions) against normal axial pulling forces. Other steps for terminating a FRP style cable are similar with the steps for terminating a standard cylindrically shaped cable as described above.

The optical connectors described above can be used in many conventional optical connector applications such as drop cables and/or jumpers. The optical connectors described above can also be utilized for termination (connectorization) of optical fibers for interconnection and cross connection in optical fiber networks inside a fiber distribution unit at an equipment room or a wall mount patch panel, inside pedestals, cross connect cabinets or closures or inside outlets in premises for optical fiber structured cabling applications. The optical connectors described above can also be used in termination of optical fiber in optical equipment. In addition, one or more of the optical connectors described above can be utilized in alternative applications. As mentioned above, the optical connector of the exemplary embodiments is of compact length and is capable of straightforward field termination with reduced assembly times. Such exemplary connectors can be readily installed and utilized for FTTP and/or FTTX network installations.

Various modifications, equivalent processes, as well as numerous structures to which the present invention may be applicable will be readily apparent to those of skill in the art to which the present invention is directed upon review of the present specification.

We Claim:

1. An optical fiber connector, comprising:
 - a housing configured to mate with a receptacle;
 - a collar body formed, at least in part, from a material that is substantially transparent to UV light that is disposed in the housing, the collar body including a ferrule securely disposed in an opening of the collar body, the ferrule including a central bore that defines an axis;
 - a UV adhesive gel disposed in a channel formed in the collar body;
 - a backbone to retain the collar body within the housing, the backbone including a fiber jacket clamping portion to clamp a jacket portion of the optical fiber; and
 - a boot attachable to a portion of the backbone, wherein the boot actuates the fiber jacket clamping portion of the backbone upon attachment to the backbone.
2. The optical fiber connector of claim 1, further comprising a protective cap that is formed from a material that is non-transparent to at least UV light attachable to end of the housing.
3. The optical fiber connector of claim 2, wherein the protective cap is configured to cover an exposed end of the ferrule.
4. The optical fiber connector of claim 1, wherein the collar body comprises a step formed on an outer surface thereof and wherein the backbone comprises a collar body mount structure formed on an inner surface thereof.
5. The optical fiber connector of claim 4, further comprising a spring disposed between the step and the collar body mount structure.
6. The optical fiber connector of claim 1, wherein backbone comprises a front portion and a rear portion and wherein the rear portion is configured to mate with the front portion.
7. The optical fiber connector of claim 1, wherein the backbone comprises a first opening at a front end thereof and a second opening formed on an outer side thereof.
8. The optical fiber connector of claim 1, wherein the housing comprises an opening formed on an outer side thereof.
9. The optical fiber connector of claim 8, wherein the opening is proximate to the collar body when the collar body is fully inserted in the housing.
10. The optical fiber connector of claim 1, wherein the fiber jacket clamping portion is configured to receive and clamp an FRP style optical fiber cable.
11. The optical fiber connector of claim 1, wherein the UV adhesive gel is a material curable by exposure to a sufficient level of UV light and the cured UV adhesive gel bonds the fiber to the collar body.

12. The optical fiber connector of claim 1, wherein the collar body comprises an axial funnel-shaped channel formed at an end of the collar body.
13. The optical fiber connector of claim 1, wherein the ferrule is formed from a material that is non-transparent to UV light.
14. The optical fiber connector of claim 1, wherein the collar body is formed from a material that is substantially transparent to UV and visible light.
15. A method of field terminating an optical fiber, comprising:
 - providing an optical fiber connector having a pre-stored UV adhesive gel disposed in an axial channel formed in a collar body;
 - preparing an end of an optical fiber cable to be terminated, wherein the fiber preparation includes stripping off a portion of an outer jacket of the optical fiber to be terminated and cleaving the fiber end;
 - inserting a fiber end into the optical fiber connector until a fiber bow is evident;
 - activating the UV adhesive gel with a UV light source to cure the UV adhesive gel and bond the optical fiber to the collar body;
 - releasing the fiber bow; and
 - installing a boot onto the backbone.

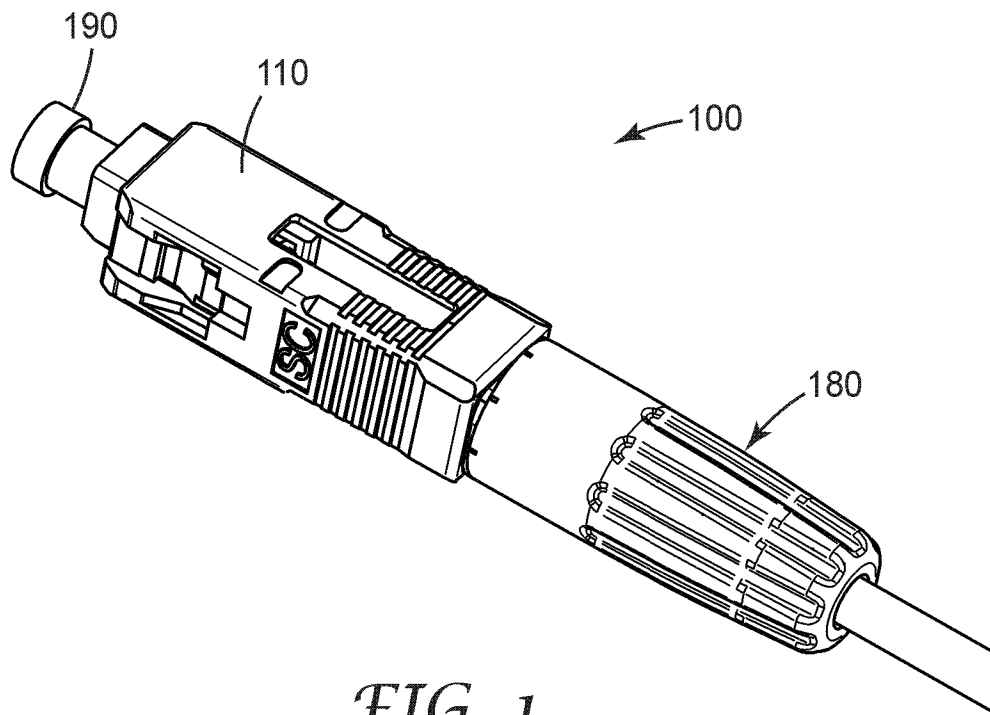
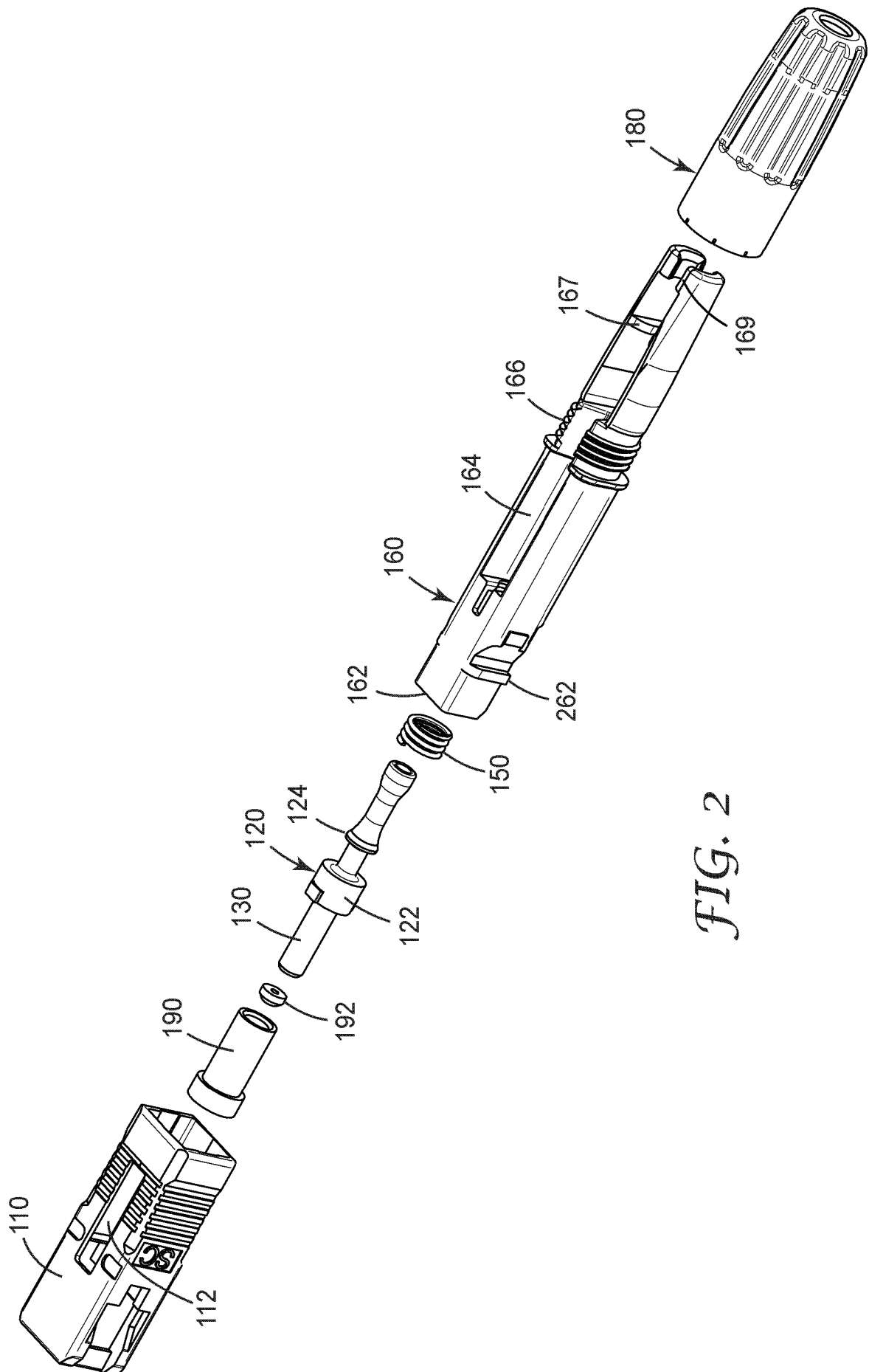


FIG. 1



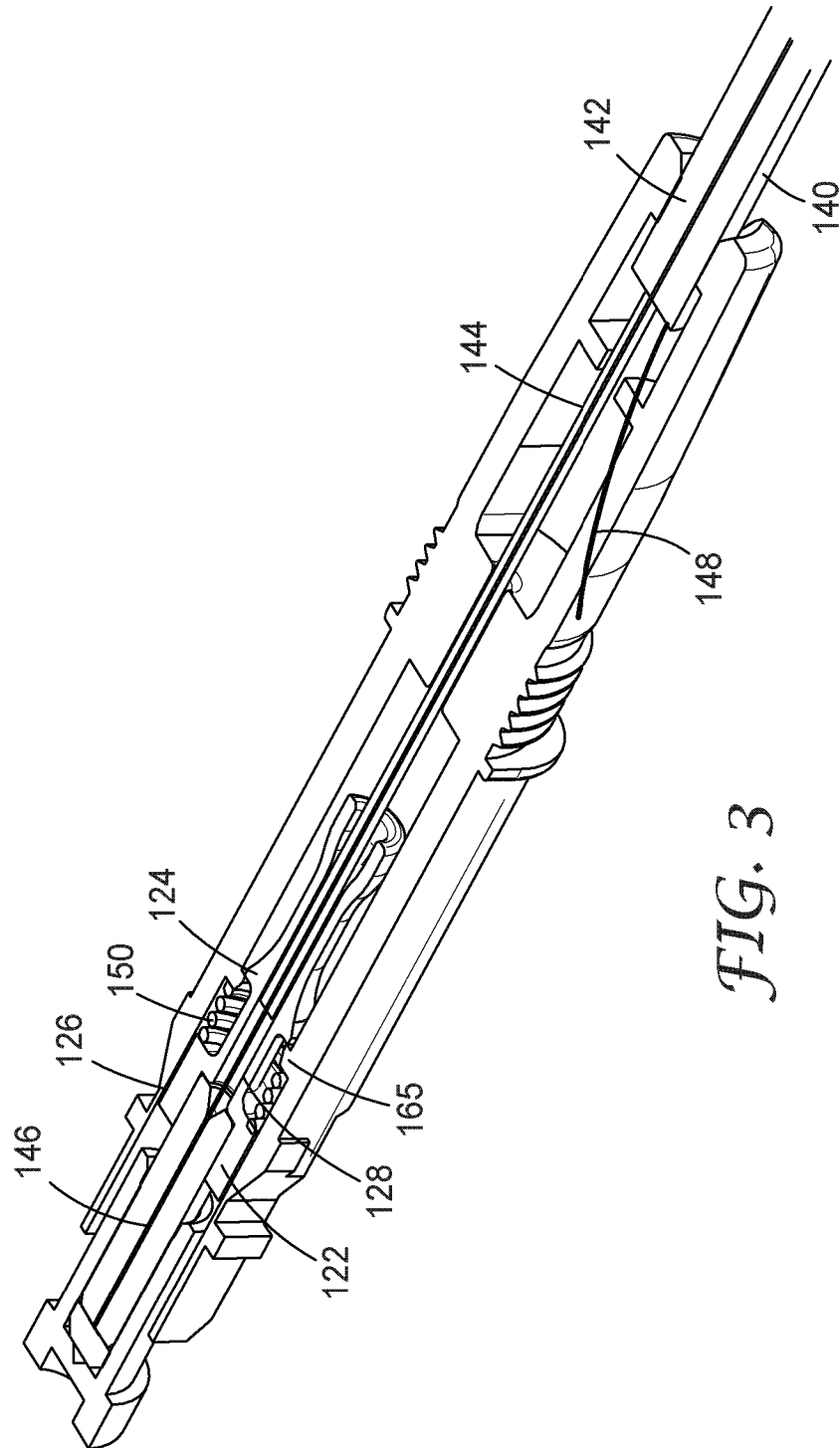
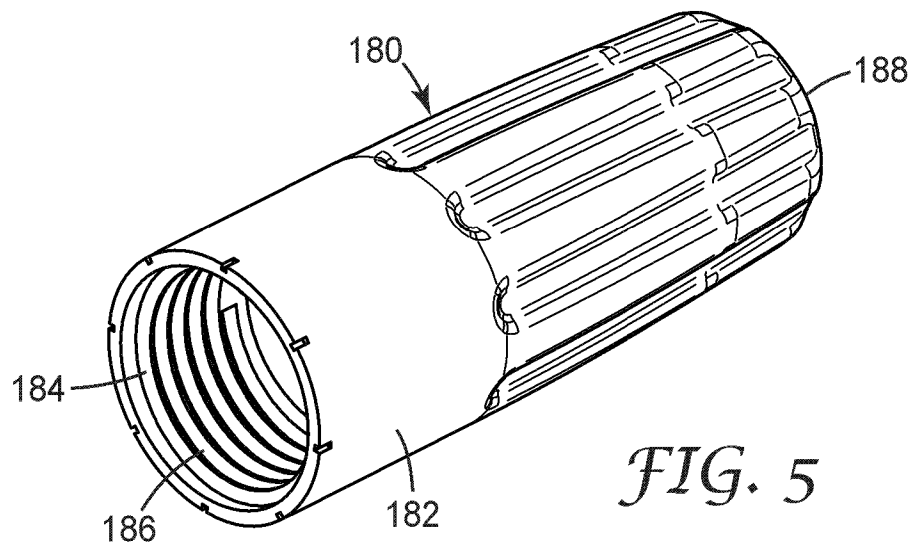
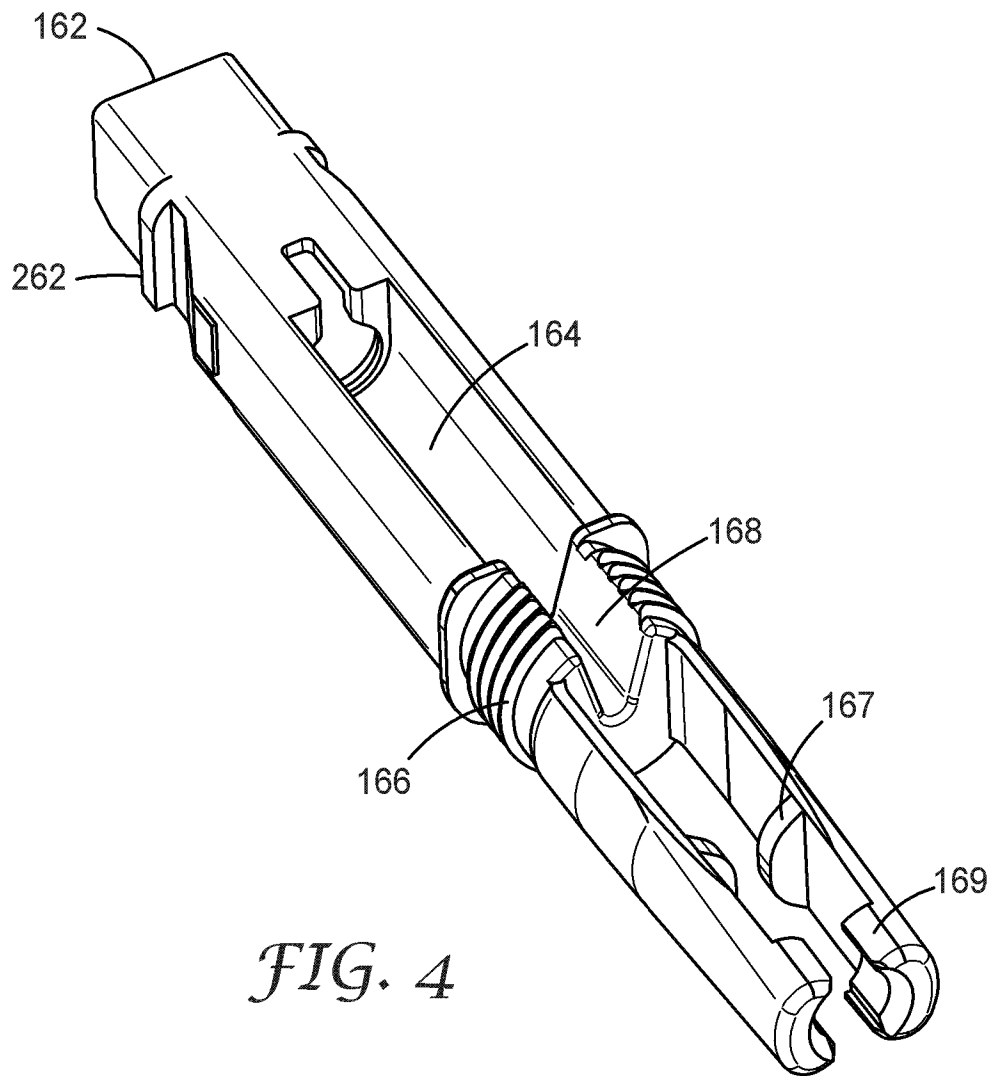
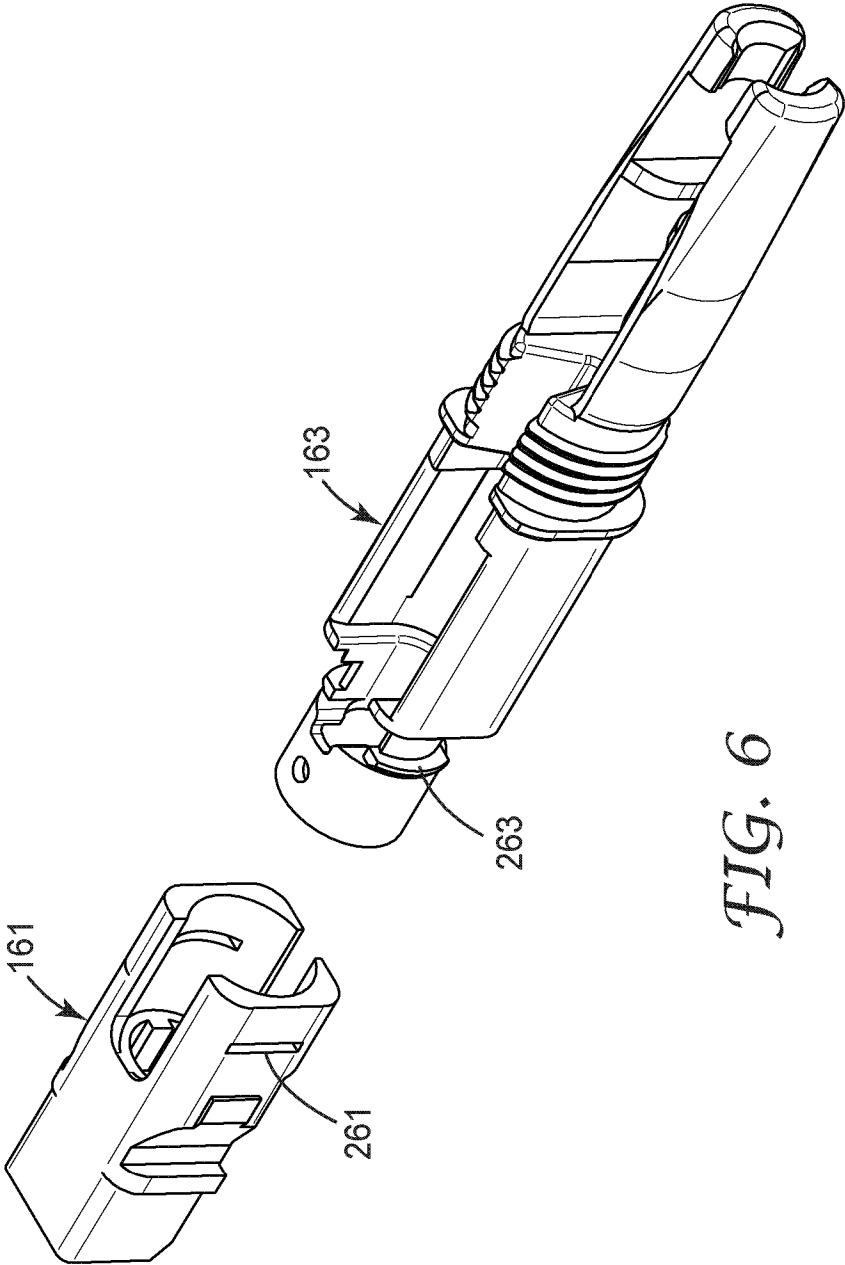


FIG. 3

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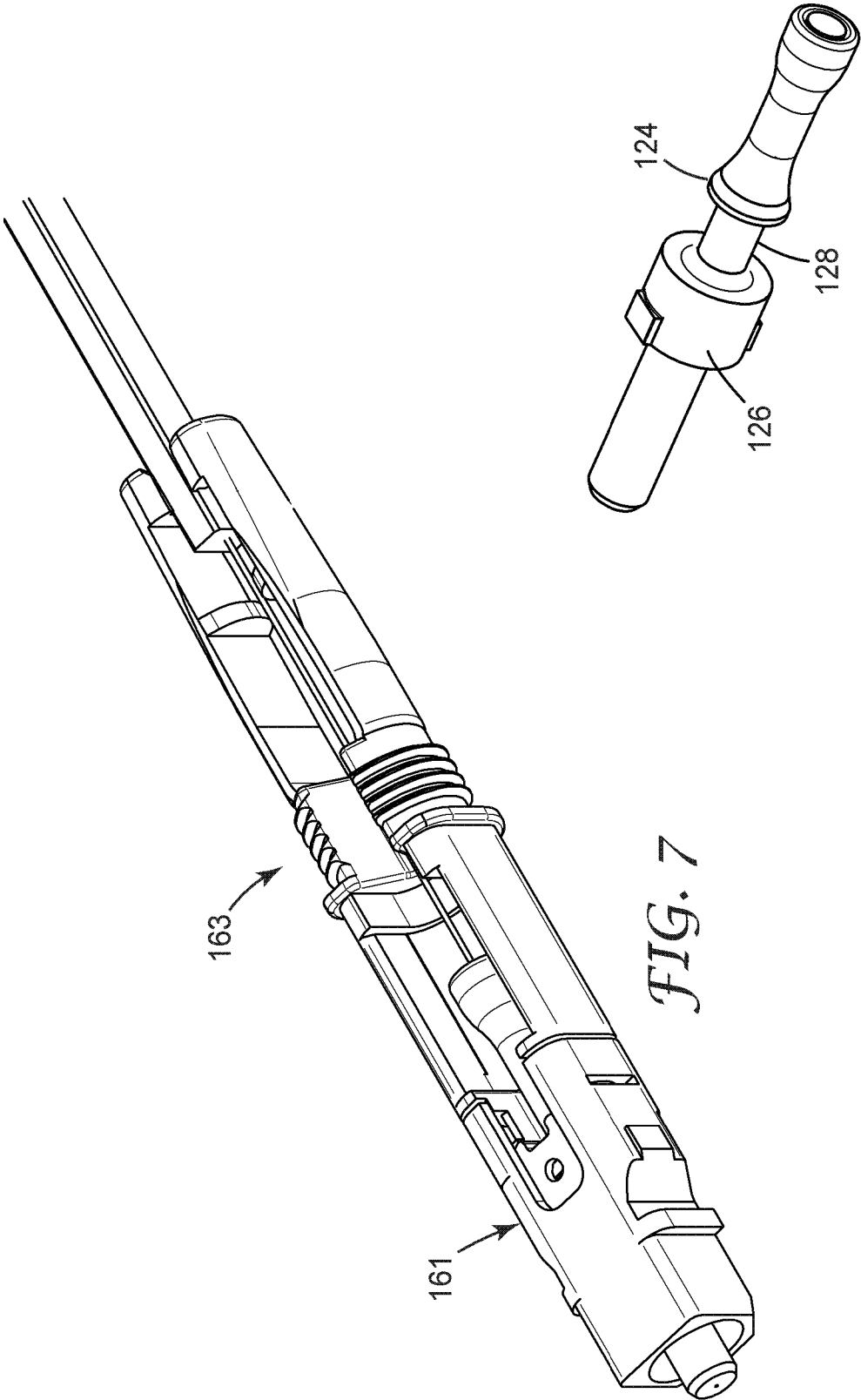


FIG. 8

FIG. 7

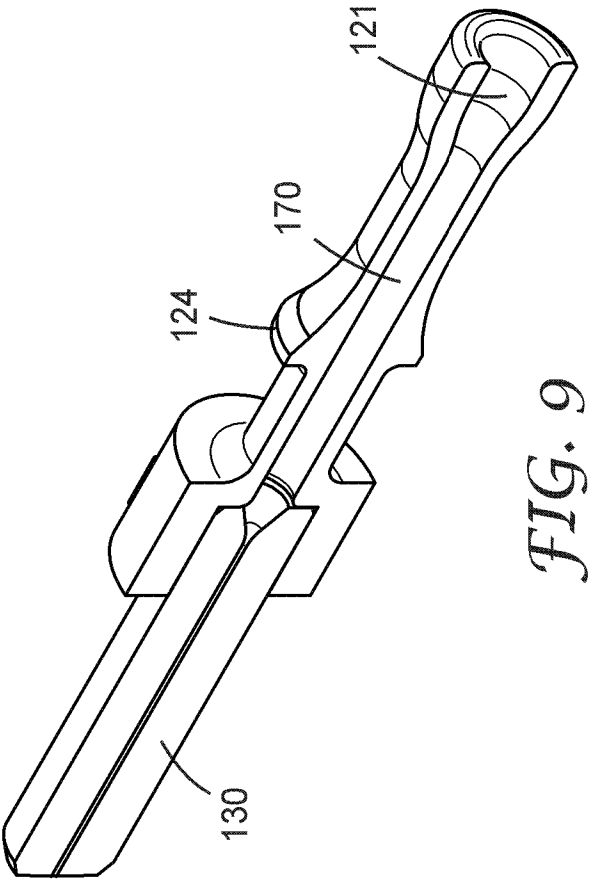


FIG. 9

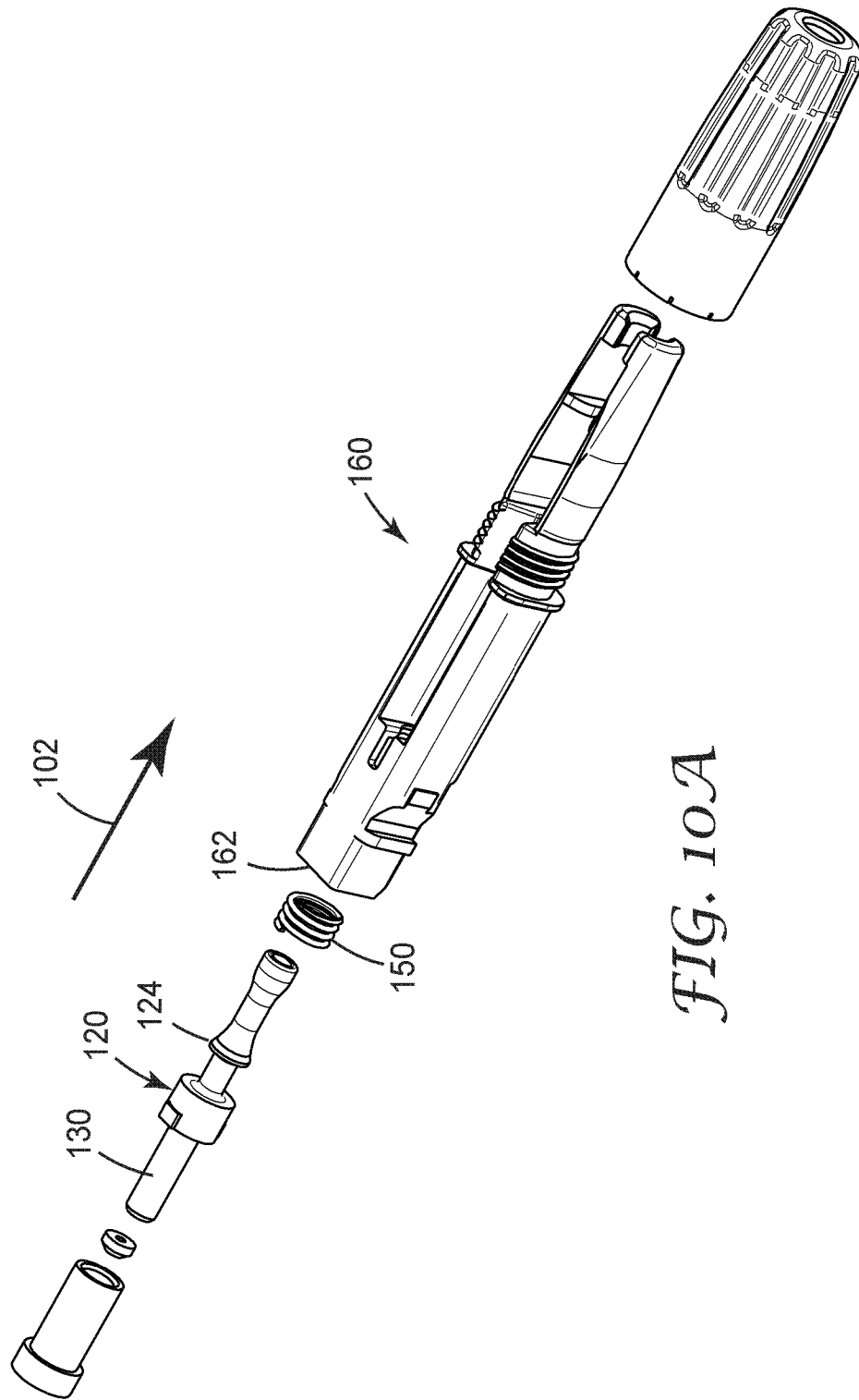
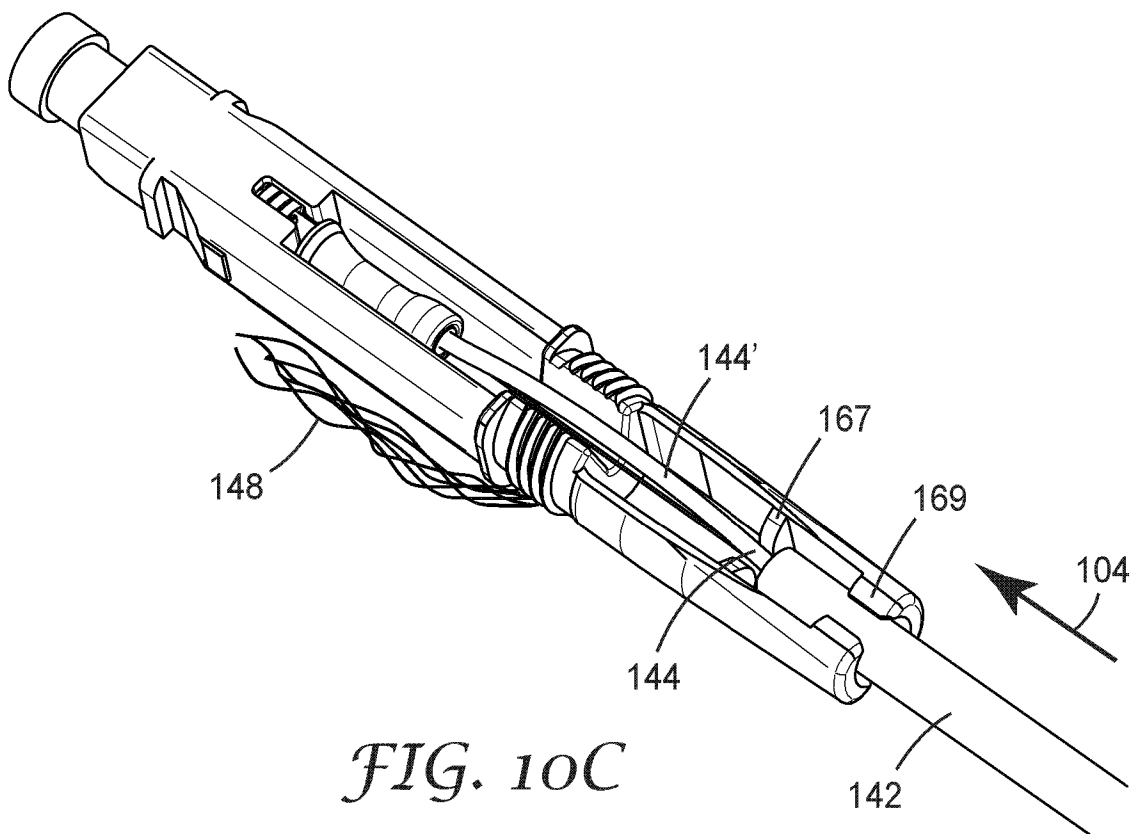
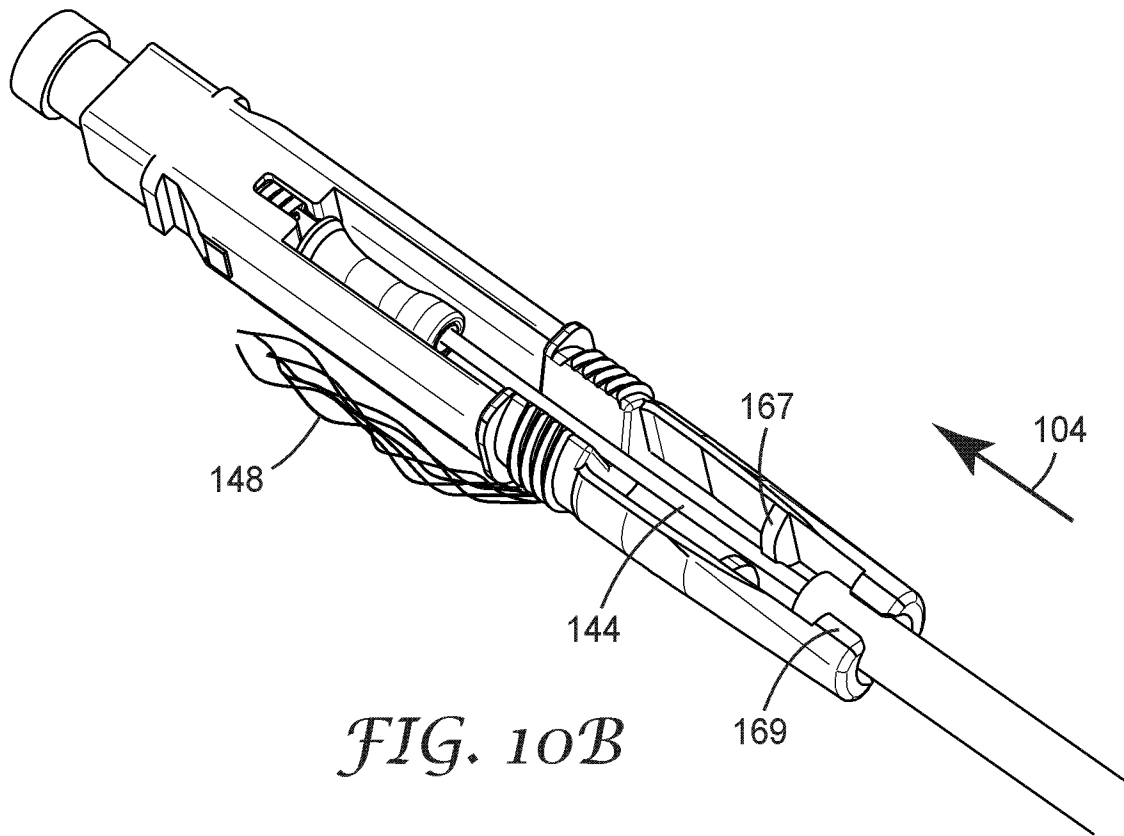
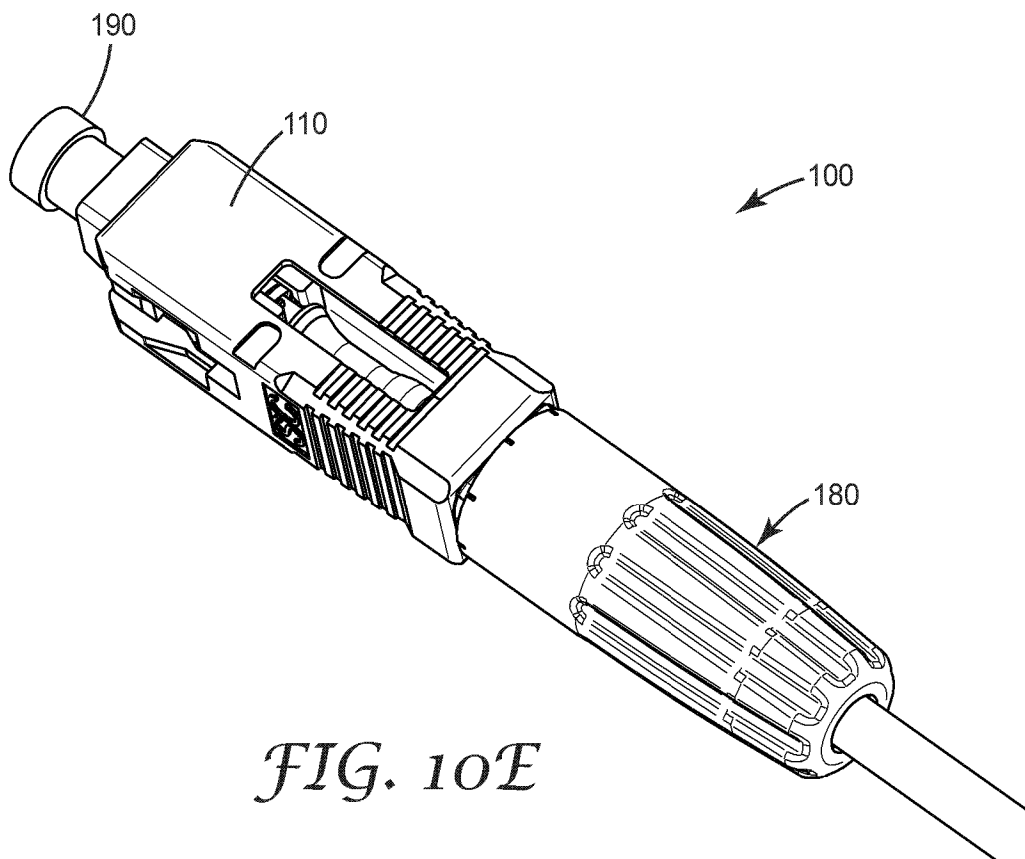
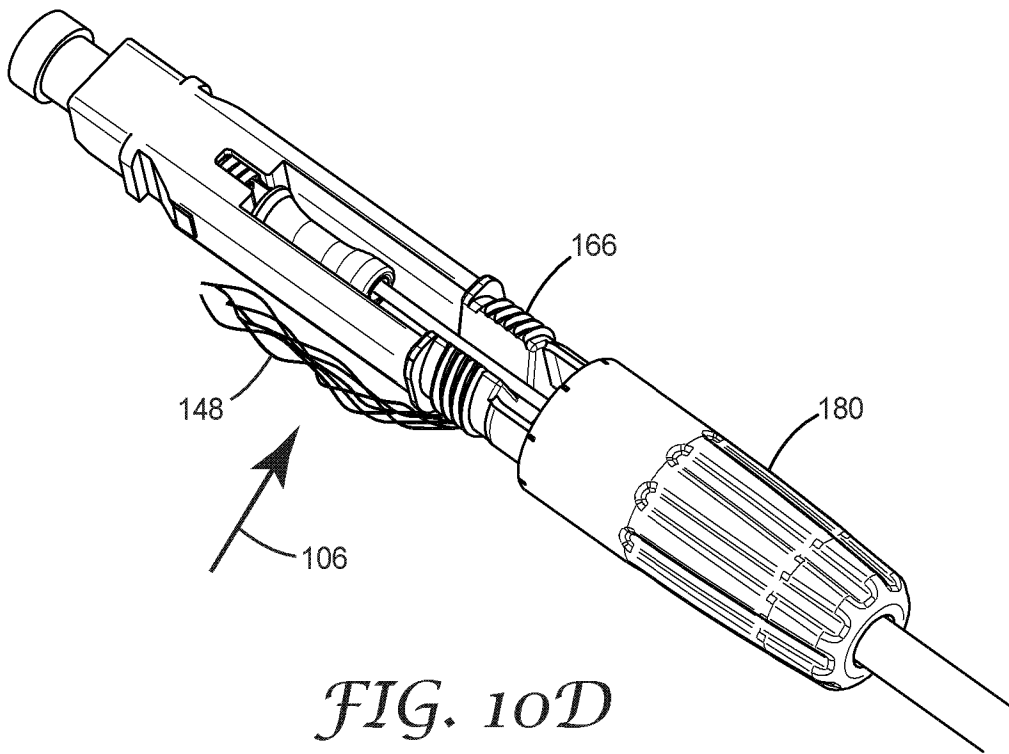


FIG. 10A

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2017/072606

A. CLASSIFICATION OF SUBJECT MATTER

G02B 6/38(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)

G02B 6/-

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)

CNPAT, CNKI, WPI, EPODOC: 3M, Optical, fiber, fibre, connect+, collar, transparent, UV, gel, resin, cur+, ferrule, clamp+, backbone

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 103376513 A (3M INNOVATIVE PROPERTIES CO.) 30 October 2013 (2013-10-30) description paragraphs [0023]-[0076], figures 1A-8B	1-15
A	CN 105093422 A (3M INNOVATIVE PROPERTIES CO.) 25 November 2015 (2015-11-25) the whole document	1-15
A	CN 102057308 A (3M INNOVATIVE PROPERTIES CO.) 11 May 2011 (2011-05-11) the whole document	1-15
A	CN 105556361 A (ADC TELECOMMUNICATIONS INC. ET AL.) 04 May 2016 (2016-05-04) the whole document	1-15
A	CN 101329424 A (HITACHI CABLE CO., LTD.) 24 December 2008 (2008-12-24) the whole document	1-15
A	JP H1152184 A (MITSUBISHI CABLE IND. LTD.) 26 February 1999 (1999-02-26) the whole document	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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“&” document member of the same patent family

Date of the actual completion of the international search

26 September 2017

Date of mailing of the international search report

20 October 2017

Name and mailing address of the ISA/CN

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2017/072606

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JP	H1152184	A	26 February 1999	None			