US 20220133285A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0133285 A1**

Chu et al. (43) **Pub. Date: May 5, 2022**

(54) **BIOPSY DEVICE FOR USE WITH ENDOSCOPE**

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(21) Appl. No.: **17/518,975**

(22) Filed: **Nov. 4, 2021**

Related U.S. Application Data

(60) Provisional application No. 63/110,139, filed on Nov. 5, 2020.

Publication Classification

(51) **Int. Cl.**

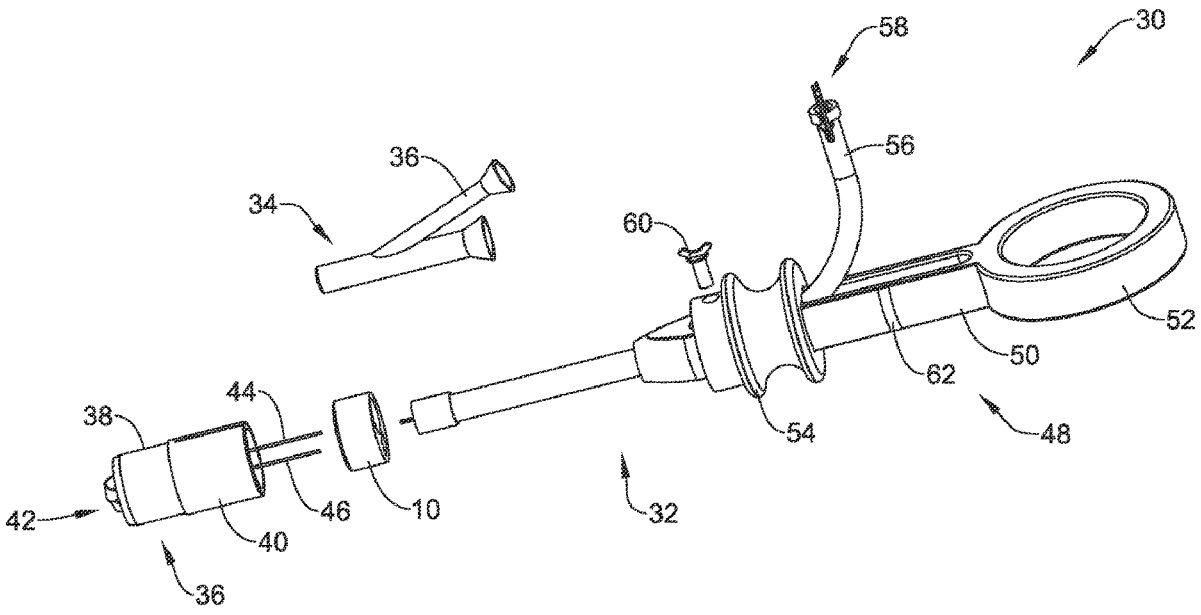
A61B 10/04	(2006.01)
A61B 10/02	(2006.01)
A61B 10/06	(2006.01)

(52) **U.S. Cl.**

CPC ***A61B 10/04*** (2013.01); *A61B 2010/0208* (2013.01); ***A61B 10/06*** (2013.01); ***A61B 10/0266*** (2013.01)

(57) **ABSTRACT**

A biopsy device adapted for use with an endoscope includes an adaptor that is adapted to be secured relative to an endoscope. The biopsy device includes a pair of jaws that are pivotably disposed relative to the adaptor. An actuator is operably coupled with the first jaw and the second jaw and extends proximally therefrom. The actuator is adapted to move the first jaw and the second jaw relative to the biopsy device housing.



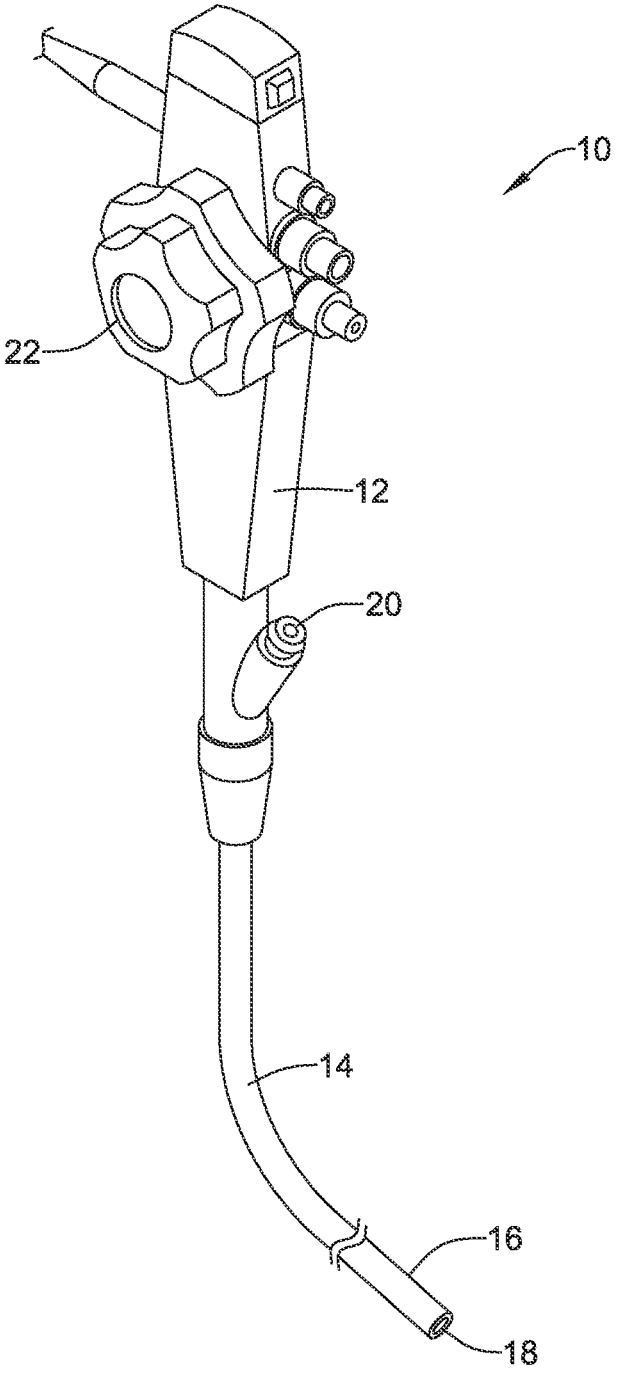


FIG. 1

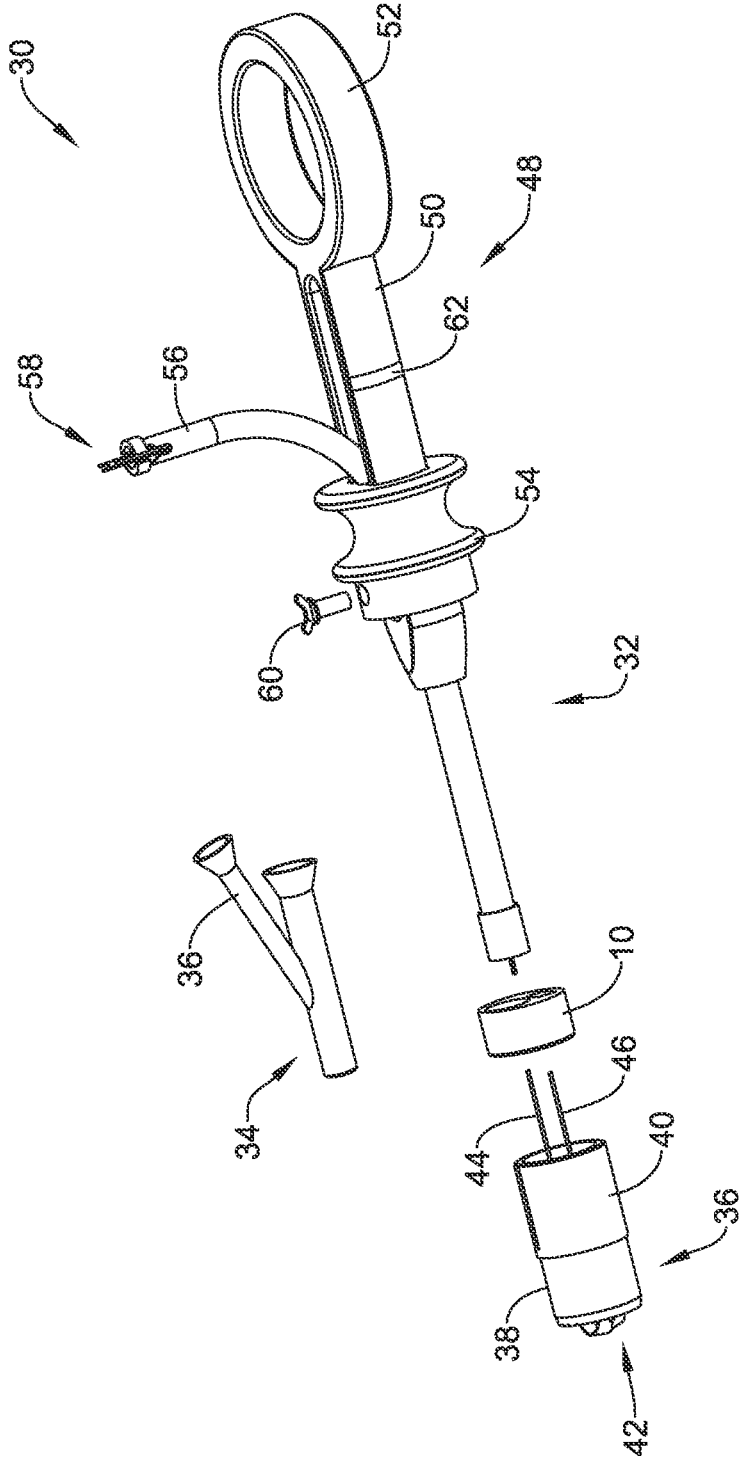
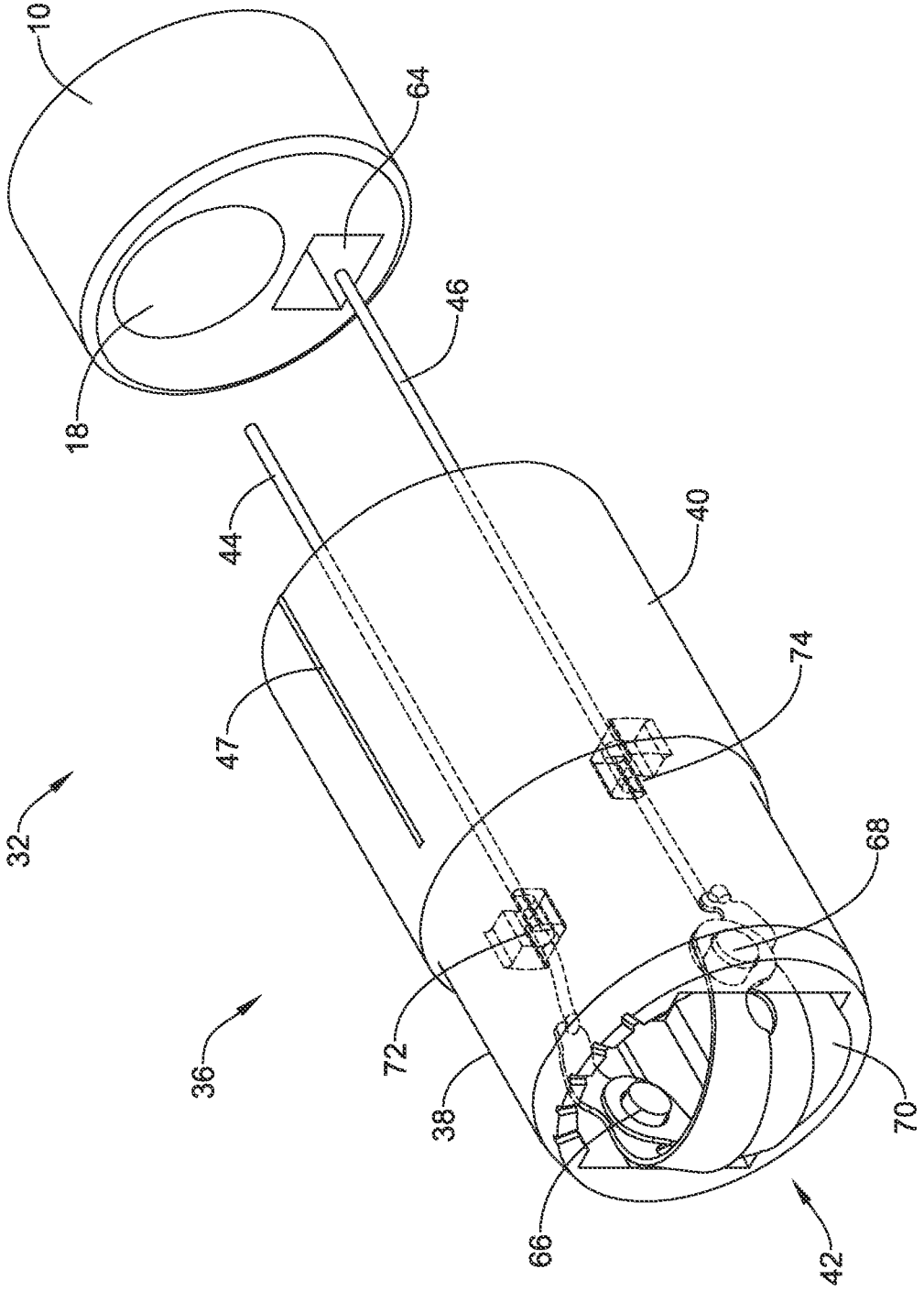


FIG. 2



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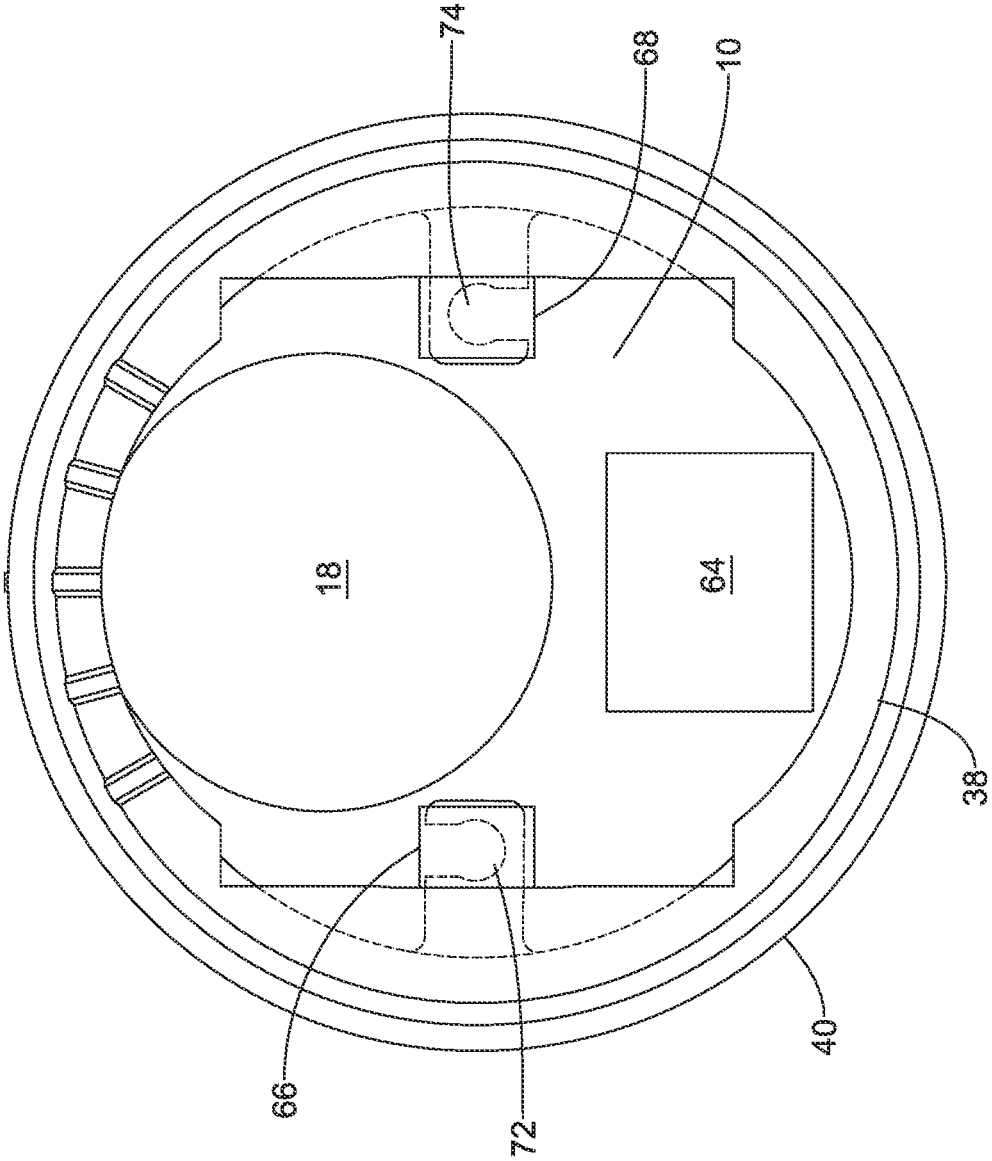

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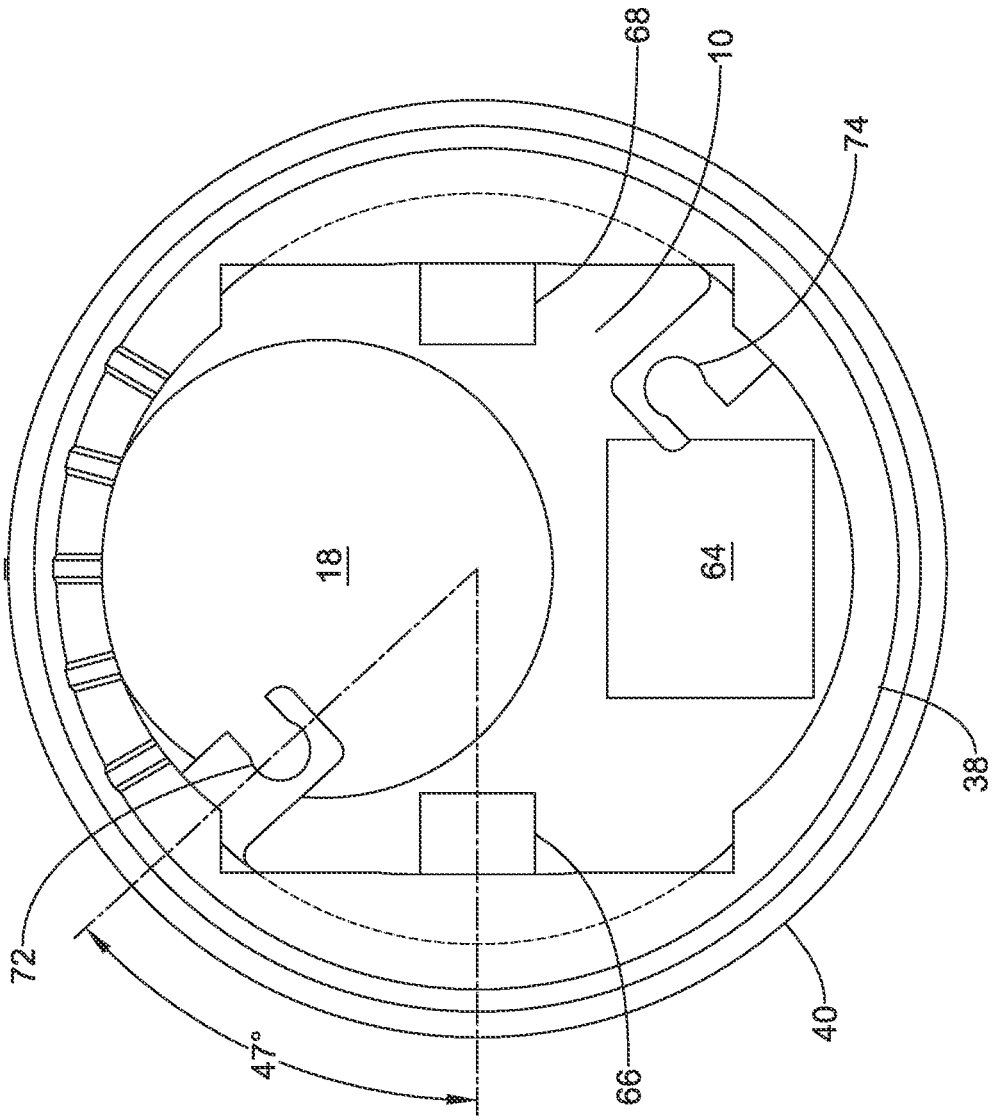

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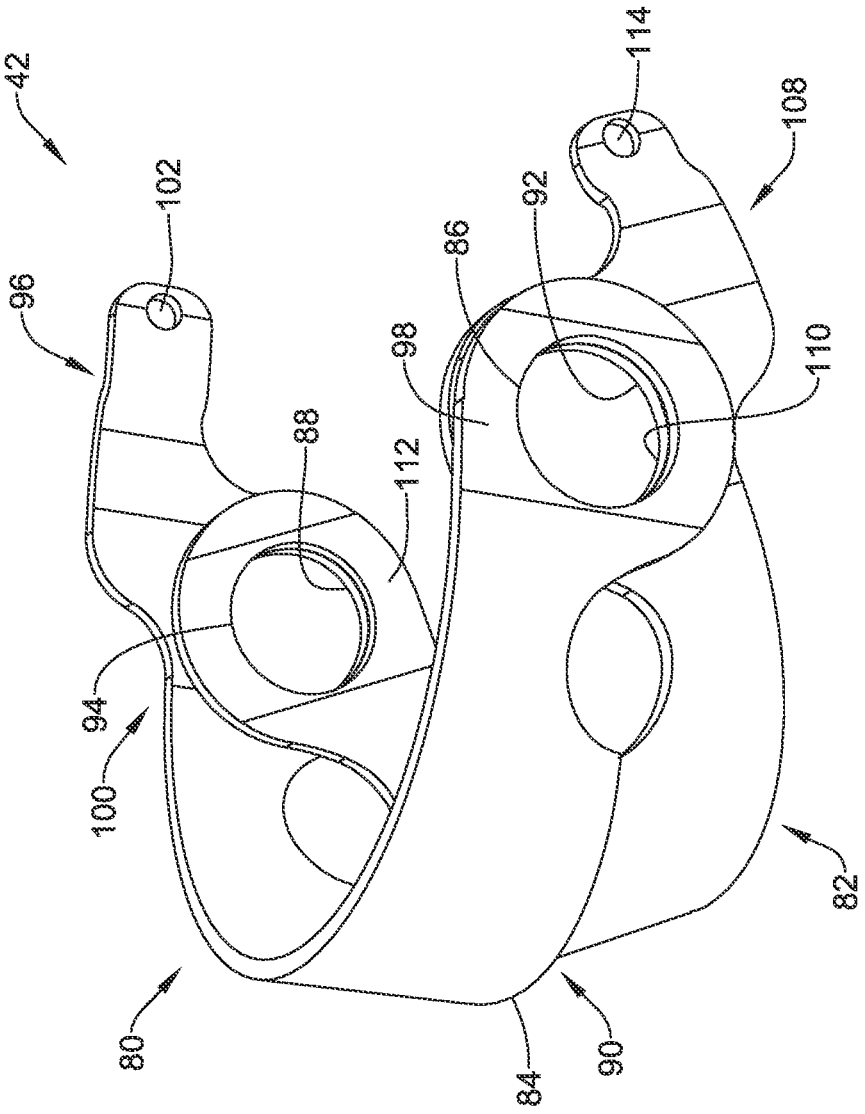

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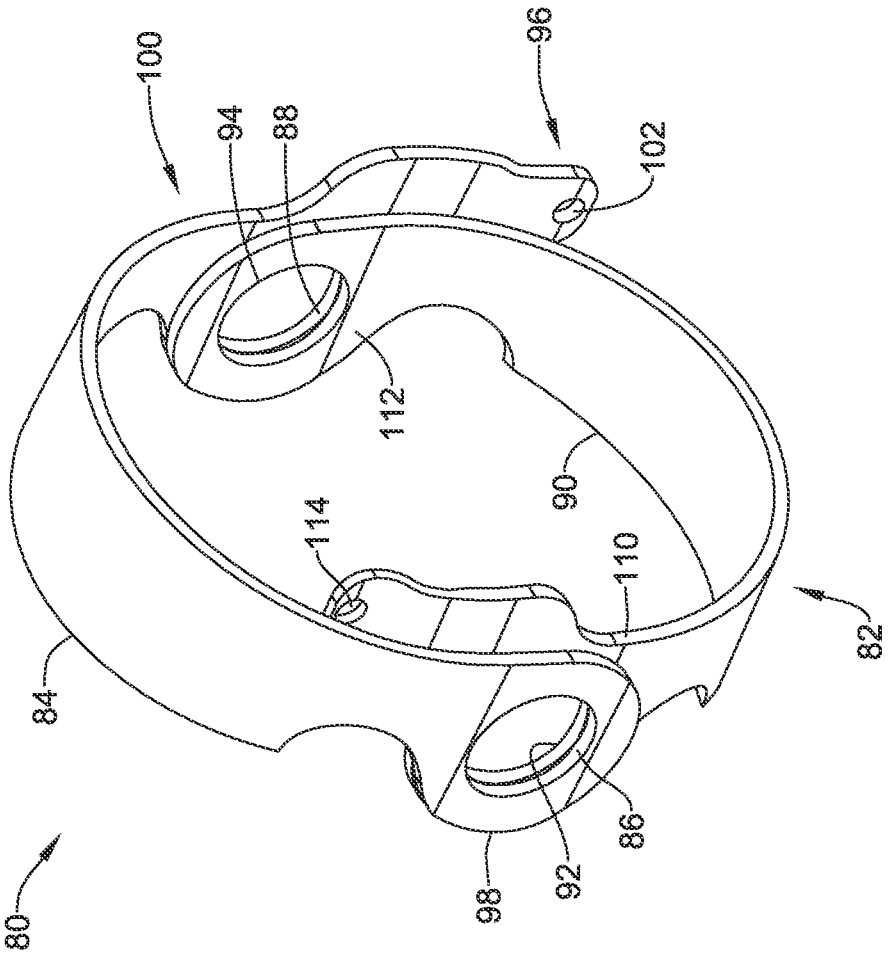

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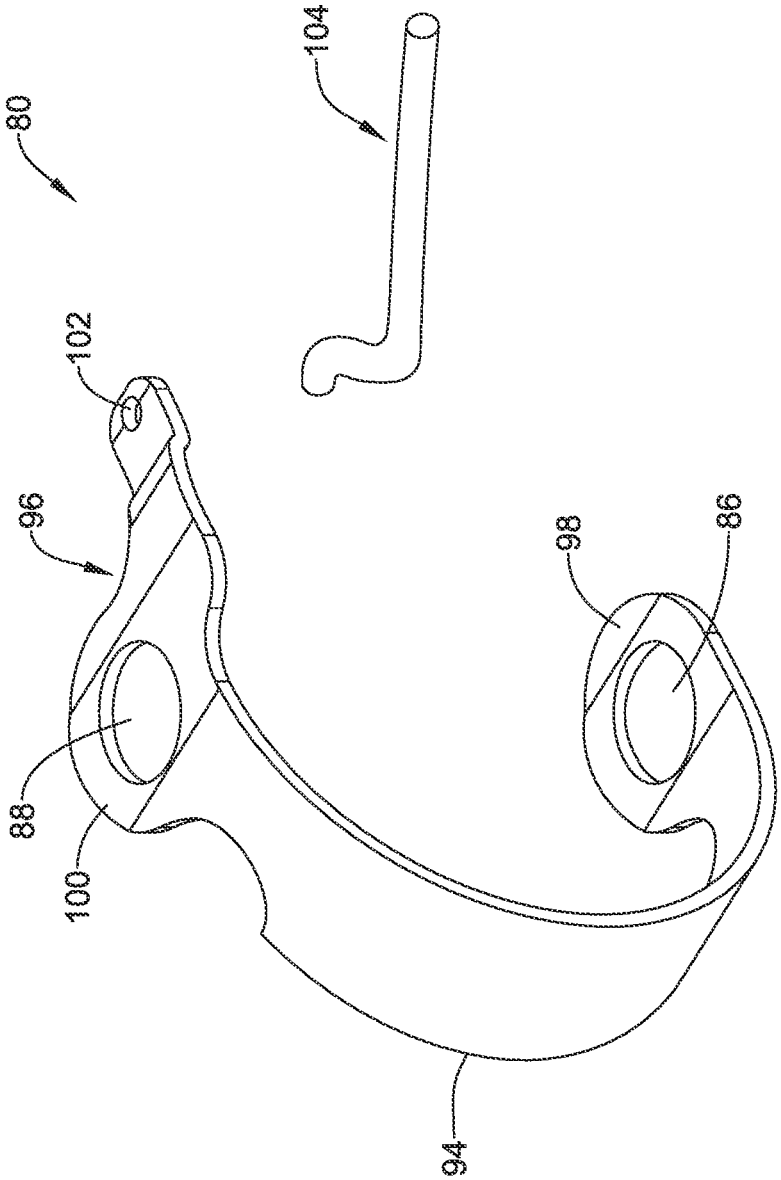

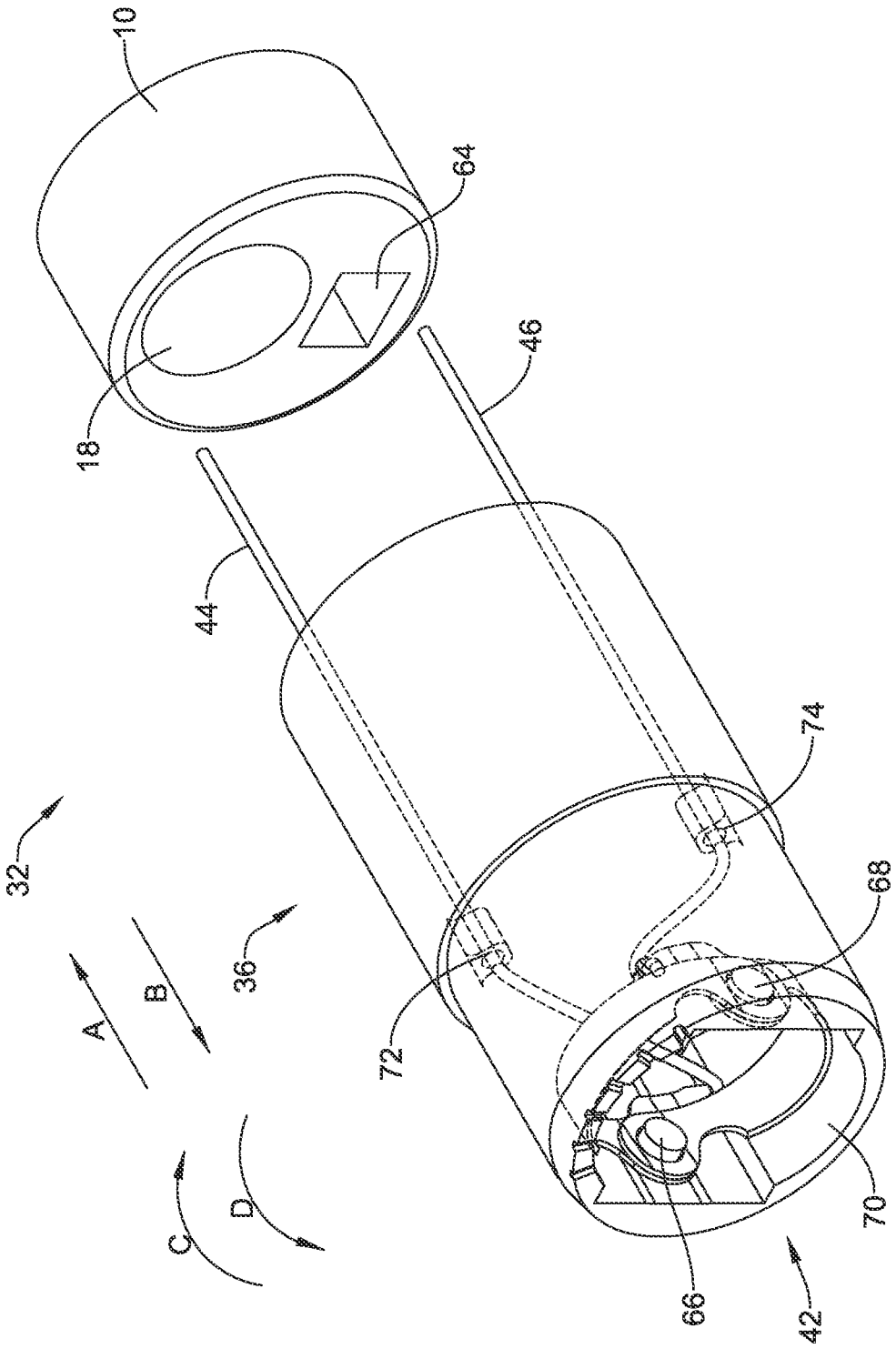

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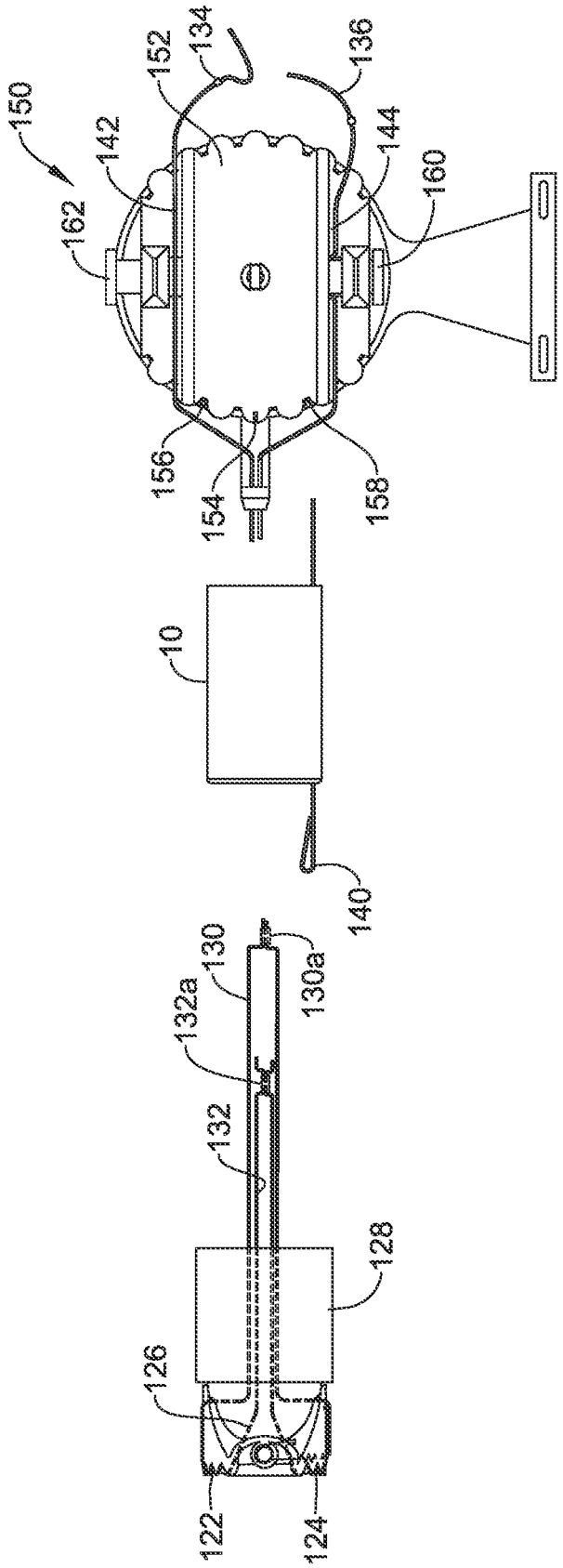
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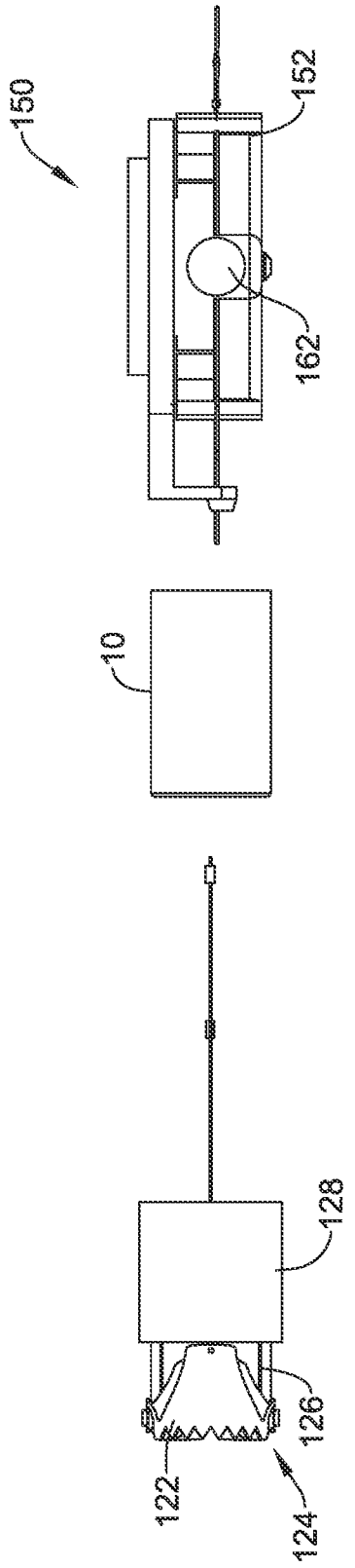
FIG. 10



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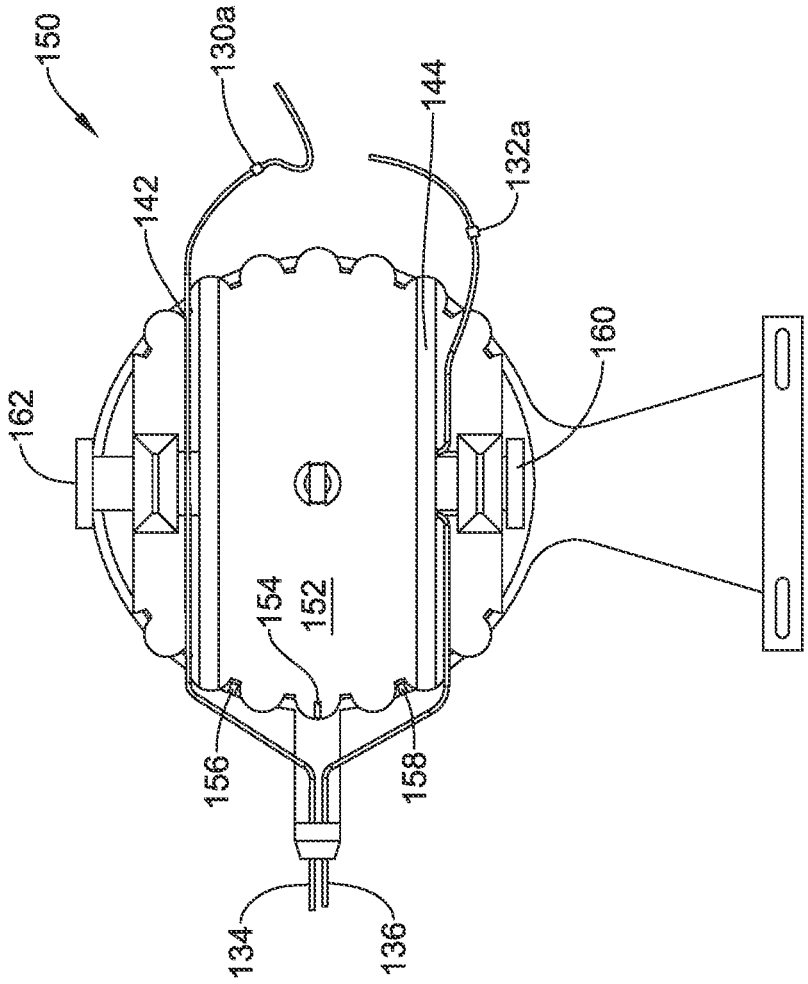

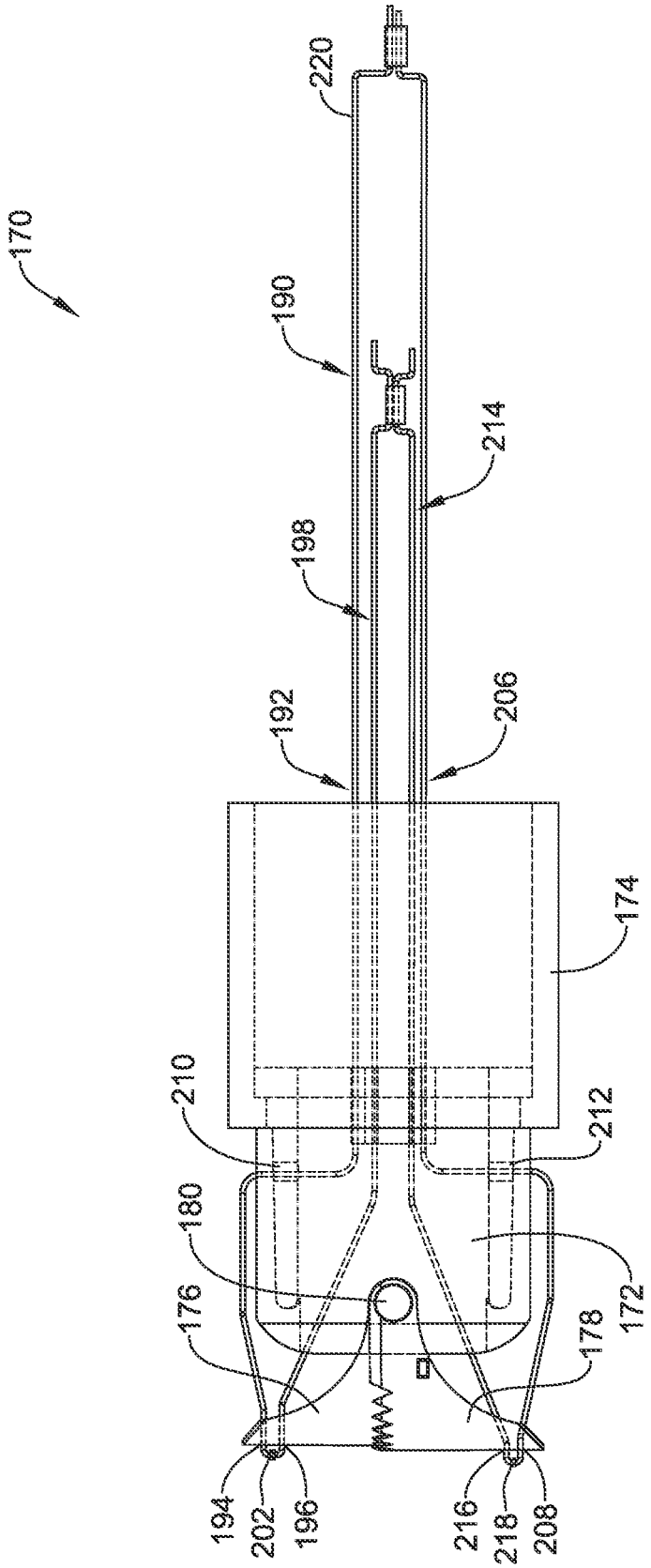
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FIG. 13

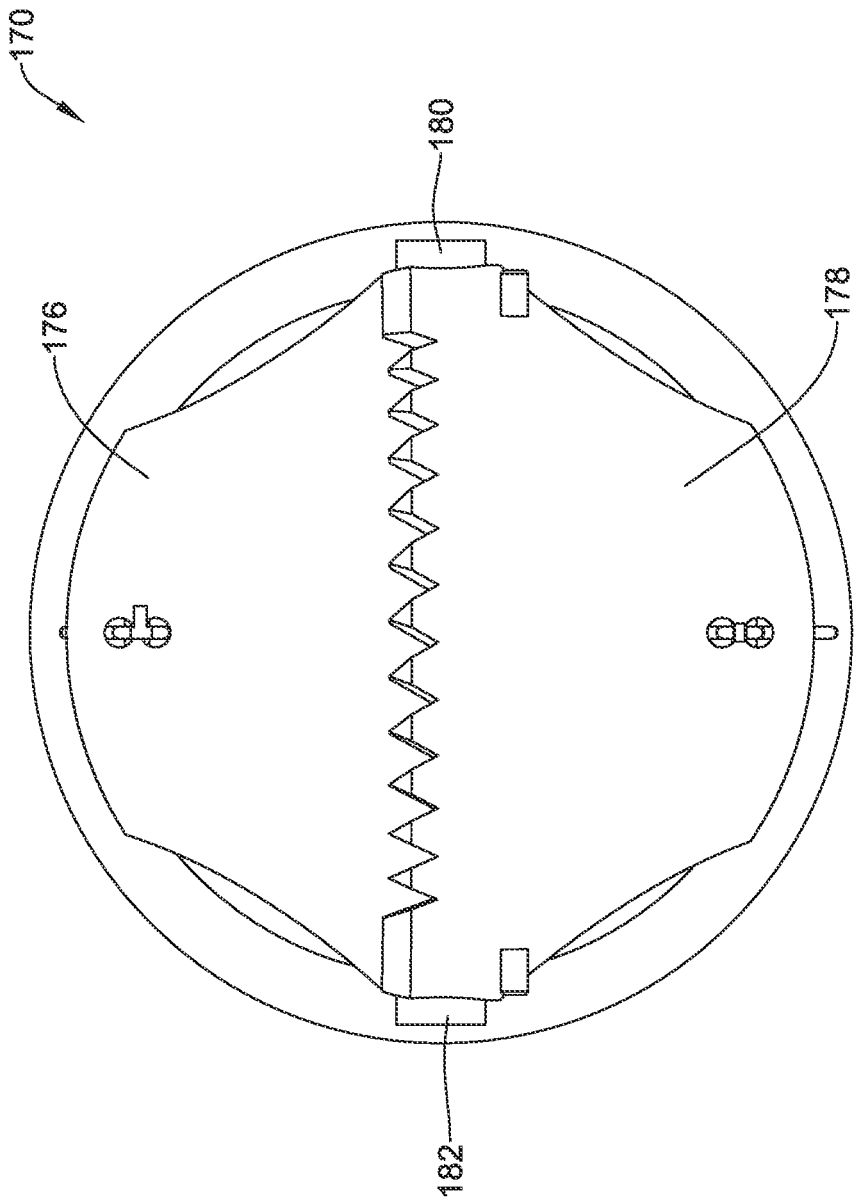
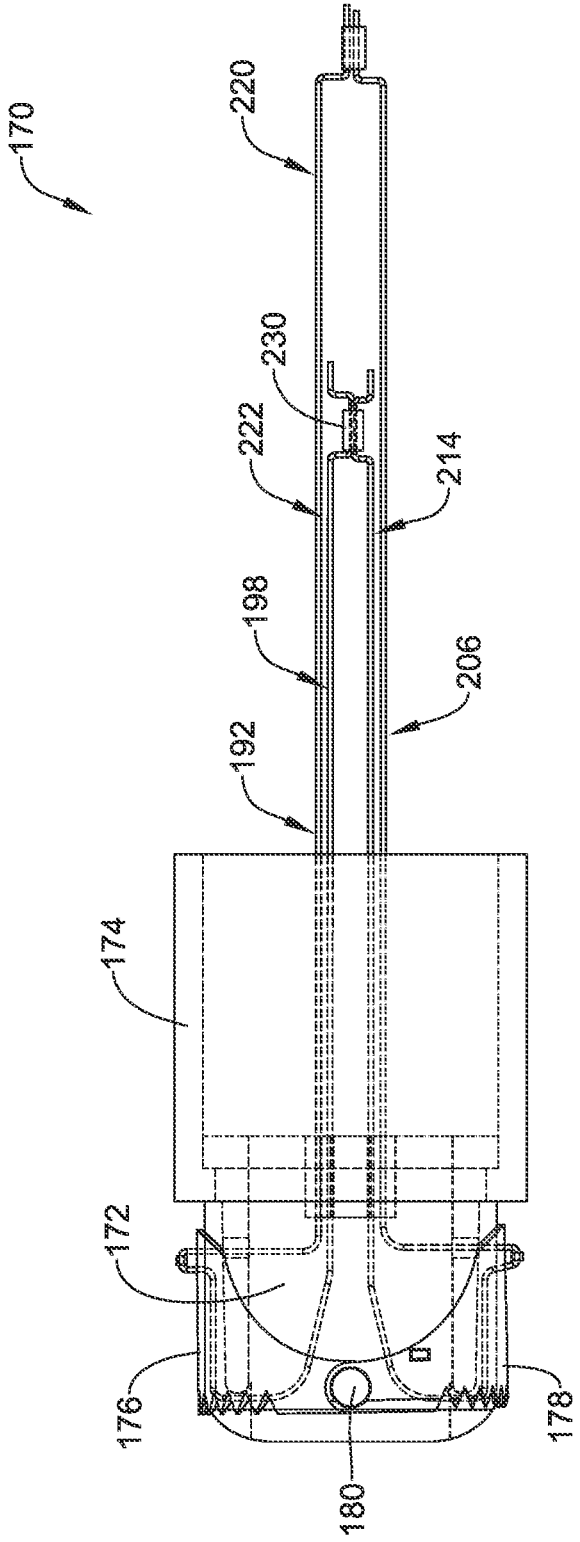


FIG. 14



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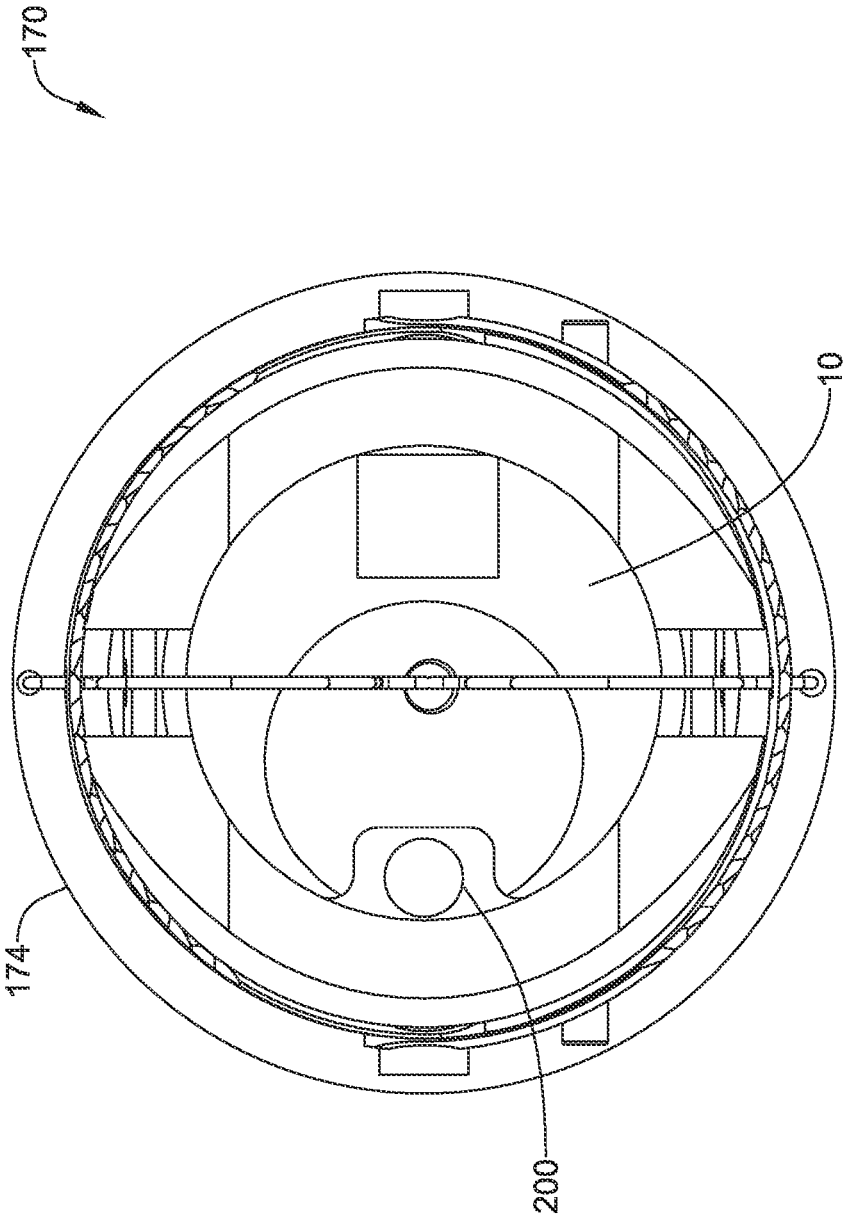

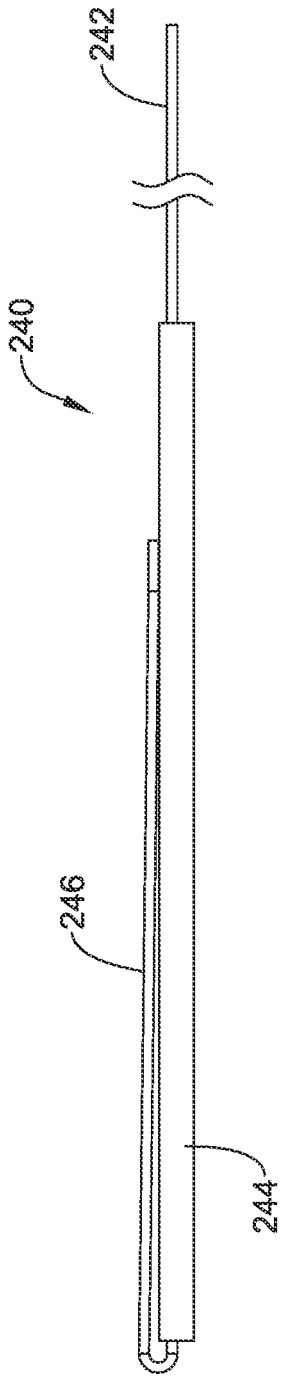

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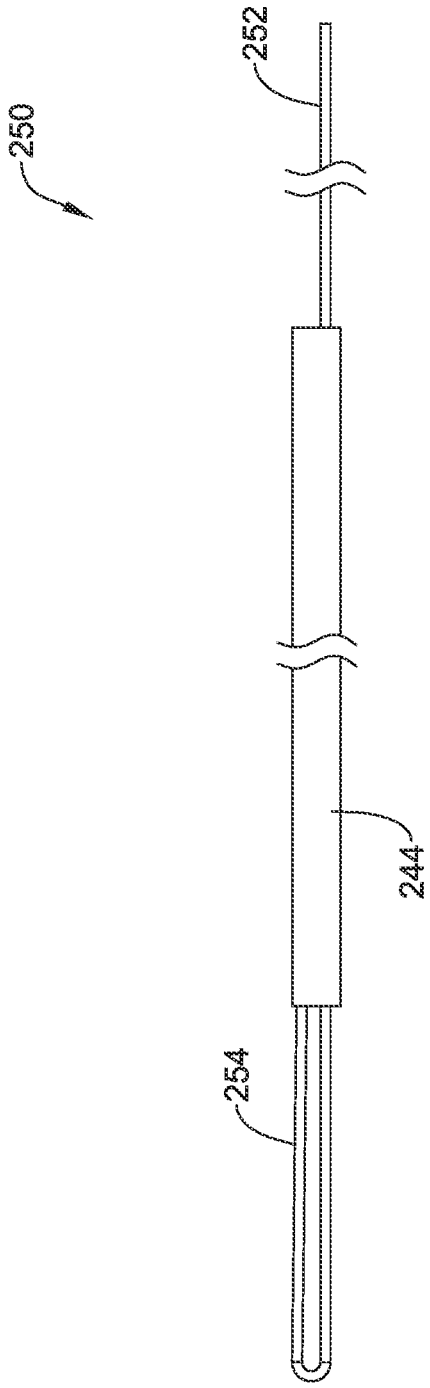

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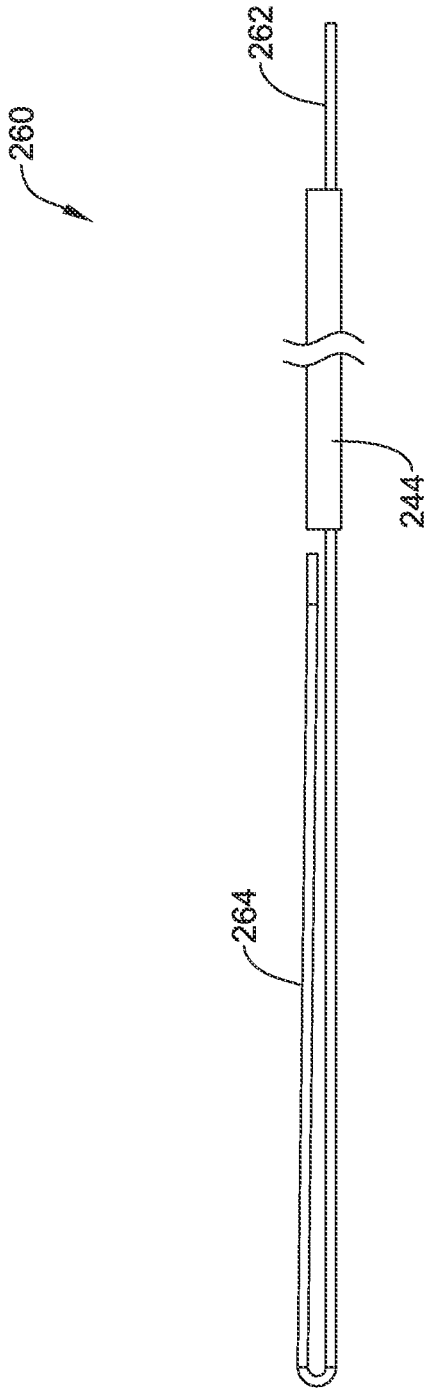

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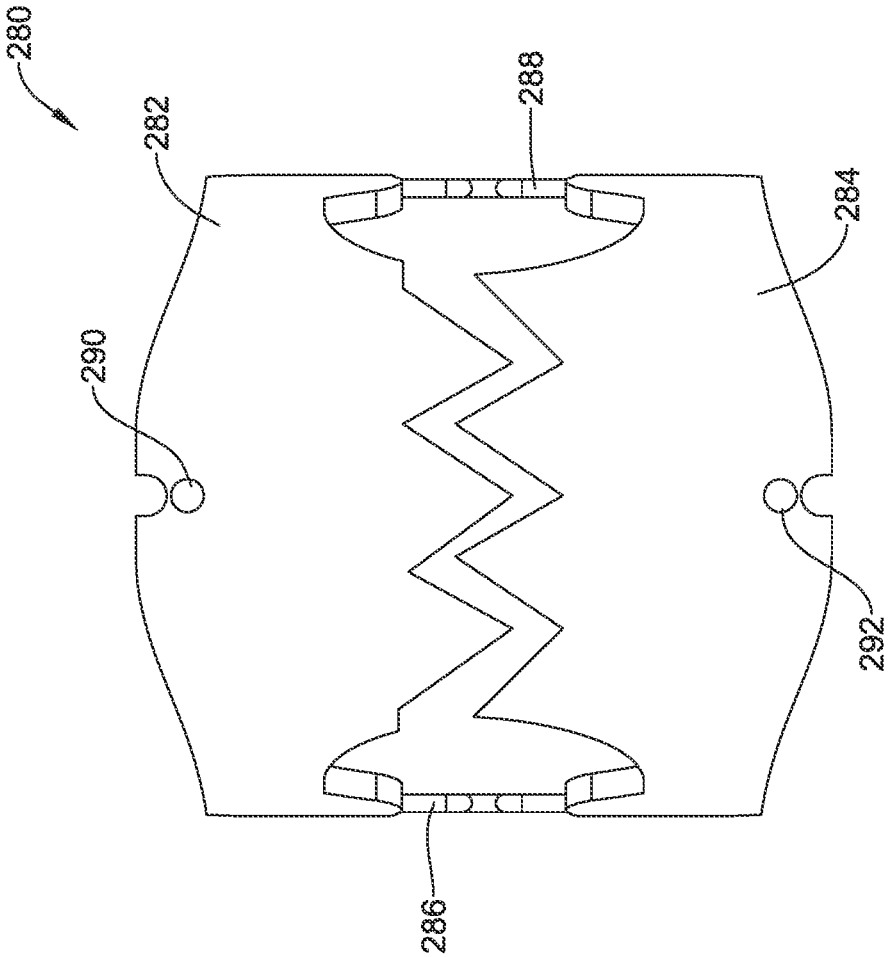

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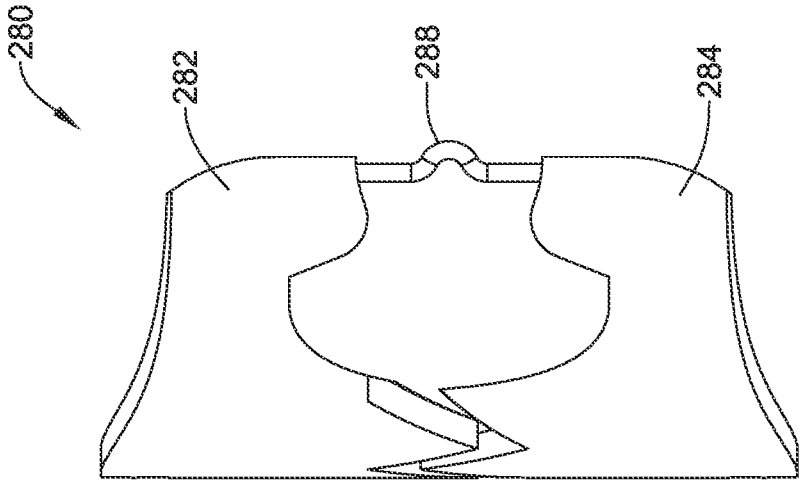

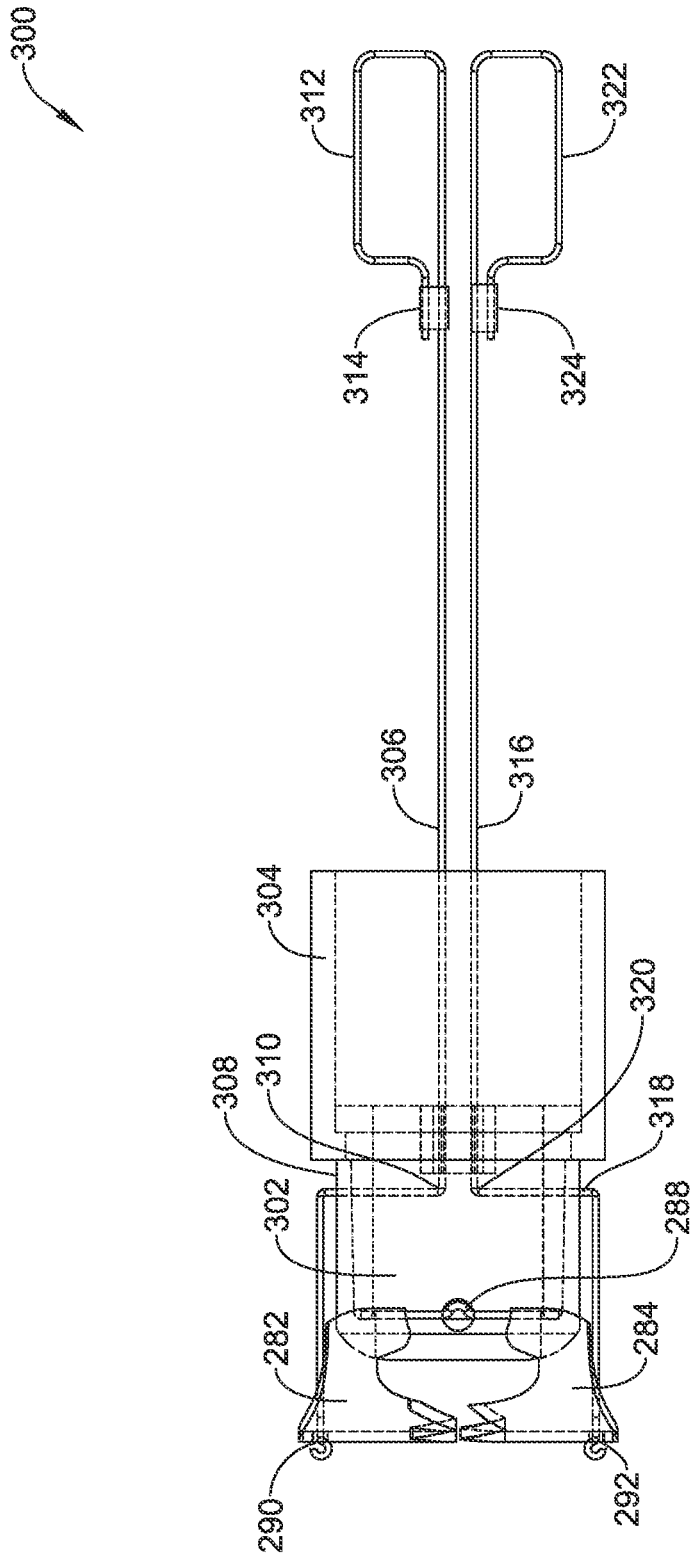
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FIG. 22

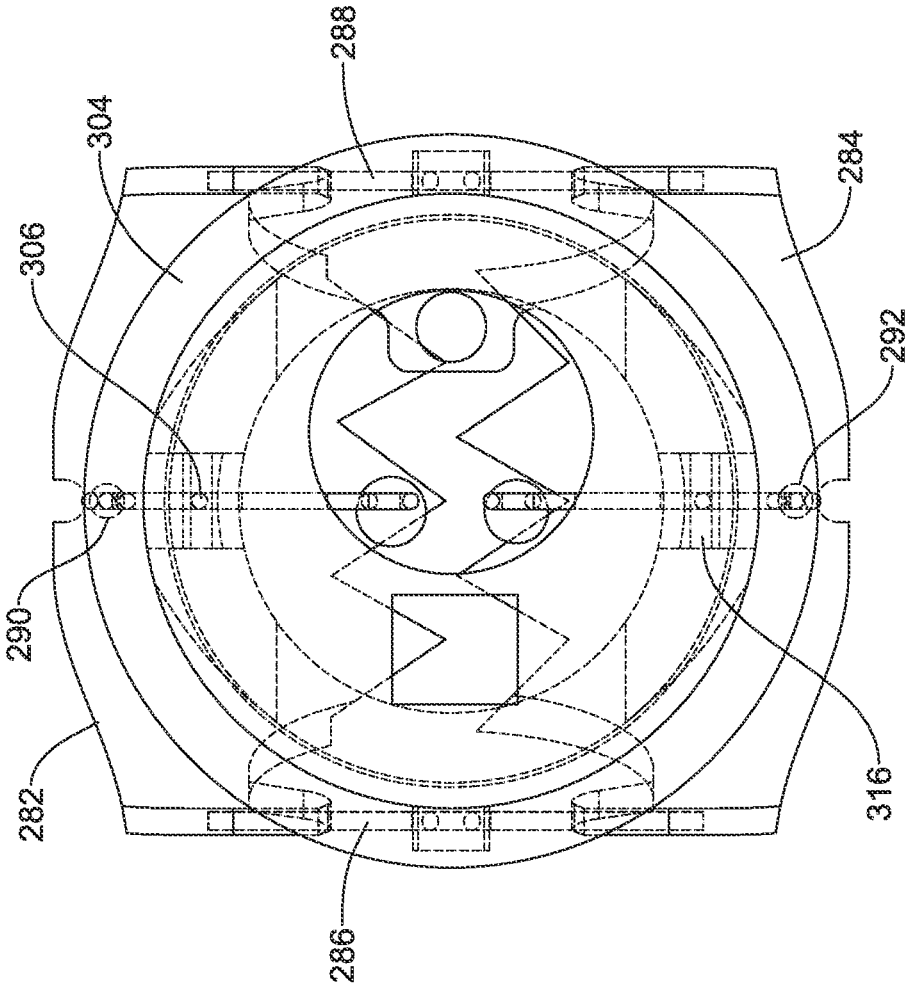

FIG. 23

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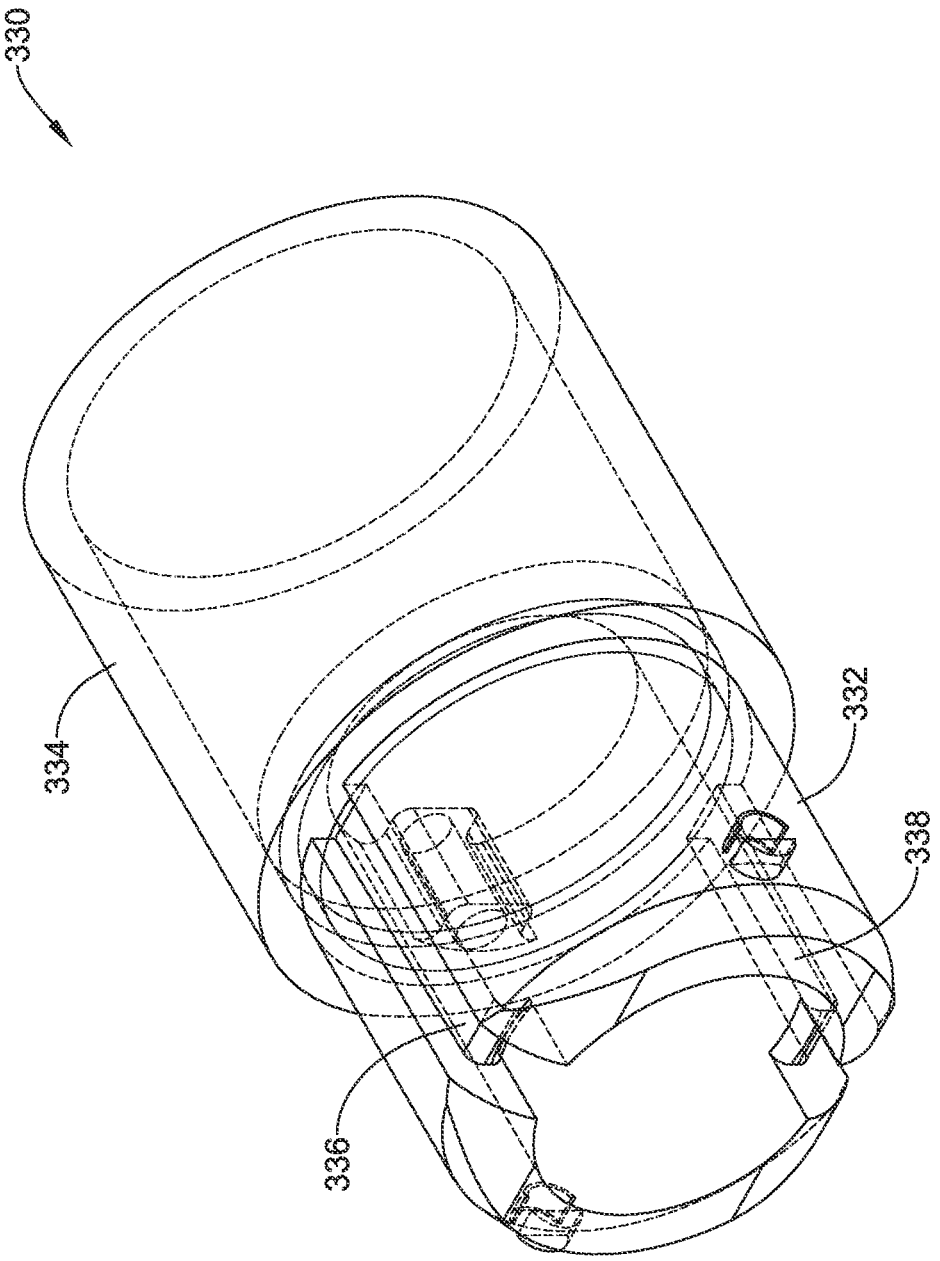


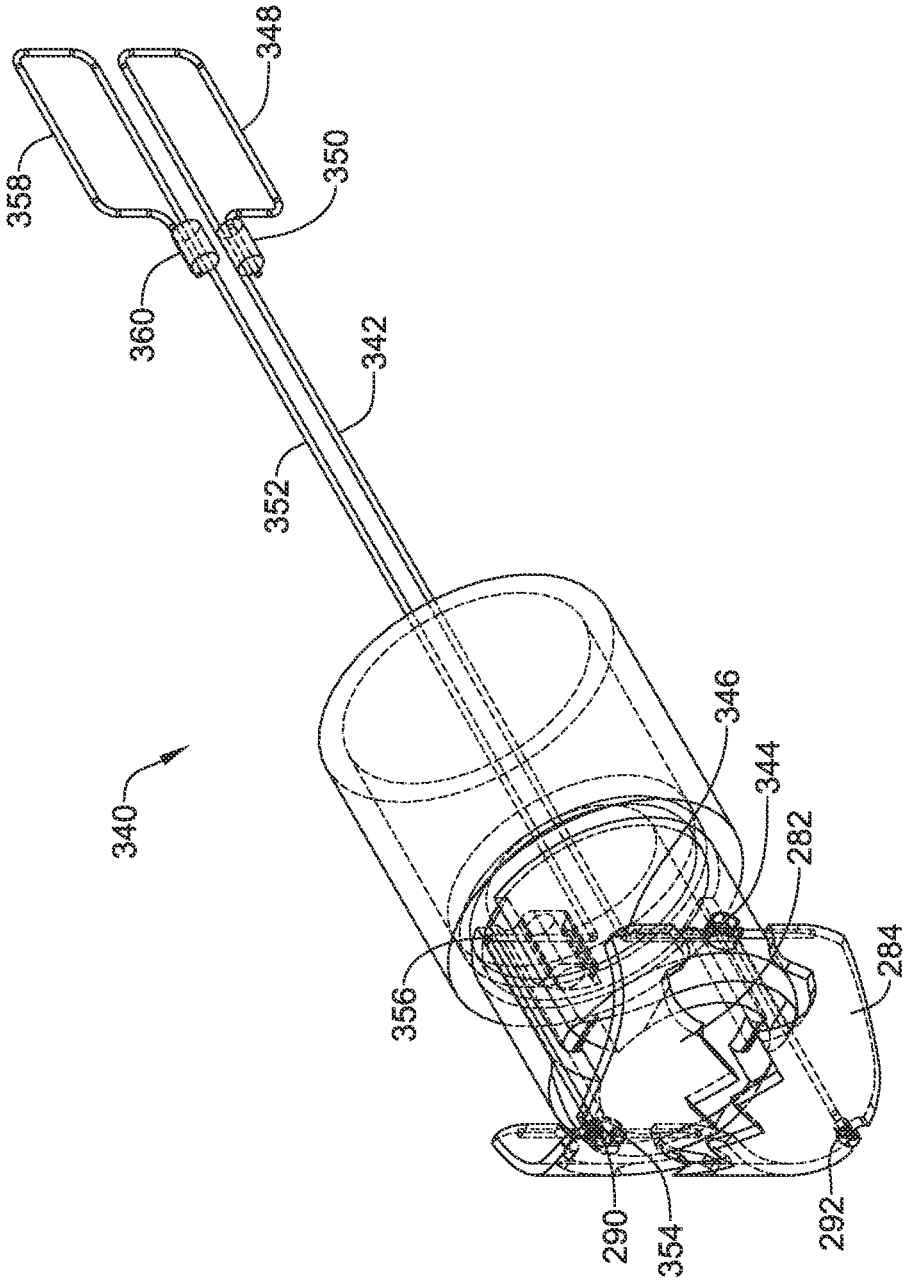


FIG. 25

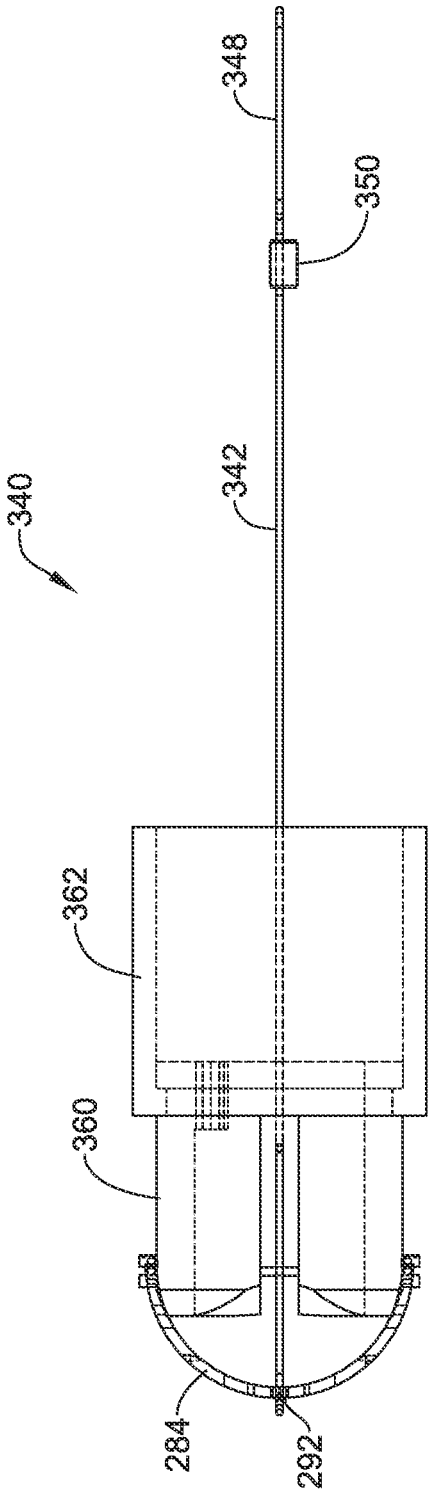


FIG. 26

FIG. 27

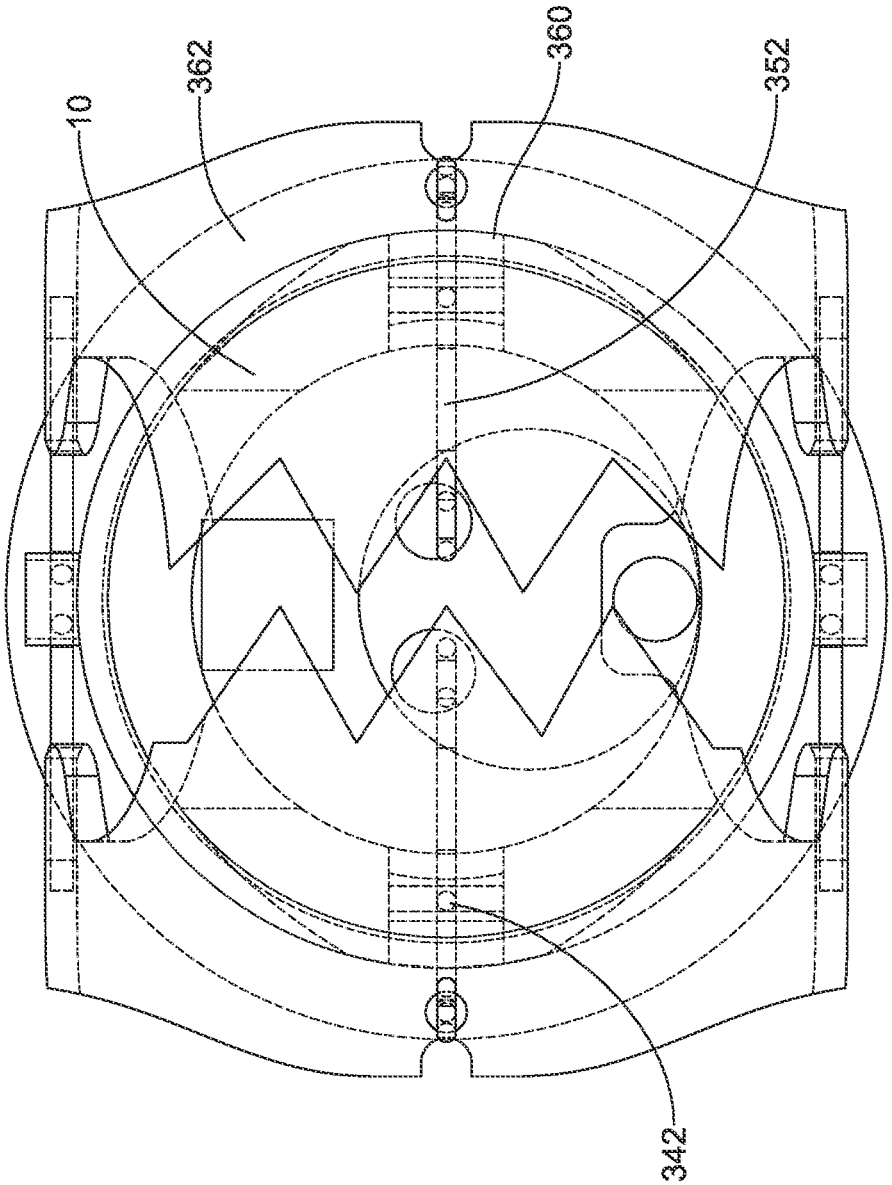


FIG. 28

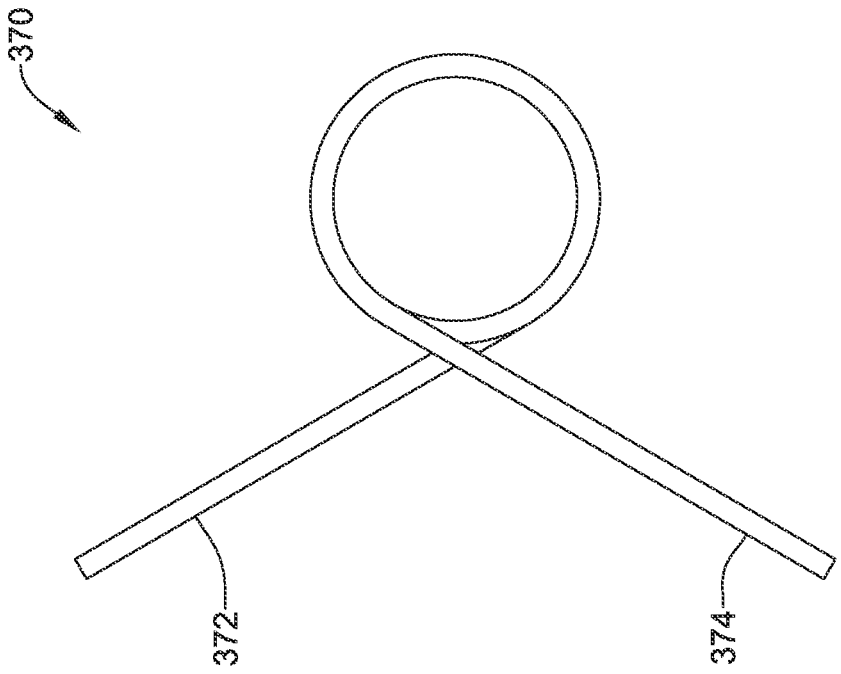


FIG. 29

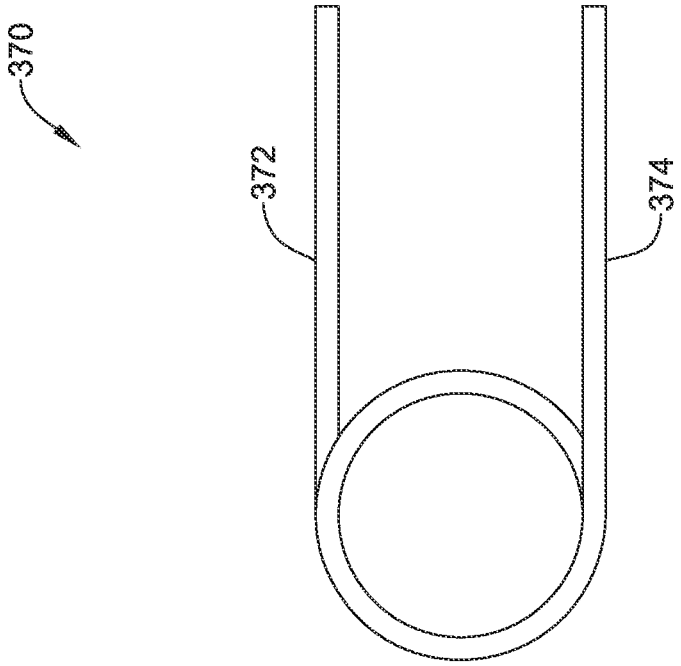


FIG. 30

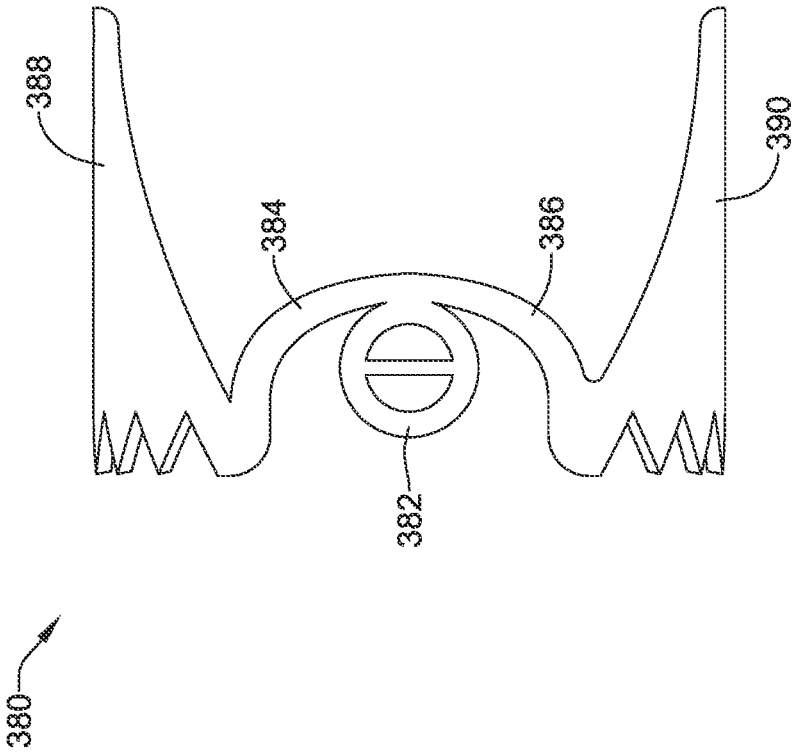


FIG. 31

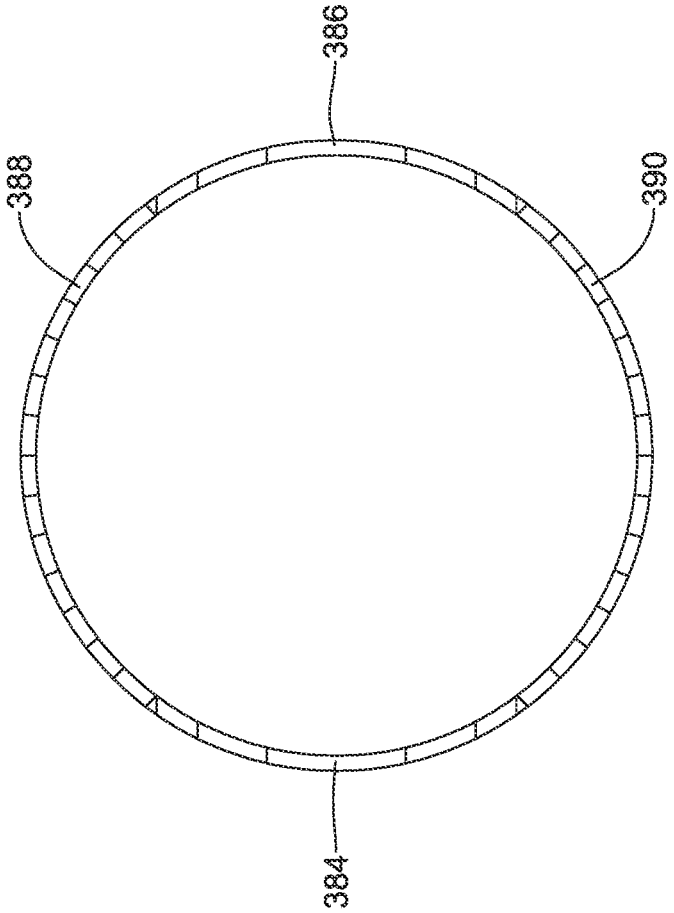
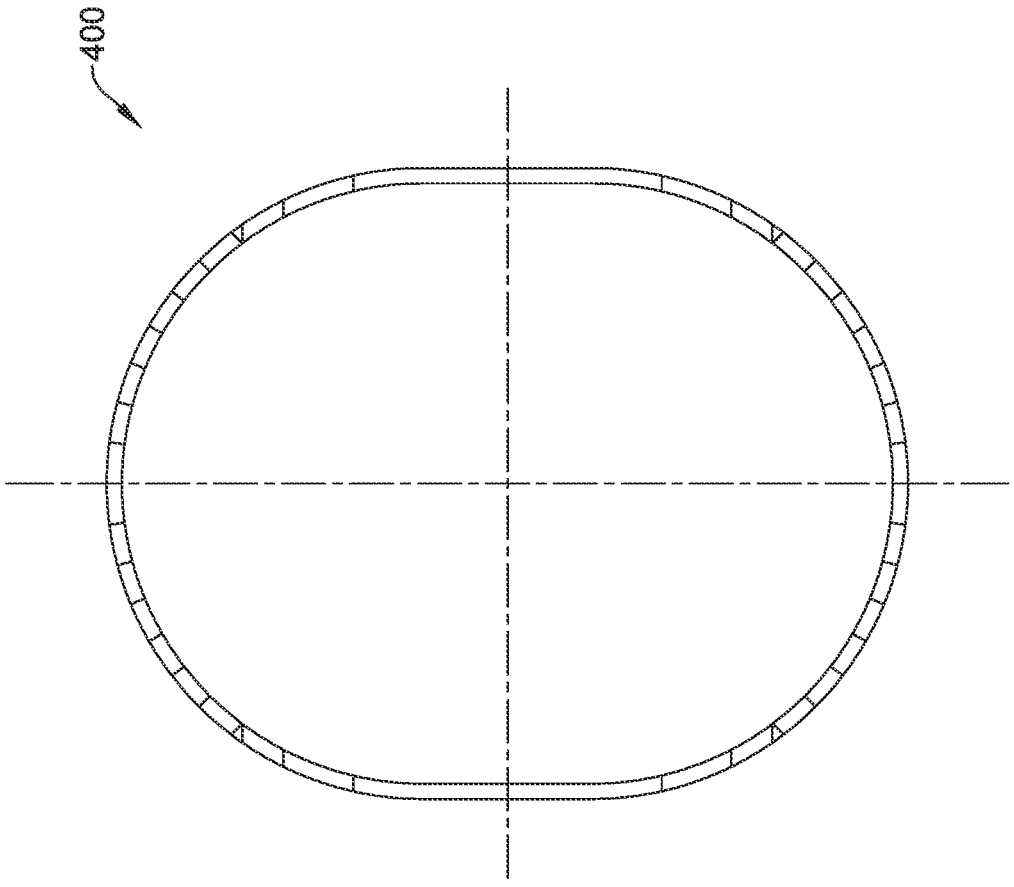


FIG. 32



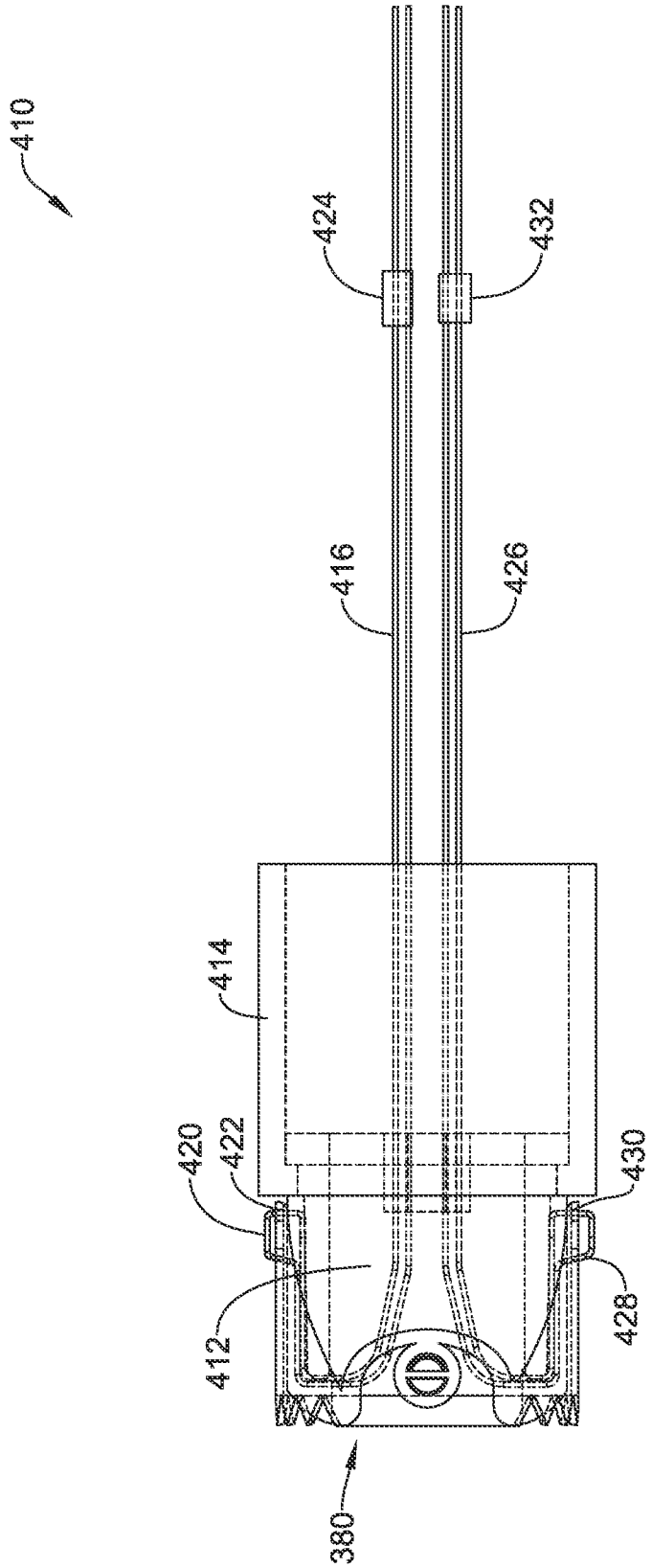


FIG. 33

FIG. 34

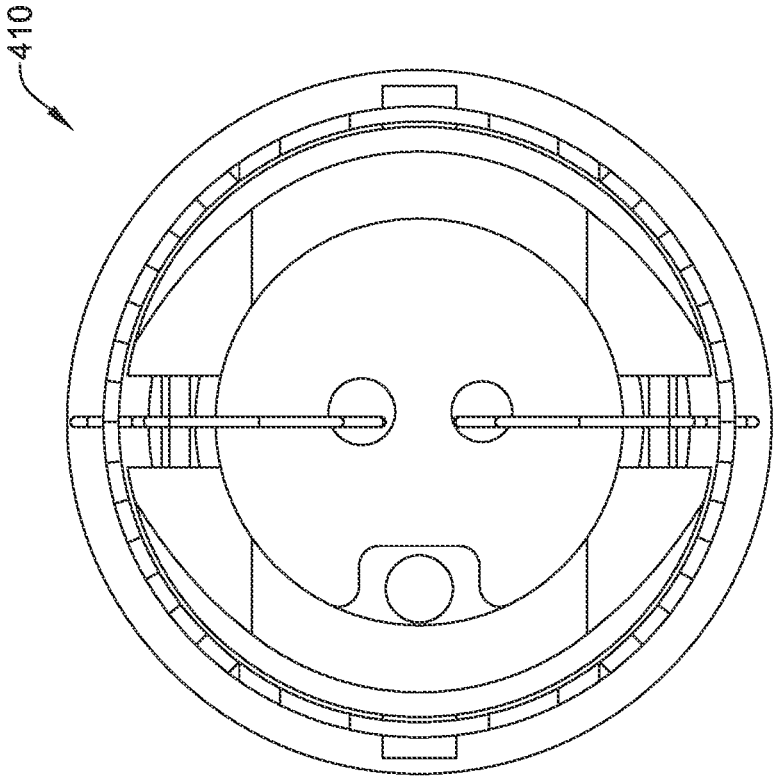
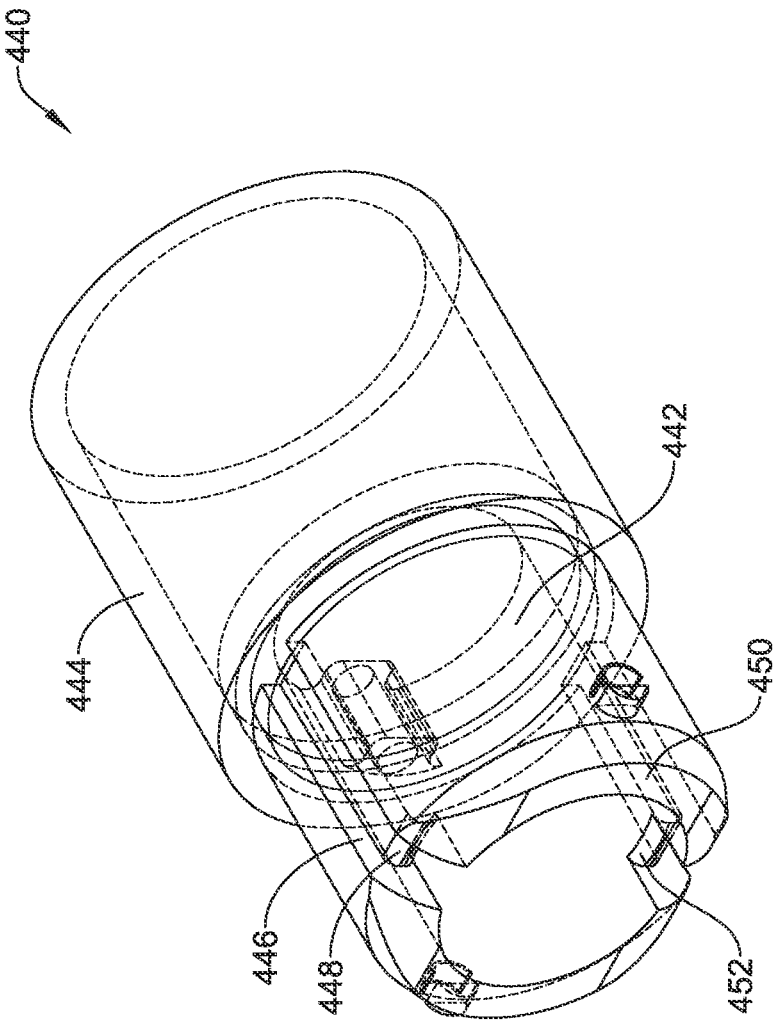


FIG. 35



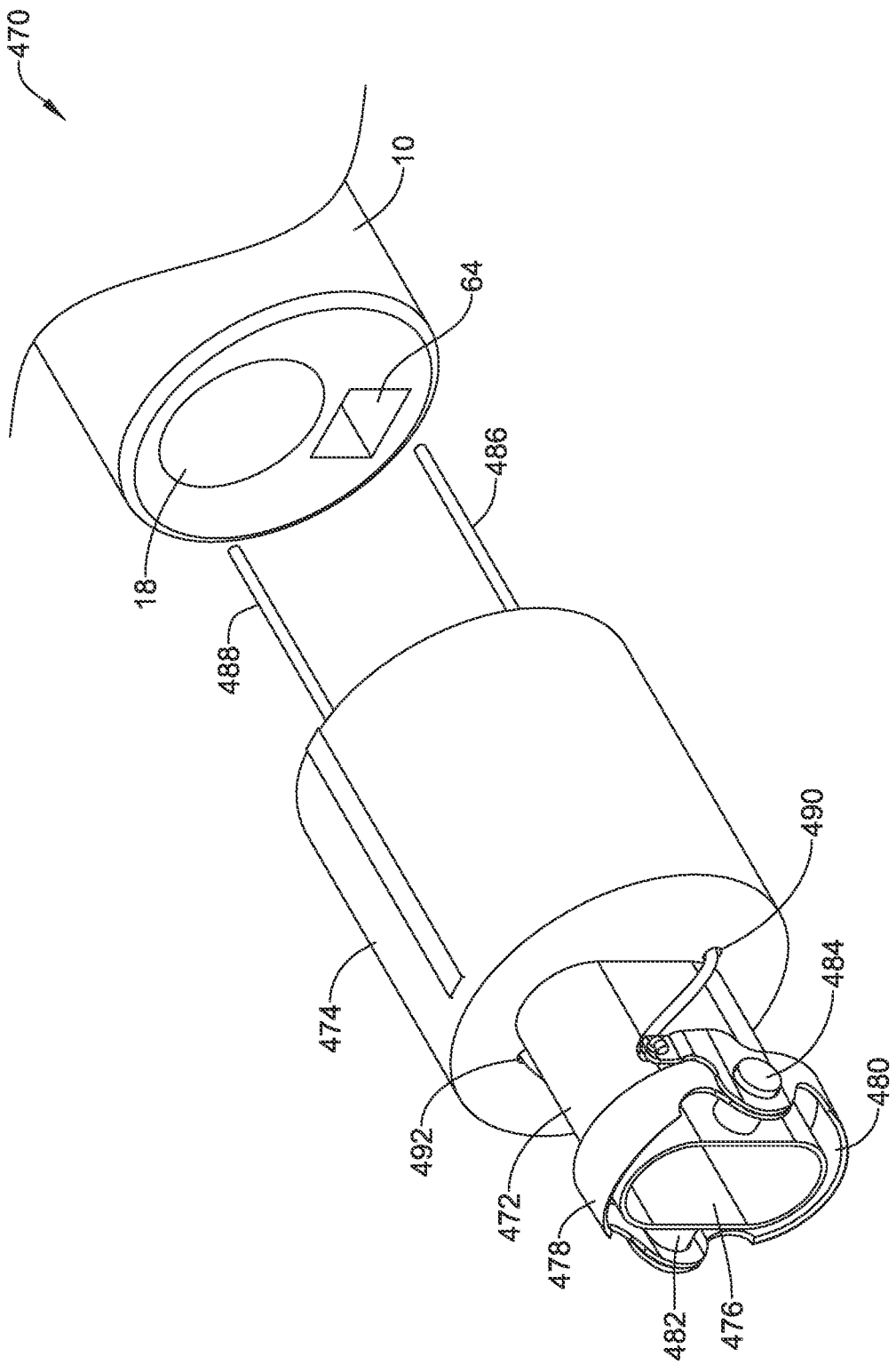


FIG. 36

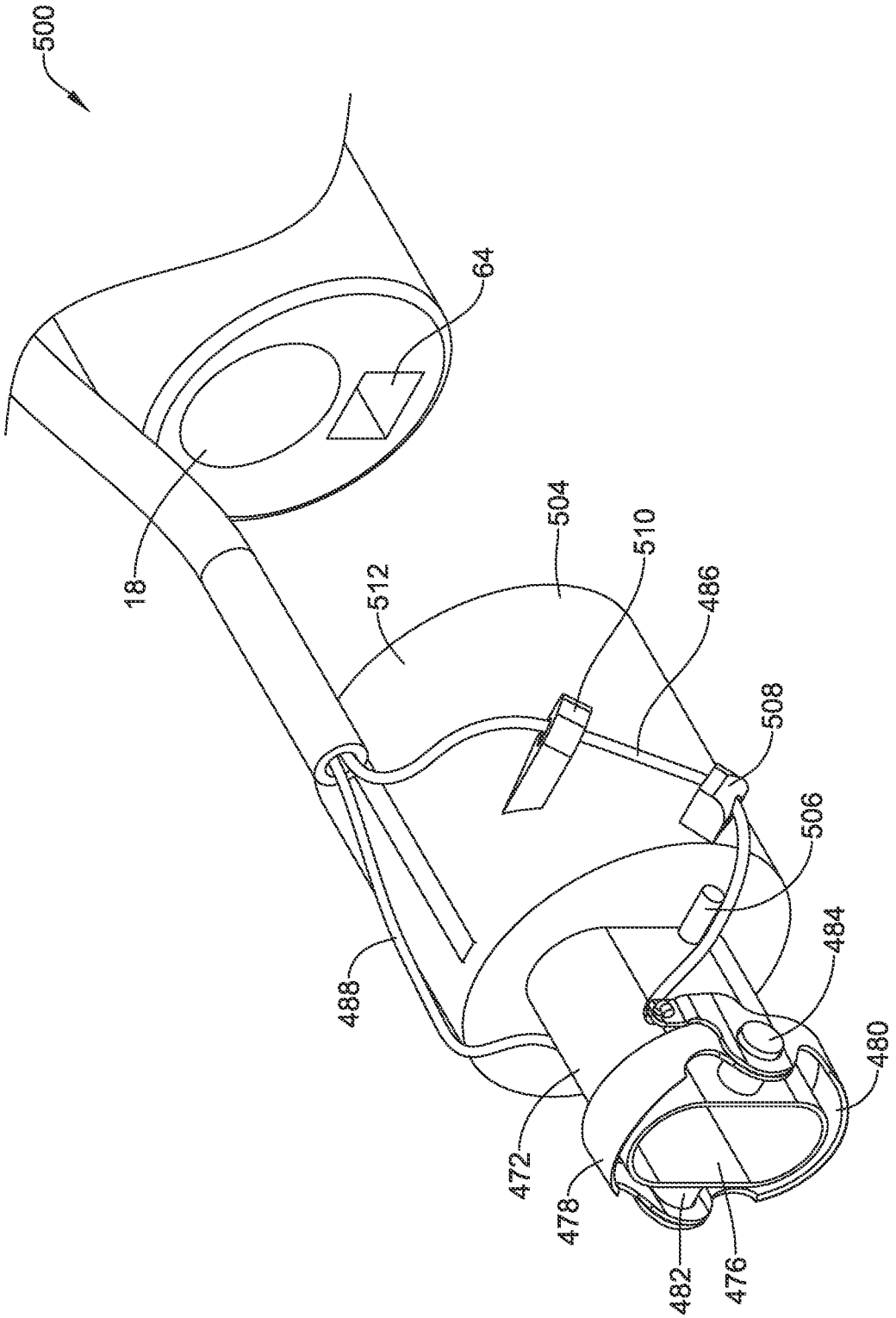


FIG. 37

BIOPSY DEVICE FOR USE WITH ENDOSCOPE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of and priority to U.S. Provisional Patent Application Ser. No. 63/110,139 filed on Nov. 5, 2020, the disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure pertains to medical devices for removing tissue. More particularly, the present disclosure pertains to medical devices usable with an endoscope for removing tissue.

BACKGROUND

[0003] A wide variety of intracorporeal medical devices have been developed for medical use, for example, intravascular use. Some of these devices include guidewires, catheters, and the like. These devices are manufactured by any one of a variety of different manufacturing methods and may be used according to any one of a variety of methods. Of the known medical devices and methods, each has certain advantages and disadvantages. There is an ongoing need to provide alternative medical devices as well as alternative methods for manufacturing and using medical devices.

BRIEF SUMMARY

[0004] This disclosure provides design, material, manufacturing method, and use alternatives for medical devices. As an example, a biopsy device adapted for use with an endoscope includes an adaptor that is adapted to be secured relative to the endoscope. The adaptor includes an inner surface and an outer surface. A pair of jaws is pivotably disposed relative to the adaptor. An actuator is operably coupled with the pair of jaws and extends proximally therefrom. The actuator is adapted to move the pair of jaws relative to the adaptor.

[0005] Alternatively or additionally, the adaptor may be adapted to be moved in a first axial direction to open the pair of jaws and to be moved in an opposing second axial direction to close the jaws.

[0006] Alternatively or additionally, the pair of jaws may be biased to a first position, and the actuator is adapted to move the pair of jaws against a biasing force.

[0007] Alternatively or additionally, the adaptor may include a first pivot point along a first side of the biopsy device housing and a second pivot point along a second side of the biopsy device housing.

[0008] Alternatively or additionally, the first pivot point and the second pivot point may be disposed on the inner surface of the adaptor.

[0009] Alternatively or additionally, the first pivot point and the second pivot may be disposed on the outer surface of the adaptor.

[0010] Alternatively or additionally, the actuator may include a first actuator member secured relative to the first jaw and a second actuator member secured relative to the second jaw such that applying an axial force to the first actuator member and/or the second actuator member causes the first jaw and/or the second jaw to pivot relative to the biopsy device housing.

[0011] Alternatively or additionally, the first jaw may include a first actuator arm and the second jaw may include a second actuator arm, with the first actuator member secured to the first actuator arm and the second actuation member secured to the second actuator arm.

[0012] Alternatively or additionally, the adaptor may include a first alignment feature that accommodates the first actuator member extending therethrough and a second alignment feature that accommodates the second actuator member extending therethrough.

[0013] Alternatively or additionally, the biopsy device may further include a coupler adapted to releasably secure the biopsy device housing relative to the endoscope.

[0014] Alternatively or additionally, the biopsy device may further include an actuator handle operably coupled with the actuator member.

[0015] Alternatively or additionally, the actuator handle may include a first member slidingly secured relative to a second member, with the actuator securable to the first member, wherein moving the first member relative to the second member may cause the actuator to open or close the pair of jaws.

[0016] Alternatively or additionally, the actuator handle may include a rotatable wheel, with the actuator securable to the rotatable wheel, and rotating the wheel may cause the actuator to open or close the pair of jaws.

[0017] As another example, a biopsy device is adapted for use with an endoscope. The biopsy device includes an adaptor adapted to be secured relative to the endoscope. A first jaw is pivotably secured to the adaptor. A second jaw is pivotably secured to the adaptor, and the first jaw and the second jaw together are pivotably to a closed configuration in which the first jaw and the second jaw cooperate to cut tissue. A first actuator member is secured to the first jaw such that moving the first actuator member causes the first jaw to pivot relative to the adaptor and a second actuator member is secured to the second jaw such that moving the second actuator member causes the second jaw to pivot relative to the adaptor. An actuator handle is operably coupled with the first actuator member and the second actuator member such that manipulating the actuator handle causes the first jaw and the second jaw to pivot relative to the adaptor.

[0018] Alternatively or additionally, the first actuator member and the second actuator member may extend proximally to the actuator handle.

[0019] Alternatively or additionally, the first actuator member and the second actuator member may be coupled together, and only one of the first actuator member and the second member may extend proximally to the actuator handle.

[0020] Alternatively or additionally, the actuator handle may include a first handle slidingly secured relative to a second handle, with at least one of the first actuator member and the second actuator handle securable to the first member, wherein moving the first handle relative to the second handle may cause the actuator to open or close the pair of jaws.

[0021] Alternatively or additionally, the actuator handle may include a rotatable wheel, with the first actuator member and the second actuator member securable to the rotatable wheel, and rotating the wheel may cause the actuator to open or close the pair of jaws.

[0022] As another example, a medical device is adapted for use with an access device. The medical device includes an adaptor adapted to be secured relative to an access device.

A pair of jaws is pivotably secured to the adaptor and are movable between an open position in which each of the pair of jaws pivots away from each other and a cutting position in which each of the pair of jaws pivots toward each other. A spring biases the pair of jaws towards one of the open position and the cutting position. An actuator is operably coupled with the pair of jaws and extends proximally therefrom and is adapted to move the pair of jaws against a biasing force applied by the spring.

[0023] Alternatively or additionally, the medical device may further include an actuator handle operably coupled with the actuator.

[0024] The above summary of some embodiments is not intended to describe each disclosed embodiment or every implementation of the present disclosure. The Figures, and Detailed Description, which follow, more particularly exemplify these embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The disclosure may be more completely understood in consideration of the following detailed description in connection with the accompanying drawings, in which:

[0026] FIG. **1** is a perspective view of an illustrative endoscope;

[0027] FIG. **2** is a perspective view of an illustrative biopsy device usable with the illustrative endoscope of FIG. **1**;

[0028] FIG. **3** is a perspective view of a portion of the illustrative biopsy device of FIG. **2**, shown with the jaws in a closed configuration;

[0029] FIG. **4** is a cross-sectional view taken along line **4-4** of FIG. **3**;

[0030] FIG. **5** is a schematic cross-sectional view of the illustrative biopsy device;

[0031] FIG. **6** is a perspective view of a pair of jaws forming part of the illustrative biopsy device of FIG. **2**, with the pair of jaws shown in a closed configuration;

[0032] FIG. **7** is a perspective view of a pair of jaws forming part of the illustrative biopsy device of FIG. **2**, with the pair of jaws shown in an open configuration;

[0033] FIG. **8** is a perspective view of a jaw forming part of the illustrative biopsy device of FIG. **2**;

[0034] FIG. **9** is a perspective view of a portion of the illustrative biopsy device of FIG. **2**, shown with the jaws in an open configuration;

[0035] FIG. **10** is a side view of an illustrative biopsy device;

[0036] FIG. **11** is a top view of the illustrative biopsy device of FIG. **10**;

[0037] FIG. **12** is an enlarged view of a portion of the illustrative biopsy device of FIG. **10**;

[0038] FIG. **13** is a side view of an illustrative biopsy device, shown with the jaws in a closed configuration;

[0039] FIG. **14** is an end view of the illustrative biopsy device of FIG. **13**;

[0040] FIG. **15** is a side view of the illustrative biopsy device of FIG. **13**, shown with the jaws in an open configuration;

[0041] FIG. **16** is an end view of the illustrative biopsy device of FIG. **15**;

[0042] FIGS. **17** through **19** are side views of illustrative extension hook wires;

[0043] FIGS. **20** and **21** are front and side views, respectively, of an illustrative pair of jaws;

[0044] FIGS. **22** through **24** are perspective, top and end views, respectively, of an illustrative adaptor and coupler;

[0045] FIGS. **25** through **27** are perspective, bottom and end views, respectively, of an illustrative biopsy device;

[0046] FIGS. **28** and **29** are schematic views of illustrative torsion springs;

[0047] FIG. **30** is a side view of an illustrative pair of jaws having a normally open position;

[0048] FIGS. **31** and **32** are schematic views of cutting patterns that may be used to form the illustrative pair of jaws of FIG. **30**;

[0049] FIGS. **33** and **34** are side and end views, respectively, of an illustrative biopsy device including the illustrative pair of jaws of FIG. **30**;

[0050] FIG. **35** is a perspective view of an illustrative adaptor and coupler usable in the illustrative biopsy device of FIGS. **33** and **34**;

[0051] FIG. **36** is a perspective view of an illustrative biopsy device; and

[0052] FIG. **37** is a perspective view of an illustrative biopsy device.

[0053] While the disclosure is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the disclosure.

DETAILED DESCRIPTION

[0054] For the following defined terms, these definitions shall be applied, unless a different definition is given in the claims or elsewhere in this specification.

[0055] All numeric values are herein assumed to be modified by the term "about", whether or not explicitly indicated. The term "about" generally refers to a range of numbers that one of skill in the art would consider equivalent to the recited value (e.g., having the same function or result). In many instances, the terms "about" may include numbers that are rounded to the nearest significant figure.

[0056] The recitation of numerical ranges by endpoints includes all numbers within that range (e.g. 1 to 5 includes 1, 1.5, 2, 2.75, 3, 3.80, 4, and 5).

[0057] As used in this specification and the appended claims, the singular forms "a", "an", and "the" include plural referents unless the content clearly dictates otherwise. As used in this specification and the appended claims, the term "or" is generally employed in its sense including "and/or" unless the content clearly dictates otherwise.

[0058] It is noted that references in the specification to "an embodiment", "some embodiments", "other embodiments", etc., indicate that the embodiment described may include one or more particular features, structures, and/or characteristics. However, such recitations do not necessarily mean that all embodiments include the particular features, structures, and/or characteristics. Additionally, when particular features, structures, and/or characteristics are described in connection with one embodiment, it should be understood that such features, structures, and/or characteristics may also be used connection with other embodiments whether or not explicitly described unless clearly stated to the contrary.

[0059] The following detailed description should be read with reference to the drawings in which similar elements in

different drawings are numbered the same. The drawings, which are not necessarily to scale, depict illustrative embodiments and are not intended to limit the scope of the invention.

[0060] The disclosure pertains to manipulating, cutting, grabbing, ligating, and/or otherwise treating tissue. In some instances, the devices, systems and/or methods discussed herein may be utilized during endoscopic mucosal resection (EMR) and/or endoscopic submucosal dissection (ESD) procedures. In some cases, EMR and ESD include endoluminal placement of one or more devices for grasping and cutting tissue proximate to a target area within the body of a patient. Placement of the one or more medical devices may be via a catheter, scope (endoscope, bronchoscope, colonoscope, gastroscope, duodenoscope, etc.), tube, or sheath, inserted into the GI tract via a natural orifice or incision. The orifice can be, for example, the nose, mouth, or anus, and the placement can be in any portion of the GI tract, including the esophagus, stomach, duodenum, large intestine, or small intestine. Placement also can be in other organs reachable via the GI tract. The patient's tissue may be grasped using suction from one or more medical devices and/or a grasper, and then the tissue may be cut by a cutting device for subsequent removal from the patient's body.

[0061] In some cases, an endoscope may be used. An example endoscope **10** is illustrated in FIG. **1**. The endoscope **10** may be any of a number of types of endoscopes or related medical devices usually identified by the particular anatomy desired to be reached. For example, the endoscope **10** may be a bronchoscope, colonoscope, duodenoscope, esophagoscope, guidetubes, introducers (without or without vision or visualization capabilities), or any other type of endoscope or related medical device. The endoscope **10** may include a handpiece **12** and an elongate shaft **14** extending distally from the handpiece **12** to a distal tip region **16**. The handpiece **12**, for example, may include a number of controls such as one or more control knobs **22**. The shaft **14** may include a lumen defining a working channel **18** extending through the shaft **14**. Although the endoscope **10** is depicted with a single working channel in FIG. **1**, it can be appreciated that in other embodiments, the endoscope **10** may include multiple working channels, as desired. A biopsy port **20** may be disposed adjacent to the shaft **14** and the biopsy port **20** may provide access to the working channel **18**.

[0062] FIG. **2** is a perspective view of an illustrative assembly **30**. The illustrative assembly **30** may include a biopsy device **32** used in conjunction with the endoscope **10**. It will be appreciated that portions of the endoscope **10** are shown schematically in FIG. **2**. For example, in some instances, the endoscope **10** may include a Y connector **34** with a side port **36**. While described as an endoscope, it will be appreciated that the endoscope **10** may also be any of a colonoscope, a sigmoidoscope, an enteroscope, a cystoscope, a ureteroscope, a flexible ureteroscope or the like.

[0063] The biopsy device **32** includes a distal assembly **36**. As will be discussed in greater detail with respect to subsequent Figures, the distal assembly **36** may include an adaptor **38** that is adapted to be secured to the distal tip region **16** of the endoscope **10**. A resilient elastomeric coupler **40** is adapted to releasably secure the adaptor **38** to the distal tip region **16** of the endoscope **10**. The distal assembly **36** includes a pair of jaws **42** that are adapted for cutting or otherwise incising tissue in order to obtain a biopsy sample, for example. The pair of jaws **42** may be adapted to move between an open position, in which the pair of jaws **42** are not positioned to cut tissue, and a closed position in which the pair of jaws **42** interact together to cut tissue. In some cases, one of the pair of jaws **42** may move over the other of the pair of jaws **42** such that a shear cut is provided. In some cases, the pair of jaws **42** may be configured such that the cutting edge of one of the pair of jaws **42** directly contacts the cutting edge of the other of the pair of jaws **42**. The cutting edges of each of the pair of jaws **42** may be serrated, for example. In some cases, one of the pair of jaws **42** has a smooth cutting edge while the other of the pair of jaws **42** has a flat surface against which the smooth cutting edge interacts in order to cut tissue.

[0064] The biopsy device **30** includes a first actuator member **44** and a second actuator member **46**. The first actuator member **44** may be secured to one of the pair of jaws **42** while the second actuator member **46** may be secured to the other of the pair of jaws **42**. Axial movement of the first actuator member **44** and/or the second actuator member **46** may cause relative movement of the pair of jaws **42** between their closed configuration and their open configuration, for example. The first actuator member **44** and the second actuator member **46** each extend proximally from the distal assembly **36** towards an actuator handle **48**. The actuator handle **48** may take a variety of different forms, as along as the actuator handle **48** is adapted to enable a user to axially translate the first actuator member **44** and/or the second actuator member **46** relative to the distal assembly **36** and thus cause a corresponding movement of the pair of jaws **42**. While the biopsy device **30** as shown in FIG. **2** shows the first actuator member **44** and the second actuator member **46** both extending proximally to the actuator handle **48**, this is not necessary in all cases. For example, in some cases, only a single actuator extends proximally to the actuator handle **48**.

[0065] As illustrated, the actuator handle **48** includes a handle body **50** having a thumb ring **52** as well as a finger ring **54** that may be slidingly disposed relative to the handle body **50**. The first actuator member **44** and the second actuator member **46** extend proximally through the finger ring **54** and into and thru an angled tube **56**. The first actuator member **44** and the second actuator member **46** are crimped together via a crimp **58**. As a result, the first actuator member **44** and the second actuator member **46** move together in unison. A fastener **60** may be threadedly engaged with the finger ring **54** in order to secure the first actuator member **44** and the second actuator member **46** relative to the finger ring **54** such that movement of the finger ring **54** relative to the handle body **50** causes corresponding movement of the pair of jaws **42**. In some cases, the handle body **50** may include a proximal marker **62** that reminds the user how far proximally the finger ring **54** should be moved relative to the handle body **50**. The proximal marker **62** may be a colored band, or may be a tab or other structure that extends far enough from the handle body **50** so that the user can feel the presence of the proximal marker **62** while moving the finger ring **54** relative to the handle body **50**.

[0066] FIG. **3** is a perspective view of a portion of the illustrative biopsy device **32** with the pair of jaws **42** shown in a closed position while FIG. **4** is a cross-sectional view of the illustrative biopsy device **32** secured relative to the endoscope **10**, taken along line **4-4** of FIG. **3**. This position corresponds to the relative position of each of the pair of jaws **42** relative to each other when the jaws **42** are cutting

tissue. In some cases, as shown, the adaptor **38** is made from a translucent or even transparent polymer in order to permit viewing through the adaptor **38**. Examples of suitable transparent polymers include polycarbonate, polystyrene, polymethyl methacrylate (PMMA) and acrylonitrile butadiene styrene (ABS) clear. While not shown in FIG. **1**, in some cases the endoscope **10** may include a camera **64** that is disposed adjacent the working channel **18**. It will be appreciated that the video and other images provided by the camera **64**. The coupler **40** may be formed of any suitable polymeric material that exhibits sufficient stretchiness to enable the coupler **40** to be stretched over both the proximal end of the adaptor **38** as well as the distal tip region **16** of the endoscope **10**. Examples of suitable polymers include silicone, rubber, polyurethane and thermoplastic elastomers (TPE). The coupler **40** may include an alignment marker **47** that, as will be discussed, may be used to align with the working channel **18** of the endoscope **10**.

[0067] The adaptor **38** includes hinge pins **66** and **68**. The hinge pins **66** and **68** are situated 180 degrees apart, one on each side of the adaptor **38**. As shown in FIG. **3**, the hinge pins **66** and **68** are disposed on an interior surface **70** of the adaptor **38**. In other cases, as will be discussed, the hinge pins **66** and **68** may instead be disposed on an exterior surface of the adaptor **38**. In some cases, the hinge pins **66** and **68** are molded hinge pins, formed when the adaptor **38** is formed. In some cases, the hinge pins **66** and **68** may instead each be part of a fastener, such as the shaft of a bolt or screw, a rivet or the like, that fasten the pair of jaws **42** to the adaptor **38** while permitting the pair of jaws **42** to rotate relative to the adaptor **38**.

[0068] The adaptor **38** includes guide holes **72** and **74** that are each adapted to accommodate and locate the first actuator member **44** and the second actuator member **46**, respectively. In some cases, as shown for example in FIG. **4**, the guide hole **72** lines up with the first hinge pin **66** and the guide hole **74** lines up with the second hinge pin **68**. Additional guide holes (not shown) may be located within the adaptor **38** in order to guide or direct the actuator members **44** and **46** against the inner wall and out of view of the camera **64**. In some cases, as shown for example in FIG. **5**, the guide holes **72**, **74** may be rotated relative to a horizontal plane extending through the hinge pins **66** and **68**. In some instances, this may allow the hinge pins **66** and **68** to be moldable, as the guide holes **72** and **74** are not in the way. The additional height H between the guide hole **72** and the hinge pin **66** allows for additional degrees of rotation. In some cases, the height H provides a pull wire angle/moment arm in which a greater force can be applied to the closed jaw for severing tough tissue, for example. It will be appreciated that when the guide holes **72** and **74** are aligned with the hinge pins **66** and **68**, any additional force applied by the user will not move the pair of jaws **42**.

[0069] FIGS. **6** and **7** provide additional views of the pair of jaws **42**. In FIG. **6**, the pair of jaws **42** is shown in a closed configuration while in FIG. **7** the pair of jaws **42** is shown in an open configuration. The pair of jaws **42** includes a first jaw **80** and a second jaw **82**. In some cases, the first jaw **80** may be slightly larger than the second jaw **82**, which allows the jaws **80**, **82** to slide past each other when the jaws move into their closed configuration. In some cases, the first jaw **80** and the second jaw **82** may be made to be the same size. The first jaw **80** includes a cutting edge **84** and a pair of hinge holes **86** and **88**. Similarly, the second jaw **82** includes a cutting edge **90** and a pair of hinge holes **92** and **94**. The cutting edges **84** and **90** may be sharp blades, or the cutting edges **84** and **90** may be serrated edges. It will be appreciated that the hinge holes **88** and **94** are adapted to fit over the first hinge pin **66** while the hinge holes **86** and **92** are adapted to fit over the second hinge pin **68**. In assembling the biopsy device **32**, in some cases the first jaw **80** and the second jaw **82** may be compressed slightly from a relaxed profile to allow placement of the first jaw **80** and the second jaw **82** relative to the first hinge pin **66** and the second hinge pin **68**. Releasing the first jaw **80** and the second jaw **82** allows the first jaw **80** and the second jaw **82** to relax back to their relaxed profile allows the hinge pins **66** and **68** to secure the first jaw **80** and the second jaw **82** via the hinge holes **86**, **88**, **92** and **94**.

[0070] FIG. **8** is a perspective view of the first jaw **80**. An actuator arm **96** extends from the first jaw **80** and in some cases may have a bent S shape in order to provide necessary clearance for other components such as but not limited to the first actuator member **44**, the second jaw **82** and the body of the adaptor **38** itself. The first jaw **80** includes a first planar section **98** in which the first hinge hole **86** is formed and a second planar section **100** in which the second hinge hole **88** is formed. The actuator arm **96** extends from the second planar section **100** and includes an aperture **102** to accommodate the first actuator member **44**. In some cases, the distal portion of the first actuator member **44** may include a distal Z-shaped tension member **104**. The Z-shaped tension member **104** may simply be the distal end of the first actuator member **44**, although in some cases the Z-shaped tension member **104** may be a separately formed part that is secured to the first actuator member **44**.

[0071] It will be appreciated that the actuator arm **96** functions as a moment arm. If there is a desire to increase the cutting force that can be applied by the first jaw **80**, one can simply make the actuator arm **96** longer. If less cutting force is desired, the actuator arm **96** may simply be made shorter, or the aperture **102** can be moved distally along the actuator arm **96**, closer to the rest of the first jaw **80**. In some cases, the first actuator member **44** (and the Z-shaped tension member **104**) are metal wires that can be pushed or pulled to move the first jaw **80** in a desired direction.

[0072] With reference to FIGS. **6** and **7**, it will be appreciated that the second jaw **82** similarly includes an actuator arm **108** that extends from the second jaw **82**. The actuator arm **108** may have a bent S shape in order to provide necessary clearance for other components such as but not limited to the second actuator member **46**, the first jaw **80** and the body of the adaptor **38** itself. The second jaw **82** includes a first planar section **110** in which the first hinge hole **92** is formed and a second planar section **112** in which the second hinge hole **94** is formed. The actuator arm **108** extends from the second planar section **112** and includes an aperture **114** to accommodate the second actuator member **46**. In some cases, the distal portion of the second actuator member **46** may include a distal Z-shaped tension member similar to the Z-shaped tension member **104**.

[0073] With reference back to FIG. **3**, assembly of the biopsy device **32** is straightforward. The first actuator member **44** may be assembled to the aperture **102** of the first jaw **80** and a proximal end of the first actuator member **44** may be inserted into the first guide hole **72**. The second actuator member **46** may be assembled to the aperture **114** of the second jaw **82** and a proximal end of the second actuator

member **46** may be inserted into the second guide hole **74**. The first jaw **80** and the second jaw **82** may be slightly squeezed together to allow placement of the jaws **80** and **82** over the hinge pins **66** and **68**. Once aligned, the jaws **80** and **82** may be released to expand out or to snap over and onto the hinge pins **66** and **68**.

[0074] In some instances, the first actuator member **44** and the second actuator member **46** may be operated independently in order to move each jaw **80** and **82** separately. In some instances, however, the first jaw **80** and the second jaw **82** are operated concurrently. The first actuator member **44** and the second actuator member **46** are crimped together (crimp **58**, as shown in FIG. **2**) in order to combine or join the actuator members **44** and **46** such that movement of one of the actuator members **44** and **46** applies the same movement to the other of the actuator members **44** and **46**. The crimp **58** may exit the working channel **18** of the endoscope **10** as well as the handle body **50** and does not interfere with space in either case. In another example (not shown), the crimp **58** joins the first actuator member **44** and the second actuator member **46** at a distal end, and only one of the first actuator member **44** and the second actuator member **46** continues proximally through the endoscope **10** to be attached to the actuator handle **48**.

[0075] Next, the crimped actuator member(s) **44** and **46** can be inserted into the working channel **18** of the endoscope **10** and out the proximal portion of the scope handle (not shown). The alignment marker **47** of the coupler **40** may be aligned to the working channel **18** of the endoscope **10** and can be secured in place relative to the distal tip region **16** of the endoscope **10**. The crimped actuator member(s) **44**, **46** can then be inserted into the handle connector and through the reinforced tube lumen and out the angled tube of the finger ring **54**. The handle connector, distal to the tube, can then be slid over the actuator member(s) **44** and **46** to be connected to the proximal port **36** of the scope handle.

[0076] The finger ring **54** may be moved proximal to the alignment marker **62** and the crimped actuator member(s) **44** and **46** may be tensioned, displacing each the same distance in order to close the pair of jaws **42** evenly and centered. The fastener **60** may be tightened in order to engage the crimped actuator member(s) **44** and **46** within the finger ring **54**, locking each of the actuator member(s) **44**, **46** at the same length distance. In some cases, it is contemplated that the fastener **60** may be an electrical connector or plug that allows high frequency energy to be conducted through the actuator member(s) **44** and **46** for electrocautery cutting or hemostasis electrocauterization via the pair of jaws **42**. In some cases, the actuator member(s) **44** and **46**, may simply be bent around the tube to be secured.

[0077] In use, an operator may insert their thumb into the thumb ring **52** with the finger ring **54** gripped between their middle finger and their fore finger. Advancing the finger ring **54** forward (distally) opens the jaws **80** and **82** while retracting the finger ring **54** causes the jaws **80** and **82** to close together, thereby cutting, severing or otherwise capturing tissue.

[0078] FIG. **9** is a perspective view of the biopsy device **32** shown with the jaws **80** and **82** shown in an opened configuration. The jaws **80** and **82** were moved into the open configuration by advancing the actuator members **44** and **46** in the direction of arrow B. This caused the first jaw **80** and its actuator arm **96** to rotate in the direction of arrow C while the second jaw **82** and its actuator arm **108** were caused to rotate in the direction of arrow D. If desired, suction may be applied through the working channel **18** of the endoscope **10** in order to draw tissue into the adaptor **38** to be cut, severed or captured. In some cases, a separate forceps may be directed through the working channel **18** in order to pull tissue into the adaptor **38**. It will be appreciated that once the tissue has been cut, the closed jaws **80** and **82** can retain the tissue or sample within the adaptor **38** during removal from the body. The adaptor **38** may be able to store more than one sample, for example.

[0079] Once the biopsy or resection procedure has been completed, the fastener **60** can be loosened in order to release the actuator members **44** and **46** from the finger ring **54**. The actuator handle **48** can be removed. The coupler **40** (and hence the adaptor **38**) can be removed from the distal tip region **16** of the endoscope **10**. The actuator member **44** and **46** can be withdrawn distally through the working channel **18**. In some cases, rather than having both the first actuator member **44** and the second actuator member **46** both extend proximally to the actuator handle **48**, one of the actuator members **44** and **46** may be crimped at a location proximal of the guide holes **72** and **74**, and then only the other of the actuator members **44** and **46** can extend to the proximal end. This provides equal movement of both the jaws **80** and **82** without needing to equally set and align during assembly with the actuator handle **48**. This can also save space within the working channel **18** for other uses. This can include providing additional space for other devices, and for flushing, for example.

[0080] FIG. **10** is a side view of an illustrative biopsy device **120** while FIG. **11** is a top view of the illustrative biopsy device **120**. FIG. **12** provides an enlarged view of an actuator handle **150**, as will be discussed. The illustrative biopsy device **120** varies from the biopsy device **32** in that the jaws **122** and **124** are on the outside of an adaptor **126**. A coupler **128** may be used to releasably secure the adaptor **126** to a reusable or disposable endoscope such as the endoscope **10**. The biopsy device **120** utilizes tension members that are fiber cords or strings, lacking column strength. In FIG. **10**, it can be seen that the tension members include an outer loop **130** and an inner loop **132**. The outer loop **130** includes a first pair of tension members joined at a crimp **130***a* while the inner loop **132** includes a second pair of tension members joined at a crimp **132***a*. It will be appreciated that applying a tensile force to the outer loop **130** will cause the jaws **122** and **124** to open while applying a tensile force to the inner loop **132** will cause the jaws **122** and **124** to close.

[0081] Tension members **134** and **136** may be threaded through the working channel **18** of the endoscope **10** to an actuator handle **150** that includes a handle wheel **152**. It will be appreciated that in some instances, the tension members **134** and **136** may represent single tension members. In some instances, the tension members **134** and **136** may instead each represent a loop, such as but not limited to the outer loop **130** and the inner loop **132**. The tension members **134** and **136** may instead extend from the outer loop **130** and the inner loop **132**. Rotating the handle wheel **152** counterclockwise opens the jaws **122** and **124**. Rotating the handle wheel **152** clockwise, however, closes the jaws **122** and **124**.

[0082] In some cases, as shown in FIG. **10**, a wire hook **140** may be used to pull longer cords or loops through the working channel **18** of the endoscope **10**. The wire hook **140** may be formed of stainless steel or the like, and can be

removed when not needed. FIGS. **17-19** will provide further details regarding wire hooks such as the wire hook **140**. In some cases, shorter color-coded hook wires may be used as extensions. To assemble the tension members to the actuator handle **130**, the tension member **134** (associated with the outer loop **130**) is laid into a slot **142**. The tension member **136** (associated with the inner loop **132**) is laid into a slot **144**. The wheel **152** of the actuator handle **150** includes a wheel marking **154** while the actuator handle **150** includes a first marking **156** and a second marking **158**. The wheel **152** is rotated in the direction of arrow D such that the wheel marking **154** aligns with the first marking **156** and the tension member **136** may be tensioned. A pin **160** is pushed in or threaded in to secure the tension member **136**. The wheel **152** is then rotated in the direction of arrow C such that the wheel marking **154** aligns with the second marking **158** and the tension member **134** may be tensioned. A pin **162** is pushed in or threaded in to secure the tension member **134**. When the wheel **152** is rotated such that the wheel marking **154** aligns with the first marking **156**, the jaws **122** and **124** are closed. When the wheel **152** is rotated such that the wheel marking **154** aligns with the second marking **158**, the jaws **122** and **124** are open.

[0083] FIGS. **13** through **16** show an illustrative biopsy device **170**. FIGS. **13** and **14** are side and end views, respectively, of the illustrative biopsy device **170** with its jaws closed. FIGS. **15** and **16** are side and end views, respectively, of the illustrative biopsy device **170** with its jaws open. The biopsy device **170** includes an adaptor **172** and a coupler **174** that is adapted to secure the adaptor **172** relative to the distal tip portion **16** of an endoscope **10**. The biopsy device **170** includes a first jaw **176** and a second jaw **178**. The adaptor **172** includes a first hinge pin **180** and a second hinge pin **182** that together pivotably secure the first jaw **176** and the second jaw **178** relative to the adaptor **172**.

[0084] A fiber cord **190** can be assembled to the first jaw **176** and the adaptor **172** by first providing a crimp or knot at its mid-point. A leg **192** is threaded through the first jaw **176** at a hole **194** and then through an adaptor hole **210** and then extended proximally. A leg **198** can be threaded through a hole **196** and then through a guide hole **200** (FIG. **16**), and then extended proximally. Instead of a crimp at crimp **202**, the fiber cord **190** can be looped several times, or glued into position.

[0085] A fiber cord **204** can be assembled to the second jaw **178** and the adaptor **172** by first crimping a crimp or tying a knot at its mid-point. A leg **206** is threaded through the second jaw **178** through a hole **208** and then through an adaptor hole **212** and then extended proximally. A leg **214** can be extended through a hole **216** in the jaw **178** and then extended proximally. Instead of a crimp at **218**, the fiber cord **206** can be looped several times, or glued into position. It will be appreciated that the crimp **202** cannot fit through the holes **194** and **196** of the first jaw **176**. The crimp **218** cannot fit through the holes **208** and **216** of the second jaw **178**. Accordingly, pulling an outer loop **220** pulls the legs **192** and **198** into the cup holes and pulls the crimp **202** against the first jaw **176** and pulls the crimp **218** against the second jaw **178** to open the jaws **176**, **178**.

[0086] With particular reference to FIG. **15**, a crimp **230** is crimped to the legs **198** and **214** at a point where the legs **198** and **214** are the same length in order to form an inner loop **222**. A crimp **232** is crimped to the legs **192** and **206** at a point where the legs **192** and **206** are the same length, in order to form the outer loop **220**. The inner loop **222** can be the length of K while the outer loop **220** can be the length of M. In some cases, K and M can both be short as illustrated, or can be longer in order to extend to an actuator handle located at the proximal end. As illustrated, K is equal to 2 centimeters (cm) and M is equal to 4 cm. The biopsy device **170** may be used in conjunction with the actuator handle **150** described with respect to FIGS. **10** to **12**, and can be connected to the actuator handle **150** in a similar manner.

[0087] With particular reference to FIG. **13**, it will be appreciated that when the outer loop **220** is tensioned or displayed proximally, the legs **192** and **206** are displaced proximally to pull the first jaw **176** with the crimp **202** engaging the first jaw **176** and pulling towards the adaptor hole **210** and the second jaw **178** is pulled via the crimp **218** pulling towards the adaptor hole **212** to open the jaws **176** and **178**. At the same time, a distal portion of the leg **198** is displaced between the first jaw **176** and an outer cup surface slot and a distal portion of the leg **214** is displaced between the second jaw **178** and the outer cup surface slot. The leg **198** and the leg **214** are wrapped around their respective slot edge when the jaws **176**, **178** are fully open. When the inner loop **222** is tensioned or displaced proximally, the leg **198** and the leg **214** are displayed proximally and their respective leg portions between the jaws **176** and **178** and the adaptor **172** are pulled distally to move the first jaw **176** with engagement of the crimp **202** and the second jaw **178** is moved via engagement of the crimp **218** to close the jaws **176** and **178**. At the same time, the leg **192** and the leg **206** are displayed distally as they are dragged by the crimp **202** and the crimp **218**. It will be appreciated that the jaws **176** and **178** have a profile that is smaller than that of the coupler **174**.

[0088] FIGS. **17** through **19** are side views of illustrative extension hook wires that may be used when threading actuator members, especially actuator and tension members that lack column strength, into and through the endoscope **10**. In FIG. **17**, an extension hook wire **240** includes a hook wire **242** and a color-coded locking tube **244** that is slidingly disposed over the hook wire **242**. The hook wire **242** includes a terminal portion **246** that it outside of the color-coded locking tube **244**. In some instances, the terminal portion **246** of the hook wire **242** bends back against an outer surface of the color-coded locking tube **244**. In FIG. **18**, an extension hook wire **250** includes a hook wire **252** having a terminal portion **254**. In this case, the color-coded locking tube **244** covers a portion of the hook wire **252** as well as covering the terminal portion **254**. While not illustrated, in some instances a proximal end of the color-coded locking tube **244** may be tapered in order to allow a smooth transition, e.g., to allow other devices to pass within the working channel **18** of the endoscope **10** without catching.

[0089] FIG. **19** illustrates use of the extension hook wires **240** and **250** with an assembly **260**. An extension hook wire **262** includes a terminal portion **264**. A tension member **266** includes a loop **268** that is formed via a knot or crimp **270**. The loop **268** may be slid over the terminal portion **264** and the color-coded locking tube **244** may be slid down over the terminal portion **264** to secure the tension member **266** in place relative to the extension hook wire **262**. The extension hook wire **240** and **250**, and hence the tension member **266**, may then be threaded into a desired position relative to the endoscope **10**.

[0090] FIG. **20** is a front view and FIG. **21** is a side view of a pair of jaws **280**. The pair of jaws **280** includes a first jaw **282** and a second jaw **284**. A first spring **286** extends between the first jaw **282** and the second jaw **284**. A second spring **288** extends between the first jaw **282** and the second jaw **284**. The first jaw **282** includes a first hole **290** for securing a tension member and the second jaw **284** includes a second hole **292** for securing a tension member, as will be illustrated subsequently. The first and second springs **286** and **288** may be crimped, welded or glued onto the first jaw **282** and the second jaw **284**. In some instances, the jaws **282** and **284** and the springs **286** and **288** may be laser cut from a single piece of U-shaped Nitinol. The springs **286** and **288** are adapted to bias the pair of jaws **280** into a closed position.

[0091] FIG. **22** is a side view of an illustrative biopsy device **300** and FIG. **23** is an end view thereof. The illustrative biopsy device **300** includes the first jaw **282** and the second jaw **284** as illustrated in FIGS. **20** and **21**. The biopsy device **300** includes an adaptor **302** and a coupler **304** that is adapted to secure the adaptor **302** relative to the distal tip region **16** of the endoscope **10**. A first tension member **306**, which is a fiber cord, may be crimped, knotted or tied to the first jaw **282** via the first hole **290**. The first tension member **306** is then assembled through a first cup hole **308** and through a guide hole **310** and extended proximally. In some instances, a loop **312** may be formed via a crimp **314**. Similarly, a second tension member **316**, which is also a fiber cord, may be crimped, knotted or tied to the second jaw **284** via the second hole **292**. The second tension member **316** is then assembled through a second cup hole **318** and through a guide hole **320** and extended proximally. In some instances, a loop **322** may be formed via a crimp **324**. The loops **312** and **322** may be secured to a single hook wire extension. In some cases, rather than forming the two loops **312** and **322**, the crimp **314** may be used to simply crimp the first tension member **306** to the second tension member **316**. In some cases, the crimp **314** may be used to connect a loop of a softer or more pliable material to the first tension member **306** and/or the crimp **324** may be used to connect a loop of a softer or more pliable material to the second tension member **316**.

[0092] FIG. **24** is a perspective view of an assembly **330** that includes an adaptor **332** and a coupler **334** that is adapted to secure the adaptor **332** relative to the distal tip region **16** of the endoscope **10**. The adaptor **332** includes recessed slots **336** and **338** that allow tissue samples to be suctioned into the adaptor **332**. In some cases, if the recessed slots **336** and **338** were through slots, the tension members could then be metal wires that extend through the slots and are attached to the jaws. Since the metal wires can be used to both open and close the jaws **282** and **284**, no springs would be needed. FIG. **25** shows an illustrative biopsy device **340** that utilizes metal wires.

[0093] FIG. **25** is a perspective view of the illustrative biopsy device **340**, FIG. **26** is a bottom view of the illustrative biopsy device **340** and FIG. **27** is an end view thereof. This is similar to the biopsy device **300** shown in FIG. **22**, but without any springs. The biopsy device **340** includes an adaptor **360** and a coupler **362** that is adapted to secure the adaptor **360** relative to the distal tip region **16** of the endoscope **10**. A first actuator member **342** is secured to the first jaw **282** via the first hole **290**. The first tension actuator member **342** is then assembled through a first cup hole **344** and through a guide hole **346** and extended proximally. In some instances, a loop **348** may be formed via a crimp **350**. Similarly, a second actuator member **352** is secured to the second jaw **284** via the second hole **292**. The second actuator member **352** is then assembled through a second cup hole **354** and through a guide hole **356** and extended proximally. In some instances, a loop **358** may be formed via a crimp **360**.

[0094] FIG. **28** is a schematic view of a torsion spring **370** that may be used instead of the springs **286** and **288** in the biopsy device **300** best seen in FIG. **22**. The torsion spring **370** has its legs **372** and **374** at or beyond vertical at equilibrium, and may be used in the biopsy device **300** to keep the jaws **282** and **284** in a normally closed position. In some instances, FIG. **29** may be considered as showing the shape of the torsion spring **370** when deflected to open the jaws **282** and **284**. Alternatively, FIG. **29** may be considered as showing a desired shape of the torsion spring **370** at equilibrium that may be used in the biopsy device **300** in order to hold the jaws **282** and **284** at a normally open position. In this case, FIG. **28** would represent the torsion spring **370** deflected into a position in which the jaws **282** and **284** are closed.

[0095] FIG. **30** is a side view of a pair of jaws **380** that are normally open. The pair of jaws **380** includes a center anchor **382** and a pair of spring arms **384** and **386** extending from the center anchor **382**. A first jaw **388** extends from the spring arm **384** and a second jaw **390** extends from the spring arm **386**. The center anchor **382** remains stationary while the spring arms **384** and **386** deflect to allow the jaws **388** and **390** to move. The pair of jaws **380** may be formed by laser cutting a Nitinol tube. FIG. **31** shows laser cutting a circular Nitinol tube to form the pair of jaws **380**. FIG. **32** shows laser cutting a racetrack-shaped Nitinol tube **400** to form the pair of jaws **380**.

[0096] FIGS. **33** and **34** are side and end views, respectively, of an illustrative biopsy device **410** that includes the illustrative pair of jaws **380** shown in FIG. **30**. The pair of jaws **380** is secured relative to an adaptor **412**. A coupler **414** is adapted to secure the adaptor **412** relative to the distal tip region **16** of the endoscope **10**. A tension member **416** may be assembled to the first jaw **388** by inserting one end of the tension member **416** into a hole **420** and inserting the other end of the tension member **416** into a hole **422**. Both ends are then extended proximally relative to the first jaw **388** and may be crimped together via a crimp **424**. A tension member **426** may be assembled to the second jaw **390** by inserting one end of the tension member **426** into a hole **428** and inserting the other end of the tension member **426** into a hole **430**. Both ends are then extended proximally relative to the second jaw **390** and may be crimped together via a crimp **432**.

[0097] FIG. **35** is a perspective view of an illustrative assembly **440** that includes an adaptor **442** and a coupler **444** that is adapted to secure the adaptor **442** to the distal tip region **16** of the endoscope **10**. The adaptor **442** includes a first recessed slot **446** having a first slot edge **448** and a second recessed slot **450** having a second slot edge **452**. It will be appreciated that once the tension member **406** has been fed through the holes **420** and **422**, the tension member **406** may wrap around the first slot edge **448** and pass through the first recessed slot **446** as it extends proximally. Similarly, once the two ends of the tension member **426** have been fed through the holes **428** and **430**, the tension member

426 may wrap around the second slot edge 452 and pass through the second recessed slot 460 as it extends proximally.

[0098] FIG. 36 is a perspective view of an illustrative biopsy device 470. The illustrative biopsy device 470 includes an adaptor 472 and a coupler 474 that is adapted to secure the adaptor 472 to the distal tip region 16 of the endoscope 10. The adaptor 472 provides a suction channel 476 that extends through an interior of the adaptor 472. The suction channel 476 enables a source of vacuum to be used to pull tissue towards and into the suction channel 476 such that a first jaw 478 and a second jaw 480, which are pivotably secured to a pair of hinge pins 482 and 484, are able to move from an open position (as shown) to a closed position in which the jaws 478 and 480 cut off a tissue sample. In some cases, the jaws 478 and 480 have a construction similar to the pair of jaws 42 shown for example in FIGS. 6 and 7.

[0099] A first actuation member 486 is operably coupled to the jaw 480 and a second actuation member 488 is operably coupled to the jaw 478. The first actuation member 486 and the second actuation member 488 extend proximally from the jaws 478 and 480 and pass through a pair of holes 490 and 492, respectively, that are formed within a panel 494 that seals off a distal end of the coupler 474. The holes 490 and 492 are sealed with an elastomeric material around the first actuation member 486 and the second actuation member 488 to provide a fluid-tight seal around the actuation members 486 and 488. In some cases, the panel 494 may be formed of an elastomeric material that stretches to allow the actuation members 486 and 488 to pass therethrough. The actuation members 486 and 488 extend proximally through the working channel 18 of the endoscope 10.

[0100] FIG. 37 is a perspective view of an illustrative biopsy device 500. The illustrative biopsy device 500 includes an adaptor 502 and a coupler 504 that is adapted to secure the adaptor 502 to the distal tip region 16 of the endoscope 10. The biopsy device 500 is similar to the biopsy device 470 shown in FIG. 36, but in FIG. 37 the adaptor 502 and the coupler 504 include additional structures that guide the actuation members 486 and 488 proximally from the jaws 478 and 480. The adaptor 502 includes a guide pin 506 that helps to direct the actuation member 486. While not visible, another guide pin on the opposite side of the adaptor 502 helps to direct the actuation member 486.

[0101] The coupler 504 includes a first guide hole 508 and a second guide hole 510 that are formed within tabs projecting from the coupler 504. The guide holes 508 and 510 may be positioned on an exterior surface 512 of the coupler 504. The guide pin 506 and the guide holes 508 and 510 in combination help to guide the actuation member 486 from the jaw 480 and into an external tube 514 that extends proximally and externally to the endoscope 10. While not visible, it will be appreciated that the opposing side of the coupler 504 includes similar guide holes to guide and direct the actuation member 488 from the jaw 478 and into the external tube 514.

[0102] It should be understood that this disclosure is, in many respects, only illustrative. Changes may be made in details, particularly in matters of shape, size, and arrangement of steps without exceeding the scope of the disclosure. This may include, to the extent that it is appropriate, the use of any of the features of one example embodiment being used in other embodiments. The invention's scope is, of course, defined in the language in which the appended claims are expressed.

What is claimed is:

1. A biopsy device adapted for use with an endoscope, the biopsy device comprising:
- an adaptor adapted to be secured relative to an endoscope, the adaptor including an inner surface and an outer surface;
- a pair of jaws pivotably disposed relative to the adaptor; and
- an actuator operably coupled with the pair of jaws and extending proximally therefrom, the actuator adapted to move the pair of jaws relative to the adaptor.

2. The biopsy device of claim 1, wherein the actuator is adapted to be moved in a first axial direction to open the pair of jaws and to be moved in an opposing second axial direction to close the jaws.

3. The biopsy device of claim 1, wherein the pair of jaws are biased to a first position, and the actuator is adapted to move the pair of jaws against a biasing force.

4. The biopsy device of claim 1, wherein the adaptor comprises a first pivot point along a first side of the biopsy device housing and a second pivot point along a second side of the biopsy device housing.

5. The biopsy device of claim 4, wherein the first pivot point and the second pivot point are disposed on the inner surface of the adaptor.

6. The biopsy device of claim 4, wherein the first pivot point and the second pivot are disposed on the outer surface of the adaptor.

7. The biopsy device of claim 1, wherein the actuator comprises a first actuator member secured relative to the first jaw and a second actuator member secured relative to the second jaw such that applying an axial force to the first actuator member and/or the second actuator member causes the first jaw and/or the second jaw to pivot relative to the biopsy device housing.

8. The biopsy device of claim 7, wherein the first jaw includes a first actuator arm and the second jaw includes a second actuator arm, with the first actuator member secured to the first actuator arm and the second actuation member secured to the second actuator arm.

9. The biopsy device of claim 7, wherein the adaptor includes a first alignment feature that accommodates the first actuator member extending therethrough and a second alignment feature that accommodates the second actuator member extending therethrough.

10. The biopsy device of claim 1, further comprising a coupler adapted to releasably secure the biopsy device housing relative to the endoscope.

11. The biopsy device of claim 1, further comprising an actuator handle operably coupled with the actuator member.

12. The biopsy device of claim 11, wherein the actuator handle includes a first member slidingly secured relative to a second member, with the actuator securable to the first member, wherein moving the first member relative to the second member causes the actuator to open or close the pair of jaws.

13. The biopsy device of claim 11, wherein the actuator handle includes a rotatable wheel, with the actuator securable to the rotatable wheel, and rotating the wheel causes the actuator to open or close the pair of jaws.

14. A biopsy device adapted for use with an endoscope, the biopsy device comprising:

an adaptor adapted to be secured relative to an endoscope;

a first jaw pivotably secured to the adaptor;

a second jaw pivotably secured to the adaptor, the first jaw and the second jaw together pivotable to a closed configuration in which the first jaw and the second jaw cooperate to cut tissue;

a first actuator member secured to the first jaw such that moving the first actuator member causes the first jaw to pivot relative to the adaptor;

a second actuator member secured to the second jaw such that moving the second actuator member causes the second jaw to pivot relative to the adaptor; and

an actuator handle operably coupled with the first actuator member and the second actuator member such that manipulating the actuator handle causes the first jaw and the second jaw to pivot relative to the adaptor.

15. The biopsy device of claim **14**, wherein the first actuator member and the second actuator member extend proximally to the actuator handle.

16. The biopsy device of claim **14**, wherein the first actuator member and the second actuator member are coupled together, and only one of the first actuator member and the second member extend proximally to the actuator handle.

17. The biopsy device of claim **14**, wherein the actuator handle includes a first handle slidingly secured relative to a second handle, with at least one of the first actuator member and the second actuator handle securable to the first member, wherein moving the first handle relative to the second handle causes the actuator to open or close the pair of jaws.

18. The biopsy device of claim **14**, wherein the actuator handle includes a rotatable wheel, with the first actuator member and the second actuator member securable to the rotatable wheel, and rotating the wheel causes the actuator to open or close the pair of jaws.

19. A medical device adapted for use with an access device, the medical device comprising:

an adaptor adapted to be secured relative to an access device;

a pair of jaws pivotably secured to the adaptor, the pair of jaws movable between an open position in which each of the pair of jaws pivots away from each other and a cutting position in which each of the pair of jaws pivots toward each other; and

a spring biasing the pair of jaws towards one of the open position and the cutting position; and

an actuator operably coupled with the pair of jaws and extending proximally therefrom, the actuator adapted to move the pair of jaws against a biasing force applied by the spring.

20. The medical device of claim **19**, further comprising an actuator handle operably coupled with the actuator.

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