



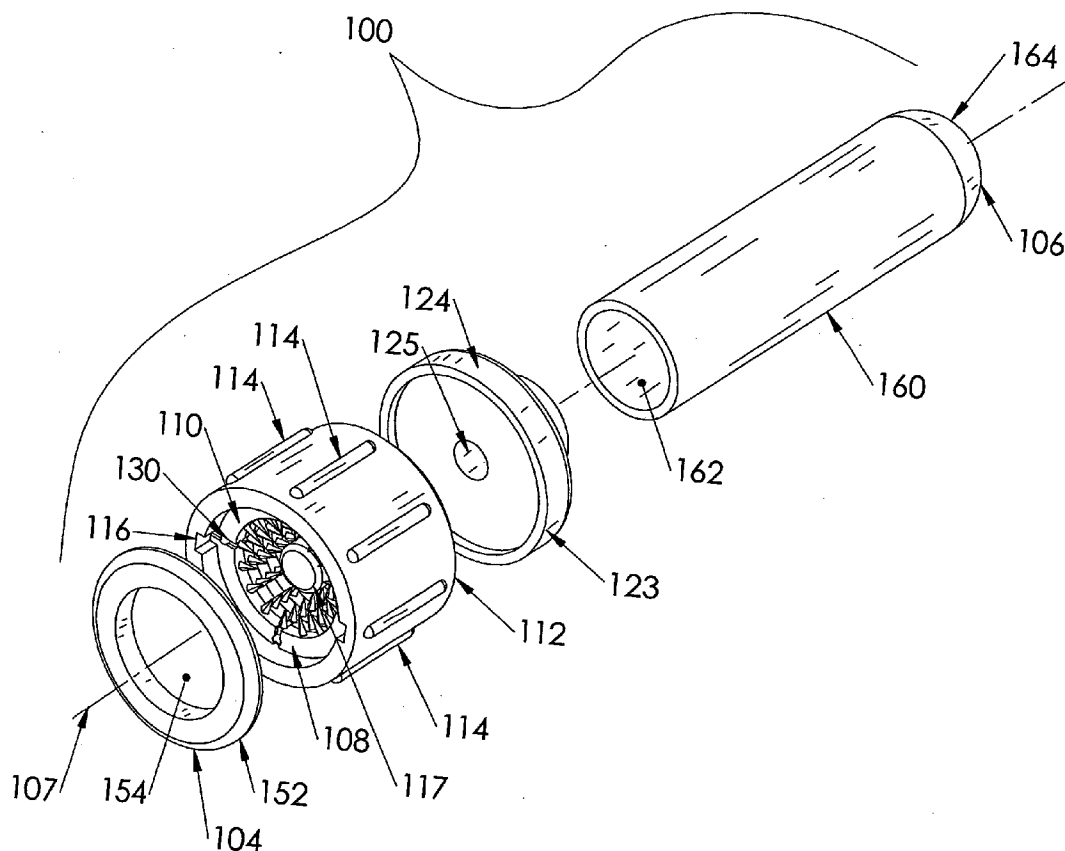
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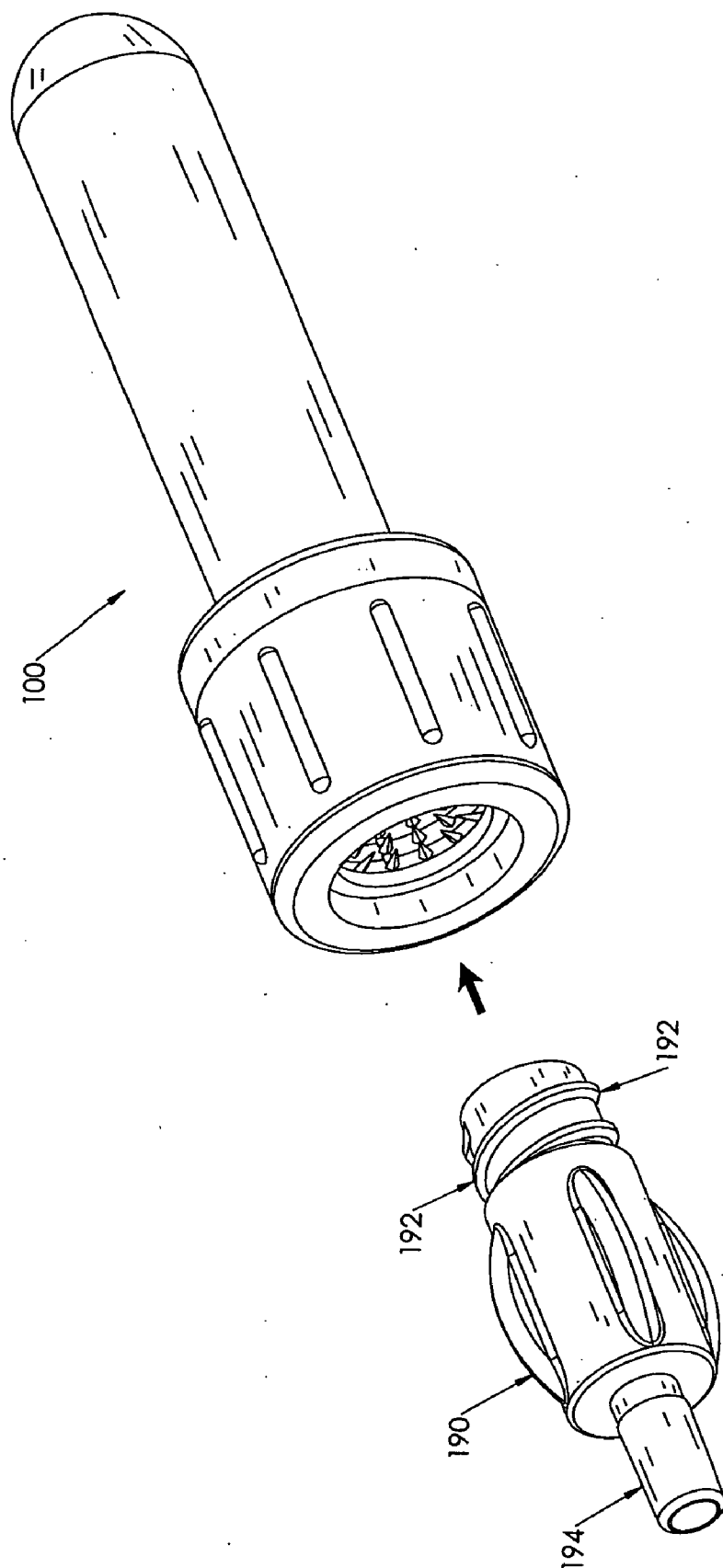
(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2006/0030827 A1**  
(43) **Pub. Date:** **Feb. 9, 2006**(54) **LUER CLEANER****Publication Classification**(75) Inventors: **J. Daniel Raulerson**, Brewton, AL (US); **Timothy Schweikert**, Levittown, PA (US); **William Shaun Wall**, North Wales, PA (US); **Mark S. Fisher**, Sellersville, PA (US)(51) **Int. Cl.**  
**A61M 25/00** (2006.01)  
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**SKIPPACK, PA 19474 (US)**(57) **ABSTRACT**

A luer cleaner (100) including a generally hollow body (112) having an open first end (104), a closed second end (106), and a longitudinal axis extending therethrough between the first end and the second end. The first end (104) is sized to receive therein a luer connector (190) proximal end and includes a plurality of bristles (134) extending generally toward the longitudinal axis sufficiently to engage the outer surfaces of the luer proximal end disposed therein. The second end comprises a compressible reservoir (166) containing a fluid (168), wherein, when the second end is compressed, the fluid is transmitted from the reservoir toward the first end through passageways to wet the luer proximal end. A method for cleaning luer connectors is also disclosed.

(73) Assignee: **Medical Components, Inc.**, Harleysville, PA(21) Appl. No.: **11/180,142**(22) Filed: **Jul. 13, 2005****Related U.S. Application Data**

(60) Provisional application No. 60/587,790, filed on Jul. 14, 2004.







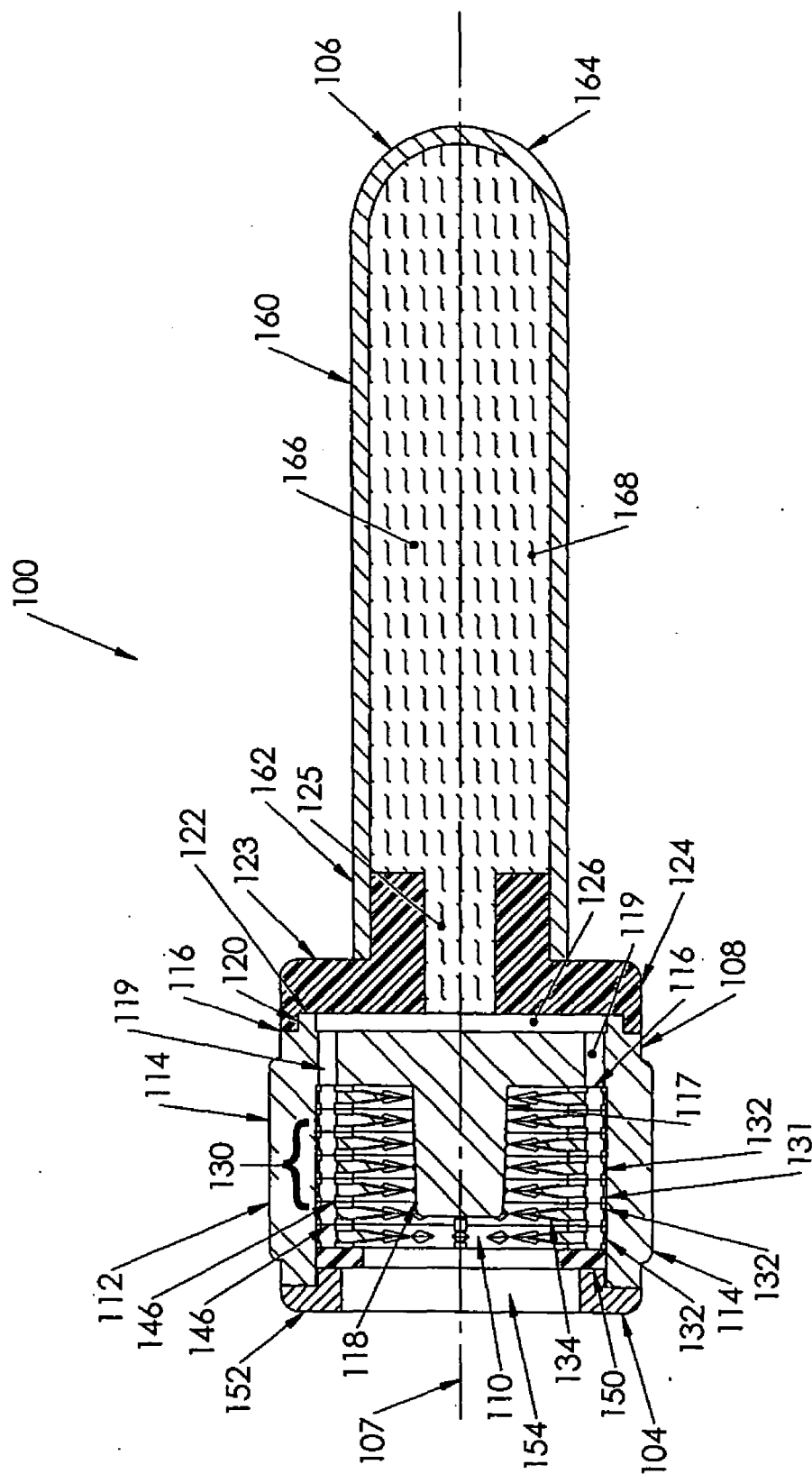


FIG. 3

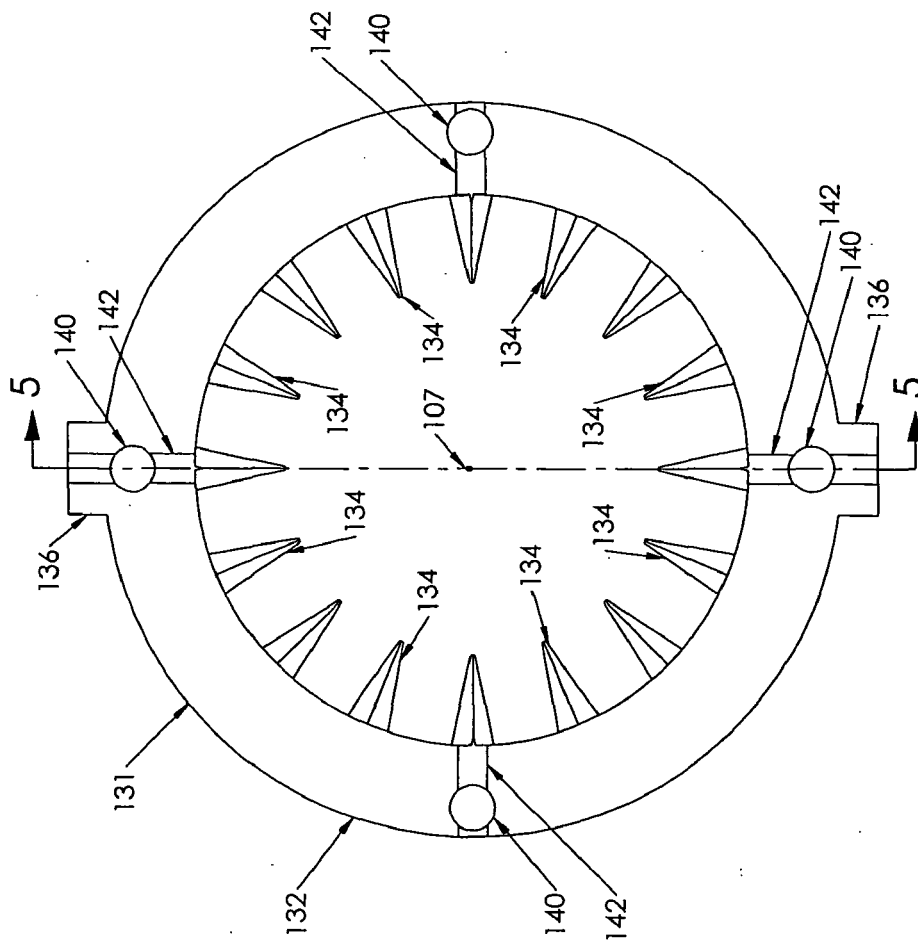


FIG. 4

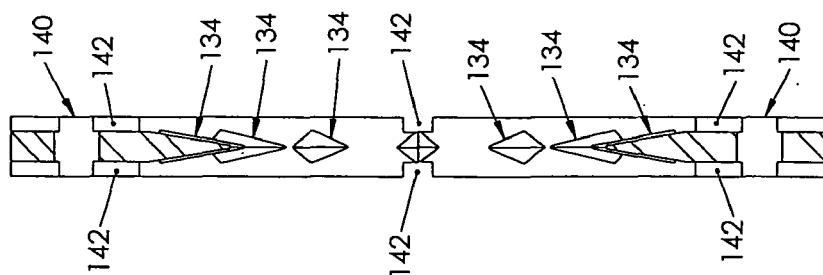


FIG. 5

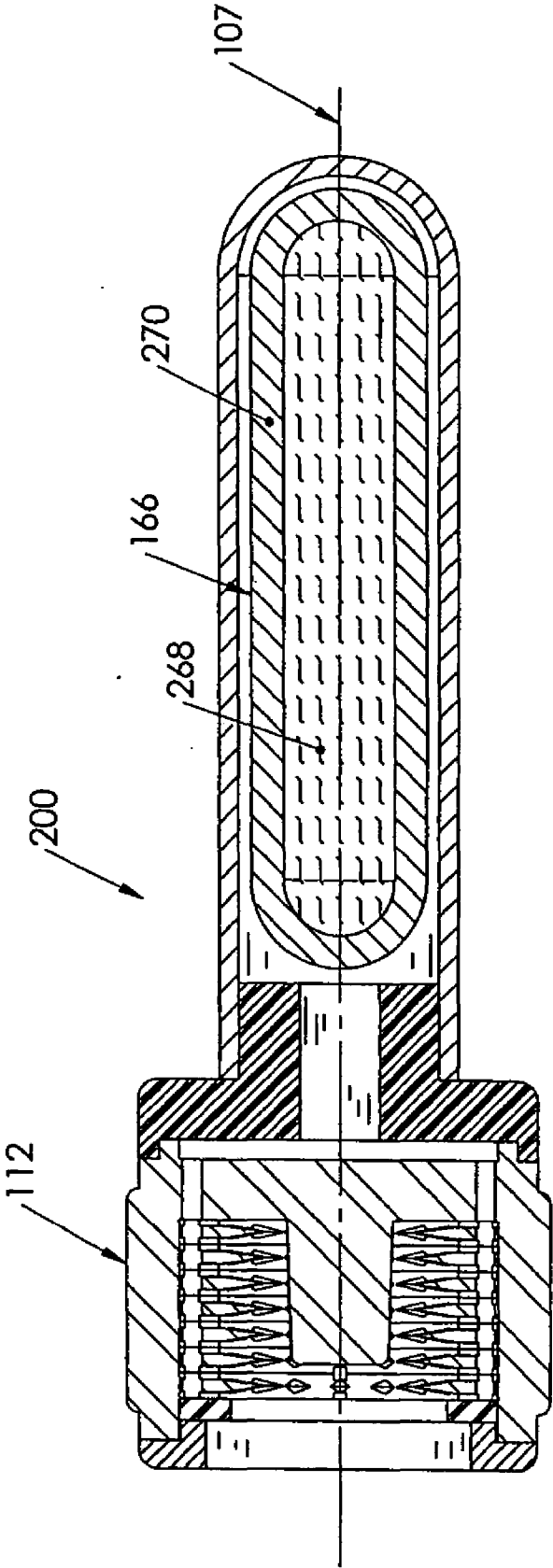


FIG. 6

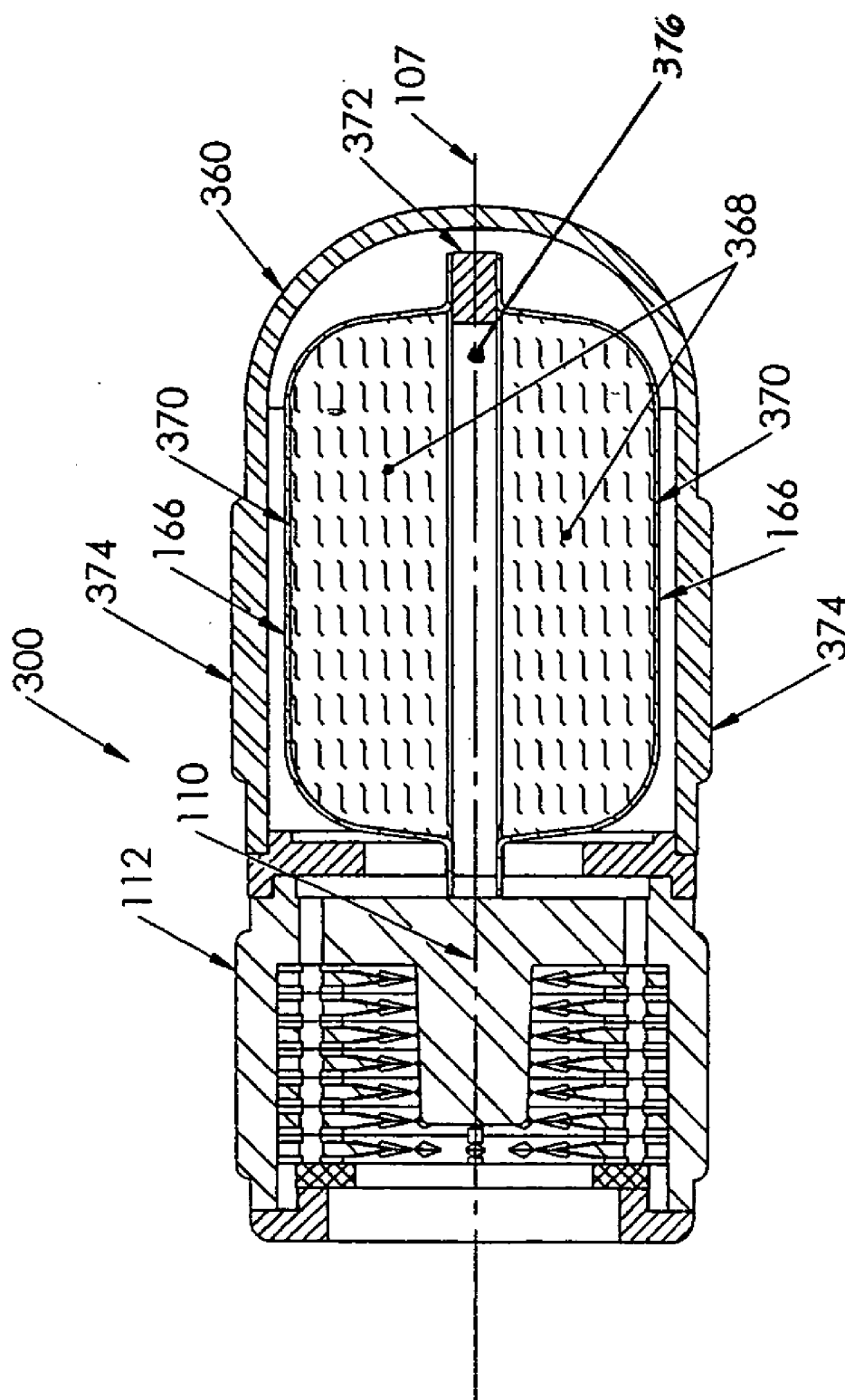


FIG. 7

## LUER CLEANER

### CROSS-REFERENCE TO RELATED APPLICATION

[0001] This relates to and claims priority from Provisional U.S. Patent Application Ser. No. 60/587,790 filed Jul. 14, 2004.

### FIELD OF THE INVENTION

[0002] The present invention relates to medical device, and more particularly to an apparatus for cleaning a luer connector that is attached to a catheter assembly implanted on a patient.

### BACKGROUND OF THE INVENTION

[0003] In catheter assemblies such as are used in hemodialysis, proximal ends of the catheters are terminated in luer connectors that are disposed outside of the patient, and the luer connectors enable easy and rapid connection to respective fluid lines of the hemodialysis apparatus in a manner permitting easy and rapid disconnect. Of course, when unconnected to the fluid lines, the ends of the luer connectors are exposed to debris and contamination and they require cleaning and decontamination prior to each connection.

### SUMMARY OF THE INVENTION

[0004] The present invention is a luer cleaner that includes a generally hollow body having an open first end, a closed second end, and a longitudinal axis extending therethrough between the first end and the second end. The first end is sized to receive therein the proximal end of the luer connector and includes a plurality of bristles extending generally toward the longitudinal axis sufficiently to engage the luer connector disposed therein. The second end comprises a compressible reservoir containing a fluid, wherein, when the second end is compressed, the fluid is transmitted from the reservoir toward the first end. When the luer cleaner is inserted over the proximal end of the luer connector and preferably is rotated reciprocally several times about the luer's axis, the bristles engage and mildly scrub the outer surfaces of the luer connector's proximal end, including the male connector threads, to dislodge debris, and the fluid washes and thus cleans and decontaminates the luer connector end when the luer cleaner is removed from the luer connector. The method of the present invention includes: inserting a luer connector proximal end into a luer cleaner open end so that bristles within the luer cleaner engage the luer proximal end outer surfaces to scrub them; compressing the luer cleaner closed second end to force fluid toward the open first end through passageways to wash the luer connector end; and rotating the luer cleaner about the luer connector to scrub and clean it.

[0005] Other embodiments of the luer cleaner provide a frangible capsule within the reservoir at the second luer cleaner end that contains the fluid and that expresses the fluid when crushed; and provide a pair of frangible capsules within the reservoir, that contain the fluid and together express the fluid.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The accompanying drawings, which are incorporated herein and constitute part of this specification, illus-

trate the presently preferred embodiments of the invention, and together with the general description given above and the detailed description given below, serve to explain the features of the invention. In the drawings:

[0007] FIG. 1 is a perspective view of a luer cleaner according to a first preferred embodiment of the present invention, with a luer being inserted into the luer cleaner;

[0008] FIG. 2 is an exploded view of the luer cleaner shown in FIG. 1;

[0009] FIG. 3 is a sectional view of the luer cleaner shown in FIG. 1;

[0010] FIG. 4 is an enlarged front view of a scrubber disc shown inside the luer cleaner;

[0011] FIG. 5 is a sectional view of the scrubber disc of FIG. 4, taken along line 5-5 of FIG. 4; and

[0012] FIGS. 6 and 7 are sectional views of luer cleaners according to second and third embodiments of the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

[0013] In the drawings, like numerals indicate like elements throughout. Certain terminology is used herein for convenience only and is not to be taken as a limitation on the present invention. The terminology includes words specifically mentioned, derivatives thereof, and words of similar import. The following describes preferred embodiments of the invention. However, it should be understood based on this disclosure that the invention is not limited by the preferred embodiments described herein.

[0014] Referring now to FIG. 1, a luer cleaner 100 according to a first embodiment of the present invention is shown. The luer cleaner 100 is insertable over the proximal end of a luer connector 190 and rotatable axially about the luer. Luer connector, or luer, 190 is preferably connected to a medical device, such as a hemodialysis catheter 194. The proximal end of luer 190 includes male threads 192 that are used to secure luer 190 to a second medical device (e.g., a hemodialysis apparatus) having fluid lines each terminating in a corresponding luer connector that incorporates internal female threads. Prior to connection of the luer 190 with the second medical device, the proximal end of luer 190 is inserted into an open end of the luer cleaner 100. As the luer cleaner 100 is rotated about the luer 190, antiseptic fluid contained in the luer cleaner 100 is forced from a reservoir in the luer cleaner 100 such as by manually applied pressure, over the luer 190, to clean debris and other contaminants that may be present on or around the luer threads 192. Also shown, along with FIGS. 2 and 3, is a body 160 defining a reservoir 166 for a fluid 168.

[0015] Referring now to FIGS. 2 and 3, the luer cleaner 100 includes an open end 104, a closed end 106, and a longitudinal axis 107 extending therethrough between the open end 104 and the closed end 106. The open end 104 includes a generally tubular body 108 having a longitudinal passage 110 that extends toward the closed end 106. Preferably, the body 108 is constructed from polyvinyl chloride or some other suitable biocompatible material. The body 108 includes an exterior portion 112 that may optionally include a plurality of gripping ribs 114 extending therefrom, away



from the longitudinal axis **107**. The gripping ribs **114** allow a user to grip the body **108** during use of the cleaner **100**. The interior of the body **108** includes at least one, and preferably two, diametrically opposed alignment notches **116** that extend from the longitudinal passage **110** away from the longitudinal axis **107**.

[0016] The body **108** further includes a guide member **117** that extends partially into the longitudinal passage **110** along the longitudinal axis **107** toward the open end **104**. The guide member **117** preferably includes a male luer taper **118** to engage a female luer connection on the luer **190**. The guide member **117** prevents fluid from entering the catheter **194** through the interior of the luer **190** after the fluid has been forced into the longitudinal passage **110** from the reservoir. The guide member **117** is preferably integrally molded with the body **108**, as seen in the cross-section view of FIG. 3.

[0017] At least one and preferably four passages **119** are disposed within the body **108** between the exterior portion **112** of the body **108** and the guide member **117** (although only two passages **119** are shown in FIG. 3). The passages **119** are preferably parallel to the longitudinal axis **107** and each passage **119** is disposed ninety degrees apart from each adjacent passage **119**.

[0018] The body **108** also includes an annular flange **120** that extends from the body **108**, away from the open end **104** of the luer cleaner **100**. The flange **120** extends outwardly of the passages **119**, with a lip **122** being formed between the flange **120** and the exterior portion **112** of the body **108**.

[0019] A tubular collar **123**, having an approximately "T-shaped" cross section, is fixedly connected to the body **108**, distal from the open end **104** of the luer connector **100**. The collar **123** includes a corresponding lip **124** that extends circumferentially therearound and that is sized to surround and engage with the flange **120** of the body **108**, as is seen in FIG. 3. The connection between the collar **123** and the body **108** may be an interference fit, a threaded connection, an adhesive-based connection, or some other suitable connection known to those skilled in the art.

[0020] The collar **123** also includes a connecting passage **125** that extends through the collar **123**, generally along the longitudinal axis **107**. When the collar **123** and the body **108** are engaged with each other, a generally circular through-way **126** is formed between the body **108** and the collar **123** that provides fluid communication between the connecting passage **125** and the passages **119** in the body **108**.

[0021] A scrubber **130** is disposed within the longitudinal passage **110** and is preferably constructed from at least one, and preferably a plurality, of scrubber discs **131**. Details of a scrubber disc **131** are shown in FIGS. 4 and 5; each scrubber disc **131** includes an annular ring **132**, with each ring **132** having a plurality of scrubber bristles **134** extending therefrom toward the longitudinal axis **107**. Preferably, the rings **132** and scrubber bristles **134** are constructed from polypropylene or some other suitable biocompatible material. The bristles **134** extend sufficiently far toward the center of each ring **132** so as to engage the luer threads of the luer when the luer is inserted into the luer cleaner **100**.

[0022] Preferably, the ring **132** for each scrubber disc **131** includes at least one, and preferably two diametrically opposed, alignment posts **136** that extend from the outer

perimeter of the ring **132** away from the center of the ring **132**. Each post **136** is sized and shaped to fit into a respective alignment notch **116** cut into the body **108**. Each post **136** engages the alignment notch **116** in a generally tight, frictional fit so that each ring **132** remains within the longitudinal passage **110** after insertion thereto.

[0023] Each ring **132** also includes at least one, and preferably, a plurality of through-passages **140** that allow fluid to pass from one side of each ring **132** to an opposing side of each ring **132**. Four through-passages **140** are preferred, as shown in FIG. 4, with each through-passage **140** being disposed at ninety-degree spacings from each adjacent through-passage **140**, although those skilled in the art will recognize that more or less than four through-passages **140** may be used. However, it is preferred that each through-passage **140** fluidly communicates with a passage **119** in the body **108**, so that fluid communication exists between all of the passages **140** and the connecting passage **125**.

[0024] Further, a plurality of radially extending channels **142** extends along an exterior of each ring **132** from the outer perimeter of the ring **132** to the inner diameter of the ring **132**, with each channel **142** fluidly communicating with a through-passage **140**. As can be discerned from FIGS. 4 and 5, four channels **142** are disposed at ninety-degree spacings apart from each adjacent channel **142**, with channels **142** disposed on either side of each ring **132**, although those skilled in the art will recognize that, for each through-passage **140**, a channel **142** is preferably disposed on either face of the ring **132**.

[0025] With a plurality of rings **132** disposed adjacent one another, as shown in FIG. 3, the radially extending channels in adjacent rings **132** form radial passages **146** that provide fluid communication between each through-passage **140** and the longitudinal passage **110** to allow fluid to be transmitted through the radial passages **146** to the longitudinal passage **110**. Fluid communication is now present between the longitudinal passage **110** and the connector passage **125**.

[0026] Again referring to FIG. 3, sealing ring **150** is disposed between the array of rings **132** and the open end **104** of the luer cleaner **100**. The sealing ring **150** preferably has an internal diameter that is approximately the same as the external diameter of the luer **190** (see FIG. 1) to prevent fluid forced manually from the reservoir **168** within bulbous body **160** and into the longitudinal passage **110**, from flowing out of the luer cleaner **100** between the luer and the body **108** of the cleaner **100**. The sealing ring **150** is preferably constructed from KRATON™ or other suitable, flexible material, so that the sealing ring **150** generally provides a seal around the luer when the luer is inserted into the luer cleaner **100**.

[0027] A cap **152** is disposed on the open end **104** of the luer cleaner **100** to retain the sealing ring **150** and the array of scrubber rings **132** within the luer cleaner **100**. The cap **152** is preferably annular, with a generally circular central opening **154** that is sized to allow the luer to be inserted therethrough. The cap **152** is preferably fixedly connected to the body **108**, such as with an adhesive, although those skilled in the art will recognize that the cap **152** may be retained by other methods, such as by interference fit, or a threaded connection.

[0028] The closed end **106** of the luer cleaner **100** includes a generally bulbous body **160** constructed from KRA-

TON™, 1064 PVC, or some other suitable, compressible material. The body 160 includes an open end 162 that is fixedly and sealingly connected to the collar 123 and a closed end 164 disposed away from the open end 162. The interior of the bulbous body 160 defines a compressible reservoir 166. A fluid 168 is disposed within the reservoir 166 such that the reservoir 166 fluidly communicates with the longitudinal passage 110 of the generally tubular body 108 through the connecting passage 125, the circular throughway 126, the passages 119, the through-passages 140, and the radial passages 146.

[0029] Preferably, the fluid 168 is a fluid having antiseptic properties, such as alcohol. More preferably, the fluid 168 is sufficiently viscous to remain in the reservoir 166 in the absence of a compressive force on the body 160 of the reservoir 166. Such a preferred fluid 168 is isopropyl alcohol in a polymer suspension, such as polyvinyl alcohol, sold commercially by GOJO Industries as PURELL®, although those skilled in the art will recognize that other fluids, including, but not limited to, povidone iodine or hydrogen peroxide, or any combination thereof, may be used instead.

[0030] In use, and referring to FIGS. 1 and 3, the luer 190, such as on a proximal end of a catheter 194, is inserted into the open end 104 of the luer cleaner 100. The sealing ring 150 engages the external portion of the luer 190, restricting fluid 166 from being forced out of the open end 104 of the luer cleaner 100.

[0031] After the luer 190 is fully inserted into the open end 104 of the luer cleaner 100, the bulbous body 160 is then compressed, forcing the fluid 168 in the reservoir 166 from the reservoir 166 and eventually into the longitudinal passage 110 of the generally tubular body 108 by way of being forced through the connecting passage 125, the circular throughway 126, the passages 119, the through-passages 140, and the radial passages 146, to the longitudinal passage 110 and thus to the exterior of the luer 190. The luer 190 is rotated about the longitudinal axis 107 of the luer cleaner 100, in a preferably back-and-forth motion, so that the bristles 134 on the scrubber discs 131, in conjunction with the fluid 168, clean contaminants from the exterior of the luer 190, including the luer threads 192. After several seconds of scrubbing, the luer is removed from the luer cleaner 100, and the luer cleaner 100 may be discarded. Luer 190 is now disinfected and may be connected to an external medical device.

[0032] In an alternate embodiment of a luer cleaner 200, shown in FIG. 6, a fluid 268 may be retained in a frangible container 270 disposed within the reservoir 166. The fluid 268 may be significantly less viscous than the fluid 168 described above with respect to the luer cleaner 100 (FIG. 1). The frangible container 270 prevents the fluid 268 from flowing out of the reservoir 166 prior to use.

[0033] To use the luer cleaner 200, the luer is inserted into the open end 104 as described above with respect to the luer cleaner 100. The user compresses the reservoir 166 toward the longitudinal axis 107, breaking the frangible container 270, and allowing the fluid 268 to flow from the reservoir 166 and to the longitudinal passage 110 as described above with respect to the luer cleaner 100.

[0034] The frangible container 270 may be constructed from a material that is easily broken open under compres-

sion. The fluid 268 may be the same as the fluid 168 described above, or the fluid 268 may be a less viscous fluid, such as, for example, isopropyl alcohol without any suspension.

[0035] In FIG. 7, a third embodiment of luer cleaner 300 is shown. A pair of frangible containers 370 are secured to opposite sides of a tab 372, each containing quantities of fluid 368 that will be expressed into and forwardly through channel 376 of tab 372 when the closed end 360 ones of frangible containers 370, to enable the user to compress those indicated surfaces to crush and open the frangible containers, which are pressed against tab 372.

[0036] It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A luer cleaner comprising:

a generally hollow body having:

an open first end, a closed second end, and a longitudinal axis extending therethrough between the first end and the second end,

wherein the first end is sized to receive therein a luer and wherein the first end includes a plurality of bristles extending generally toward the longitudinal axis sufficiently to engage the luer disposed therein; and

wherein the second end comprises a compressible reservoir containing a fluid, wherein, when the second end is compressed, the fluid is transmitted from the reservoir toward the first end.

2. The luer cleaner according to claim 1, wherein the fluid is an antiseptic fluid.

3. The luer cleaner according to claim 1, wherein the plurality of bristles comprises at least one ring disposed in the open end, and wherein the plurality of bristles extend from the at least one ring toward the longitudinal axis.

4. The luer cleaner according to claim 3, wherein the at least one ring comprises a plurality of rings.

5. The luer cleaner according to claim 1, wherein the reservoir is defined within an initially separate compressible body joined to the hollow cleaner body remote from the open first end.

6. The luer cleaner according to claim 5, wherein the separate compressible body further comprises a collar disposed thereon forwardly of the reservoir, for being joined sealingly with the hollow cleaner body.

7. The luer cleaner according to claim 1, wherein the body further comprises an exterior portion, wherein the exterior portion comprises a plurality of ribs extending therefrom, away from the longitudinal axis.

8. The luer cleaner according to claim 1, further comprising a centering post disposed along the longitudinal axis and within the open first end, complementary to the open proximal end of a luer connector that closes the open proximal end upon full insertion of the luer connector proximal end into the open first end of the luer cleaner body.

9. The luer cleaner according to claim 1, wherein the fluid is retained in a frangible capsule within the compressible reservoir.

10. The luer cleaner according to claim 1, wherein the fluid is retained in two frangible capsules within the compressible reservoir, separated from each other by a tab having a channel extending forwardly toward the luer cleaner first end.

11. The luer cleaner according to claim 1, wherein, in the absence of compression of the reservoir, the fluid is sufficiently viscous to remain within the reservoir.

12. The luer cleaner according to claim 1, comprising at least one passageway for communicating the fluid from the reservoir to the first end.

13. A method of cleaning a luer comprising the steps of:

(a) providing a luer cleaner comprising:

a generally hollow body having an open first end, a closed second end, and a longitudinal axis extending therethrough between the first end and the second end,

wherein the first end is sized to receive therein a luer and wherein the first end includes a plurality of bristles extending generally toward the longitudinal axis sufficiently to engage the luer disposed therein; and

wherein the second end comprises a compressible reservoir adapted to receive and retain a fluid,

wherein, when the second end is compressed, the fluid is transmitted toward the first end;

(b) inserting a luer into the open end, wherein the plurality of bristles engage an exterior of the luer; and

(c) compressing the second end and transmitting the fluid to the luer and to the plurality of bristles.

14. The method according to claim 13, further comprising rotating the luer about the longitudinal axis.

15. The method according to claim 14, wherein rotating the luer about the longitudinal axis further comprises reciprocally rotating the luer in each of two directions.

16. A luer cleaner comprising:

a generally hollow body having:

an open first end, a closed second end, and a longitudinal axis extending therethrough between the first end and the second end,

means for scrubbing a luer disposed at the first end; and

a reservoir for retaining a fluid at the second end and for transmitting the fluid from the second end toward the first end.

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