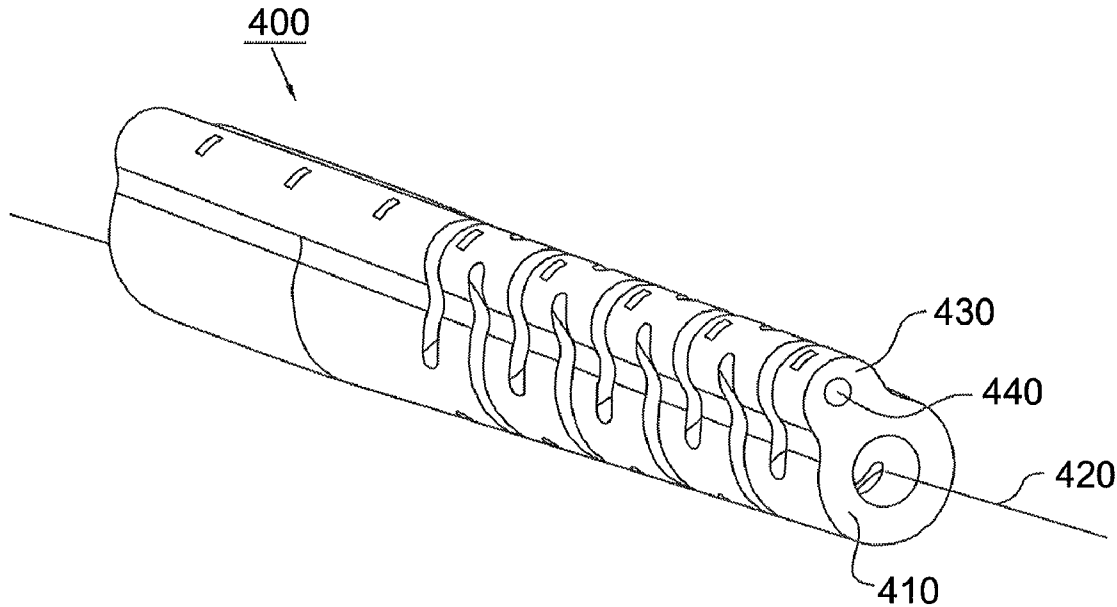




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(19) **United States**(12) **Patent Application Publication**
LIN et al.(10) **Pub. No.: US 2013/0094816 A1**(43) **Pub. Date: Apr. 18, 2013**(54) **FLEXIBLY BENDED BOOT FOR OPTICAL
FIBER CONNECTOR****Publication Classification**(75) Inventors: **I En LIN**, New Taipei City (TW);
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MA (US)(51) **Int. Cl.**
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(52) **U.S. Cl.**
USPC **385/86**; 29/874(73) Assignees: **SENKO ADVANCED
COMPONENTS, INC.**, Marlboro, MA
(US); **PROTAI PHOTONIC CO.,
LTD.**, Sinjhuang City (TW)(57) **ABSTRACT**

A boot for an optical fiber connector according to the present invention is provided. The boot includes a hollow cylindrical body defining an axial direction, a protrusion portion formed on the cylindrical body, and a member with the property of plasticity disposed in the protrusion portion, wherein the member has at least one protrusion formed thereon. The at least one protrusion sticks in the protrusion portion formed on the cylindrical body.

(21) Appl. No.: **13/275,656**(22) Filed: **Oct. 18, 2011**

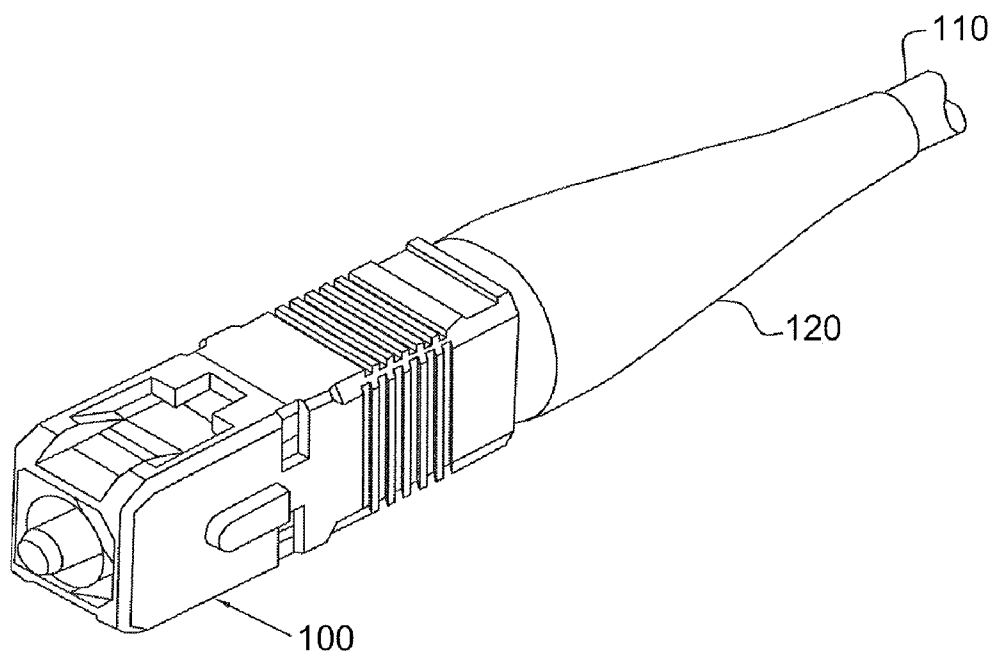


FIG. 1 (PRIOR ART)

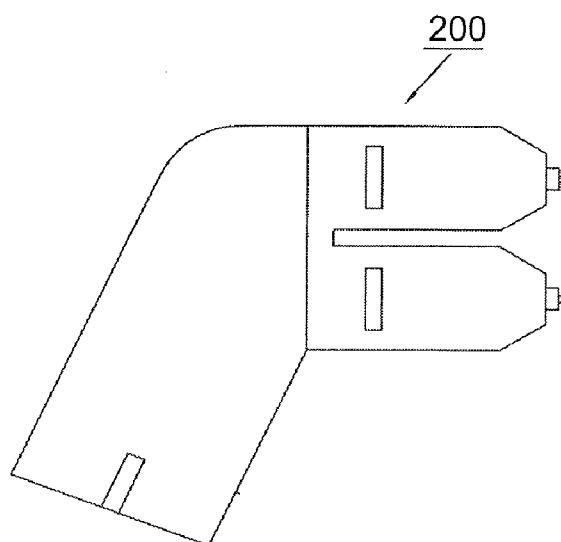


FIG. 2 (PRIOR ART)

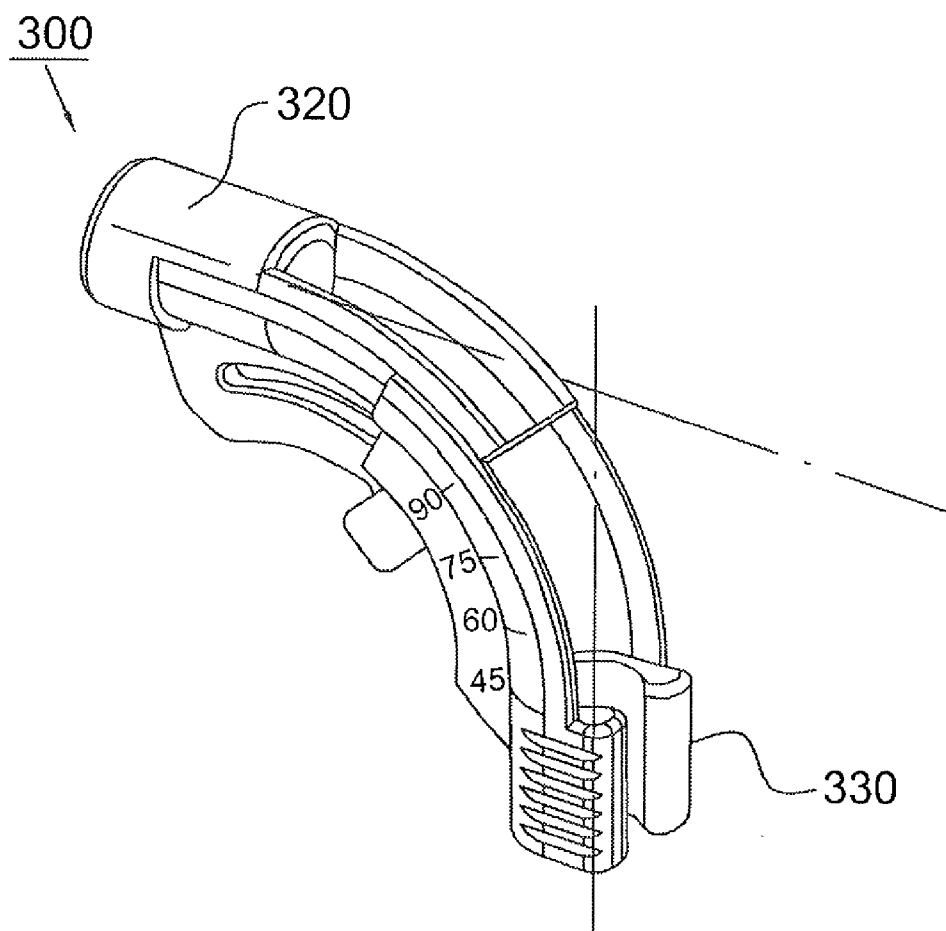


FIG. 3 (PRIOR ART)

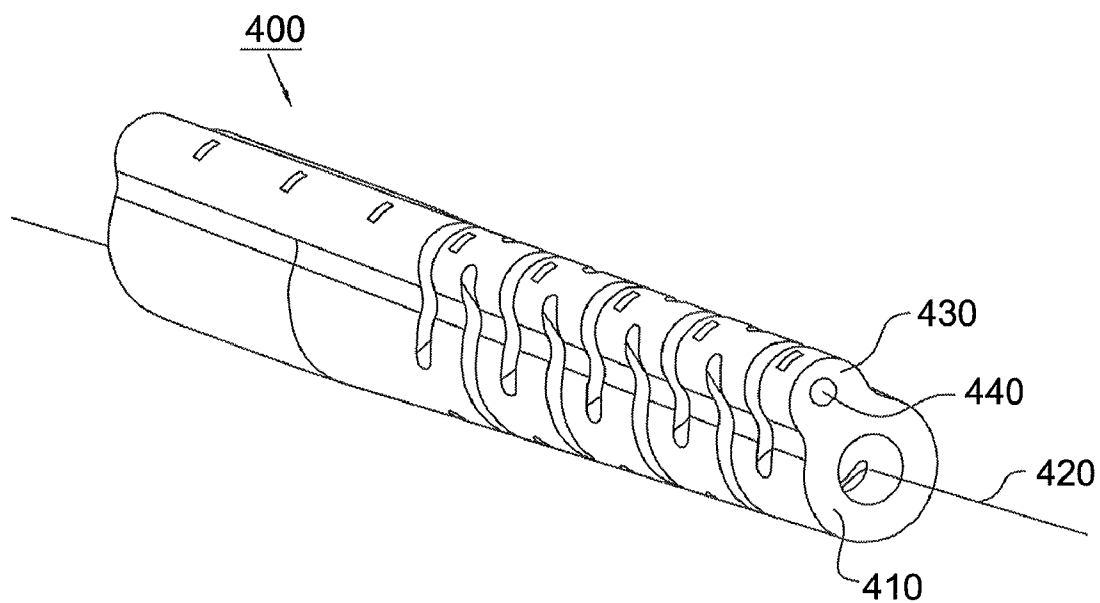


FIG. 4

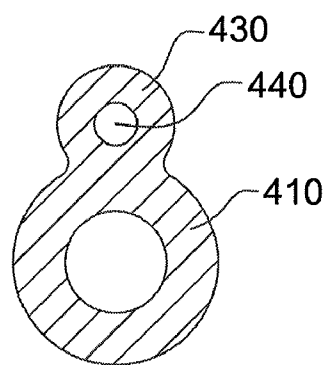


FIG. 5

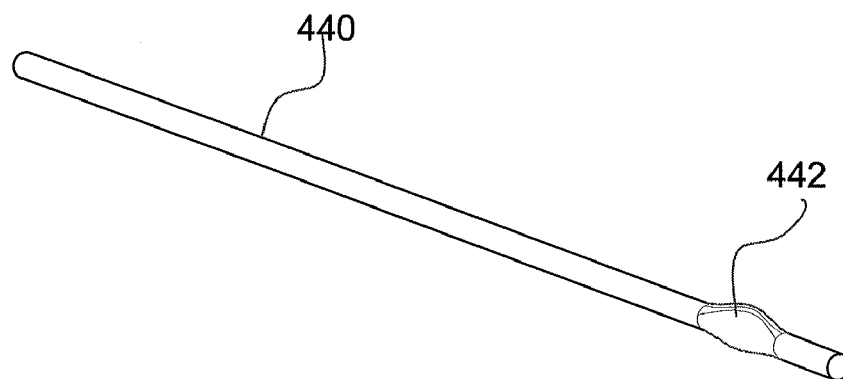


FIG. 6

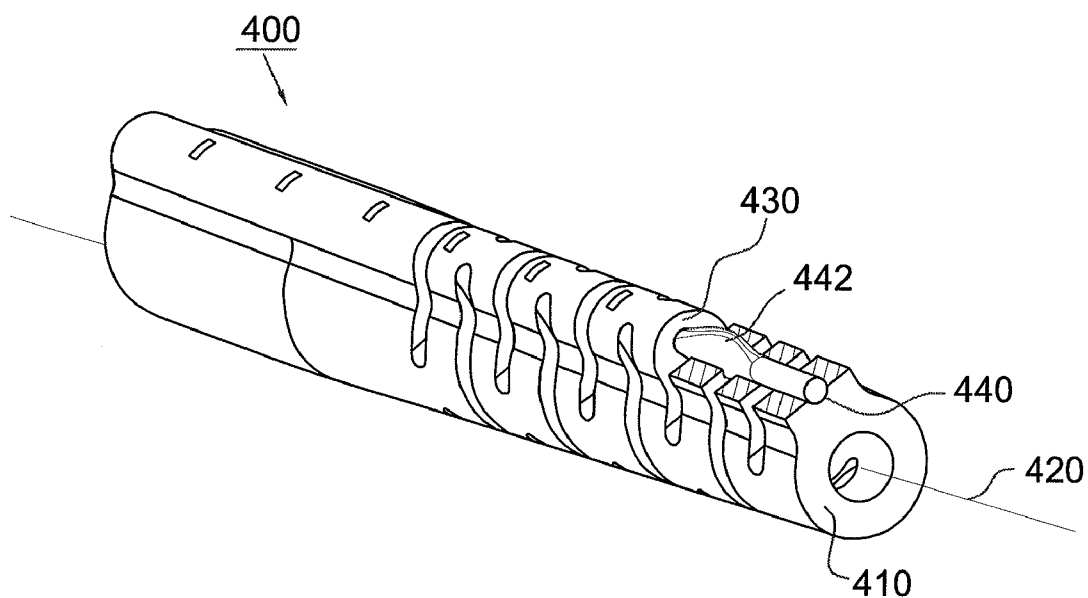


FIG. 7

FLEXIBLY BENDED BOOT FOR OPTICAL FIBER CONNECTOR

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates to an optical fiber connector, and more particularly, to a boot for an optical fiber connector.

[0003] 2. Description of the Related Art

[0004] The application of fiber optics to the telecommunication and data storage industries is expanding ever day. Fiber optics enables the high-speed transmission of communications and data. Connectors for optical fibers can be found in the back of instrumentation, telecommunication, routing, and switching cabinets. These cabinets accept a large number of fiber optical connectors. The optical fibers project away from the connector and tend to bend toward the ground due to the effect of gravity or the optical fibers are bent in a different direction due to an externally applied force. An optical signal passing through an optical fiber can experience a power loss if the bend radius of the optical fiber is too great. In order to prevent the optical fiber from being bent beyond a minimum bend radius, strain relief boots can be attached to the optical fiber in a region adjacent to the connector. The strain relief boot provides for a gentle, smooth, non-abrupt transition of the optical fiber from the connector to some other environment so as to maintain the optical signal at an acceptable power level.

[0005] Typically, strain relief boots have a straight, unbent shape when they are not subject to an externally applied force. Such a strain relief boot is disclosed in U.S. Pat. No. 5,781,681. FIG. 1 is taken from U.S. Pat. No. 5,781,681 showing a prior art connector **100**. The prior art connector **100** includes the prior art optical fiber **110** which is surrounded, adjacent to the connector **100**, by the prior art strain relief boot **120**. When the prior art optical fiber **110** is subjected to a side load, such as the gravity, the strain relief boot **120** will bend. If the side load is too heavy, the boot **120** will bend greatly to cause a micro-bending loss of the fiber **110**. Moreover, when a great number of fibers **110** are arranged in the above-mentioned cabinets, it is usually required to bundle these fiber **110** together. This will also cause the boot **120** to bend.

[0006] In order to solve the above problem, referring to FIG. 2, U.S. Pat. No. 6,695,486 discloses an angled optical fiber connector **200**. However, the connector **200** is difficult to be angled.

[0007] In addition, referring to FIG. 3, U.S. Pat. No. 6,634,801 discloses an adjustable strain relief boot **300** for an optical fiber connector. The strain relief boot **300** includes a stationary portion **320** and a moving portion **330** slidably connected to the stationary portion **320**. The bending angle of the boot **300** can be adjusted by moving the moving portion **330**.

[0008] However, the bending angle of the boot **300** is adjusted through teeth. The teeth will cause the bending angle not to be adjusted arbitrarily. Furthermore, the mechanism of the moving portion **330** is a little bit complicated and the boot **300** can be angled only in a direction.

[0009] Accordingly, there exists a need to provide a flexibly bended boot to solve the above-mentioned problems.

SUMMARY OF THE INVENTION

[0010] The present invention provides a flexibly bended boot for an optical fiber connector.

[0011] In one embodiment, the boot of the present invention includes a hollow cylindrical body defining an axial direction, a protrusion portion formed on the cylindrical body, and a member with the property of plasticity disposed in the protrusion portion, wherein the member has at least one protrusion formed thereon. The at least one protrusion sticks in the protrusion portion formed on the cylindrical body.

[0012] The present invention further provides a method of manufacturing the above boot.

[0013] In one embodiment, the method of manufacturing a boot according to the present invention comprises: forming a protrusion portion on a hollow cylindrical body, wherein the cylindrical body defines an axial direction; providing a member with the property of plasticity; deforming a portion of the member so as to form at least one protrusion on the member; and disposing the member in the protrusion portion formed on the cylindrical body such that the at least one protrusion of the member sticks in the protrusion portion formed on the cylindrical body.

[0014] The foregoing, as well as additional objects, features and advantages of the invention will be more readily apparent from the following detailed description, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 illustrates a conventional boot for an optical fiber connector.

[0016] FIG. 2 illustrates a conventional angled optical fiber connector.

[0017] FIG. 3 illustrates a conventional adjustable boot for an optical fiber connector.

[0018] FIG. 4 is an elevated perspective view of the flexibly bended boot for an optical fiber connector according to the present invention.

[0019] FIG. 5 is a cross-sectional view of the flexibly bended boot for an optical fiber connector according to the present invention.

[0020] FIG. 6 illustrates that a protrusion is formed on the member.

[0021] FIG. 7 illustrates that the protrusion on the member sticks in the protrusion portion formed on the cylindrical body.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0022] Referring to FIGS. 4 and 5, the flexibly bended boot **400** of the present invention is for an optical fiber connector. The boot **400** is adjacent to an optical fiber connector and surrounds an optical fiber (not shown in the figures). The boot **400** includes an elastic hollow body **410** which is cylindrical and defines an axial direction **420**. A protrusion portion **430** is integrally formed on the outer surface of the body **410** along the axial direction **420**. In addition, a member **440** with the property of plasticity is axially embedded in the protrusion portion **430**. The member **440** can be integrally formed and is a metal wire, such as an iron wire.

[0023] According to the present invention, the boot **400** can be bent to a desired shape in subjection to an external force. When the boot **400** is bent, the member **440** will also be bent accordingly. Since the member **440** has the property of plasticity, the boot **400** can still be kept in the desired shape even though when the external force vanishes. Similarly, the boot **400** can be bent to an original shape with an appropriate force.

It is to be noted that the member **440** with the property of plasticity according to the present invention is one that can be bent to a desired shape in subjection to an external force and still be kept in the desired shape even though the external force vanishes. The member **440** can be bent to an original shape with an appropriate force.

[0024] Referring to FIGS. 6 and 7, to prevent the member **440** from movement or rotation in the protrusion portion **430** when the boot **400** is bent, it is preferable that the member **440** has at least one protrusion **442** formed on a lateral side thereof such that the protrusion **442** sticks in the protrusion portion **430**. The protrusion **442** may be formed by deforming a portion of the member **440**. For example, the protrusion **442** may be formed by pressing a portion of the member **440**.

[0025] It will be appreciated that the boot of the present invention can be used in any type of optical fiber connector, such as FC, SC or LC type connector.

[0026] Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

1. A boot for an optical fiber connector, comprising:
a hollow cylindrical body defining an axial direction;
a protrusion portion formed on the cylindrical body; and
a member having plasticity, and disposed in the protrusion portion, wherein
the member has at least one protrusion formed thereon,
the at least one protrusion sticks in the protrusion portion
formed on the cylindrical body, and
the at least one protrusion protrudes in only one direction
transverse to the axial direction.
2. The boot as claimed in claim 1, wherein the member and the at least one protrusion are integrally formed.
3. The boot as claimed in claim 1, wherein the member includes a metal wire.
4. The boot as claimed in claim 1, wherein the protrusion portion is integrally formed with the cylindrical body.
5. The boot as claimed in claim 1, wherein the member is disposed along the axial direction.
6. The boot as claimed in claim 1, wherein the at least one protrusion is formed on a lateral side of the member.

7. The boot as claimed in claim 1, wherein the member includes an iron wire.

8. A method of manufacturing a boot for an optical fiber connector, the method comprising:

forming a protrusion portion on a hollow cylindrical body,
wherein the cylindrical body defines an axial direction;
providing a member having plasticity;

deforming a portion of the member so as to form at least one protrusion on the member; and

disposing the member in the protrusion portion formed on the cylindrical body such that the at least one protrusion of the member sticks in the protrusion portion formed on the cylindrical body, wherein

the at least one protrusion protrudes in only one direction transverse to the axial direction.

9. The method as claimed in claim 8, wherein the deforming includes pressing the portion of the member in the only one direction transverse to the axial direction.

10. The method as claimed in claim 8, wherein the at least one protrusion is formed on a lateral side of the member.

11. The method as claimed in claim 9, wherein the at least one protrusion is formed on a lateral side of the member.

12. The method as claimed in claim 8, wherein the member and the at least one protrusion are integrally formed.

13. The method as claimed in claim 8, wherein the member includes a metal wire.

14. The method as claimed in claim 8, wherein the protrusion portion is integrally formed with the cylindrical body.

15. The method as claimed in claim 8, wherein the member is disposed along the axial direction.

16. The method as claimed in claim 8, wherein the member includes an iron wire.

17. The boot as claimed in claim 1, wherein the at least one protrusion includes a portion of the member deformed by pressing the portion of the member in the only one direction transverse to the axial direction.

18. The boot as claimed in claim 1, wherein the only one direction is perpendicular to the axial direction.

19. The method as claimed in claim 8, wherein the only one direction is perpendicular to the axial direction.

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