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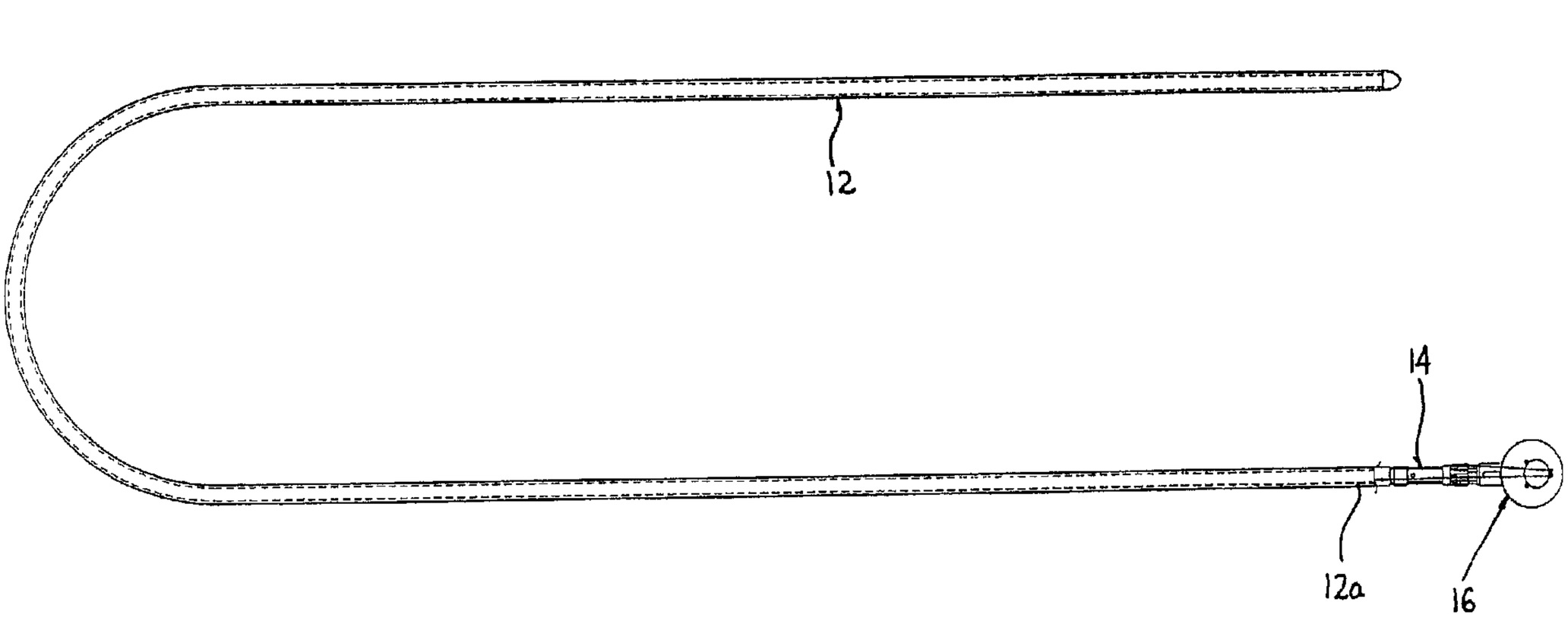
(54) Titre : ACCESSOIRE SERVANT A INTRODUIRE UN DISPOSITIF A BUTEE DANS UN ORGANE
(54) Title: ANVIL DELIVERY DEVICE ACCESSORY



(57) Abrégé/Abstract:
An anvil delivery system includes an anvil assembly, a flexible tube, and a fitting. The fitting is coupled to the flexible tube and includes a body having a proximal end portion and a distal end portion and a tip disposed on the distal end portion. The proximal end portion of the body is adapted to attach the body to the flexible tube. The tip is configured for insertion into a body lumen. The anvil delivery system may further include a plurality of protrusions disposed on the proximal end portion of the body of the fitting.

ABSTRACT

An anvil delivery system includes an anvil assembly, a flexible tube, and a fitting. The fitting is coupled to the flexible tube and includes a body having a proximal end portion and a distal end portion and a tip disposed on the distal end portion. The proximal end portion of the body is adapted to attach the body to the flexible tube. The tip is configured for insertion into a body lumen. The anvil delivery system may further include a plurality of protrusions disposed on the proximal end portion of the body of the fitting.

ANVIL DELIVERY DEVICE ACCESSORY

BACKGROUND

1. Technical Field

[0002] The present disclosure relates generally to a surgical apparatus for use during anastomosis procedures. More particularly, the present disclosure relates to methods and apparatus to deliver an anvil assembly to a surgical site.

2. Description of the Related Art

[0003] Surgical anastomosis is the surgical connection of severed or separate of hollow organs. Typically, an anastomosis procedure follows another surgical procedure where a diseased or defective section of hollow tissue is removed and the remaining end sections are joined. The end sections may be joined by circular, end-to-end, or side-to-side organ reconstruction methods.

[0004] In a circular anastomosis procedure, the two ends of the organ sections are joined by means of a stapling instrument that drives a circular array of staples through the end section of each organ section and simultaneously cores any tissue interior of the driven circular array of staples to free the tubular passage. Examples of instruments for performing circular anastomosis of hollow organs are described in U.S. Patent Nos. 7,168,604; 6,053,390; 5,588,579; 5,119,983; 5,005,749; 4,646,745; 4,576,167; and 4,473,077. Typically,

these instruments include an elongated shaft having a handle portion at a proximal end to actuate the instrument and a staple holding component disposed at a distal end. An anvil assembly including an anvil rod with an attached anvil head is mounted to the distal end of the instrument adjacent the staple holding component. Opposing end portions of tissue of the hollow organ(s) to be stapled are clamped between the anvil head and the staple holding component. The clamped tissue is stapled by driving one or more staples from the staple holding component so that the ends of the staples pass through the tissue and are deformed by the anvil head. An annular knife is concurrently advanced to core tissue within the hollow organ to free a tubular passage within the organ.

[0005] Certain circular anastomosis procedures entail minimally invasive techniques. In these procedures, surgeons often position an anvil assembly in the desired hollow organ by inserting an anvil delivery system through a patient's esophagus. U.S. Patent No. 7,179,267, for example, describes a method and apparatus for delivering an anvil assembly through a patient's esophagus. Although surgical apparatus that can deliver an anvil assembly into a hollow organ are well-known in the art, there is a need for more versatile anvil delivery systems.

SUMMARY

[0006] The present disclosure relates to an anvil delivery system including an anvil assembly, a flexible tube, and a fitting coupled to the flexible tube. The fitting includes a body having a proximal end portion and a distal end portion, and a tip on the distal end portion. The proximal end portion is adapted to attach the body of the fitting to the flexible tube. The tip is configured for insertion into a body lumen.

[0007] The present disclosure also relates to an anvil delivery system comprising an anvil assembly, a flexible tube having a first end portion and a second end portion, and a fitting. The fitting has a proximal end portion and a distal end portion, wherein the proximal end portion is removably coupled to the second portion of the flexible tube and the distal end portion includes a tip for advancing through tissue.

[0008] In one embodiment, anvil delivery system further includes a bore extending through the distal end portion of the fitting to receive a suture. In one embodiment the anvil delivery system includes a plurality of protrusions disposed on a proximal end portion of the body of the fitting. In one embodiment, the anvil is pivotable with respect to the flexible tube.

[0009] The present disclosure also relates to a kit. The kit includes a flexible tube having a distal end an open proximal end, an adapter configured to be releasably secured to the flexible tube, and a fitting configured to be attached to the flexible tube after the distal end of the flexible tube has been cut. The fitting includes a body having a proximal end portion configured to attach to the flexible tube and a distal end portion.

[0010] In one embodiment, the kit also includes the anvil assembly.

[0011] In one embodiment, the proximal end portion of the body of the fitting is dimensioned to be supported within the flexible tube.

[0012] In one embodiment, the tip is blunt and configured for insertion into a body lumen. In one embodiment, the fitting includes a bore extending through the distal end portion of the body. In one embodiment, the plurality of protrusions is adapted to operatively attach the body of the fitting to the flexible tube.

[0013] The present disclosure also relates to method of performing a surgical procedure comprising:

providing an anvil assembly having an anvil head and a flexible tube having a first end portion extending from the anvil assembly;

cutting a second end portion of the flexible tube, the second end portion being disposed on an opposite end of the flexible tube from the first end portion;

attaching a fitting to the second end portion of the flexible tube, the fitting having an insertion tip;

inserting the second end portion of the flexible tube into a body;

positioning the anvil assembly within the body using the flexible tube; and

detaching the flexible tube from the anvil assembly while the anvil assembly is positioned within the body.

[0014] The fitting may include a bore to receive a suture and the inserting step may include the step of grasping the suture to pull the insertion tip to advance the fitting, flexible tube and anvil assembly. The step of attaching the fitting may include the step of inserting a portion of the fitting within the second end portion of the flexible tube to frictionally engage the tube.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Various embodiments of the presently disclosed surgical apparatus are disclosed herein with reference to the drawings, wherein:

[0016] FIG. 1 is a top plan view of an anvil delivery system according to an embodiment of the present disclosure;

[0017] FIG. 1A is a top plan view of an anvil delivery system with a fitting attached thereto according to an embodiment of the present disclosure;

[0018] FIG. 1B is a side plan view of the anvil delivery system with the fitting shown in FIG. 1A;

[0019] FIG. 2 is a perspective view of a portion of the anvil delivery system shown in FIG. 1;

[0020] FIG. 3 is a side cross-sectional view of a portion of the anvil delivery system shown in FIG. 1;

[0021] FIG. 4 is perspective view of a portion of the anvil delivery system shown in FIG. 1;

[0022] FIG. 5 is a side plan view of a fitting according to an embodiment of the present disclosure;

[0023] FIG. 6 is a cross-sectional rear view of the fitting shown in FIG. 5, taken along section line C-C of FIG. 5;

[0024] FIG. 7 is a front plan view of the fitting shown in FIG. 5;

[0025] FIG. 8 is a cross-sectional side view of the fitting shown in FIG. 5, taken along section line A-A of FIG. 7;

[0026] FIG. 9 is a cross-sectional side view of a portion of the fitting shown in FIG. 5, taken along section line B-B of FIG. 6; and

[0027] FIG. 10A is a top plan view of an anvil delivery system according to another embodiment of the present disclosure;

[0028] FIG. 10B is a side plan view of the anvil delivery system with the fitting shown in FIG. 10A;

[0029] FIG. 11 is a top plan view of the fitting according to the embodiment of FIG. 10A;

[0030] FIG. 12 is a side plan view of the fitting shown in FIG. 11;

[0031] FIG. 13 is a cross-sectional side view of the fitting shown in FIG. 11; and

[0032] FIG. 14 is a rear plan view of the fitting shown in FIG. 11.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0033] Embodiments of the presently disclosed anvil delivery system will now be described in detail with reference to the drawings wherein like reference numerals designate identical or corresponding elements in each of the several views. In the description that follows, the term "proximal," as is traditional, will refer to the end of anvil delivery system, or a portion thereof, that is closer to the operator, while the term "distal" will refer to the end of the anvil delivery system that is farther from the operator.

[0034] With reference to FIG. 1, an anvil delivery system is generally shown as 10. Anvil delivery system 10 includes a flexible tube 12, an adapter 14, and an anvil assembly 16. Anvil assembly 16 may be a 21mm or a 25mm anvil assembly, sold under the trademark EEA ORVIL™. Alternatively, other anvil assemblies may be used with the presently disclosed anvil delivery system. Flexible tube 12 has an open end 12a and a blunt end on the opposite end. Adapter 14 and anvil assembly 16 are supported on open end 12a of flexible tube 12, as described in detail below.

[0035] Referring to FIGS. 2 and 3, anvil assembly 16 includes an anvil head 30, an anvil center rod 20, and an anvil 60. Anvil 60, which is supported on anvil head 30, has a plurality of pockets 60a for receiving and deforming surgical staples. Center rod 20

is operatively connected to anvil head 30. In the embodiment shown in FIG. 2, center rod 20 is pivotably coupled to anvil head 30. Further, center rod 20 includes flexible legs 26 configured to capture at least a portion of adapter 14 therebetween.

[0036] With continued reference to FIGS. 2 and 3, adapter 14 includes a first end 14a dimensioned to be received within open end 12a of flexible tube 12 and a second end 14b configured to be received in the center rod 20 of anvil assembly 16. First end 14a includes a series of annular rings 22 dimensioned to frictionally retain first end 14a of adapter 14 within open end 12a of flexible tube 12. It is envisioned that other retaining structure can be provided to retain first end 14b of adapter 14 to flexible tube 12, e.g., clamps, pins, threads, etc. Second end 14b of adapter 14 includes a longitudinal guide member 24 dimensioned to be received between flexible legs 26 of center rod 20 of anvil assembly 16. In addition, second end 14b of adapter 14 is dimensioned to allow center rod 20 of anvil assembly 16 to freely slide on and off second end 14b of adapter 14.

[0037] Referring to FIG. 4, anvil head 30 of anvil assembly 16 includes spaced apart openings 32 that are in communication with each other. Adapter 14 includes a first throughbore 40 formed in a central hub portion 14c and a second throughbore 42 formed in first end 14a. As will be discussed below, anvil delivery system 10 includes a suture 50 to secure anvil assembly 16 to adapter 14.

[0038] Referring to FIGS. 2 and 4, suture 50 has a first end 50a and a second end 50b. To secure adapter 14 to anvil assembly 16, first end 50a of suture 50 is inserted into one opening 32 of anvil head 30 and pulled out of the other opening 32 such that the ends 50a and 50b of suture 50 are positioned on opposite sides of center rod 20 of anvil assembly 16. Next, second end 14b of adapter 14 is positioned within center rod 20 and

each end 50a and 50b of suture 50 is inserted through an opposite end of throughbore 40 of central hub portion 14c of adapter 14 to define a first suture loop 54 (see FIG. 2). Each end 50a and 50b of suture 50 is pulled tight such that adapter 14 is held against center rod 20. Thereafter, each end 50a and 50b is inserted through an opposite end of throughbore 42 of first end 14a of adapter 14 to define a second suture loop 56 (see FIG. 2). Second suture loop 56 extends about first end 14a of adapter 14. The frictional contact between rings 22 of first end 14a of adapter 14 and the inner surface of flexible tube 12 secures adapter 14 to flexible tube 12 and prevents suture 50 from loosening up.

[0039] With reference to FIGS. 1A and 1B, after operatively connecting flexible tube 12 to anvil assembly 16 via adapter 14, a healthcare professional may decide to shorten flexible tube 12. In some bariatric surgeries, for instance, short flexible tubes 12 are beneficial. Therefore, the healthcare professional may decide to cut flexible tube 12, thereby creating another open end 12b on the new distal end of flexible tube 12. Because the cut end of flexible tube 12 may be abrasive and/or include jagged or irregular surfaces, a fitting 62 may be attached to open end 12b of tube 12 to facilitate smooth atraumatic passage of tube 12 through or into a body lumen.

[0040] With reference to FIGS. 5-9, fitting 62 includes a body 64 having a proximal end portion 66 adapted to be supported in open end 12b of flexible tube 12, a distal end portion 68, and a middle portion 70. Distal end portion 68 has bore 74 defined therethrough and a blunt tip 72 configured for insertion into a body lumen such as the esophagus. In a preferred embodiment, the tip 72 is bullet-shaped to aid insertion. Bore 74 may be dimensioned to receive a suture (not shown) so it can pulled through the lumen if desired. Middle portion 70 is between proximal end portion 66 and distal end

portion 68. Proximal end portion 66 includes a plurality of protrusions 76 adapted to frictionally retain proximal end portion 66 of fitting 62 within open end 12b of flexible tube 12.

[0041] In operation, a surgeon employs anvil delivery system 10 to position anvil assembly 16 in the body during minimally invasive procedures. During such procedures, the surgeon initially secures adaptor 14 to open end 12a of flexible tube 12 and sutures anvil assembly 16 to central hub portion 14c of adapter 14. Flexible tube 12 may then be cut at any desired length. The cut creates a distal open end 12b from the blunt closed end in flexible tube 12. After cutting flexible tube 12, the surgeon secures fitting 62 in open end 12b. Specifically, proximal end portion 66 of fitting 62 is inserted into open end 12b. The frictional contact between protrusions 76 of distal end portion 66 of fitting 62 and the inner surface of flexible tube 12 secures fitting 62 to flexible tube 12.

[0042] For transoral applications, once fitting 62 has been secured to flexible tube 12, the surgeon inserts fitting 62 in the patent's mouth and moves fitting 62 along with flexible tube 12 down through the esophagus to the surgical site, e.g., stomach. It is also contemplated that the anvil delivery system can be used for other applications besides transoral insertion, such as transgastric and transanal approaches for colorectal, bariatric and other applications. This can be achieved due to the bullet shaped tip which can penetrate tissue, e.g. the stomach wall to deliver the anvil assembly. Other penetrating tip configurations could be provided.

[0043] After insertion, the surgeon should then make a small incision at the surgical site to create an inner access to the fitting 62. After making the incision, the surgeon pulls fitting 62 through the incision, thereby pulling anvil assembly 16 through the

esophagus (or other body tissue or organ depending on the procedure) to the surgical site. If a suture is used through bore 74, the suture can be grasped and pulled to pull the anvil assembly. As flexible tube 12 is pulled through the incision, the distal end of center rod 20 of anvil assembly 16 advances through the incision. When anvil assembly 16 is properly positioned at the surgical site, the surgeon may release adapter 14 from anvil assembly 16 by cutting suture 40 and sliding center rod 20 from end 14b of adapter 14. Next, the flexible tube 12 (with fitting 62) and adapter 14 may be pulled from the body through the incision. The surgeon can now mount center rod 20 of anvil assembly 16 on a surgical stapling device (not shown) and perform the desired surgical procedure.

[0044] The components of anvil delivery system 10 may be provided in kit form. The kit may include a flexible tube 12 adapted to be secured to the anvil assembly 16, an adapter 14 configured to secure an anvil assembly 16 to the flexible tube 12 and a fitting 62 configured to be attached to flexible tube 12. Fitting 62, in turn, may include a body 64 having a proximal end portion 66 and a distal end portion 68, a blunt tip 72 disposed on the distal end portion 68, and a plurality of protrusions 76 disposed on the proximal end portion 66. Proximal end portion 66 of body 64 may be dimensioned to be supported within flexible tube 12. The plurality of protrusions 76 may be adapted to operatively attach the body 64 of the fitting 62 to flexible tube 12. Blunt tip 72 may be configured for insertion into a body lumen. Fitting 62 may include a bore 74 extending through distal end portion 68 of body 64. The kit may further include an anvil assembly 16. In one embodiment, the anvil assembly 16, the flexible tube 12, and adapter 14 are fastened together with a suture 50, as discussed above, and the fitting 62 is provided to blunt the end of flexible tube 12 if the flexible tube 12 has to be cut and to provide an insertion tip.

[0045] With reference to FIGS. 10A and 10B, another embodiment of anvil delivery system 10 includes an alternative fitting 82. Like fitting 62, fitting 82 is attached to open end 12b of tube 12 to facilitate smooth atraumatic passage of tube 12 through or into a body lumen. Since the structure and operation of an anvil delivery system 10 with fitting 62 is substantially identical to the structure and operation of an anvil delivery system 10 with fitting 82, the present disclosure only discusses in detail the structural features of fitting 82.

[0046] Referring to FIGS. 11-14, fitting 82 includes a body 84 having a proximal end portion 86 supported in open end 12b of flexible tube12, a distal end portion 88, and a middle portion 90. Distal end portion 88 has a bore 94 defined therethrough and a blunt tip 92 configured for insertion into a body lumen such as the esophagus. Body 90 of fitting 82 has a tapered surface 98 leading to blunt tip 92. Tip 92 is bullet-shaped to aid insertion. Bore 94 is dimensioned to receive a suture (not shown). The suture is attached to tip 92 and pulled to pull tube 12 through a lumen if desired. Proximal end portion 86 includes a plurality of protrusions 96 adapted to frictionally retain proximal end portion 86 of fitting 82 within open end 12b of flexible tube 12. Protrusions 96 are disposed around an outer periphery of proximal end portion 86.

[0047] It will be understood that various modifications may be made to the embodiments disclosed herein. For example, the particular configuration of fitting 62 need not be exactly as shown but rather may be configured in any manner capable of facilitating atraumatic passage of tube 12 through a body lumen. Therefore, the above description should not be construed as limiting, but merely as exemplifications of the

embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto.

What is claimed is:

1. An anvil delivery system, comprising:

an anvil assembly;

a flexible tube; and

a fitting coupled to the flexible tube, the fitting including:

a body having a proximal end portion and a distal end portion, the proximal end portion being adapted to attach the body of the fitting to the flexible tube; and

a tip on the distal end portion, the tip configured for insertion into a body lumen.

2. The anvil delivery system according to claim 1, further comprising a plurality of protrusions disposed on the proximal end portion of the body of the fitting.

3. The anvil delivery system according to claim 1, further comprising a bore extending through the distal end portion to receive a suture.

4. The anvil delivery system according to claim 1, wherein the fitting includes a tapered surface extending from the body to the tip.

5. The anvil assembly system according to claim 1, further comprising an adapter configured to releasably secure the flexible tube to the anvil assembly.

6. An anvil delivery system, comprising:

an anvil assembly;

a flexible tube having a first end portion and a second end portion; and

a fitting having a proximal end portion and a distal end portion, the proximal end portion removably coupled to the second portion of the flexible tube and the distal end portion including a tip for advancing through tissue.

7. The anvil delivery system of claim 6, wherein the anvil assembly include an anvil, the anvil pivotable with respect to the flexible tube.

8. The anvil delivery system according to claim 6, further comprising a bore extending through the distal end portion to receive a suture.

9. The anvil delivery system according to claim 6, further comprising an adapter configured to releasably secure the first end portion of the flexible tube to the anvil assembly.

10. The anvil delivery system according to claim 9, further comprising a suture extending between the adapter and anvil assembly.

11. A kit, comprising:

a flexible tube having a distal end and an open proximal end;

an adapter configured to be releasably secured to the flexible tube;

a fitting configured to be attached to the flexible tube after the distal end of the flexible tube has been cut, the fitting having a body having a proximal end portion configured to attach to the flexible tube and a distal end portion.

12. The kit according to claim 11, wherein the proximal end portion of the body is dimensioned to be supported within the flexible tube.

13. The kit according to claim 11, wherein the distal end is configured for insertion into a body lumen.

14. The kit according to claim 11, further comprising a plurality of protrusions disposed on the proximal end portion of the body, the plurality of protrusions being adapted to operatively attach the body of the fitting to the flexible tube.

15. The kit according to claim 11, wherein the fitting includes a bore extending through the distal end portion of the body.

16. The kit according to claim 11, further comprising an anvil assembly configured to be attach to the flexible tube.

17. The kit according to claim 12, wherein the anvil assembly, the flexible tube, and the adapter are fastened together with a suture.

18. The kit according to claim 11, further comprising a casing encompassing at least the adapter, the flexible tube, and the fitting.

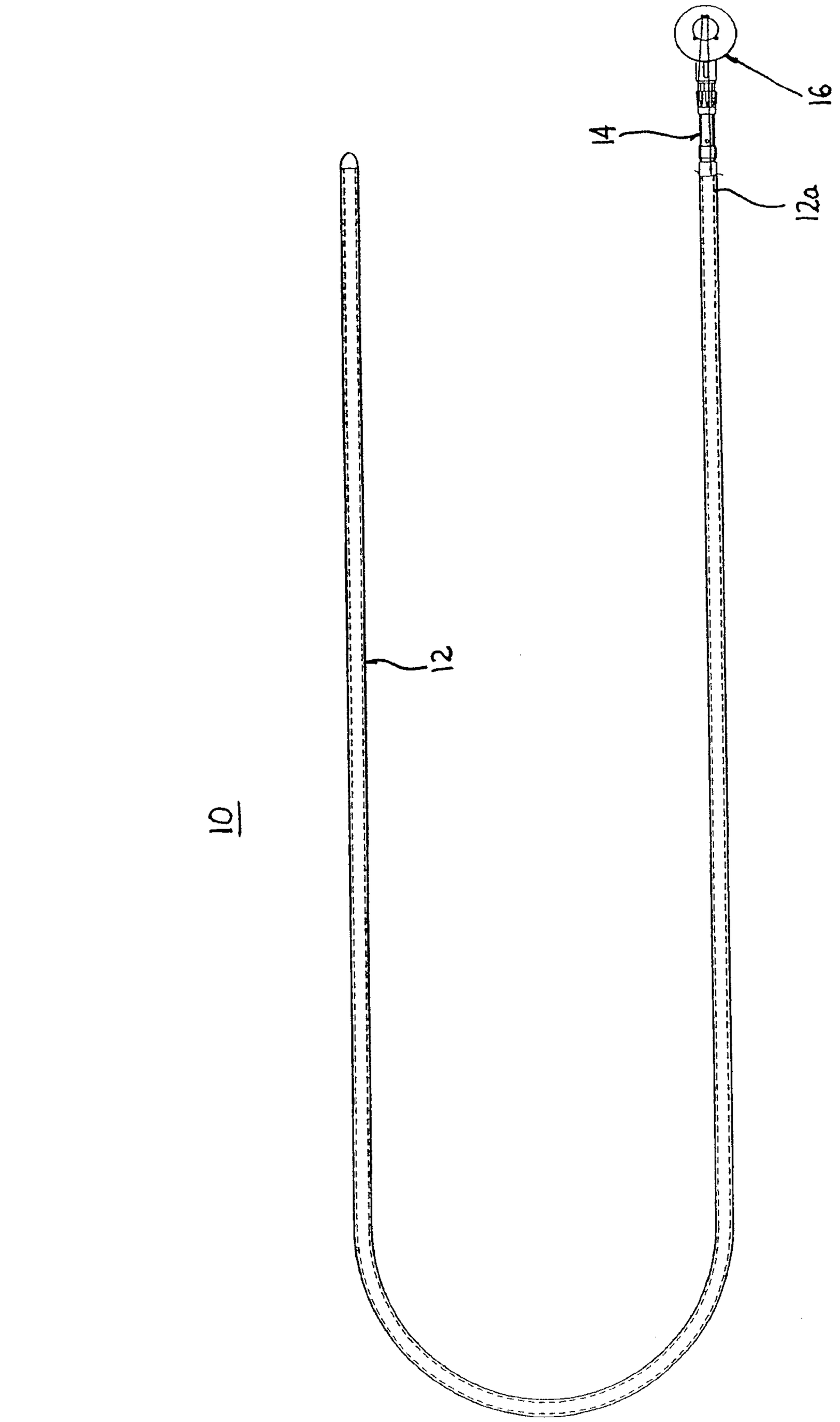


FIG. 1

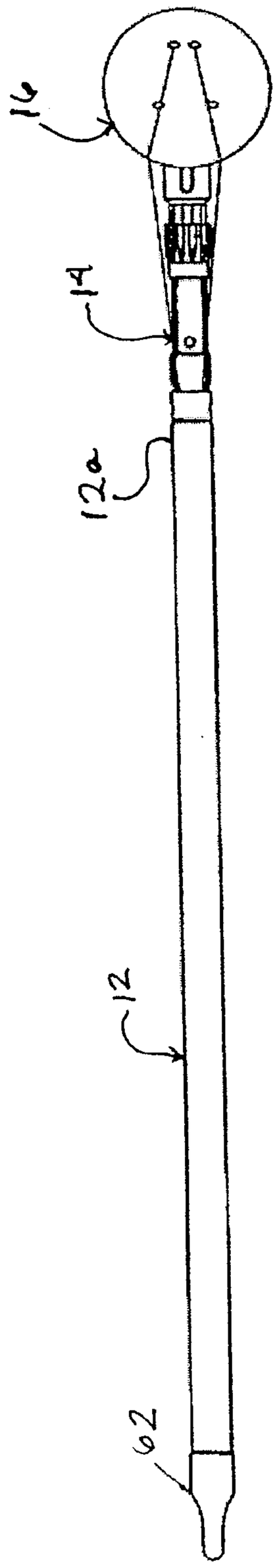


FIG. 1A

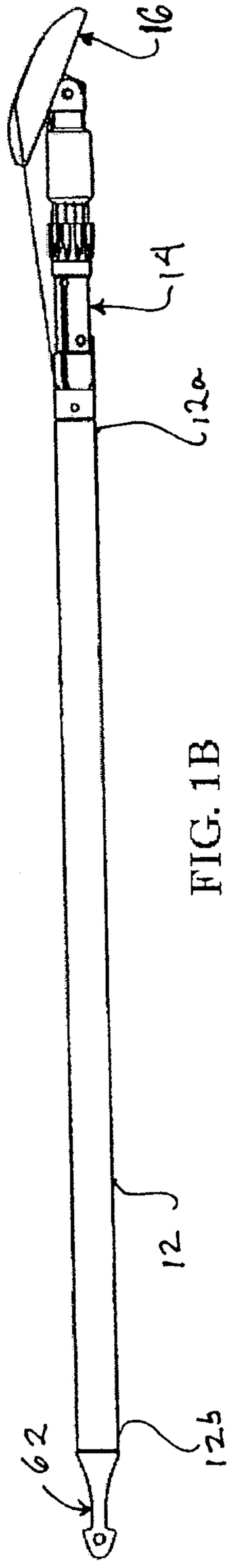


FIG. 1B

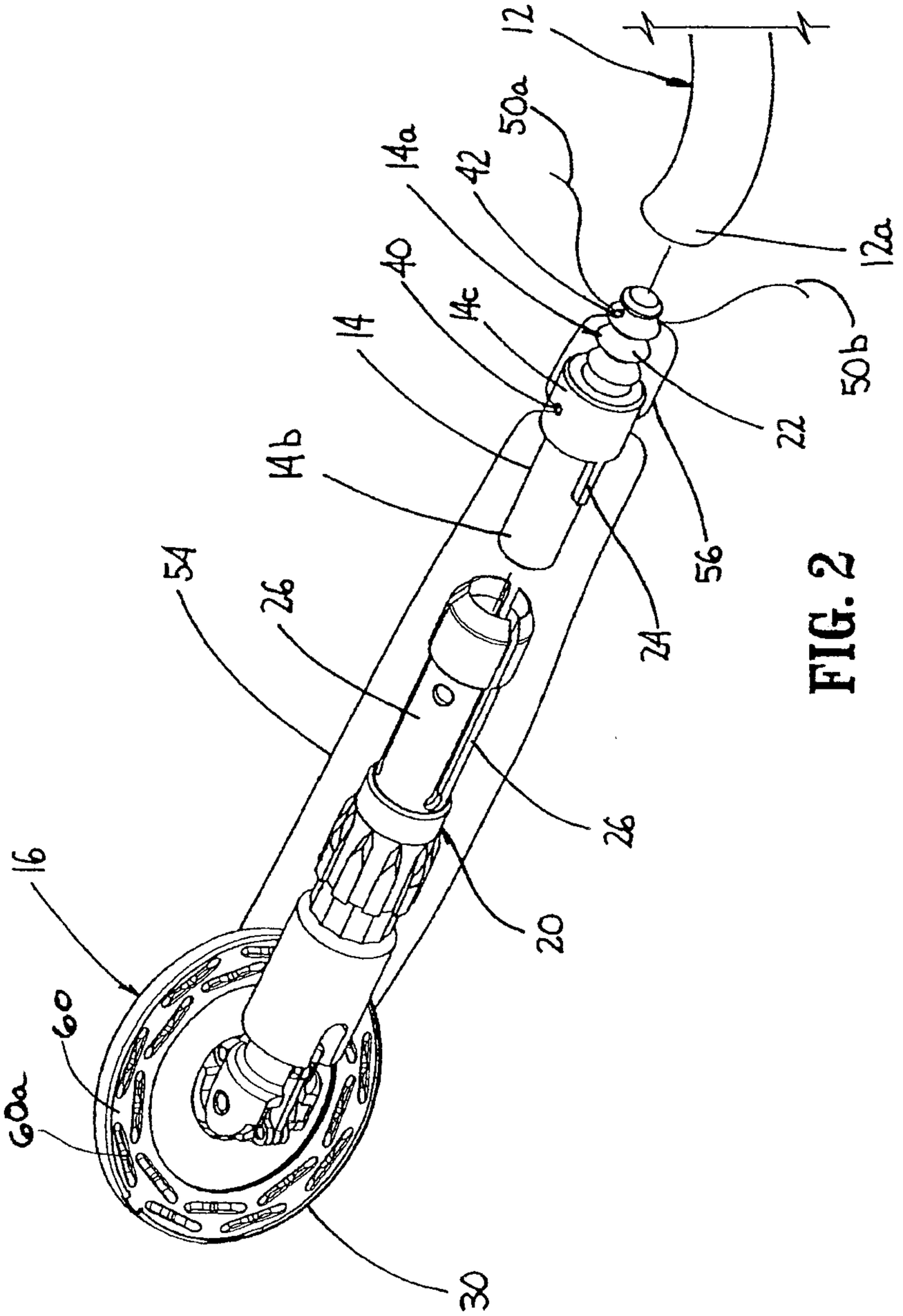


FIG. 2

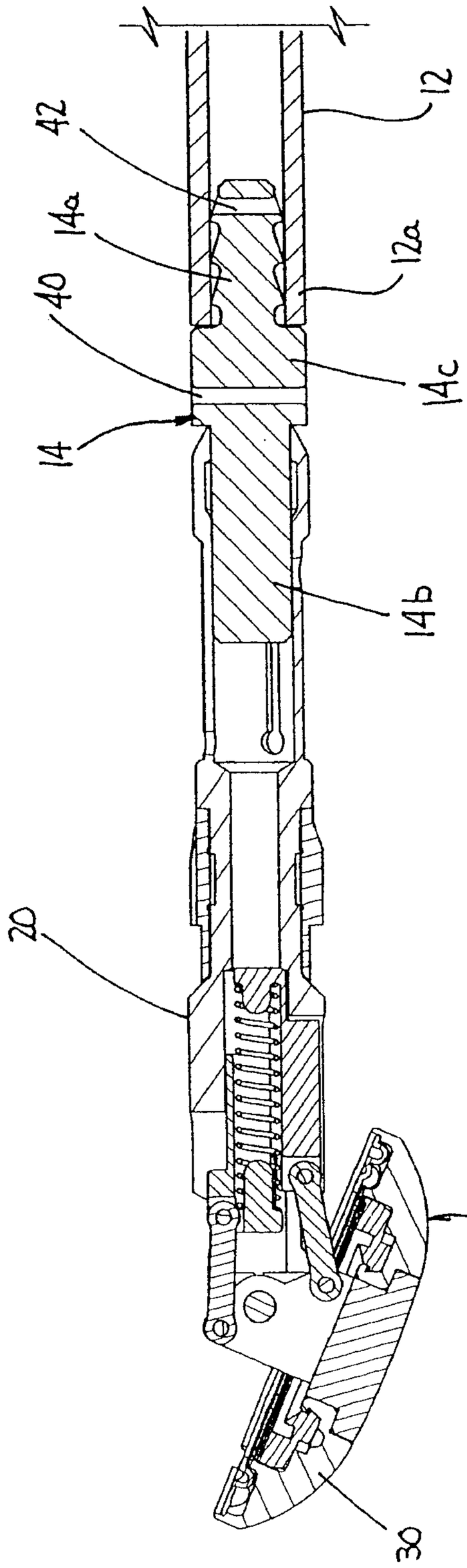


FIG. 3

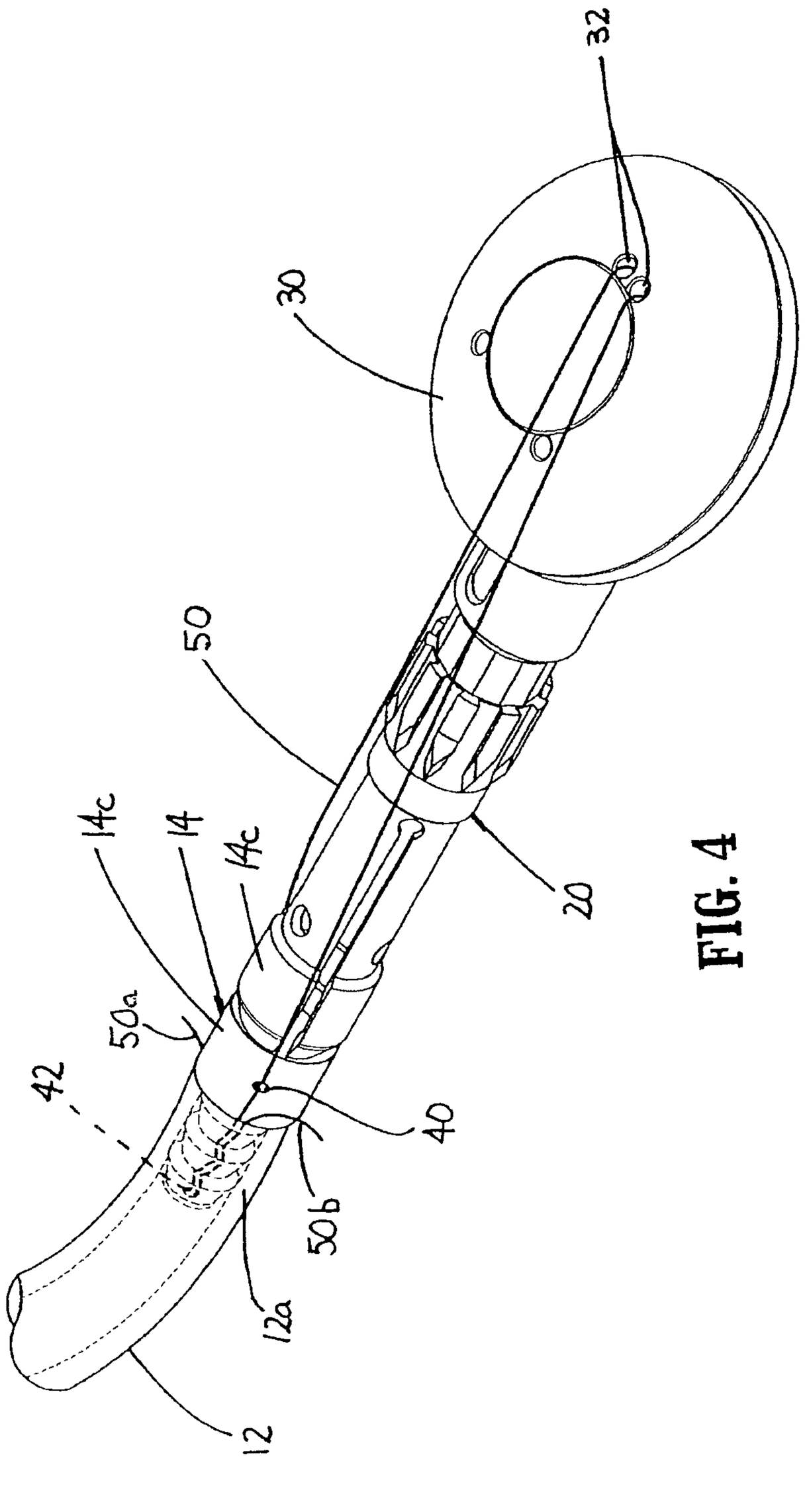


FIG. 4

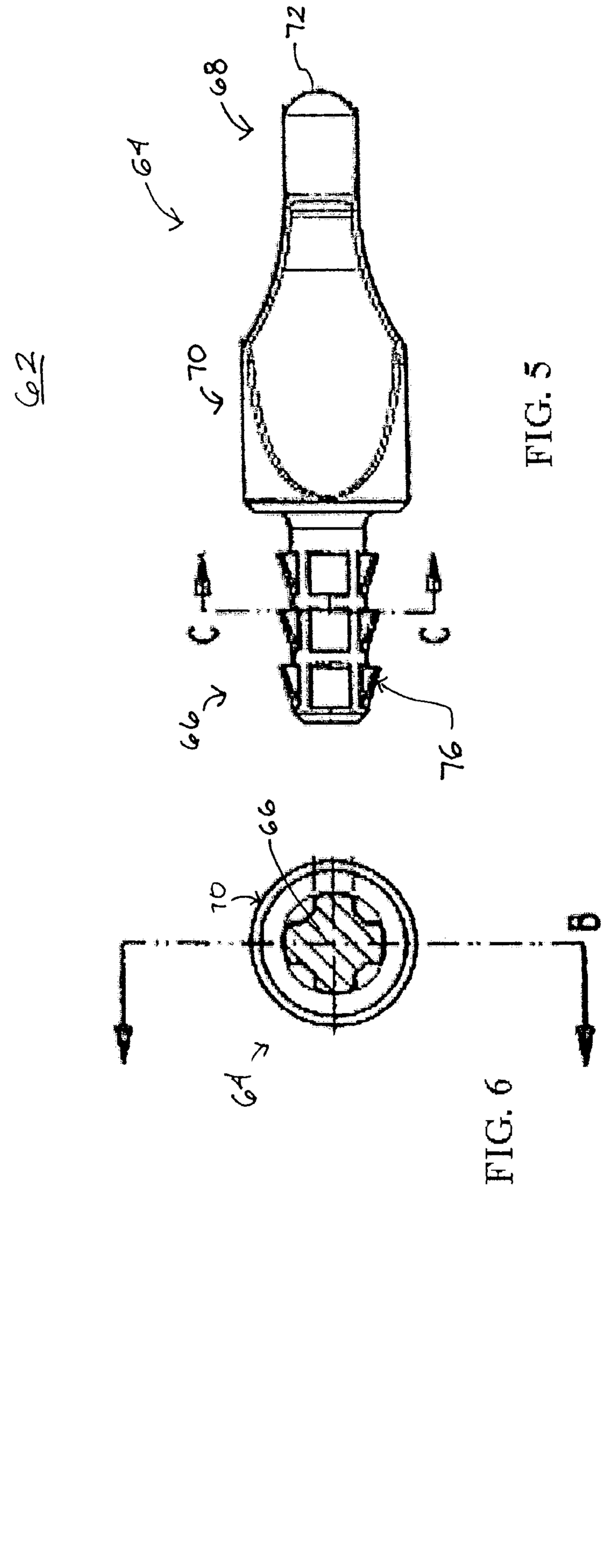


FIG. 5

FIG. 6

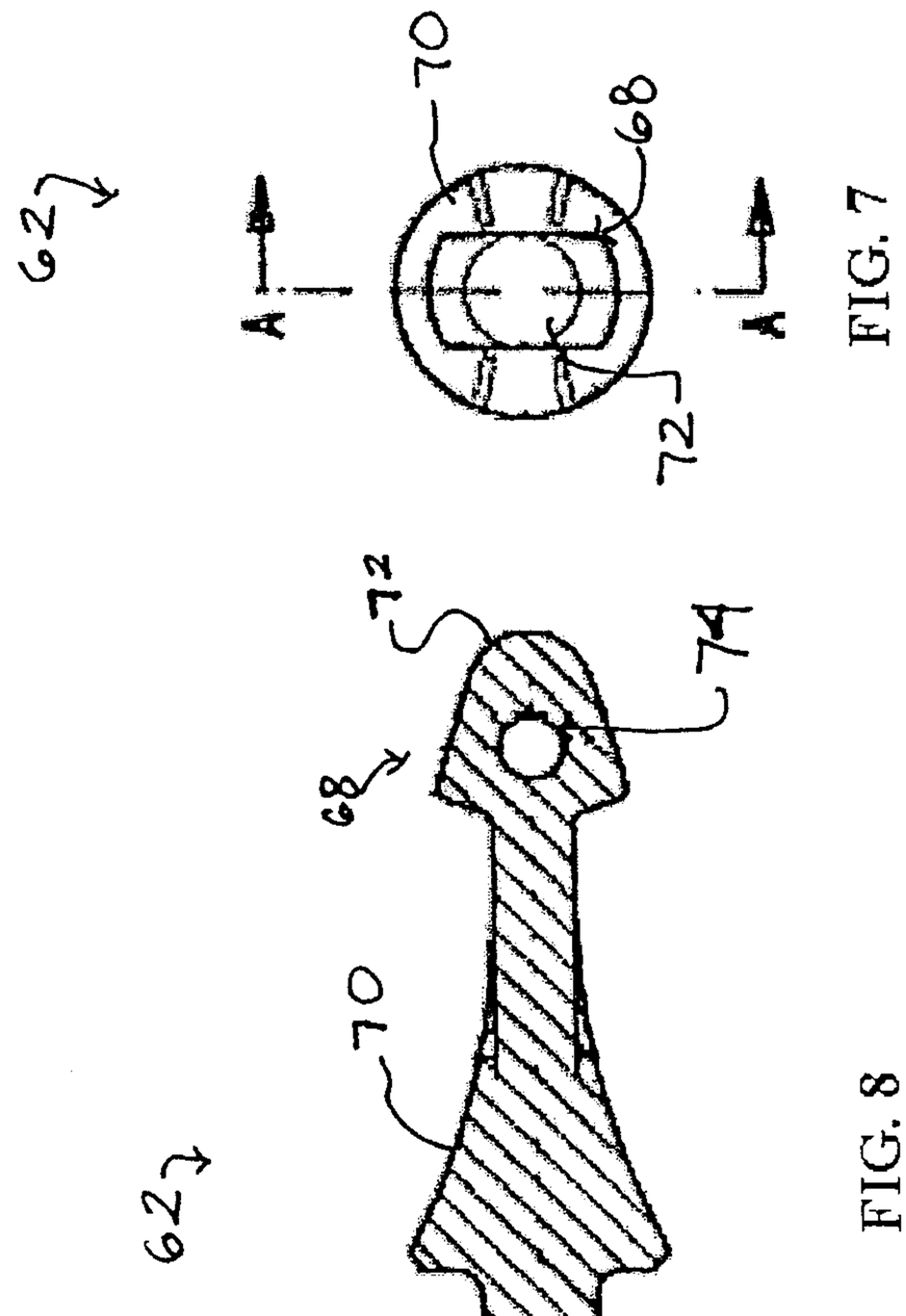


FIG. 7

FIG. 8

FIG. 9

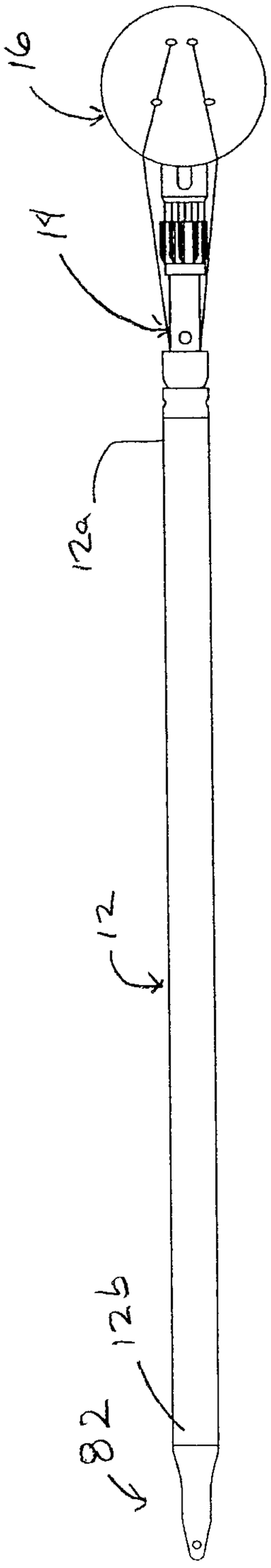


FIG. 10A

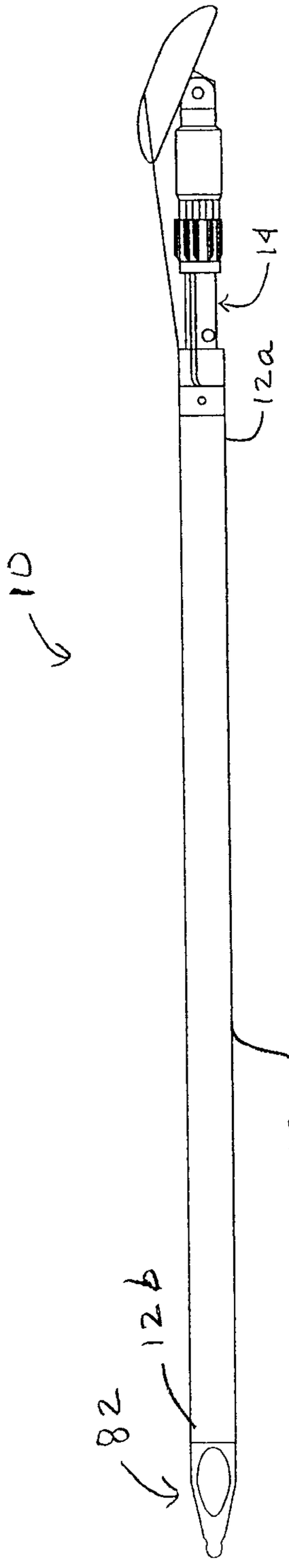


FIG. 10B

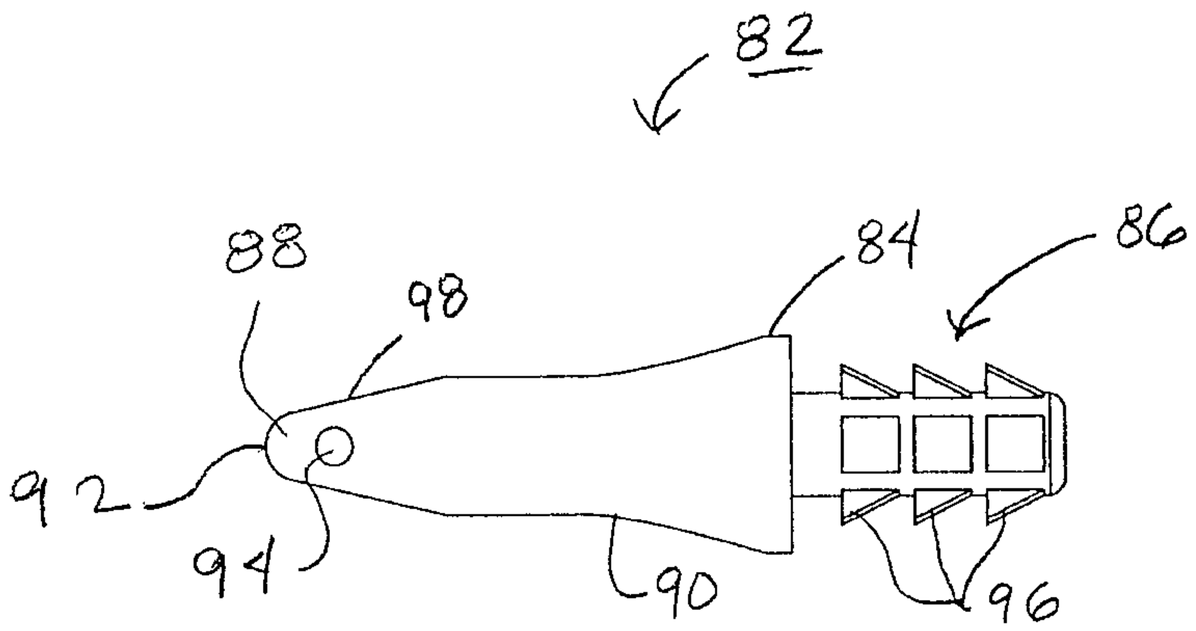


FIG. 11

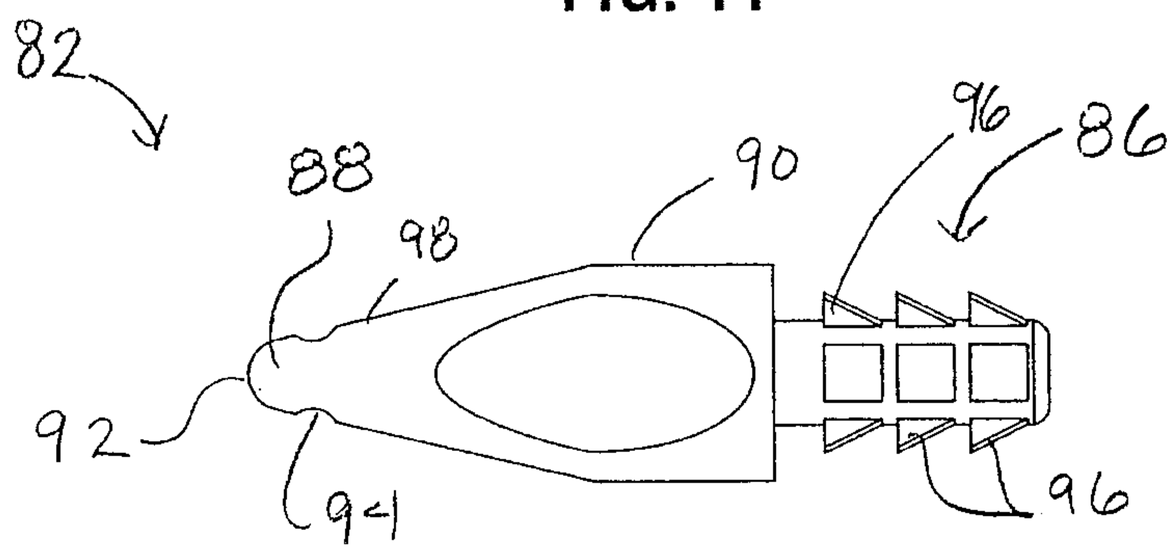


FIG. 12

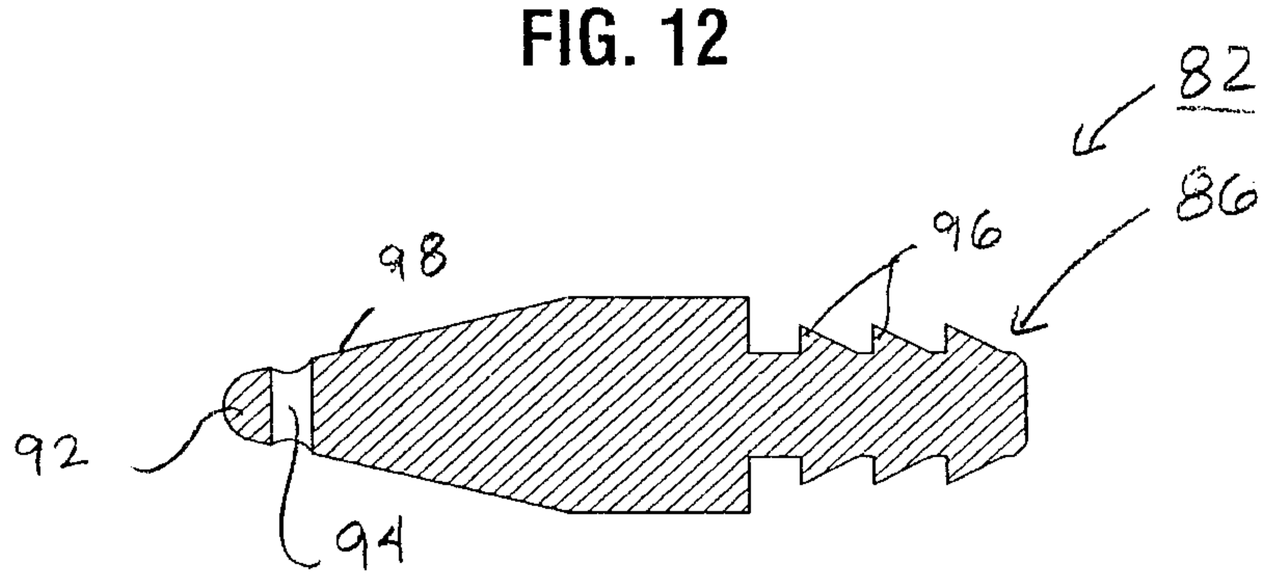


FIG. 13

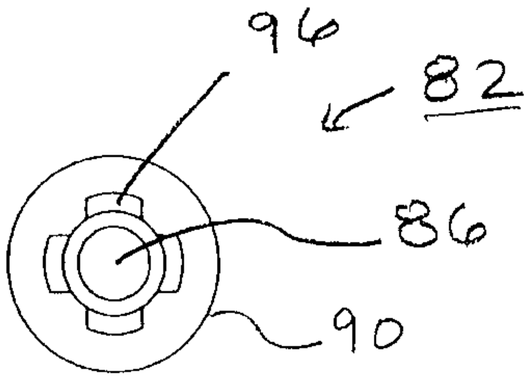
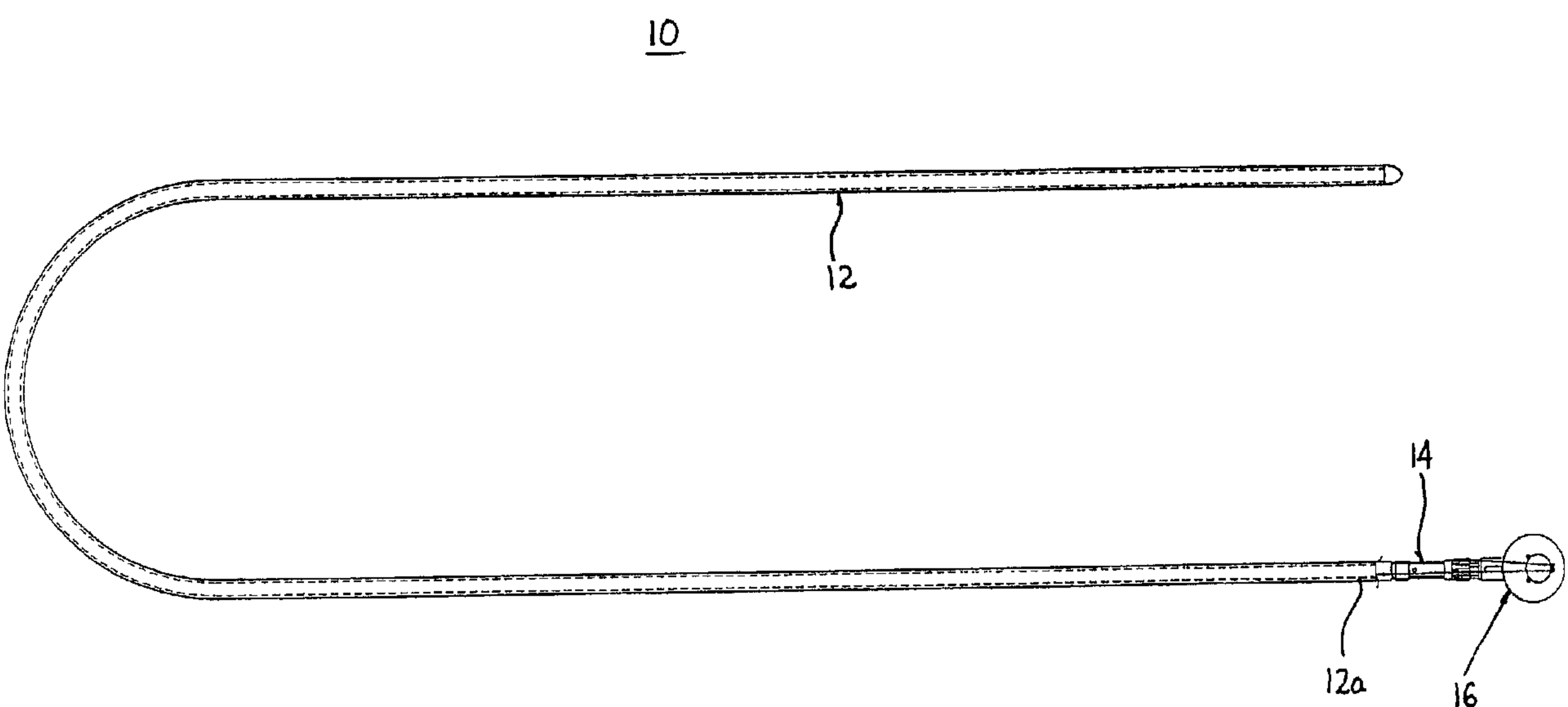


FIG. 14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12a
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