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(54) Title: PORT REDUCER FOR TELECOMMUNICATIONS BOX

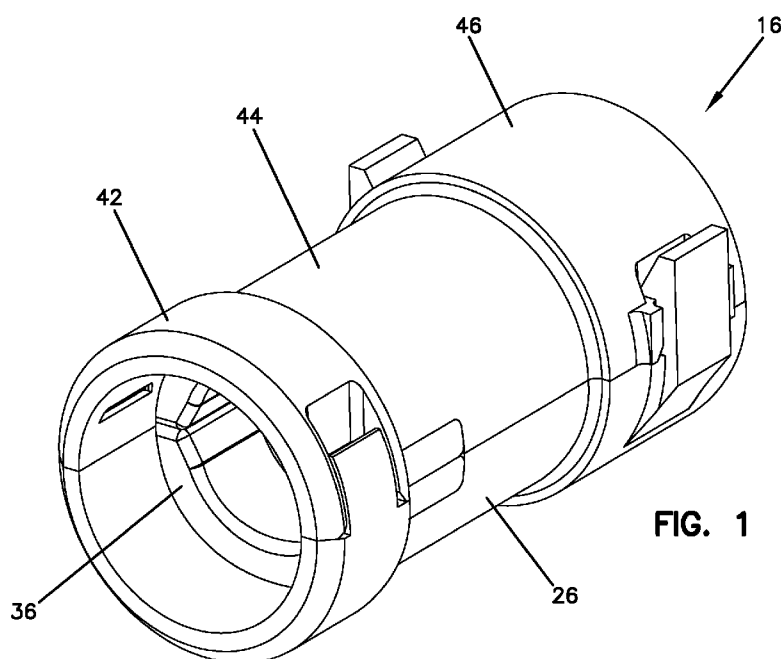


FIG. 1

(57) Abstract: The present disclosure provides a system and method for sealing cable ports (10) of a telecommunications box (14). The system and method enables quick and easy sealing of cables of a variety of outer diameters. In one embodiment of the present disclosure the port (10) of the telecommunications box includes a port reducer (16) that includes a pair of internal gel strips (22, 24) that when compressed deform, and together form a gel ring (36) that provides a seal between the external surface of the cable and the inside of the port reducer.



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PORT REDUCER FOR TELECOMMUNICATIONS BOX

Cross-Reference to Related Application

This application claims the benefit of U.S. Patent Application Serial No. 62/116,090, filed on February 13, 2015, the disclosure of which is incorporated herein by reference in its entirety.

Technical Field

The present disclosure provides a system and method for sealing cable ports of a telecommunications box.

Background

Telecommunications boxes are enclosures that include splices and/or house telecommunications equipment therein. They include openings that allow cables to enter and exit the enclosure. These opening are commonly referred to as ports. It is desirable to seal these openings once the cables are routed into and out of the enclosure to prevent intrusion of water or other contaminants. Forming a seal around the cables and the ports can be relatively difficult and time-consuming especially given the fact that the outer diameters of the cables vary.

Summary

The present disclosure provides a system and method for sealing cable ports of a telecommunications box. The system and method enables quick and easy sealing of cables of a variety of outer diameters. In one embodiment of the present disclosure the port of the telecommunications box includes a port reducer that includes a pair of internal gel strips that when compressed deform, and together form a gel ring that provides a seal between the external surface of the cable and the inside of the port reducer.

Brief Description of the Figures

FIG. 1 is a perspective view of one of the port reducer;

FIG. 2 is a perspective view of the port reducer of FIG. 1 installed in a telecommunications box;

FIG. 3 is exploded assembly view of the port reducer of FIG. 1;

FIG. 4 is a partially exploded assembly view of the port reducer of FIG. 1;

FIG. 5 is a perspective view of the port reducer of FIG. 1 in an open orientation;

FIG. 6 is an end view of the port reducer of FIG. 1; and

FIG. 7 is a cross sectional view of the port reducer of FIG. 1 installed.

Detailed Description

5 Referring to FIGS. 1-7, the system and method of the present disclosure are described in further detail in one embodiment. The present disclosure provides a method of sealing a cable port 10. In the depicted embodiment, the cable ports 10 are apertures in a seal block 12 such as a rubber stopper 12. In the depicted embodiment, the rubber stopper 12 is inserted into a pocket in a polymeric telecommunications housing 14. In the depicted embodiment, the apertures are
10 circular in shape and have a relatively fixed diameter. This fixed diameter may or may not correspond to the diameter of cables that are routed through the apertures. Some compression of the rubber stopper 12 may occur upon closure of the box (cover to base).

In the depicted embodiment, port reducers 16 are engaged with some of the cable ports 10. The exterior of the port reducers 16 are sized and shaped to provide a seal with the cable
15 ports 10. In the depicted embodiment, the port reducer 16 includes a first portion 18 and a second portion 20. In the depicted embodiment, each portion includes half rings 22, 24 of seal material (e.g., gel) therein. In the depicted embodiment, the first and second portions 18, 20 are configured such that when they are forced together they lock and form a generally cylindrical body. It should be appreciated that many alternative configurations are also possible. For
20 example, the first and second portions could be hinged and they can be secured together by ties.

In the depicted embodiment, a method of sealing a cable port of a telecommunications box can include the step of forcing a first portion 18 of a port reducer against a second portion 20
of a port reducer into engagement to secure a section of cable between the first and second portions 18, 20. In the depicted embodiment, the step of forcing the first and second portions
25 into engagement presses gel within the port reducer and forces the gel out through apertures 26, 50 in the body of the port reducer 16. This step of enclosing a section of cable within the port reducer also simultaneously radially seals the cable to the port reducer. It should be appreciated that other sealing steps are also possible.

In the depicted embodiment, the telecommunications housing 14 is a telecommunications
30 box with a base and a cover. The box can be the type that is suspended on a pole, buried underground, or otherwise located. In the depicted embodiment, the box includes four cable

ports 10. As discussed above, each cable port 10 is defined by an aperture in seal block 12. Port reducer 16 is configured to be inserted into the aperture such that an external surface of the port reducer seals against the aperture. The size, shape, and surface characteristics are such that the port reducer 16 snugly fits within the cable port 10. In situations where the cable diameter is compatible with the size of the port, no port reducer 16 is needed for sealing. In some applications, some of the cable ports 10 are fitted with port reducers 16 and some are not. As discussed above, the port reducer 16 of the depicted embodiment includes sealant material therein that deforms and creates a seal between the port reducer 16 and a cable that extends through the port reducer. It should be appreciated that sealant material other than gel could be used (e.g., neoprene, foam, rubber, etc.).

In the depicted embodiment, the port reducer includes a body that is generally cylindrically shaped. As discussed above, the first portion 18 and the second portion 20 are at least partially separable so that a section of cable can be received between the first and second portions. In the depicted embodiment, the first portion 18 and second portion 20 are completely separable. The first portion includes spring arms 28, 30 that engage catches 32, 34 to lock the first portion 18 to the second portion 20. As discussed above, it should be appreciated that a number of other configurations are also possible.

In the depicted embodiment, when the port reducer is in an assembled orientation it defines a first section 42 having a first diameter, a second section 44 having a second diameter, and a third section 46 having a third diameter. In the depicted embodiment, the second section 44 is between the first section 42 and the third section 46 and wherein the second diameter is smaller than both the first diameter and the third diameter. In the depicted embodiment, the second section of the port reducer engages the aperture in the seal block 12.

As discussed above, in the depicted embodiment the port reducer includes a deformable sealing material such as a gel. In the depicted embodiment gel is in the form of upper and lower half ring strips 22, 24 that are arranged such that when the port reducer is in an assembled orientation the strips cooperatively form an annular ring 36, 38 around an interior surface of the port reducer. In the depicted embodiment, the gel forms two spaced apart rings 36, 38 around an interior surface of the port reducer when the first and second portions of the port reducers are engaged with each other. In the depicted embodiment the gel can escape the inner cavity of the port reducer via an aperture 26 in the body of the port reducer. At the apertures 26, 50 the half

rings of gel are pressed together forming a seal, and they also press against the inside surface of the cable port 10 forming a seal. The meeting between the two half rings and the inside surface of the cable port 10 is referred to herein as a triple point 40, 48.

5 It is to be appreciated that one ring 36 or 38, or two rings, or more rings are in each case an option for the port reducer. The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. Since many embodiments of the invention can be made without departing from the spirit and scope of the invention, the invention resides in the claims hereinafter appended.

Parts List

	10	cable port
	12	seal block/rubber stopper
	14	telecommunications housing/box
5	16	port reducer
	18	first portion of port reducer
	20	second portion of port reducer
	22	half ring of sealing material (lower)
	24	half ring of sealing material (upper)
10	26	aperture in the body of the port reducer (first)
	28	spring arm (first)
	30	spring arm (second)
	32	catch (first)
	34	catch (second)
15	36	gel ring (first)
	38	gel ring (second)
	40	triple point (first)
	42	first section of the port reducer
	44	second section of the port reducer
20	46	third section of the port reducer
	48	triple point (second)
	50	aperture in the body of the port reducer (second)

What is claimed is:

1. A telecommunications box comprising:
a housing (14) including at least one port (10);
the port (10) being defined by an aperture in a seal block (12); and
a port reducer (16) configured to be inserted into the aperture such that an external surface of the port reducer (16) seals against the aperture;
wherein the port reducer (16) includes sealant material (36) therein that is configured to deform and create a seal between the port reducer (16) and a cable that extends through the port reducer (16).
2. The telecommunications box of claim 1, wherein the aperture (10) in the seal block (12) has a circular shape.
3. The telecommunications box of claim 1, wherein the port reducer (16) includes a body that is generally cylindrically shaped and includes a first portion (18) and a second portion (20), the first portion and second portion being at least partially separable.
4. The telecommunications box of claim 3, wherein the first portion (18) and second portion (20) are completely separable and include spring arms (28, 30) that engage when locking the first portion (18) to the second portion (20).
5. The telecommunications box of claim 3, wherein when the port reducer is in an assembled orientation it defines a first section (42) having a first diameter, a second section (44) having a second diameter, and a third section (46) having a third diameter, wherein the second section (44) is between the first section (42) and the third section (46) and wherein the second diameter is smaller than both the first diameter and the third diameter.
6. The telecommunications box of claim 3, wherein the second section (44) of the port reducer engages the aperture (10) in the seal block (12).
7. The telecommunications box of claim 1, wherein the sealant material (36) is a gel.

8. The telecommunications box of claim 7, wherein the gel forms a ring (36) around an interior surface of the port reducer (16).
9. The telecommunications box of claim 7, wherein the gel forms two spaced apart rings (36, 38) around an interior surface of the port reducer (16).
10. The telecommunications box of claim 7, wherein the port reducer (16) includes an aperture (26) in the body arranged to allow gel from within the port reducer to flow out of the port reducer (16).
11. The telecommunications box of claim 1, wherein the sealant material (36) forms a ring.
12. The telecommunications box of claim 11, wherein the sealant material (36) forms two rings.
13. The telecommunications box of claim 12, wherein the two rings are connected.
14. The telecommunications box of claims 11-13, wherein the port reducer (16) includes two portions, and a half ring of sealant material (36) is mounted to each portion.
15. A port reducer comprising:
 - a body (16) that is generally cylindrically shaped and includes a first portion (18) and a second portion (20), the first portion (18) and second portion (20) being at least partially separable;
 - a sealant material (36) located in the inner cavity of the body; and
 - an aperture (10) in the body arranged to allow the sealant material (36) to escape the inner cavity of the body (16).
16. The telecommunications box of claim 15, wherein the sealant material (36) is a gel.

17. The telecommunications box of claim 16, wherein the gel forms two spaced apart rings (36, 38) around an interior surface of the port reducer.
18. The telecommunications box of claim 15, wherein the first portion (18) and second portion (20) are completely separable and include spring arms (28, 30) that engage when locking the first portion to the second portion.
19. The telecommunications box of claim 15, wherein when the port reducer is in an assembled orientation it defines a first section (42) having a first diameter, a second section (44) having a second diameter, and a third section (46) having a third diameter, wherein the second section is between the first section and the third section and wherein the second diameter is smaller than both the first diameter and the third diameter.
20. A method of sealing a cable port of a telecommunications box comprising the steps of:
forcing a first portion (18) of a port reducer against a second portion (20) of a port reducer into engagement to secure a section of cable therebetween;
wherein the step of forcing the first and second portions (18, 20) into engagement compresses gel (36) within the port reducer and forces the gel out through an aperture (26) in the port reducer.
21. The method of claim 20, wherein the step of forcing the first and second portions (18, 20) into engagement seals the cable to the port reducer (16).
22. The method of claim 20, further comprising the step of inserting the port reducer (16) into an aperture (10) that defines an opening to a telecommunications box (14).

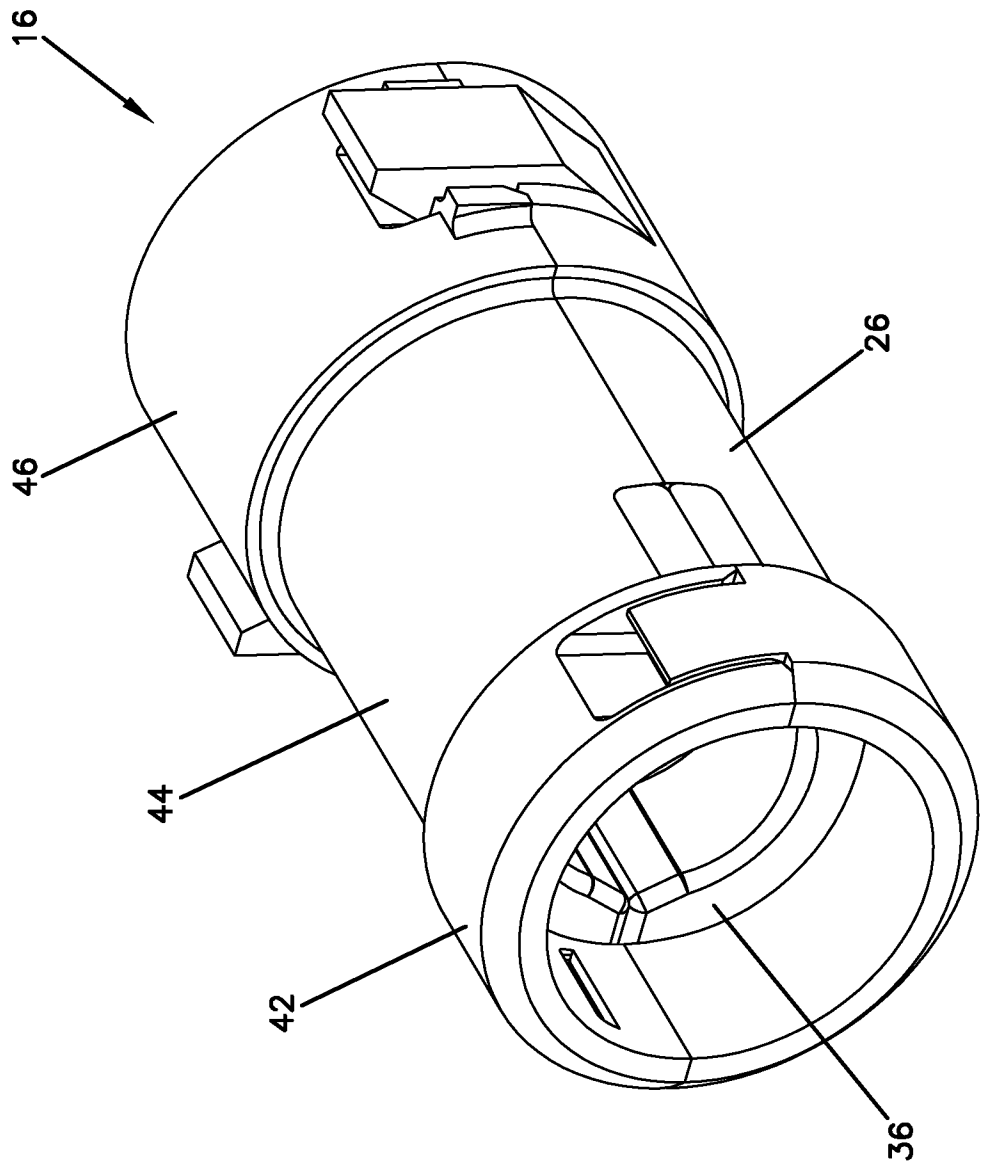


FIG. 1

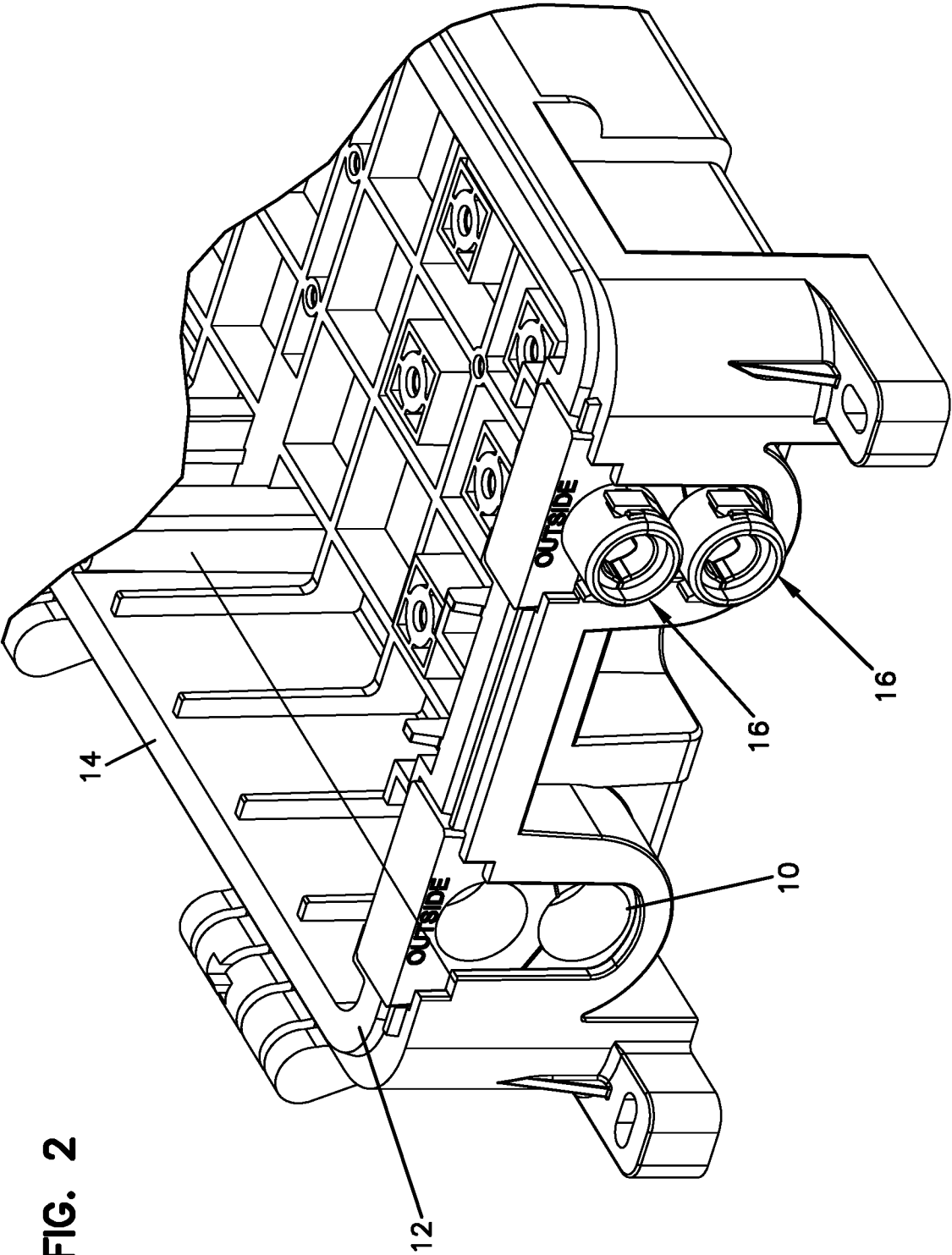


FIG. 3

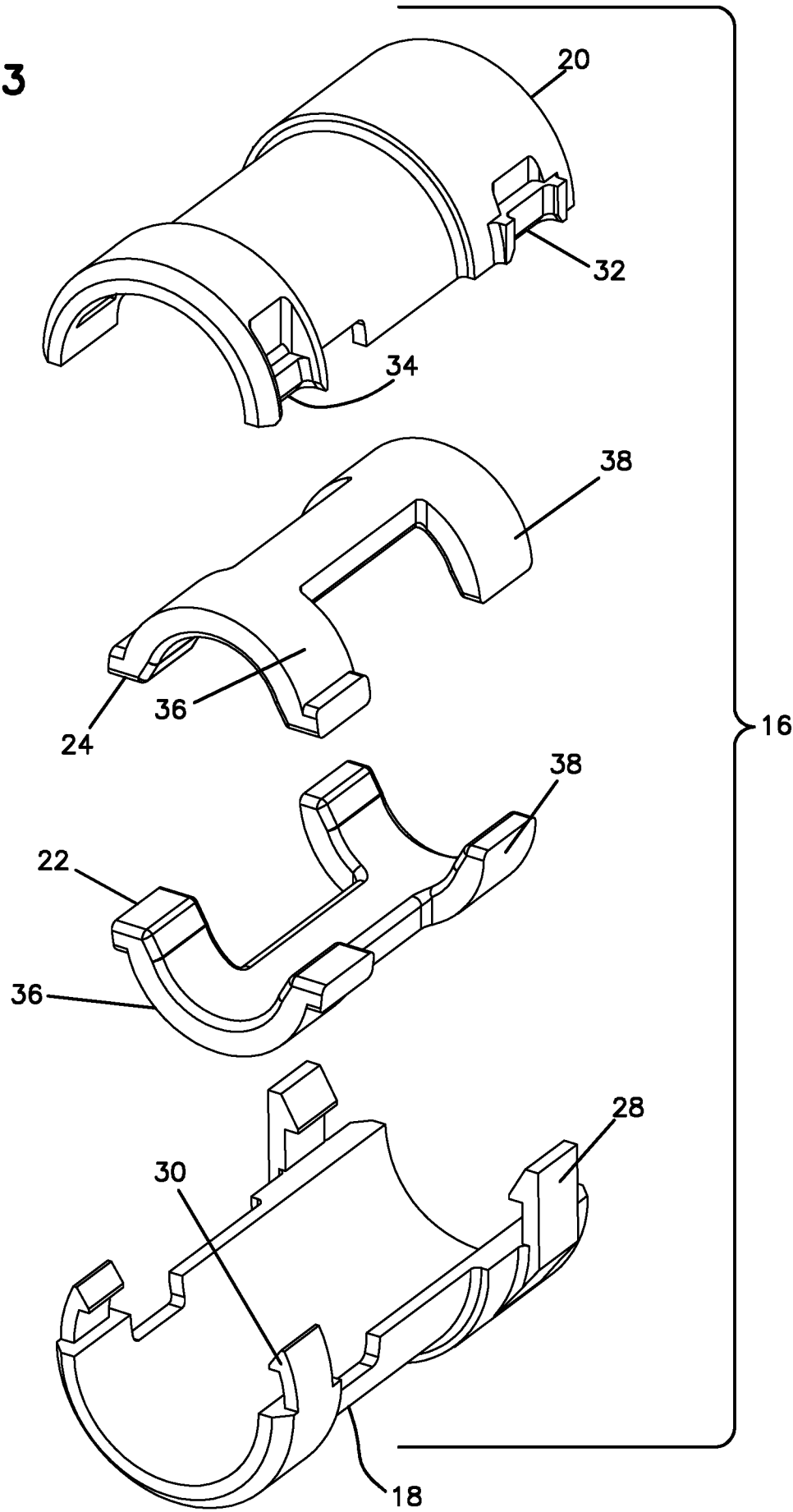
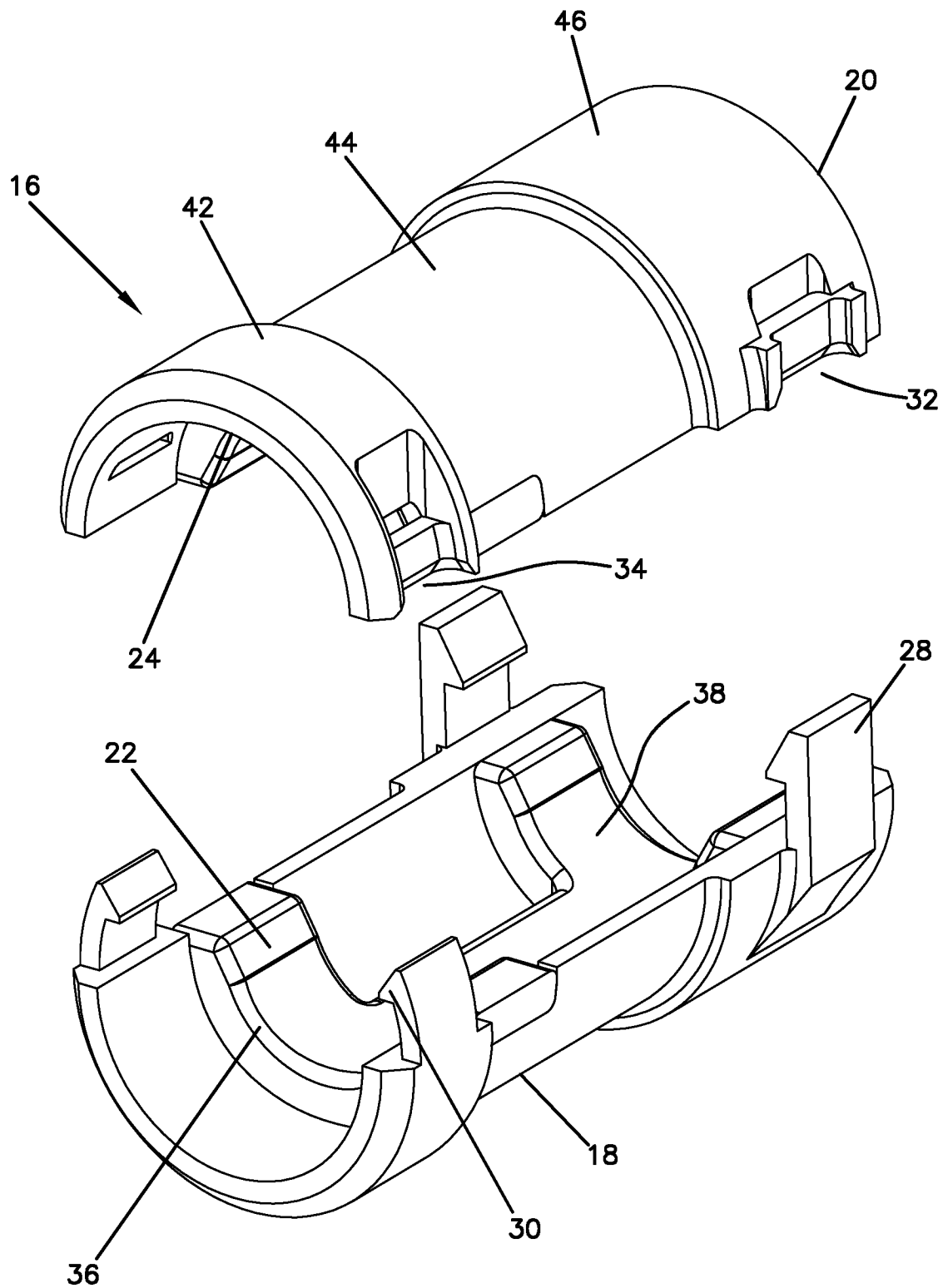


FIG. 4



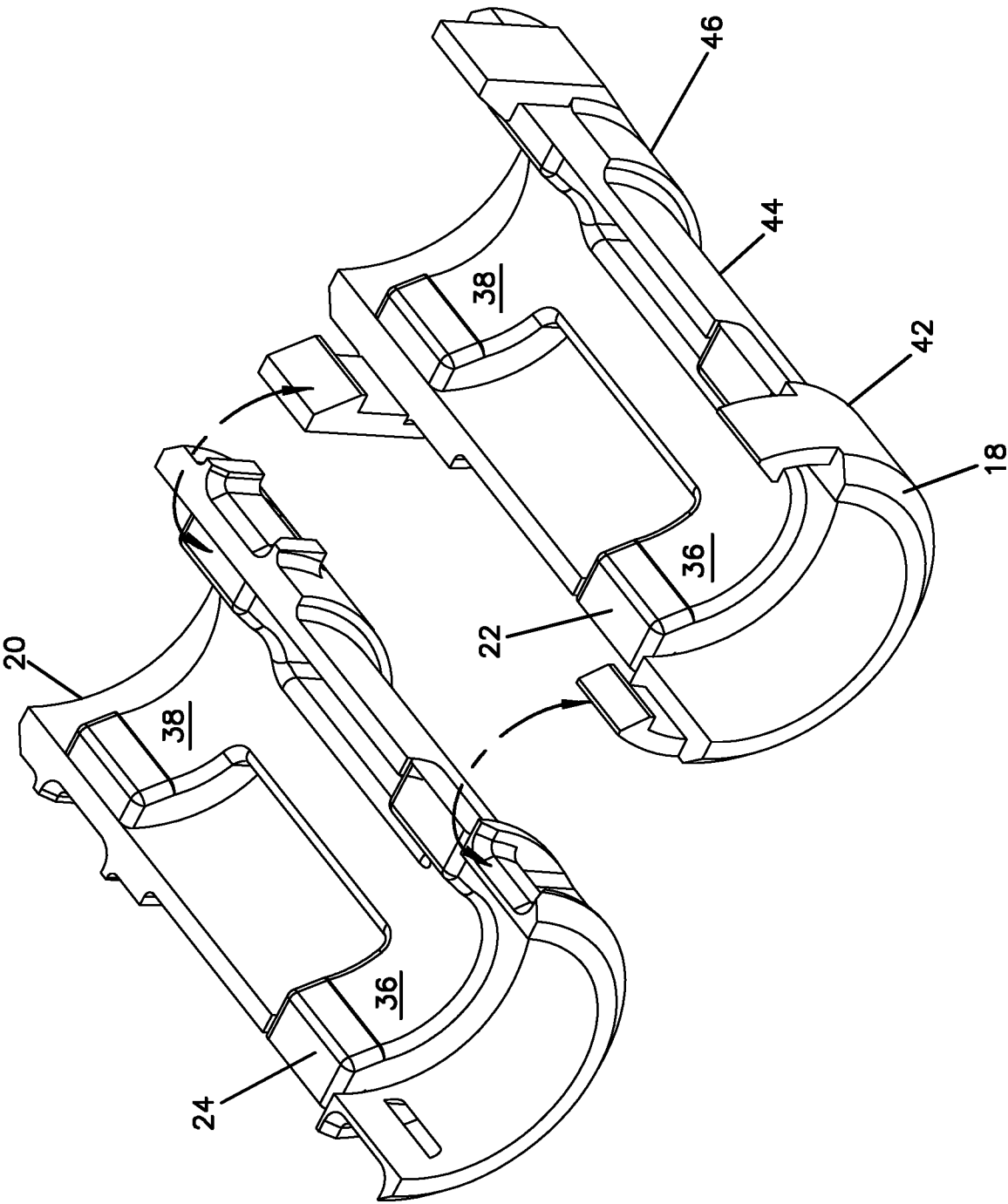


FIG. 5

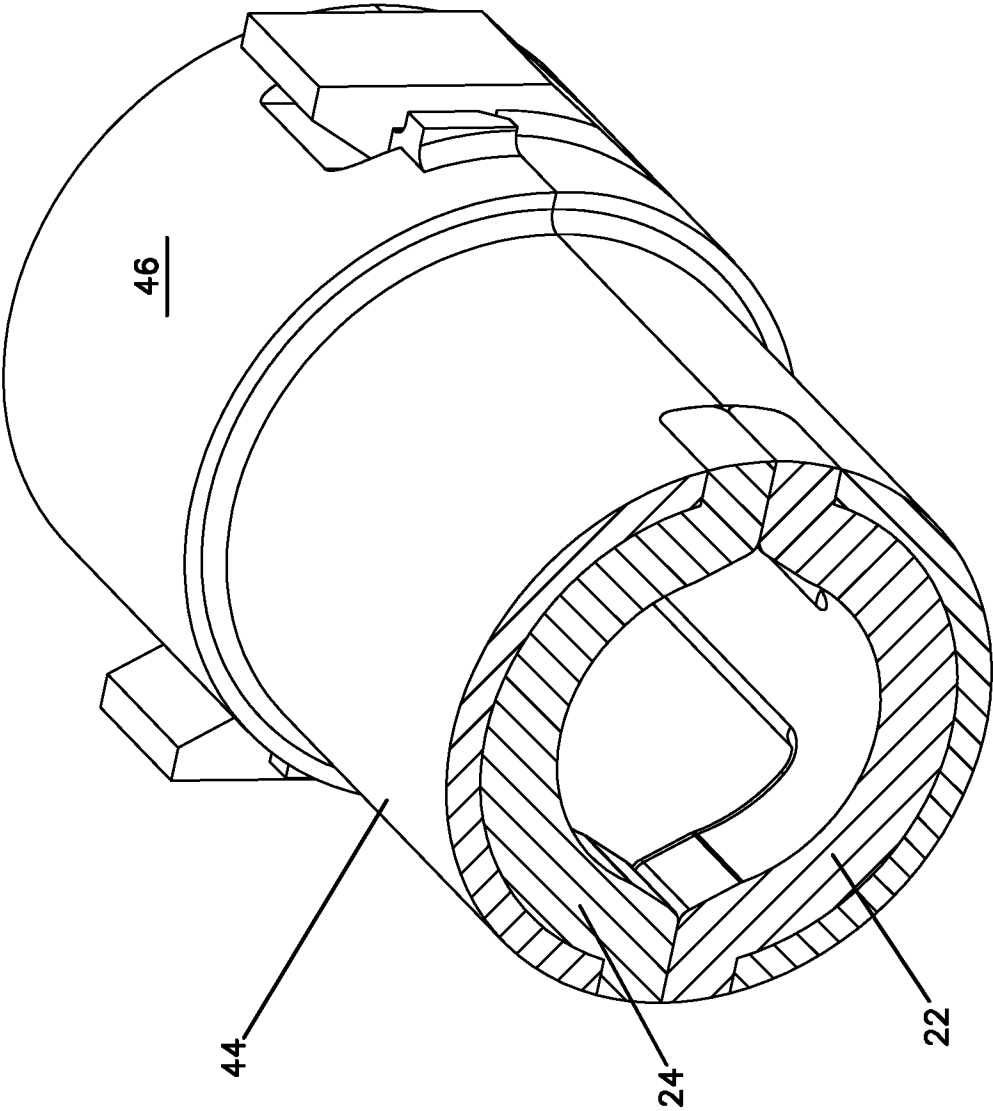
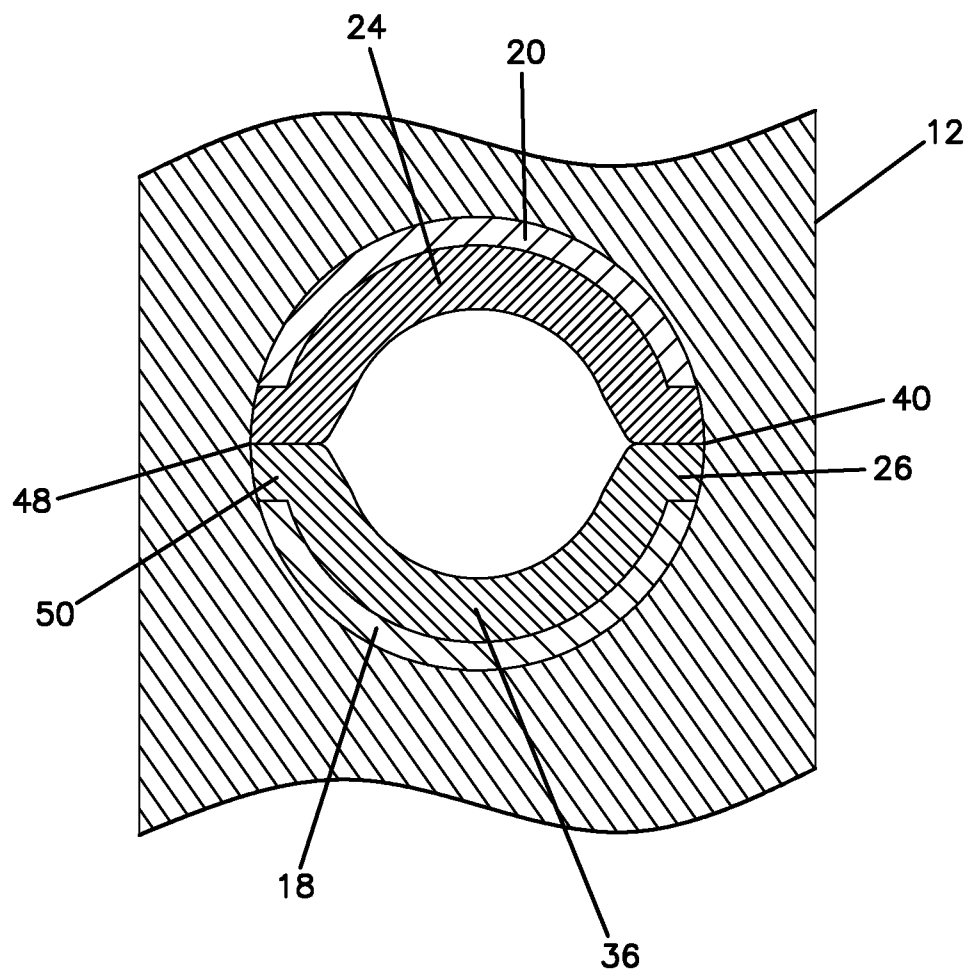


FIG. 6

FIG. 7



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/053080

A. CLASSIFICATION OF SUBJECT MATTER
INV. H02G15/013
ADD.

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)
H02G

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 2002/180163 A1 (MULLER THORSTEN [DE] ET AL) 5 December 2002 (2002-12-05) abstract	1-22



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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