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English

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Declarations under Rule 4.17:
— of inventorship (Rule 4.17(iv))
— with international search report (Art. 21(3))

Title: PENILE PROSTHESIS CYLINDER HAVING AN ADJUSTABLE STIFFENER ROD

Abstract: An inflatable penile prosthesis cylinder (102) configured for implantation in a corpus cavernosum of a patient and includes an inflatable portion (110) having an inflated state and a deflated state, a fluid reservoir (106) between a rear tip (108) and the inflatable portion, and a stiffener rod (140). The stiffener rod extends along a longitudinal axis (104) of the cylinder from the rear tip toward the inflatable portion. The stiffener rod is configured to move along the longitudinal axis relative to the inflatable portion to adjust the length of the cylinder between expanded and contracted states.

FIG. 4
Erectile dysfunction (ED) is the inability to get or keep an erection that is firm enough, or lasts long enough, to have successful sexual intercourse. It can have serious effects on a person's sexual relationship and their self-esteem. Erectile dysfunction is caused by several factors that contribute to erection and ejaculation. Physical and mental stimulants, hormones, neural transmissions and feedback, muscle contractions and relaxations, and cardiovascular blood flow all work together to create and maintain an erection leading to ejaculation. When any of these processes are disrupted, it can cause erectile dysfunction. The causes of ED are generally divided into two major categories: those that are psychological in nature and those that are physical (or organic) in nature.

One technique for treating ED is a penile implant, or a penile prosthesis. The penile prosthesis is concealed entirely within the body and requires some degree of manipulation before and after intercourse to make the penis erect or flaccid.

A two-piece inflatable penile prosthesis typically consists of a pair of inflatable cylinders implanted in the corpus cavernosum and an inflation apparatus, such as a single pump bulb, implanted in the scrotum. A reservoir containing inflation fluid is contained at the rear of each cylinder. Patients simply squeeze the pump to drive fluid from the reservoir of each cylinder into the forward inflatable portion of the cylinder to inflate the cylinder. Fluid may be returned from the inflatable portion back to the reservoir by bending the penis. This closed, fluid-filled system allows for good rigidity and partial flaccidity. Moreover, the two-piece penile prosthesis does not require an abdominal incision. However, the two-piece prosthesis does have some challenges when in use such as reduced flaccidity. Additionally, the reservoir
typically includes a stiffener rod that extends along a longitudinal axis of the cylinder. The length of the stiffener rod can make implantation of the cylinders in the corpus cavernosa difficult due to a minimal corporotomy length.

There is a continuous demand for improvements to inflatable penile prostheses, including improvements that simplify the implantation of the inflatable cylinders in the corpus cavernosum of a patient.

SUMMARY

Embodiments of the invention are directed to an inflatable penile prosthesis cylinder, a penile prosthesis that includes the cylinder, and methods of implanting an inflatable penile prosthesis cylinder in a corpus cavernosum of a patient’s penis to treat erectile dysfunction. In some embodiments, the inflatable penile prosthesis cylinder is configured for implantation in a corpus cavernosum of a patient and includes an inflatable portion having an inflated state and a deflated state, a fluid reservoir between a rear tip and the inflatable portion, and a stiffener rod. The stiffener rod extends along a longitudinal axis of the cylinder from the rear tip toward the inflatable portion. The stiffener rod is configured to move along the longitudinal axis relative to the inflatable portion to adjust the length of the cylinder between expanded and contracted states.

In some embodiments of the method of implanting an inflatable penile prosthesis cylinder in a corpus cavernosum of a patient’s penis to treat erectile dysfunction, an inflatable penile prosthesis cylinder is provided that comprises an inflatable portion having an inflated state and a deflated state, a fluid reservoir between a rear tip and the inflatable portion, and a stiffener rod extending along a longitudinal axis of the cylinder from the rear tip toward the inflatable portion. A length of the inflatable penile prosthesis cylinder is contracted by moving a rear end of the stiffener rod along the longitudinal axis toward the inflatable portion to place the cylinder in a contracted state. The
cylinder is then inserted into the corpus cavernosum through an incision in the penis. The length of the inflatable penile prosthesis cylinder is then expanded within the corpus cavernosum by moving the rear end of the stiffener rod along the longitudinal axis away from the inflatable portion to place the cylinder in an expanded state.

This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter. The claimed subject matter is not limited to implementations that solve any or all disadvantages noted in the Background.

**BRIEF DESCRIPTION OF THE DRAWINGS**

**[0008]** FIG. 1 is a schematic perspective view of an exemplary penile prosthesis comprising inflatable penile prosthesis cylinders, in accordance with one or more embodiments of the invention.

**[0009]** FIG. 2 is a simplified cross-sectional view of a penis with an inflatable penile prosthesis cylinder implanted in the corpus cavernosum.

**[0010]** FIG. 3 is a simplified cross-sectional view of a penile prosthesis cylinder in accordance with embodiments of the invention, taken generally along line 3-3 of FIG. 1.

**[0011]** FIGS. 4 and 5 are simplified diagrams of a penile prosthesis cylinder respectively in extended and contracted states, in accordance with embodiments of the invention.

**[0012]** FIGS. 6 and 7 are simplified cross-sectional views illustrating a method of implanting an inflatable penile prosthesis cylinder in the corpus cavernosum of a patient's penis to treat erectile dysfunction, in accordance with embodiments of the invention.
FIG. 8 is a flowchart illustrating a method of implanting an inflatable penile prosthesis cylinder in the corpus cavernosum of a patient's penis to treat erectile dysfunction, in accordance with embodiments of the invention.

FIG. 9 is a simplified side view of a penile prosthesis cylinder in an expanded state, in accordance with embodiments of the invention.

FIGS. 10 and 11 are simplified side views of the penile prosthesis cylinder of FIG. 9 in a contracted state, in accordance with embodiments of the invention.

FIG. 12 is a side view of a stiffener rod, in accordance with embodiments of the invention.

FIGS. 13 and 14 are simplified side views of an exemplary rod position adjustment mechanism respectively in locking and release positions, in accordance with embodiments of the invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Embodiments of the invention are described more fully hereinafter with reference to the accompanying drawings. Elements that are identified using the same or similar reference characters refer to the same or similar elements. The various embodiments of the invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

Specific details are given in the following description to provide a thorough understanding of the embodiments. However, it is understood by those of ordinary skill in the art that the embodiments may be practiced without these specific details. For example, circuits, systems, networks, processes, frames, supports, connectors, motors, processors, and other components may not be
shown, or shown in block diagram form in order to not obscure the embodiments in unnecessary detail.

[0020] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0021] It will be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. In contrast, if an element is referred to as being "directly connected" or "directly coupled" to another element, there are no intervening elements present.

[0022] It will be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. Thus, a first element could be termed a second element without departing from the teachings of the present invention.

[0023] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.
Embodiments of the invention may also be described using flowchart illustrations and block diagrams. Although a flowchart may describe the operations as a sequential process, many of the operations can be performed in parallel or concurrently. In addition, the order of the operations may be rearranged. A process is terminated when its operations are completed, but could have additional steps not included in a figure or described herein.

It is understood that one or more of the blocks (of the flowcharts and block diagrams) may be implemented by computer program instructions. These program instructions may be provided to a processor circuit, such as a microprocessor, microcontroller or other processor, which executes the instructions to implement the functions specified in the block or blocks through a series of operational steps to be performed by the processor(s) and corresponding hardware components.

FIG. 1 is a schematic perspective view of an exemplary penile prosthesis 100 for treating erectile dysfunction that includes a pair of inflatable penile prosthesis cylinders 102, in accordance with one or more embodiments of the invention. While the exemplary penile prosthesis 100 is depicted as a two-piece inflatable penile prosthesis, the cylinders 102 may also be used with other types of inflatable penile prostheses, such as three-piece inflatable penile prostheses, that utilize inflatable cylinders, as is readily apparent to those skilled in the relevant art.

In some embodiments, the cylinders 102 are each configured for implantation in one of the corpus cavernosa of the penis of a patient. Each cylinder 102 has a longitudinal axis 104 that is oriented along the length of the cylinder 102. In some embodiments, each cylinder 102 includes a fluid reservoir 106, a rear tip 108, an inflatable portion 110, a fluid control block 112, and/or an end cap 114. In some embodiments, the fluid reservoir 106 is positioned at another location, such as externally to the cylinder 102. In some embodiments, the fluid control block 112 includes fluid pathways and valves that fluidically
connect components of the inflatable portion 110 to tubing 116 and the reservoir 106, in accordance with conventional penile prosthesis cylinders, to control fluid flow between the reservoir 106 and components of the inflatable portion 110. The cylinders 102 may also comprise conventional components that are not shown in the drawings in order to simplify the illustrations.

[0028] FIG. 2 is a simplified cross-sectional view of a penis 118 with the cylinder 102 implanted in the corpus cavernosum 120. In some embodiments, the rear tip 108 is positioned adjacent the base of the penis 118, and the inflatable portion 110 extends toward the glans penis 122.

[0029] In some embodiments, fluid in the reservoir 106 is driven through the tubing 116, the fluid control block 112, and into the inflatable portion 110 using an inflation device 124, such as a pump bulb or other suitable device. This transitions the penile prosthesis 100 or cylinder 102 from a deflated state or flaccid condition to a rigid or inflated state corresponding to an erect penis condition, which is shown in FIG. 2. Fluid contained in the inflatable portion 110 may be returned to the reservoir 106 of the cylinder 102 through the fluid control block 112 using conventional techniques, to transition the penile prosthesis 100 or cylinder 102 to the deflated state or flaccid condition. For example, a high pressure condition may be generated within the inflatable portion 110 by bending the cylinder 102, which opens a ball valve in the fluid control block 112, and allows fluid in components of the inflatable portion 110 to flow back to the reservoir 106.

[0030] In some embodiments, inflatable portion 110 includes one or more inflatable chamber sections 126 (hereinafter "chamber sections"), which may be formed of silicone or other suitable material. In some embodiments, the inflatable portion 110 includes a plurality of the inflatable chamber sections 126, as shown in FIG. 3, which is a simplified cross-sectional view of a penile prosthesis cylinder 102, in accordance with embodiments of the invention, taken generally along line 3-3 of FIG. 1. In some embodiments, the inflatable chamber
sections 126 are contained within an outer tube member 128 having a proximal end 130 and a distal end 132, which is positioned adjacent the glans penis 122 of the patient when the cylinder 102 is implanted in the corpus cavernosum 120, as shown in FIG. 2. The outer tube member 128 may be formed of silicone or other suitable biocompatible material. In some embodiments, the inflatable chamber sections 126 extend along the longitudinal axis 104 between the proximal end 124 and the distal end 132 of the outer tube member 128.

[0031] In some embodiments, each inflatable chamber section 126 is a balloon-like structure that includes an interior chamber 134 (FIG. 3) that is in fluid communication with the reservoir 106 through, for example, the fluid control block 112, or other suitable arrangement. Each inflatable chamber section 126 may be transitioned from a deflated or contracted state, in which a low volume of fluid is contained in the chamber 134, to an inflated or expanded state, in which a higher volume of fluid is contained in the chamber 134, by driving fluid from the reservoir 106 into the inflatable chamber section 126 using the inflation device 124.

[0032] In some embodiments, the inflatable chamber sections 126 expand in at least a radial direction relative to the axis 104, and press against each other and an interior wall 136 of outer tube member 128, shown in FIG. 3. The outer tube member 128 is configured to constrain the radial expansion of the inflatable chamber sections 126. The constrained expansion of the inflatable chamber sections 126 in their expanded states and the resultant tensile stress generated in the outer tube member 128, causes the inflatable portion 110 to become rigid and generate an erect penis condition when implanted in a corpus cavernosum 120 of a patient, as shown in FIG. 2. Fluid is discharged from the chambers 134 and returned to the reservoir 106 to transition the inflatable chamber sections 126 to the deflated or contracted state. In some embodiments, this deflation of the inflatable chamber sections 126 radially contracts the inflatable chamber sections 126 and decreases the pressure on the interior wall 136 of the outer tube
In some embodiments, the outer tube member 128 and the deflated inflatable chamber sections 126 are flexible, resulting in a softened inflatable portion 110 and a flaccid penis condition when the cylinder 102 is implanted in the corpus cavernosum of a patient.

[0033] In some embodiments, the inflatable portion 110 includes a low friction barrier 138 between the interior wall 136 of the outer tube member 128 and the inflatable chamber sections 126, as shown in FIG. 3. The low friction barrier 138 reduces binding of the inflatable chamber sections 126 when they expand within the outer tube member 128. In some embodiments, the low friction barrier 138 includes a sleeve or layer of fabric.

[0034] FIGS. 4 and 5 are simplified diagrams of a penile prosthesis cylinder 102 respectively in extended and contracted states, in accordance with embodiments of the invention. The fluid control block 112 and other components are not shown in FIGS. 4 and 5, or in other drawings presented herein, to simplify the illustrations. In some embodiments, the fluid reservoir 106 includes a stiffener rod 140 that extends along the longitudinal axis 104 from the rear tip 118 toward the inflatable portion 110, and generally supports the walls of the reservoir 106 and forms a rigid section of the cylinder 102. In some embodiments, the stiffener rod 140 is a rigid member.

[0035] In some embodiments, the stiffener rod 140 is formed of materials used to form stiffener rods of conventional penile prosthesis cylinders. In some embodiments, the stiffener rod 140 is formed of stainless steel. In some embodiments, the stiffener rod 140 may take on various cross-sectional shapes. In accordance with exemplary embodiments, the cross-sectional shape of the rod 140 may be circular, oval (to allow for preferential bending of the rod) and other advantageous shapes.

[0036] Embodiments of the cylinder 102 operate to simplify the implantation of the cylinder 102 in the corpus cavernosum 120 of a patient. Rather than requiring a physician to bend the stiffener rod 140 in order to
facilitate implantation of the cylinder 102 in the corpus cavernosum 120 of a patient, embodiments allow the length of the cylinder 102 to be shortened by moving the stiffener rod 140 along the longitudinal axis 104 toward the inflatable portion 110. In some embodiments, the cylinder 102 has an expanded state (FIG. 4), in which a rear end 142 of the stiffener rod 140 extends a length 144 from a fixed point, such as the proximal end 130 of the outer tube member 128, and a contracted state (FIG. 5), in which the stiffener rod 140 is moved toward the inflatable portion 110 to shorten the distance the rear end 142 is from the fixed point to a contracted length of 146, which is less than the length 144.

In some embodiments, the cylinder 102 includes a rod position adjustment mechanism 150 that is used to control the position of the rod 140 relative to the inflatable portion 110. In some embodiments, the mechanism 150 facilitates movement of the stiffener rod 140 back and forth along the axis 104 relative to the inflatable portion 110 to adjust the length of the cylinder 102. This allows the length of the cylinder 102 to be adjusted as necessary based on the corporotomy of the patient, and also facilitates insertion of the cylinders 102 in the corpus cavernosum of the patient without bending the stiffener rod 140.

FIGS. 6 and 7 are simplified cross-sectional views illustrating a method of implanting the cylinder 102 in the corpus cavernosum of a patient's penis 118 to treat erectile dysfunction, and FIG. 8 is a flowchart of the method, in accordance with embodiments of the invention. At step 152, the cylinder 102 is placed in the contracted state by moving the stiffener rod 140 or its rear end 142, along the longitudinal axis 104 toward the inflatable portion 110. At step 154, the cylinder 102, in its contracted state, is inserted through an incision 156 in the base of the penis 118 and into the corpus cavernosum 120, as shown in FIG. 6. In some embodiments, the corpus cavernosum 120 is dilated before inserting the cylinder 102 in step 154. At step 158, the length of the cylinder 102 is expanded within the corpus cavernosum 120 by moving the rear end 142 of the stiffener rod 140 along the longitudinal axis and away from the inflatable
portion 110 to place the cylinder 102 in the expanded state, as shown in FIG. 7. In some embodiments of the method, the position of the stiffener rod 140 relative to the inflatable portion 110 is locked using the mechanism 150 to lock the cylinder 102 in the expanded state. Thus, the length of the cylinder 102 may be shortened to facilitate insertion of the cylinder 102 into the corpus cavernosum 120 of the patient, and then extended along the longitudinal axis 104 to push the reservoir 106 toward the base of the penis 118 to the extent of available space due to the corporotomy of the patient, to complete the implantation of the cylinder 102 in the corpus cavernosum 120. A second cylinder 102 may then be similarly implanted in the other corpus cavernosum of the patient.

[0039] In some embodiments, a distal end 160 of the rod 140 extends into the inflatable portion 110 when the cylinder 102 is in the contracted state, as illustrated in FIG. 5. In some embodiments, the distal end 160 of the rod 140 extends within an opening 162 between the inflatable chamber sections 126, as shown in FIG. 3. In some embodiments, the rod 140 does not extend into the inflatable portion 110 or the outer tube member 128, or lies outside the inflatable portion 110, when the cylinder 102 is in the expanded state, as shown in FIG. 4. In some embodiments, the distal end 160 of the rod 140 extends into the inflatable portion 110 when in the expanded state, as shown in FIG. 9, which is a simplified side view of a cylinder 102 in the expanded state, in accordance with embodiments of the invention.

[0040] FIGS. 10 and 11 are simplified side views of the penile prosthesis cylinder of FIG. 9 in a contracted state, in accordance with embodiments of the invention. In some embodiments, the wall 164 of the fluid reservoir 106 bends or flexes in response to the contraction of the reservoir 106 due to the movement of the rod 140 along the longitudinal axis 104 toward the inflatable portion 110, as shown in FIG. 10. In some embodiments, the wall 164 of the fluid reservoir 106 includes bellows 166 that are generally oriented perpendicularly to the
stiffener rod 140, and fold as the rod 140 is displaced along the longitudinal axis 104 toward the inflatable portion 110, as shown in FIG. 11.

[0041] FIG. 12 is a side view of the stiffener rod 140 in accordance with embodiments of the invention. In some embodiments, the stiffener rod 140 includes a lumen 170 that forms a fluid pathway between the fluid reservoir 106 and the inflatable portion 110 (FIG. 9). Thus, fluid is configured to flow between the inflatable chamber 126 of the inflatable portion 110 and the fluid reservoir 106. In some embodiments, the rod 140 includes various fluid access ports to the lumen 170, such as, one or more central openings 172 and/or one or more side ports 174, for example.

[0042] In some embodiments, the mechanism 150 operates as a ratchet mechanism to control the selective displacement of the rod 140 along the longitudinal axis 104. FIGS. 13 and 14 are simplified side views of an exemplary mechanism 150, in accordance with embodiments of the invention. In some embodiments, the mechanism 150 includes one or more protrusions 176 that extend toward the rod 140, as shown in FIG. 13. In some embodiments, the rod 140 includes one or more detents or recesses 178 that are configured to receive the protrusions 176.

[0043] In some embodiments, the mechanism 150 includes a locking position, in which the rod 140 is held in a desired position along the longitudinal axis 104 relative to the inflatable portion 110. That is, the stiffener rod 140 has a fixed position along the longitudinal axis 104 relative to the inflatable portion 110 when the mechanism 150 is in the locking position. In some embodiments, the one or more protrusions 176 are received within the detents or recesses 178 of the rod 140 when the mechanism 150 is in the locking position. When it is desired to move the rod 140 along the longitudinal axis 104 relative to the inflatable portion 110, the mechanism 150 may be transitioned to a release position (FIG. 14), in which the rod 140 is allowed to move along the longitudinal axis 104 relative to the inflatable portion 110. In some
In some embodiments, the one or more protrusions 176 are removed from the detents or recesses 178 of the rod 140 when the mechanism 150 is in the release position. In some embodiments, the mechanism 150 includes a live hinge that may be actuated by pressing on opposing sides of the mechanism 150 to compress voids 180 (FIG. 13) and cause the one or more protrusions 176 to deflect away from the recesses or detents 178 of the rod 140, as shown in FIG. 14.

[0044] The mechanism 150 can take on other suitable forms while providing selective locking of the rod 140 in a desired position along the longitudinal axis 104 relative to the inflatable portion 110. In some embodiments, the mechanism 150 is only configured to secure the rod 140 in the expanded state. That is, once the rod 140 is released from the expanded state (FIG. 4), the rod 140 is free to move along the longitudinal axis 104 relative to the inflatable portion 110.

[0045] In some embodiments, the mechanism 150 is configured to selectively hold the rod 140 in multiple positions along the longitudinal axis 104 relative to the inflatable portion 110. Thus, with regard to the ratcheting embodiment described above (FIGS. 13 and 14), the mechanism 150 may cooperate with the rod 140 to selectively lock the position of the rod in multiple positions along the longitudinal axis 104 relative to the inflatable portion 110. In some embodiments, the mechanism 150 and the rod 140 include cooperating screw threads that allow the rod 140 to be displaced along the longitudinal axis 104, relative to the inflatable portion 110 by rotating the rod 140 about the axis 104 relative to the mechanism 150.

[0046] Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.
WHAT IS CLAIMED IS:

1. An inflatable penile prosthesis cylinder configured for implantation in a corpus cavernosum of a patient's penis comprising:
   an inflatable portion having an inflated state and a deflated state;
   a fluid reservoir between a rear tip and the inflatable portion; and
   a stiffener rod extending along a longitudinal axis of the cylinder from the rear tip toward the inflatable portion;
   wherein the stiffener rod is configured to move along the longitudinal axis relative to the inflatable portion to adjust the length of the cylinder between expanded and contracted states.

2. The inflatable penile prosthesis cylinder according to claim 1, wherein a rear end of the stiffener rod extends a first length from the inflatable portion when the cylinder is in the expanded state, the rear end of the stiffener rod extends a second length from the inflatable portion that is less than the first length when the cylinder is in the contracted state.

3. The inflatable penile prosthesis cylinder according to claim 2, wherein the stiffener rod extends into the inflatable portion when the cylinder is in the contracted state.

4. The inflatable penile prosthesis cylinder according to claim 3, wherein the stiffener rod lies outside the inflatable portion when the cylinder is in the expanded state.

5. The inflatable penile prosthesis cylinder according to any of claims 1-4, wherein the fluid reservoir includes a wall that defines an interior chamber, and the wall bends in response to transitioning the cylinder from the expanded state to the contracted state.

6. The inflatable penile prosthesis cylinder according to claim 5, wherein the wall of the fluid reservoir includes bellows.

7. The inflatable penile prosthesis cylinder according to any of claims 1-6, wherein the inflatable portion includes an inflatable chamber that receives a
flow of fluid from the fluid reservoir to transition the inflatable portion from the deflated state to the inflated state.

8. The inflatable penile prosthesis cylinder according to claim 7, wherein the inflatable portion includes a plurality of inflatable chamber sections within an outer tube member, wherein the inflatable chamber sections form the inflatable chamber.

9. The inflatable penile prosthesis cylinder according to claim 8, wherein the stiffener rod extends along the longitudinal axis between the inflatable chamber sections and into the outer tube member when the cylinder is in the contracted state.

10. The inflatable penile prosthesis cylinder according to any of claims 1-9, wherein the stiffener rod includes a lumen that forms a fluid pathway between the fluid reservoir and the inflatable portion, wherein fluid flows between the fluid reservoir and the inflatable portion through the lumen of the stiffener rod to transition the inflatable portion between the inflated and deflated states.

11. The inflatable penile prosthesis cylinder according to any of claims 1-10, further comprising a rod position adjustment mechanism that controls the positioning of the stiffener rod along the longitudinal axis relative to the inflatable portion.

12. The inflatable penile prosthesis cylinder according to claim 11, wherein the rod position adjustment mechanism includes a locking position, in which a position of the stiffener rod along the longitudinal axis is fixed relative to the inflatable portion, and a release position, in which the stiffener rod is configured to move along the longitudinal axis relative to the inflatable portion.

13. The inflatable penile prosthesis cylinder according to claim 12, wherein the rod position adjustment mechanism comprises a ratchet mechanism.

14. The inflatable penile prosthesis cylinder according to claim 13, wherein the ratchet mechanism comprises one or more protrusions that are receivable within one or more detents or recesses of the stiffener rod.
15. A method of implanting an inflatable penile prosthesis cylinder in a corpus cavernosum of patient's penis to treat erectile dysfunction comprising:

   providing an inflatable penile prosthesis cylinder comprising:
   an inflatable portion having an inflated state and a deflated state;
   a fluid reservoir between a rear tip and the inflatable portion; and
   a stiffener rod extending along a longitudinal axis of the cylinder
   from the rear tip toward the distal end;

   contracting a length of the inflatable penile prosthesis cylinder
   comprising moving a rear end of the stiffener rod along the
   longitudinal axis toward the inflatable portion to place the
   cylinder in a contracted state;

   inserting the cylinder into the corpus cavernosum through an incision in
   the penis; and

   expanding the length of the inflatable penile prosthesis cylinder within
   the corpus cavernosum comprising moving the rear end of the
   stiffener rod along the longitudinal axis away from the inflatable
   portion to place the cylinder in an expanded state.

16. The method of claims 15, further comprising, when the cylinder is in the expanded state, locking the position of the stiffener rod along the longitudinal axis relative to the inflatable portion using a rod position adjustment mechanism.
CONTRACT THE CYLINDER BY MOVING THE STIFFENER ROD ALONG THE LONGITUDINAL AXIS TOWARD THE INFLATABLE PORTION

INSERT THE CYLINDER INTO THE CORPUS CAVERNOSUM

EXPAND THE CYLINDER WITHIN THE CORPUS CAVERNOSUM BY MOVING THE STIFFENER ROD ALONG THE LONGITUDINAL AXIS AWAY FROM THE INFLATABLE PORTION

FIG. 8
**INTERNATIONAL SEARCH REPORT**

**International application No**
PCT/US2015/018911

### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** A61F2/26

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)
A61F

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>X</td>
<td>US 4 378 792 A (FINNEY ROY P) 5 April 1983 (1983-04-05) col umn 4, line 48 - col umn 5, line 3; fi gures 5, 6, 10, 11</td>
<td>1, 4-7, 11, 12</td>
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<tr>
<td>A</td>
<td>GB 2 163 354 A (FISCHELL ROBERT) 25 February 1986 (1986-02-26) the whole document</td>
<td>1-14</td>
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### Further documents are listed in the continuation of Box C.

### See patent family annex.

* Special categories of cited documents:
  * **A** document defining the general state of the art which is not considered to be of particular relevance
  * **E** earlier application or patent but published on or after the international filing date
  * **L** document which may throw doubts on priority claim(s) or which cited to establish the publication date of another citation or other special reason (as specified)
  * **O** document referring to an oral disclosure, use, exhibition or other means
  * **P** document published prior to the international filing date but later than the priority date claimed

**Date of the actual completion of the international search**
6 May 2015

**Date of mailing of the international search report**
19/05/2015

**Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016**

**Authorized officer**
Steiner, Bronwen
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<thead>
<tr>
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<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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**INTERNATIONAL SEARCH REPORT**

**Box No. II** Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. **Claims Nos.:**
   - □ Nos. 1, 5, 16 because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.:
   - because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. □ Claims Nos.:
   - because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III** Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

□ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

□ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

□ No protest accompanied the payment of additional search fees.
## INTERNATIONAL SEARCH REPORT

Information on patent family members

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