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(71) Applicant *(for all designated States except US)*: **HITACHI ALOKA MEDICAL, LTD.** [US/US]; 10 Fairfield Boulevard, Wallingford, CT 06492 (US).

(72) Inventor; and
(71) Applicant : **BLAKE, Jason, K.** [US/US]; 806 Mapledale Road, Orange, CT 06477 (US).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **OKO, Thomas, P.** [US/US]; 2 Blueberry Lane, Shelton, CT 06484 (US).

(74) Agents: **BUMGARNER, Aaron, P.** et al.; McCarter & English, LLP, Canterbury Green, 201 Broad Street, Stamford, CT 06901 (US).

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(54) **Title**: ASSEMBLY FOR USE WITH SURGERY SYSTEM

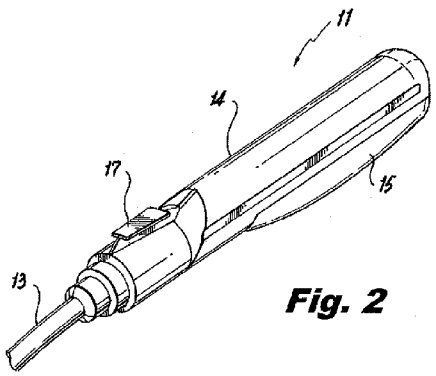


Fig. 2

(57) **Abstract**: The present disclosure provides systems, assemblies and methods for surgery (e.g., robotic surgery). More particularly, the present disclosure provides systems and methods for releasably securing or attaching an assembly for use in a surgical procedure with respect to a user-operable surgical device. In general, the present disclosure provides systems and methods for releasably securing or attaching an assembly with respect to and for use with a user-operable surgery system. Systems and methods for releasably securing or attaching an assembly (e.g., imaging assembly) having a receiver member with respect to a user-operable grasper member of a surgery system are provided.

ASSEMBLY FOR USE WITH SURGERY SYSTEM

BACKGROUND

1. Technical Field

The present disclosure relates to advantageous systems, assemblies and methods for surgery (e.g., robotic surgery) and, more particularly, to a system and method for releasably securing or attaching an assembly (e.g., a surgical or imaging assembly having a receiver member) with respect to a surgical device (e.g., with respect to a grasper member of a surgery system).

2. Background Art

Minimally invasive surgical systems or the like are known. Minimally invasive surgery typically presents some advantages compared to traditional and/or open surgery procedures (e.g., reduced scarring and/or recovery time, decreased injury/pain to the patient, decreased hospitalization time, etc.). Minimally invasive surgery is generally known under various names (e.g, endoscopy, laparoscopy, arthroscopy, etc.), with the names typically being specific to the anatomical area of the surgery. For example, laparoscopic surgery, which is one type of minimally invasive surgery, is a more recent surgical technique where operations in the abdomen are performed through small incisions (e.g., about 1.0 cm) as compared to larger incisions typically required in traditional surgical procedures.

In general, telesurgery systems allow a surgeon to operate on a patient from a remote location. Telesurgery is a general term for surgical systems (e.g., robotic surgical systems) where the surgeon uses some form of servo-mechanism to manipulate the surgical instruments movements rather than directly holding and moving some of the tools. Robotic surgical systems such as minimally invasive robotic surgical systems or the like are generally known. Telesurgery systems have been utilized for both open and endoscopic procedures.

During a minimally invasive surgical procedure (robotic or manual), tubes or the like (e.g., cannulas or trocars or other tool guides) may be inserted through the same or different incisions so that assemblies, devices, probes and/or surgical instruments/tools may be introduced to the desired surgical site. In general, many different surgical procedures can then be performed without requiring a large and/or open cavity incision as typically required by traditional surgical procedures. The laparoscopic surgical instruments generally are similar to those used in conventional (open) surgery, except that the working end of each tool

is separated from its handle by an approximately 12-inch long extension tube. The surgeon (and/or robotic system) typically passes instruments through a cannula or the like and manipulates them inside the abdomen by sliding them in and out through the cannula, rotating them in the cannula, levering or pivoting the instruments in the abdominal wall and actuating end effectors on the distal end of the instruments.

In general, imaging devices or the like (e.g., ultrasound probes/transducers and/or assemblies, endoscopes, cameras, etc.) and other surgical instruments/assemblies (e.g., clamp members/instruments, grasper members/instruments, blades, needles, scissors, holder members/instruments, staplers, etc.) for use with minimally invasive surgical systems (e.g., robotic or manual) are known. For example, imaging devices such as ultrasound assemblies and/or probes or the like that are introduced to the desired surgical site provide images of the site to the surgeon. As noted, minimally invasive tools or devices are typically configured and dimensioned to be inserted through a cannula or trocar or other tool guide located in a minimally invasive incision of the patient in order to extend the surgical tools or devices to the surgical site. Exemplary minimally invasive robotic surgical systems are disclosed, for example, in U.S. Patent Nos. 5,797,900; 5,876,325; 6,371,952 and 7,107,090; and U.S. Patent Publication Nos. 2007/0021738; 2008/0064921; 2009/0088773; 2009/0192519; 2009/0245600; 2009/0248041 and 2009/0326318; the foregoing being incorporated herein by reference in their entireties.

In general and as disclosed in the above listed references, robotic surgical systems typically include user-operable master input devices (e.g., joysticks, gloves, trigger-guns, hand-operated controllers, etc.) that allow a user to manipulate them to have a processor then cause their respectively associated slave arms or the like manipulate their respectively coupled and/or held surgical instruments and/or devices. In short, a surgeon typically performs a minimally invasive surgical procedure with a robotic system by manipulating the master input devices to control (via a processor) the robotic slave arms, which have tools, instruments, probes, etc. attached thereto. Robotic surgical systems typically also include a master display or display screen.

Current practice provides that surgeons or technicians are frequently confronted with the need to move, position, re-position, align and/or adjust various assemblies/devices/tools or the like (e.g., surgical assemblies, imaging assemblies, ultrasound probes/transducers, endoscopes, blades, etc.) during surgery (robotic or manual surgery) under difficult conditions (e.g., in confined/tight spaces, in conjunction with robotic surgical systems, etc.). Such movements/procedures can be very difficult and/or time consuming, especially when

the surgical and/or imaging assemblies or the like are associated with and/or utilized along with minimally invasive surgical systems (e.g., minimally invasive robotic surgical systems).

With the foregoing in mind, those skilled in the art will understand that a need exists to provide a patient with an assembly for use in a surgical procedure that is capable of releasably securing or attaching to a user-operable surgical device (e.g., a user-operable surgical device associated with a minimally invasive surgery system, such as a robotic surgery system). Thus, despite efforts to date, a need remains for improved and efficient systems/methods for releasably securing or attaching an assembly for use in a surgical procedure (e.g., an imaging assembly having a receiver member) with respect to a surgical device (e.g., with respect to and for use with a grasper member of a robotic surgery system).

These and other challenges and opportunities for improvement are addressed and/or overcome by the systems, assemblies and methods of the present disclosure.

SUMMARY

The present disclosure provides advantageous systems, assemblies and methods for surgery (e.g., robotic surgery). More particularly, the present disclosure provides improved systems and methods for releasably securing or attaching an assembly for use in a surgical procedure with respect to a user-operable surgical device. In general, the present disclosure provides improved systems and methods for releasably attaching or securing an assembly (e.g., a surgical or imaging assembly) with respect to and for use with a user-operable robotic surgery system. In exemplary embodiments, the present disclosure provides advantageous systems and methods for releasably securing or attaching an assembly having a receiver member with respect to a user-operable grasper member of a robotic or manual surgery system.

The present disclosure provides for an assembly for use in a surgical procedure including a housing defining a substantially fin-shaped receiver member, the receiver member including a post member and a securing member; wherein the post member extends from the housing and the securing member extends past both sides of the post member to define the substantially fin-shaped receiver member; and wherein the substantially fin-shaped receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device.

The present disclosure also provides for a surgical assembly further including an imaging member mounted with respect to the housing. The present disclosure also provides for a surgical assembly wherein the imaging member is an ultrasound transducer. The

present disclosure also provides for a surgical assembly wherein the receiver member is positioned at or near the proximal end of the housing.

The present disclosure also provides for a surgical assembly wherein the user-operable surgical device includes first and second end effectors, the first end effector having a first slit and the second end effector having a second slit; wherein the securing member has a first side and a second side; and wherein at least a portion of the first side of the securing member extends through the first slit and at least a portion of the second side of the securing member extends through the second slit when the user-operable surgical device is releasably secured to the receiver member.

The present disclosure also provides for a surgical assembly wherein the receiver member is integrally formed from the housing. The present disclosure also provides for a surgical assembly wherein the securing member has a first end and a second end and the post member defines a longitudinal axis; and wherein the securing member tapers from the first end to the second end with the first end of the securing member extending a greater distance from the longitudinal axis relative to the distance that the second end of the securing member extends from the longitudinal axis.

The present disclosure also provides for a surgical assembly wherein the post member has a first end and a second end, the post member tapering from the first end to the second end with the first end being wider than the second end. The present disclosure also provides for a surgical assembly wherein at least a portion of the receiver member is retractable within the housing. The present disclosure also provides for a surgical assembly wherein at least a portion of the receiver member is foldable with respect to the housing.

The present disclosure also provides for a surgical assembly wherein the housing is mounted with respect to a flexible cable; and wherein the imaging member is configured and dimensioned to capture an image of a surgical site. The present disclosure also provides for a surgical assembly wherein the user-operable surgical device is a minimally invasive user-operable surgical device; and wherein the housing and receiver member are configured and dimensioned to be: (i) inserted through a guide tool located in a minimally invasive incision of a patient, and (ii) moved to a surgical site within the patient by the minimally invasive user-operable surgical device.

The present disclosure also provides for a surgical assembly wherein the user-operable surgical device includes first and second end effectors; wherein the post member has a first side and a second side; and wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the first side of the post

member is adjacent to at least a portion of the first end effector, at least a portion of the second side of the post member is adjacent to at least a portion of the second end effector, and at least a portion of the first and second end effectors are positioned underneath the securing member.

The present disclosure also provides for a surgical assembly wherein the post member has a first side and a second side, the first and second sides each having a grooved or textured surface. The present disclosure also provides for a surgical assembly wherein the post member has a first side and a second side, the first and second sides each having a protrusion or extending member; wherein the user-operable surgical device includes first and second end effectors, the first and second end effectors each having a recess or concave portion; and wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the protrusion or extending member of the first side of the post member is positioned within at least a portion of the recess or concave portion of the first end effector, and at least a portion of the protrusion or extending member of the second side of the post member is positioned within at least a portion of the recess or concave portion of the second end effector.

The present disclosure also provides for an assembly for use in a surgical procedure including a housing defining a receiver member, the receiver member including a post member that extends from the housing; wherein the post member has a first end and a second end, the post member tapering from the first end to the second end with the first end being wider than the second end; and wherein the tapered post member of the receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device.

The present disclosure also provides for a surgical assembly further including an imaging member mounted with respect to the housing. The present disclosure also provides for a surgical assembly wherein the imaging member is an ultrasound transducer.

The present disclosure also provides for a surgical assembly wherein at least a portion of the receiver member is retractable within the housing. The present disclosure also provides for a surgical assembly wherein at least a portion of the receiver member is foldable with respect to the housing.

The present disclosure also provides for a surgical assembly wherein the user-operable surgical device includes first and second end effectors; wherein the post member has a first side and a second side; and wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the first side of the post

member is adjacent to at least a portion of the first end effector, and at least a portion of the second side of the post member is adjacent to at least a portion of the second end effector.

The present disclosure also provides for a surgical assembly wherein the post member has a top side and a bottom side, the post member tapering from the bottom side to the top side with the bottom side being wider than the top side. The present disclosure also provides for a surgical assembly wherein the housing is mounted with respect to a flexible cable; wherein the user-operable surgical device is a minimally invasive user-operable surgical device; wherein the housing and receiver member are configured and dimensioned to be: (i) inserted through a guide tool located in a minimally invasive incision of a patient, and (ii) moved to a surgical site within the patient by the minimally invasive user-operable surgical device; and wherein the imaging member is configured and dimensioned to capture an image of the surgical site.

The present disclosure also provides for a surgical assembly wherein the post member has a first side and a second side, the first and second sides each having a grooved or textured surface. The present disclosure also provides for a surgical assembly wherein the post member has a first side and a second side, the first and second sides each having a protrusion or extending member; wherein the user-operable surgical device includes first and second end effectors, the first and second end effectors each having a recess or concave portion; and wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the protrusion or extending member of the first side of the post member is positioned within at least a portion of the recess or concave portion of the first end effector, and at least a portion of the protrusion or extending member of the second side of the post member is positioned within at least a portion of the recess or concave portion of the second end effector.

The present disclosure also provides for an imaging assembly including a housing defining a substantially fin-shaped receiver member, the receiver member including a post member and a securing member; an imaging member mounted with respect to the housing; wherein the post member extends from the housing and the securing member extends past both sides of the post member to define the substantially fin-shaped receiver member; wherein the securing member has a first end and a second end and the post member defines a longitudinal axis; wherein the securing member tapers from the first end to the second end with the first end of the securing member extending a greater distance from the longitudinal axis relative to the distance that the second end of the securing member extends from the longitudinal axis; wherein the receiver member is positioned at or near the proximal end of

the housing; wherein the substantially fin-shaped receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device; wherein the user-operable surgical device includes first and second end effectors, the first end effector having a first slit and the second end effector having a second slit; wherein the securing member has a first side and a second side; and wherein at least a portion of the first side of the securing member extends through the first slit and at least a portion of the second side of the securing member extends through the second slit when the user-operable surgical device is releasably secured to the receiver member.

Additional advantageous features, functions and applications of the disclosed systems, assemblies and methods of the present disclosure will be apparent from the description which follows, particularly when read in conjunction with the appended figures.

BRIEF DESCRIPTION OF THE DRAWINGS

To assist those of ordinary skill in the art in making and using the disclosed systems, assemblies and methods, reference is made to the appended figures, wherein:

FIG. 1 is a side perspective view of an exemplary assembly for use in a surgical procedure in accordance with the present disclosure;

FIG. 2 is a side perspective view of the assembly of FIG. 1;

FIG. 3 is a side view of the assembly of FIG. 1;

FIG. 4 is a partial side perspective view of the assembly of FIG. 1, with the receiver member unattached;

FIG. 5 is a bottom view of the receiver member of the assembly of FIG. 1;

FIG. 6 is a side view of the receiver member of FIG. 5;

FIG. 7 is a proximal end view of the receiver member of FIG. 5;

FIG. 8 is a distal end view of the receiver member of FIG. 5;

FIG. 9 is an in situ side perspective view of an exemplary user-operable surgical device for use with the exemplary assembly of FIG. 1;

FIGS. 10-11 are side perspective views of the assembly of FIG. 1 with the user-operable surgical device of FIG. 9 prior to attachment thereto;

FIG. 12 is a partial side perspective view of the assembly of FIG. 1 with the user-operable surgical device of FIG. 9 attached thereto;

FIG. 13 is an in situ side perspective view of the assembly of FIG. 1 with the user-operable surgical device of FIG. 9 attached thereto;

FIG. 14 is a partial sectional side perspective view of an alternative embodiment of an assembly for use in a surgical procedure according to the present disclosure, the assembly positioned within a tool guide;

FIG. 15 is an exploded partial sectional side view of the assembly of FIG. 14, the receiver member of the assembly in the retracted position;

FIG. 16 is an exploded partial sectional side view of the assembly of FIG. 14, the assembly positioned at least partially out of the tool guide, the receiver member of the assembly in the un-retracted position;

FIG. 17 is a partial side perspective view of an alternative embodiment of an assembly for use in a surgical procedure according to the present disclosure, the receiver member of the assembly in the folded position;

FIG. 18 is a partial side perspective view of the assembly of FIG. 17, the receiver member of the assembly in the un-folded position;

FIG. 19 is a partial sectional side view of an alternative embodiment of an assembly for use in a surgical procedure according to the present disclosure, the receiver member of the assembly in the retracted position; and

FIG. 20 is a partial sectional side view of the assembly of FIG. 19, the receiver member of the assembly in the un-retracted position;

FIG. 21 is a side view of another exemplary assembly for use in a surgical procedure in accordance with the present disclosure;

FIG. 22 is a partial side perspective view of the assembly of FIG. 21, with the receiver member unattached;

FIG. 23 is a bottom view of the receiver member of the assembly of FIG. 21;

FIG. 24 is a side view of the receiver member of FIG. 23;

FIG. 25 is a proximal end view of the receiver member of FIG. 23;

FIG. 26 is a distal end view of the receiver member of FIG. 23;

FIGS. 27-29 are side perspective views of the assembly of FIG. 21 with a user-operable surgical device, prior to attachment thereto;

FIG. 30 is a partial side perspective view of the assembly of FIG. 21 with a user-operable surgical device attached thereto;

FIG. 31 is an in situ side perspective view of the assembly of FIG. 21 with a user-operable surgical device attached thereto;

FIGS. 32-33 are side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to attachment thereto;

FIGS. 34-35 are side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to attachment thereto;

FIG. 36 is a side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to attachment thereto;

FIG. 36A is a side perspective view of the receiver member of the assembly of FIG. 36;

FIG. 37 is a side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to attachment thereto;

FIG. 37A is a side perspective view of the receiver member of the assembly of FIG. 37;

FIGS. 38-39 are side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to attachment thereto; and

FIGS. 40-42 are side perspective views of another exemplary assembly for use in a surgical procedure, along with a user-operable surgical device, prior to and during attachment thereto.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

The exemplary embodiments disclosed herein are illustrative of advantageous assemblies (e.g., imaging or surgical assemblies) for use with surgery systems and methods/techniques thereof. It should be understood, however, that the disclosed

embodiments are merely exemplary of the present disclosure, which may be embodied in various forms. Therefore, details disclosed herein with reference to exemplary assemblies/systems and associated methods/techniques of assembly and use are not to be interpreted as limiting, but merely as the basis for teaching one skilled in the art how to make and use the advantageous assemblies/systems and/or alternative surgical and/or imaging devices of the present disclosure.

The present disclosure provides improved systems, assemblies and methods for surgery (e.g., robotic surgery). More particularly, the present disclosure provides advantageous systems and methods for releasably attaching or securing an assembly (e.g., an imaging or surgical assembly) with respect to a user-operable surgical device. In general, the present disclosure provides systems and methods for releasably attaching or securing an assembly for use in a surgical procedure with respect to and for use with a user-operable robotic surgery system. In exemplary embodiments, the present disclosure provides advantageous systems and methods for releasably attaching or securing an assembly having a receiver member with respect to a user-operable grasper member of a robotic or manual surgery system.

In exemplary embodiments, the assembly for use in a surgical procedure includes at least one receiver member, the at least one receiver member configured and dimensioned to be releasably secured to a user-operable surgical device (e.g., a user-operable grasper member of a robotic or manual surgery system). In general, the assembly for use in a surgical procedure includes an imaging member (e.g., ultrasound probe/transducer, endoscope, camera, etc.) and/or a surgical instrument/tool/device (e.g., clamp members/instruments, blades, needles, scissors, holder members, staplers, etc.) or the like, and/or some other treatment instrument/device.

In exemplary embodiments, the assembly for use in a surgical procedure includes at least one receiver member, component or protrusion (e.g., a T-shaped or fin-shaped protrusion) that allows the assembly to be releasably secured with respect to a user-operable surgical device. A user may then manipulate the user-operable surgical device to move/position the releasably secured surgical or imaging assembly to any desired position and/or location. For example, the assembly may include a T-shaped or fin-shaped protrusion at one end that extends from the assembly to allow the user operable surgical device to releasably secure or attach to at least a portion of the protrusion of the assembly. The receiver member may define at least one cavity, recess, channel or receiving feature/surface

that allows the user-operable surgical device to releasably secure to the surgical or imaging assembly.

Current practice provides that it is often very difficult and/or time consuming for a surgeon or technician to move, position, re-position, align and/or adjust assemblies or the like (e.g., surgical or imaging assemblies) during surgery, especially when the assemblies or the like are associated with and/or utilized along with minimally invasive surgical systems (e.g., minimally invasive robotic surgical systems). In exemplary embodiments, the present disclosure provides for improved and effective systems/designs for assemblies that are easily releasably attached or secured to a user-operable surgical device (e.g., a user-operable surgical device associated with a minimally invasive surgery system, such as a robotic surgery system), thereby providing a significant manufacturing, commercial and/or surgical advantage as a result. Furthermore, the exemplary assemblies/systems may also be capable of attaching, mounting and/or mating with respect to other user-operable surgical devices, thereby providing a significant manufacturing, commercial and/or surgical advantage as a result.

Referring now to the drawings, like parts are marked throughout the specification and drawings with the same reference numerals, respectively. Drawing figures are not necessarily to scale and in certain views, parts may have been exaggerated for purposes of clarity.

FIGS. 1-42 depict exemplary embodiments of the advantageous assemblies, systems and methods of the present disclosure. As shown in FIGS. 1-4, an exemplary assembly 11 for use in a surgical procedure is typically attached or mounted with respect to a flexible cable 13 or the like. In general, cable 13 allows assembly 11 to be introduced to a surgical site (e.g., in a minimally invasive manner) for imaging and/or surgical purposes or the like (see, e.g., FIGS. 9 and 13). For example, assembly 11 with respective cable 13 attached thereto is typically configured and dimensioned to be inserted through a cannula or trocar or other tool guide 12 (FIG. 9) located in a minimally invasive incision of a patient in order to allow a surgeon or technician to extend at least a portion of the assembly 11 to a surgical site for imaging and/or surgical purposes. Assembly 11 may also be inserted through a body orifice, or utilized in other surgical procedures (e.g., open surgery).

In exemplary embodiments, assembly 11 is connected to and/or in communication with a display device/assembly 16 for displaying images of the surgical site, the display device 16 generally in communication with a processor and being positioned outside of the body of the patient. In one embodiment, cable 13 connects imaging assembly 11 to display

device 16 for displaying captured images of the surgical site. However, other variations and modifications are possible. It is noted that assembly 11 is to be construed broadly to include image capture components or members and their associated wiring, cabling, circuitry, hardware and/or display devices. Assembly 11 may relay image data via wired or wireless connections to display device 16 (e.g., to display device 16 positioned outside of the body of the patient).

Exemplary assembly 11 takes the form of an imaging assembly (e.g., an ultrasound imaging assembly), although the present disclosure is not limited thereto. Rather, assembly 11 may take a variety of forms, including, without limitation, an endoscopic imaging assembly, an optical imaging assembly, an infrared imaging assembly, a camera-based imaging assembly or the like. It is noted that assembly 11 may or may not include an imaging member or the like. For example, assembly 11 may include a surgical member/instrument/tool/device (e.g., clamp members/instruments, blades, needles, scissors, holder members, staplers, grasper members, etc.) or the like, and/or some other treatment member/instrument/device (e.g., for use in a surgical procedure).

As shown in FIGS. 1-4, exemplary assembly 11 for use in a surgical procedure includes housing 14. In one embodiment, assembly 11 takes the form of an imaging assembly 11 (e.g., an ultrasound imaging assembly), although the present disclosure is not limited thereto. Rather and as noted above, assembly 11 for use in a surgical procedure may take a variety of forms. Assembly 11 is typically configured and dimensioned to be inserted through a cannula or trocar or other tool guide 12 located in a minimally invasive incision of a patient in order to allow a surgeon or technician to extend the assembly 11 to a surgical site for imaging and/or surgical/treatment purposes.

In exemplary embodiments, housing 14 is configured and dimensioned to house, secure and/or mount with respect to an imaging member 15. Exemplary imaging member 15 takes the form of an ultrasound transducer, although the present disclosure is not limited thereto. Rather, imaging member 15 may take a variety of forms (e.g., endoscope, camera, etc.). In general, imaging member 15 is configured and dimensioned to capture/obtain images of the surgical site.

In exemplary embodiments, imaging member 15 is an ultrasound transducer that includes a plurality of ultrasonic energy generation elements. As shown in FIG. 1, ultrasound transducer 15 typically extends to the distal end 22 of the housing 14 of ultrasound imaging assembly 11. However and as noted above, the present disclosure is not to be limited to an ultrasonic imaging device/assembly. In exemplary embodiments, ultrasound transducer 15 is

configured and dimensioned to obtain two-dimensional or three-dimensional images of the desired surgical site (e.g., in a minimally invasive manner). For example, assembly 11 with ultrasound transducer 15 is typically configured and dimensioned to be inserted through a cannula or trocar or other tool guide 12 located in a minimally invasive incision of a patient in order to allow a surgeon or technician to extend the ultrasound transducer 15 to a surgical site so that the assembly 11 can relay captured ultrasound image data to outside the patient body. Assembly 11 may also be used in other surgical procedures, e.g., open surgery procedures, for imaging and/or surgical purposes.

As depicted in FIGS. 1-13, exemplary assembly 11 (e.g., ultrasound imaging assembly) also includes a receiver member 17. In one embodiment, the housing 14 and the receiver member 17 are of unitary construction with respect to each other (e.g., the receiver member 17 is integrally formed from the housing 14), although the present disclosure is not limited thereto. Alternatively, receiver member 17 may be separately fabricated and then secured, attached or mounted with respect to (e.g., welded) housing 14 (FIG. 4).

In general, receiver member 17 is configured and dimensioned to be releasably secured or attached to a user-operable surgical device 19 (e.g., a user-operable grasper member of a robotic or manual surgery system), as further discussed below in conjunction with FIGS. 9-13. As such, a user may then manipulate the user-operable surgical device 19 to move/position the releasably secured imaging assembly 11 to any desired position and/or location (e.g., in a minimally invasive manner within the surgical site for imaging, surgical and/or diagnostic purposes).

In exemplary embodiments, the receiver member 17 is a substantially T-shaped or fin-shaped component or protrusion that extends from the housing 14 (e.g., from or near the proximal end 18 of housing 14) to allow the user operable surgical device 19 to releasably secure or attach to at least a portion of the receiver member 17. The receiver member 17 may also define at least one cavity, recess, channel or receiving feature/surface that allows the user-operable surgical device 19 to releasably secure to the assembly 11.

In exemplary embodiments and as shown in FIGS. 5-8, receiver member 17 includes a post member 23 that extends from housing 14, and a securing member 25 that extends beyond or past both sides of the post member 23 to define a substantially T-shaped or fin-shaped component or protrusion (i.e., receiver member 17) that extends from the housing 14 (e.g., extends from at or near the proximal end 18 of housing 14). In general, the post member 23 and the securing member 25 are of unitary construction with respect to each other, although the present disclosure is not limited thereto. Post member 23 may also

include an attachment member 24, the attachment member 24 being configured and dimensioned to be attached, secured or mounted with respect to the housing 14 (e.g., with respect to a groove or slot of housing 14) of the assembly 11.

The post member 23 has a first end 27 and a second end 29, with the first end 27 typically being wider (e.g., laterally wider) than the second end 29 (FIG. 5) (e.g., the post member 23 tapers from the first end 27 to the second end 29). The securing member 25 has a first end 31 and a second end 33, with the first end 31 typically extending (e.g., laterally) a greater distance beyond the longitudinal axis 35 of the post member 23 relative to the extension of the second end 33 of the securing member 25 beyond axis 35 (FIG. 5) (e.g., the securing member 25 tapers from the first end 31 to the second end 33).

As noted above, assembly 11 may be utilized in conjunction with a user-operable surgical device 19 (FIGS. 9-13), such as, for example, a user-operable grasper member of a robotic or manual surgery system (e.g., a minimally invasive surgery system). For example, a technician or surgeon can operate/move user-operable surgical device 19 either manually (e.g., by operating a conventional laparoscopic surgical device 19) or by robotic tele-surgery operation (e.g., utilizing a robotic surgery system such as a minimally invasive robotic surgery system) within or near the surgical site to releasably secure or attach the user-operable surgical device 19 to assembly 11. Once the user-operable surgical device 19 is releasably secured or attached to the assembly 11, a user may then move/position (e.g., manually or tele-surgically) the assembly 11 to any desired position and/or location (e.g., in a minimally invasive manner within the surgical site for imaging, surgical and/or diagnostic purposes).

As noted above, exemplary robotic surgical systems (e.g., minimally invasive robotic surgical systems) and their operations/movements thereof are disclosed and described in U.S. Patent Nos. 5,797,900; 5,876,325; 6,371,952 and 7,107,090; and U.S. Patent Publication Nos. 2007/0021738; 2008/0064921; 2009/0088773; 2009/0192519; 2009/0245600; 2009/0248041 and 2009/0326318; the entire contents of each being hereby incorporated by reference in their entireties.

In one embodiment, the user-operable grasper member 19 includes first and second end effectors 37, 39 (e.g., first and second jaws or grasping members 37, 39), with each end effector 37, 39 having respective slots 41, 43. As such, a user may operate the user-operable grasper member 19 (e.g., either manually or tele-surgically) to firstly open or widen the first and second end effectors 37, 39, and then secondly to position the slots 41, 43 of grasper member 19 adjacent to the left side and right side 36, 38 of securing member 25, respectively.

The user may then operate the grasper member 19 to then close the end effectors 37, 39 so that at least a portion of the left side 36 of securing member 25 is releasably secured within slot 41, and at least a portion of the right side 38 of securing member 25 is releasably secured within slot 43 (FIGS. 12-13). In exemplary embodiments, at least a portion of left side 36 extends through slot 41 and at least a portion of right side 38 extends through slot 43 after the end effectors 37, 39 are releasably secured to receiver member 17.

In this way, user-operable surgical device 19 is now releasably secured or attached to receiver member 17 of assembly 11, and a user may then move/position the assembly 11 to any desired position and/or location (e.g., for imaging/surgical purposes) by operating device 19 (e.g., either manually or tele-surgically). For example and as shown in FIG. 13, a user may then move and/or position the assembly 11 over, across and/or adjacent to at least a portion of tissue or organ 49 of a patient for imaging purposes.

As previously noted, the first end 31 of securing member 25 typically extends a greater distance beyond the longitudinal axis 35 of the post member 23 relative to the extension of the second end 33 of the securing member 25 beyond axis 35 (FIGS. 4 and 5), and the first end 27 of the post member 23 is typically wider than the second end 29 of the post member 23, and these structural features/configurations of receiver member 17 further ensure that surgical device 19 is appropriately releasably secured or attached to receiver member 17 (i.e., that end effectors 37, 39 are appropriately releasably secured or attached to the left and right sides 36, 38 of securing member 25). In other words and as depicted in FIGS. 9-13, since the user-operable surgical device 19 typically approaches the assembly 11 from the proximal 18 of the housing 14 (FIGS. 9-11), the configuration of having the second end 33 of the securing member 25 being not as laterally wide as the first end 31 allows the opened first and second end effectors 37, 39 (which are typically "V" shaped when opened) to quickly and easily be manipulated/positioned around the securing member 25 in order to ensure that surgical device 19 is appropriately releasably secured or attached to receiver member 17 (FIGS. 12-13).

In an alternative embodiment and as shown in FIGS. 14-16, the receiver member 117 of assembly 111 is configured and dimensioned to be at least partially retractable within housing 114. For example, when the receiver member 117 is in the retracted position (e.g., at least partially within housing 114 - FIGS. 14-15), this thereby allows the assembly 111 to be positioned in and/or inserted through a tool guide 112 having an inner diameter 150 that is substantially the same as or slightly larger than the greatest outer diameter of assembly 111. In other words, the retractable receiver member 117 allows assembly 111 to have a sleeker

profile when inserted to the surgical site via tool guide 112 (FIGS. 14-15). Thus, after insertion of assembly 111 to the desired surgical site with the retracted receiver member 117, the post member 123 of receiver member 117 may then be un-retracted from housing 114 to then allow a surgical device 19 to be releasably secured to assembly 111 (e.g., to utilize imaging member 115 for imaging purposes, as similarly discussed above in relation to assembly 11).

In one embodiment and as depicted in FIGS. 14-15, post member 123 of receiver member 117 may be configured/dimensioned to be at least partially retractable within housing 114 via at least one spring member 155. When assembly 111 is inserted into tool guide 112, the inner wall 157 of tool guide 112 pushes against securing member 125, which thereby compresses spring members 155, which in turn allows at least a portion of post member 123 to be retracted within housing 114. It is noted that receiver member 117 and/or spring members 155 may be configured and dimensioned to allow the entire post member 123 (and securing member 125) to be retracted within housing 114 during insertion through tool guide 112. As shown in FIG. 16, when the securing member 125 is positioned out of the tool guide 112, the spring members 155 un-compress, thereby un-retracting the receiver member 117 from its position from inside the housing 114.

In another embodiment and as shown in FIGS. 19-20, post member 223 of receiver member 217 includes a movable sealing member 275, and post member 223 is configured/dimensioned to be at least partially retractable within fluidic chamber 259 of housing 214. In general, fluidic chamber 259 is a fluid-tight compartment (e.g., in conjunction with movable sealing member 275) that is configured and dimensioned to house and/or contain at least one fluid (e.g., when received from fluid line 261). In one embodiment, prior to inserting assembly 211 having receiver member 217 to the desired surgical (e.g. via tool guide 112), a user may force the post member 223 into the retracted position within the fluidic chamber 259 (FIGS. 14 and 19) (e.g., by pushing on securing member 225). Alternatively, it is noted that the inner wall 157 of tool guide 112 may push against securing member 225 to force at least a portion of post member 223 into the fluidic chamber 259. Fluid line 261 is typically in fluid communication with chamber 259 and with an actuating member 251 (e.g., an actuator). When it is desired to have the post member 223 positioned out of the fluidic chamber 259 (FIG. 20), a user may actuate the actuating member 251, which thereby forces fluid into the fluidic chamber 259 via the fluid line 261, which in turn forces post member 223 to its un-retracted position as shown in FIG. 20.

In exemplary embodiments, actuating member 251 is typically located or positioned outside of the body of the patient. Alternatively, actuating member 251 may be positioned on housing 214 or some other location on assembly 211 (e.g., to be actuated via device 19). In one embodiment, post member 223 and securing member 225 are both substantially retracted or housed in housing 214 when the receiver member 217 is in the retracted position.

In another alternative embodiment and as shown in FIGS. 17-18, receiver member 317 (e.g., post member 323) may be configured and dimensioned to be at least partially foldable towards and/or relative to the surface of housing 314 (e.g., to allow assembly 311 to have a sleeker profile when inserted to the surgical site). Thus, after insertion of assembly 311 to the desired surgical site with the folded receiver member 317, the post member 323 of receiver member 317 may then be unfolded away from housing 314 to then allow a surgical device 19 to be releasably secured to assembly 311 as similarly discussed above in relation to assembly 11. Post member 323 may be folded or unfolded via actuating member 351, or manually (e.g., via device 19).

In one embodiment and as shown in FIGS. 17-18, receiver member 317 includes a hinge 397. Hinge 397 is configured and dimensioned to allow receiver member 317 (e.g., post member 323) to be at least partially foldable towards and/or relative to the surface of housing 314.

In one embodiment, prior to inserting assembly 311 having receiver member 317 to the desired surgical (e.g. via tool guide 112), a user may force the post member 323 into the folded position (FIG. 17) (e.g., by pushing on securing member 325). Alternatively, it is noted that the inner wall 157 of tool guide 112 may push against receiver member 317 to force the receiver member into the folded position (and the receiver member may thereby un-fold from the folded position after being positioned out of the tool guide via a spring of hinge 397, or via a user manually, or via actuating means 351, as discussed below).

When it is desired to have the post member 323 un-folded from the folded position, a user may actuate the actuating member 351, which actuates a biasing spring associated with the hinge 397 to force the post member 323 to the un-folded position as shown in FIG. 18.

Turning now to FIGS. 40-42, an alternative assembly 411 may be utilized in conjunction with a user-operable surgical device 219. Assembly 411 may be structurally and functionally similar to the assembly 11 discussed above, with some differences. Moreover, device 219 may be structurally and functionally similar to device 19 discussed above, with some differences.

Similar to assembly 11, the assembly 411 for use in a surgical procedure is typically attached or mounted with respect to a flexible cable 413 or the like. Exemplary assembly 411 takes the form of an imaging assembly (e.g., an ultrasound imaging assembly), although the present disclosure is not limited thereto. Rather, assembly 411 may take a variety of forms to allow a surgeon or technician to extend at least a portion of the assembly 411 to a surgical site for imaging and/or surgical purposes, as discussed above in conjunction with assembly 11.

As shown in FIGS. 40-42, exemplary assembly 411 typically includes housing 414, imaging member 415, and receiver member 417. Similar to receiver member 17, receiver member 417 is typically configured and dimensioned to be releasably secured or attached to a user-operable surgical device 219 (or device 19). As such, a user may then manipulate the user-operable surgical device 219 to thereby move/position the releasably secured assembly 411 to any desired position and/or location (e.g., in a minimally invasive manner within the surgical site for imaging, surgical and/or diagnostic purposes).

In exemplary embodiments, receiver member 417 is a substantially T-shaped or fin-shaped component or protrusion that extends from housing 414 to allow the user operable surgical device 219 to releasably secure or attach to at least a portion of the receiver member 417. The receiver member 417 may also define at least one cavity, recess, channel or receiving feature/surface that allows the user-operable surgical device 219 to releasably secure to assembly 411.

In exemplary embodiments, receiver member 417 includes a post member 423 that extends from housing 414, and a securing member 425 that extends beyond or past both sides of the post member 423 to define a substantially T-shaped or fin-shaped component or protrusion that extends from the housing 414. Post member 423 typically extends from housing 414 a sufficient distance to allow first and second end effectors 237, 239 of device 219 to be positioned and/or attached to post member 423 and underneath securing member 425 when device 219 is releasably attached to receiver member 417, as discussed below.

Similar to receiver member 17, the post member 423 of receiver member 417 has a first end 427 and a second end 429, with the first end 427 typically being wider (e.g., laterally wider) than the second end 429 (e.g., the post member 423 tapers from the first end 427 to the second end 429). The securing member 425 includes a first end 431 and a second end 433. In one embodiment, the first end 431 laterally extends substantially the same distance beyond the longitudinal axis of the post member 423 relative to the lateral extension of the second end 433 of the securing member 425 beyond the longitudinal axis of the post member 423.

However, it is noted that similar to receiver member 17, the first end 431 may laterally extend a greater distance beyond the longitudinal axis of the post member 423 relative to the lateral extension of the second end 433 of the securing member 425 beyond the longitudinal axis of the post member 423 (e.g., similar to FIG. 5, with securing member 425 tapering from the first end 431 to the second end 433).

In exemplary embodiments, the user-operable grasper member 219 includes first and second end effectors 237, 239 (e.g., first and second jaws or grasping members 237, 239). Each end effector 237, 239 may or may not include slots (see, e.g., FIGS. 40-42, and FIG. 10). As such, a user may operate the user-operable grasper member 219 (or device 19), either manually or tele-surgically, to open or widen the first and second end effectors 237, 239, and then to position the first and second end effectors 237, 239 adjacent to the left side and right side 437, 439 of post member 423, respectively. The user may then operate the device 219 to then close the end effectors 237, 239 so that at least a portion of the left side 437 of post member 423 is releasably secured to end effector 237, and at least a portion of the right side 439 of post member 423 is releasably secured to end effector 239. Moreover and in this releasably secured position, at least a portion of end effectors 237, 239 is positioned against post member 423 and underneath securing member 425 (FIG. 42). Stated another way, at least a portion of end effectors 237, 239 are positioned underneath securing member 425 after the end effectors 237, 239 are releasably secured to post member 423.

In this way, user-operable surgical device 219 is now releasably secured or attached to receiver member 417 of assembly 411, and a user may then move/position the assembly 411 to any desired position and/or location (e.g., for imaging/surgical purposes) by operating device 219 (e.g., either manually or tele-surgically).

It is to be noted that receiver member 417 of assembly 411 may be configured and dimensioned to operate structurally and functionally similar to: (i) the receiver member 117 of assembly 111 (e.g., to be at least partially retractable within housing 414, as similarly depicted in FIGS. 14-16), (ii) the receiver member 317 of assembly 311 (e.g., to be at least partially foldable towards and/or relative to the surface of housing 414, as similarly depicted in FIGS. 17-18), or (iii) the receiver member 217 of assembly 211 (e.g., to be at least partially retractable within a fluidic chamber of housing 414, as similarly depicted in FIGS. 19-20).

Moreover, it is also to be noted that post member 423 of receiver member 417 may include at least one projection or protrusion that is configured and dimensioned to operate in a structurally and functionally similar fashion to projections or protrusions 537c, 539c, 537d or 539d as disclosed and described below in conjunction with FIGS. 34-35 and FIGS. 38-39.

Furthermore, it is also to be noted that post member 423 of receiver member 417 may include at least one surface that is configured and dimensioned to operate in a structurally and functionally similar fashion to surfaces 537a, 539a, 537b or 539b as disclosed and described below in conjunction with FIGS. 32-33 and FIGS. 36-36A.

Turning now to FIGS. 21-39, an alternative assembly 511 may be utilized in conjunction with a user-operable surgical device 319 (or device 19, or device 219, etc.). Assembly 511 may be structurally and functionally similar to the assembly 11 discussed above, with some differences. Moreover, device 319 may be structurally and functionally similar to device 19 discussed above, with some differences.

Similar to assembly 11, the assembly 511 for use in a surgical procedure is typically attached or mounted with respect to a flexible cable 513 or the like. Exemplary assembly 511 takes the form of an imaging assembly (e.g., an ultrasound imaging assembly), although the present disclosure is not limited thereto. Rather, assembly 511 may take a variety of forms to allow a surgeon or technician to extend at least a portion of the assembly 511 to a surgical site for imaging and/or surgical purposes, as discussed above in conjunction with assembly 11.

As shown in FIGS. 21-22, exemplary assembly 511 typically includes housing 514, imaging member 515, and receiver member 517. Similar to receiver member 17, receiver member 517 is typically configured and dimensioned to be releasably secured or attached to a user-operable surgical device 319 (or device 19, or device 219, etc.). As such, a user may then manipulate the user-operable surgical device 319 to thereby move/position the releasably secured assembly 511 to any desired position and/or location (e.g., in a minimally invasive manner within the surgical site for imaging, surgical and/or diagnostic purposes).

In exemplary embodiments, receiver member 517 is a component or protrusion that extends from housing 514 to allow the user operable surgical device 319 to releasably secure or attach to at least a portion of the receiver member 517. The receiver member 517 may also define at least one receiving feature and/or surface that allows the user-operable surgical device 319 to releasably secure to assembly 511.

In exemplary embodiments, receiver member 517 includes a post member 523 that extends from housing 514. Post member 523 typically extends from housing 414 a sufficient distance to allow at least a portion of first and second end effectors 337, 339 of device 319 to be positioned adjacent and/or attached/secured to at least a portion of post member 523 when device 319 is releasably attached or secured to receiver member 517, as discussed below.

Similar to receiver member 17, the post member 523 of receiver member 517 has a first end 527 and a second end 529, with the first end 527 typically being wider (e.g., laterally wider) than the second end 529 (e.g., the post member 523 tapers from the first end 527 to the second end 529). Post member 523 may also include an attachment member 524, the attachment member 524 being configured and dimensioned to be attached, secured or mounted with respect to the housing 514 (e.g., with respect to a groove or slot of housing 514) of the assembly 511.

In exemplary embodiments, the user-operable grasper member 319 includes first and second end effectors 337, 339 (e.g., first and second jaws or grasping members 337, 339). Each end effector 337, 339 may or may not include slots. As such, a user may operate the user-operable grasper member 319 (or device 19 or 219), either manually or tele-surgically, to open or widen the first and second end effectors 337, 339, and then to position the first and second end effectors 337, 339 adjacent to the left side and right side 537, 539 of post member 523, respectively. The user may then operate the device 319 to then close the end effectors 337, 339 so that at least a portion of the left side 537 of post member 523 is releasably secured to end effector 337, and at least a portion of the right side 539 of post member 523 is releasably secured to end effector 339 (FIG. 30). In this releasably secured position, at least a portion of end effectors 337, 339 are positioned against at least a portion of post member 523.

In this way, user-operable surgical device 319 is now releasably secured or attached to receiver member 517 of assembly 511, and a user may then move/position the assembly 511 to any desired position and/or location (e.g., for imaging/surgical purposes) by operating device 319 (e.g., either manually or tele-surgically). For example and as shown in FIG. 31, a user may then move and/or position the assembly 511 over, across and/or adjacent to at least a portion of tissue or organ 49 of a patient for imaging/surgical purposes.

It is to be noted that prior to releasably securing device 319 to receiver member 517, the device 319 may approach receiver member 517 from a variety of angles/positions. For example and as shown in FIGS. 27, 28 and 30, the device 319 may approach assembly 511 from the proximal end of assembly 511. Alternatively and as shown in FIG. 29, device 319 may approach receiver member 517 of assembly 511 from a different position (e.g., from a position located above the receiver member 517) so that at least a portion of end effectors 337, 339 are positioned against at least a portion of post member 523 once device 319 is releasably secured to receiver member 517. In one embodiment and as depicted in FIGS. 37 and 37A, receiver member 517' includes a post member 523' that is slightly tapered from the bottom side 585' to the top side 587' to facilitate the releasable securement of device 319 to

receiver member 517' from a variety of angles/positions (e.g., from a position located above the receiver member 517 as shown in FIG. 29). Stated another way, the width D of the post member 523' at the bottom side 585' is larger than the width d of the post member 523' at the top side 587' to facilitate the releasable securement of device 319 to receiver member 517' from a variety of angles/positions.

As previously noted, the first end 527 of the post member 523 is typically wider than the second end 529 of the post member 523, and this structural feature/configuration of receiver member 517 further ensures that surgical device 319 is appropriately releasably secured or attached to receiver member 517 (e.g., that end effectors 337, 339 are appropriately releasably secured or attached to the left and right sides 537, 539 of post member 523).

In one embodiment and as depicted in FIGS. 32-33, end effectors 337, 339 include grooved interior surfaces 360, 362, and at least a portion of left side and right side 537, 539 of post member 523 includes grooved exterior surfaces 537a, 539a. As such, a user may then operate the device 319 to close the end effectors 337, 339 so that at least a portion of the left side grooved exterior surface 537a of post member 523 is releasably secured to grooved interior surface 360 of end effector 337, and at least a portion of the right side grooved exterior surface 539a of post member 523 is releasably secured to grooved interior surface 362 of end effector 339.

In another embodiment and as depicted in FIGS. 36 and 36A, at least a portion of left side and right side 537, 539 of post member 523 includes roughened or textured exterior surfaces 537b, 539b. As such, a user may then operate the device 319 to close the end effectors 337, 339 so that at least a portion of the left side roughened/textured exterior surface 537b of post member 523 is releasably secured to end effector 337, and at least a portion of the right side roughened/textured exterior surface 539b of post member 523 is releasably secured to end effector 339.

In another embodiment and as depicted in FIGS. 34-35, end effectors 337, 339 include an interior recess or aperture 380, 382, and left side and right side 537, 539 of post member 523 includes protrusions or knobs 537c, 539c. As such, a user may then operate the device 319 to close the end effectors 337, 339 so that left side knob 537c of left side 537 is releasably positioned and/or secured within at least a portion of recess/aperture 380 of end effector 337, and so that right side knob 539c of right side 539 is releasably positioned and/or secured within at least a portion of recess/aperture 382 of end effector 339.

In another embodiment and as depicted in FIGS. 38-39, end effectors 337, 339 include an interior concave or cup-like portion 390, 392, and left side and right side 537, 539 of post member 523 includes protrusions or extending members 537d, 539d. As such, a user may then operate the device 319 to close the end effectors 337, 339 so that left side extending member 537d of left side 537 is releasably positioned and/or secured within at least a portion of concave or cup-like portion 390 of end effector 337, and so that right side extending member 539d of right side 539 is releasably positioned and/or secured within at least a portion of concave or cup-like portion 392 of end effector 339.

It is to be noted that receiver member 517 of assembly 511 may be configured and dimensioned to operate structurally and functionally similar to: (i) the receiver member 117 of assembly 111 (e.g., to be at least partially retractable within housing 514, as similarly depicted in FIGS. 14-16), (ii) the receiver member 317 of assembly 311 (e.g., to be at least partially foldable towards and/or relative to the surface of housing 514, as similarly depicted in FIGS. 17-18), or (iii) the receiver member 217 of assembly 211 (e.g., to be at least partially retractable within a fluidic chamber of housing 514, as similarly depicted in FIGS. 19-20).

Although the systems, assemblies and methods of the present disclosure have been described with reference to exemplary embodiments thereof, the present disclosure is not limited to such exemplary embodiments and/or implementations. Rather, the systems and methods of the present disclosure are susceptible to many implementations and applications, as will be readily apparent to persons skilled in the art from the disclosure hereof. The present disclosure expressly encompasses such modifications, enhancements and/or variations of the disclosed embodiments. Since many changes could be made in the above construction and many widely different embodiments of this disclosure could be made without departing from the scope thereof, it is intended that all matter contained in the drawings and specification shall be interpreted as illustrative and not in a limiting sense. Additional modifications, changes, and substitutions are intended in the foregoing disclosure. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the scope of the disclosure.

What is claimed is:

CLAIMS

1. An assembly for use in a surgical procedure comprising:

a housing defining a substantially fin-shaped receiver member, the receiver member including a post member and a securing member;

wherein the post member extends from the housing and the securing member extends past both sides of the post member to define the substantially fin-shaped receiver member; and

wherein the substantially fin-shaped receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device.

2. The assembly of claim 1 further comprising an imaging member mounted with respect to the housing.

3. The assembly of claim 2, wherein the imaging member is an ultrasound transducer.

4. The assembly of claim 1, wherein the receiver member is positioned at or near the proximal end of the housing.

5. The assembly of claim 1, wherein the user-operable surgical device includes first and second end effectors, the first end effector having a first slit and the second end effector having a second slit;

wherein the securing member has a first side and a second side; and

wherein at least a portion of the first side of the securing member extends through the first slit and at least a portion of the second side of the securing member extends through the second slit when the user-operable surgical device is releasably secured to the receiver member.

6. The assembly of claim 1, wherein the receiver member is integrally formed from the housing.

7. The assembly of claim 1, wherein the securing member has a first end and a second end and the post member defines a longitudinal axis; and

wherein the securing member tapers from the first end to the second end with the first end of the securing member extending a greater distance from the longitudinal axis relative to the distance that the second end of the securing member extends from the longitudinal axis.

8. The assembly of claim 1, wherein the post member has a first end and a second end, the post member tapering from the first end to the second end with the first end being wider than the second end.

9. The assembly of claim 1, wherein at least a portion of the receiver member is retractable within the housing.

10. The assembly of claim 1, wherein at least a portion of the receiver member is foldable with respect to the housing.

11. The assembly of claim 2, wherein the housing is mounted with respect to a flexible cable; and

wherein the imaging member is configured and dimensioned to capture an image of a surgical site.

12. The assembly of claim 1, wherein the user-operable surgical device is a minimally invasive user-operable surgical device; and

wherein the housing and receiver member are configured and dimensioned to be: (i) inserted through a guide tool located in a minimally invasive incision of a patient, and (ii) moved to a surgical site within the patient by the minimally invasive user-operable surgical device.

13. The assembly of claim 1, wherein the user-operable surgical device includes first and second end effectors;

wherein the post member has a first side and a second side; and

wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the first side of the post member is adjacent to at least a portion of the first end effector, at least a portion of the second side of the post member is adjacent to at least a portion of the second end effector, and at least a portion of the first and second end effectors are positioned underneath the securing member.

14. The assembly of claim 1, wherein the post member has a first side and a second side, the first and second sides each having a grooved or textured surface.

15. The assembly of claim 1, wherein the post member has a first side and a second side, the first and second sides each having a protrusion or extending member;

wherein the user-operable surgical device includes first and second end effectors, the first and second end effectors each having a recess or concave portion; and

wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the protrusion or extending member of the first side of the post member is positioned within at least a portion of the recess or concave portion of the first end effector, and at least a portion of the protrusion or extending member of the second side of the post member is positioned within at least a portion of the recess or concave portion of the second end effector.

16. An assembly for use in a surgical procedure comprising:

a housing defining a receiver member, the receiver member including a post member that extends from the housing;

wherein the post member has a first end and a second end, the post member tapering from the first end to the second end with the first end being wider than the second end; and

wherein the tapered post member of the receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device.

17. The assembly of claim 16 further comprising an imaging member mounted with respect to the housing.

18. The assembly of claim 17, wherein the imaging member is an ultrasound transducer.

19. The assembly of claim 16, wherein at least a portion of the receiver member is retractable within the housing.

20. The assembly of claim 16, wherein at least a portion of the receiver member is foldable with respect to the housing.

21. The assembly of claim 16, wherein the user-operable surgical device includes first and second end effectors;

wherein the post member has a first side and a second side; and

wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the first side of the post member is adjacent to at least a portion of the first end effector, and at least a portion of the second side of the post member is adjacent to at least a portion of the second end effector.

22. The assembly of claim 16, wherein the post member has a top side and a bottom side, the post member tapering from the bottom side to the top side with the bottom side being wider than the top side.

23. The assembly of claim 17, wherein the housing is mounted with respect to a flexible cable;

wherein the user-operable surgical device is a minimally invasive user-operable surgical device;

wherein the housing and receiver member are configured and dimensioned to be: (i) inserted through a guide tool located in a minimally invasive incision of a patient, and (ii) moved to a surgical site within the patient by the minimally invasive user-operable surgical device; and

wherein the imaging member is configured and dimensioned to capture an image of the surgical site.

24. The assembly of claim 16, wherein the post member has a first side and a second side, the first and second sides each having a grooved or textured surface.

25. The assembly of claim 16, wherein the post member has a first side and a second side, the first and second sides each having a protrusion or extending member;

wherein the user-operable surgical device includes first and second end effectors, the first and second end effectors each having a recess or concave portion; and

wherein when the user-operable surgical device is releasably secured to the receiver member, at least a portion of the protrusion or extending member of the first side of the post member is positioned within at least a portion of the recess or concave portion of the first end effector, and at least a portion of the protrusion or extending member of the second side of the post member is positioned within at least a portion of the recess or concave portion of the second end effector.

26. An imaging assembly comprising:

a housing defining a substantially fin-shaped receiver member, the receiver member including a post member and a securing member;

an imaging member mounted with respect to the housing;

wherein the post member extends from the housing and the securing member extends past both sides of the post member to define the substantially fin-shaped receiver member;

wherein the securing member has a first end and a second end and the post member defines a longitudinal axis;

wherein the securing member tapers from the first end to the second end with the first end of the securing member extending a greater distance from the longitudinal axis relative to the distance that the second end of the securing member extends from the longitudinal axis;

wherein the receiver member is positioned at or near the proximal end of the housing;

wherein the substantially fin-shaped receiver member is configured and dimensioned to be releasably secured to a user-operable surgical device;

wherein the user-operable surgical device includes first and second end effectors, the first end effector having a first slit and the second end effector having a second slit;

wherein the securing member has a first side and a second side; and

wherein at least a portion of the first side of the securing member extends through the first slit and at least a portion of the second side of the securing member extends through the second slit when the user-operable surgical device is releasably secured to the receiver member.

Fig. 1

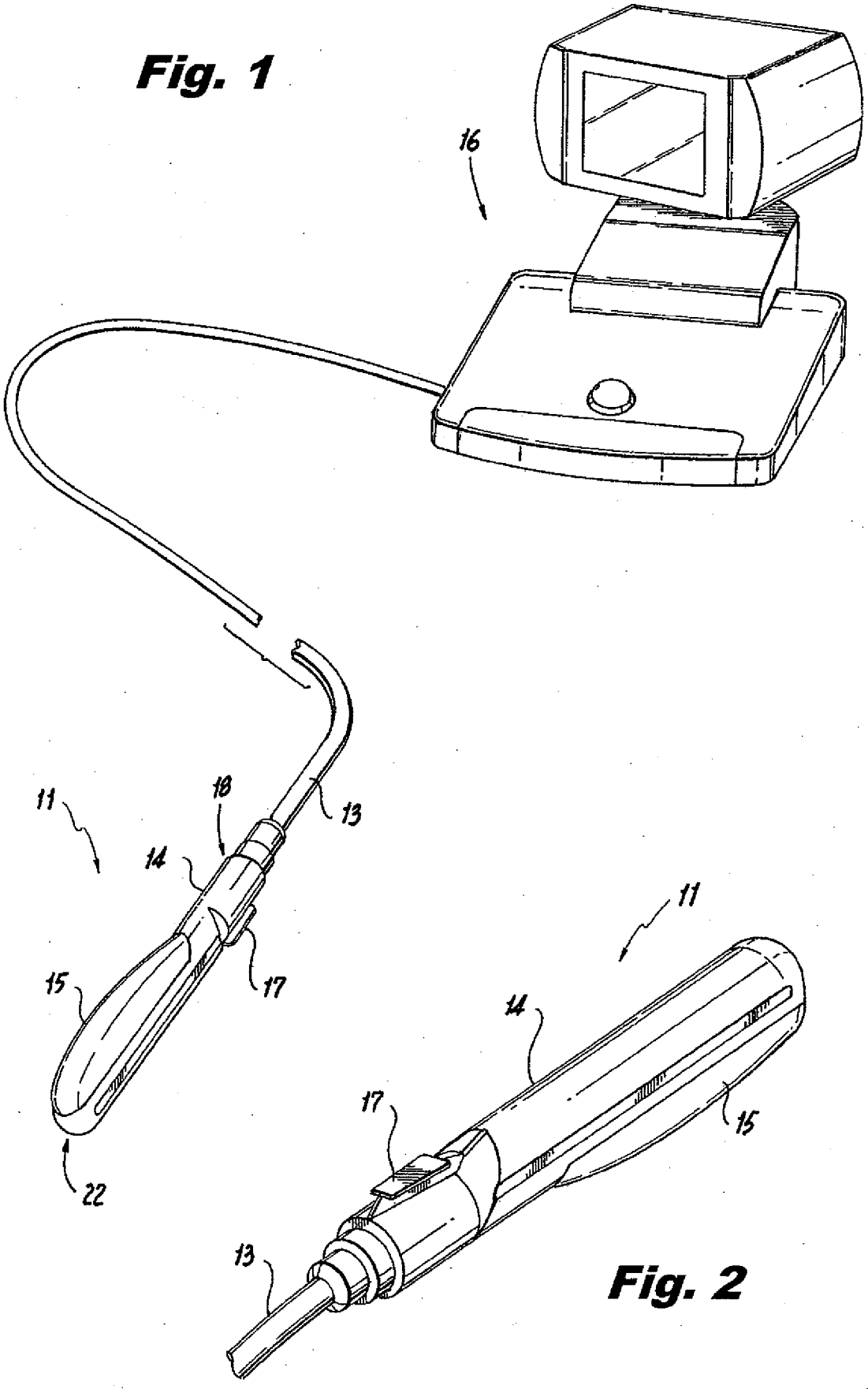
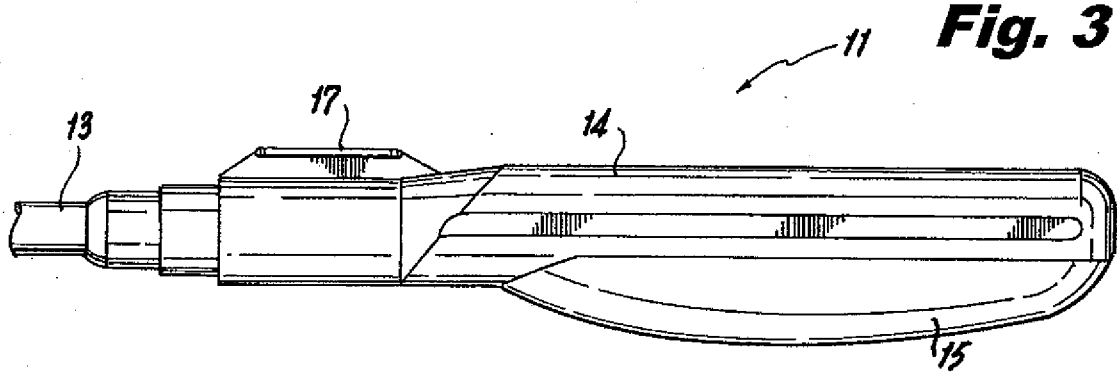


Fig. 2

Fig. 3



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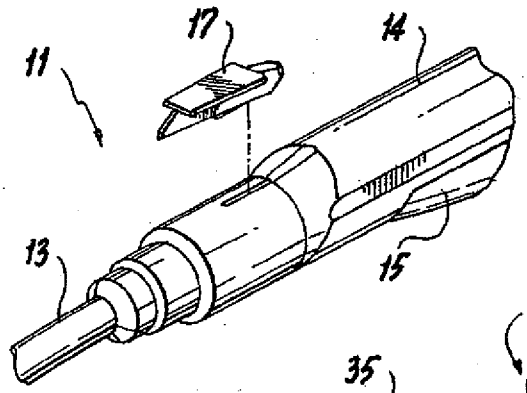
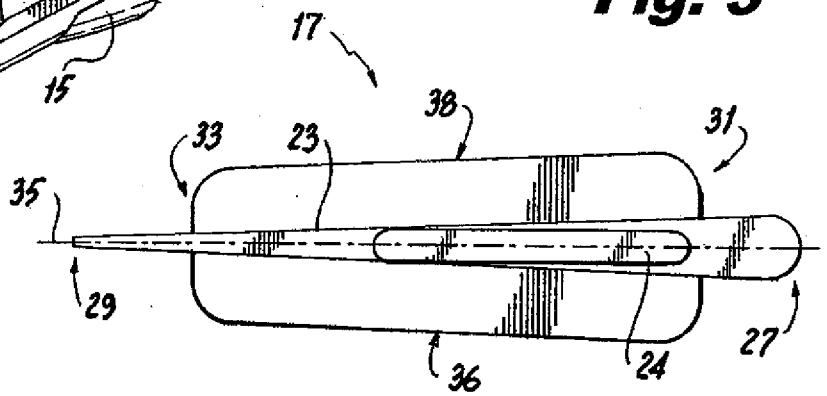
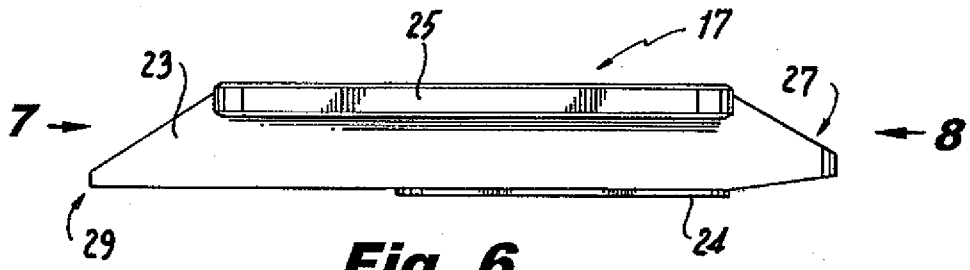


Fig. 5





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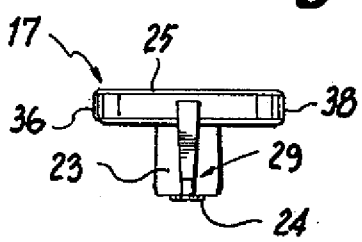

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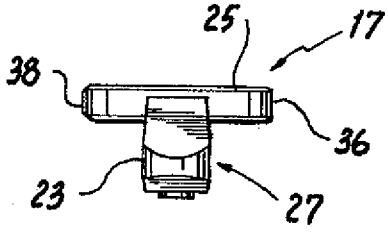

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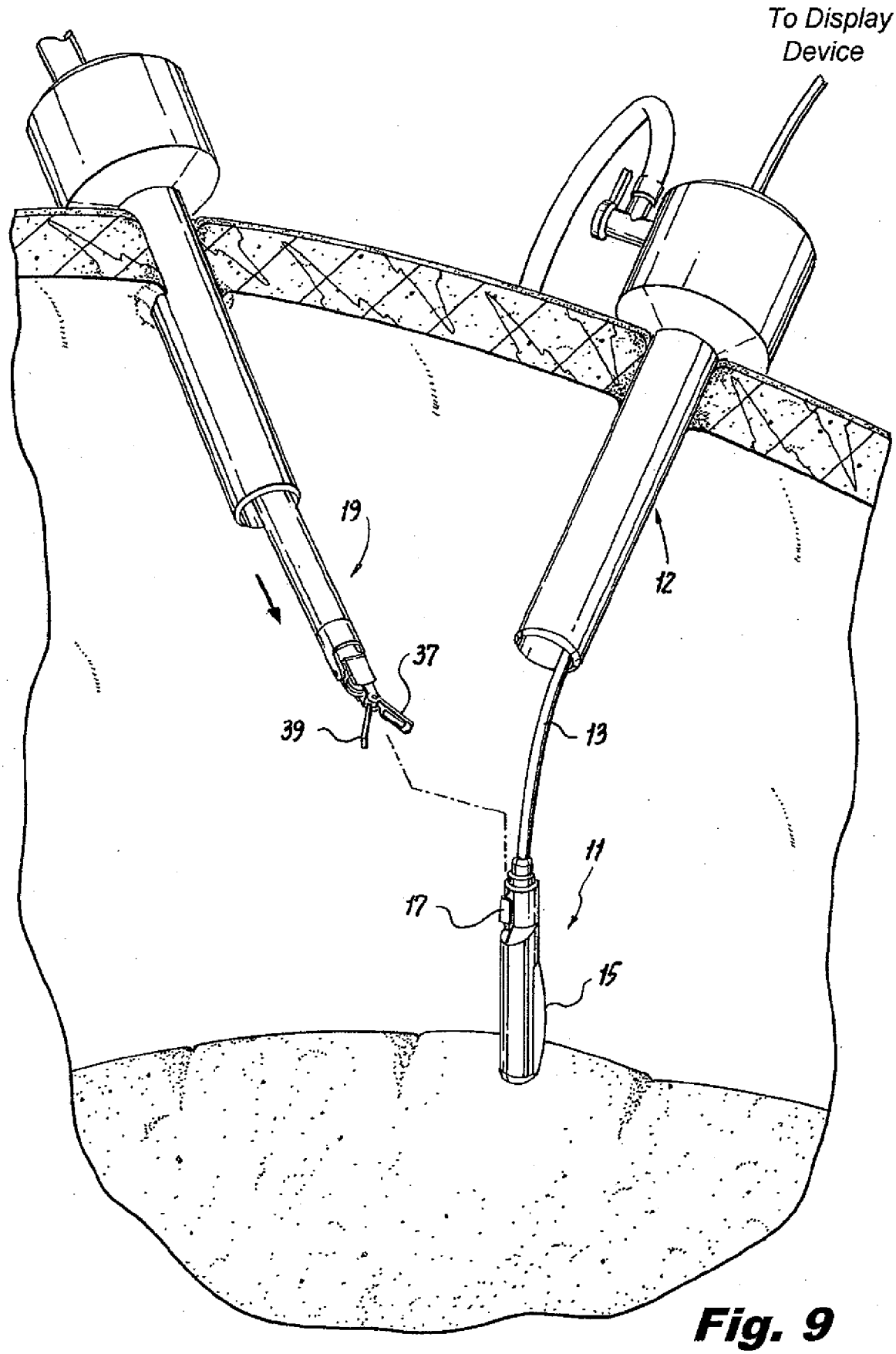
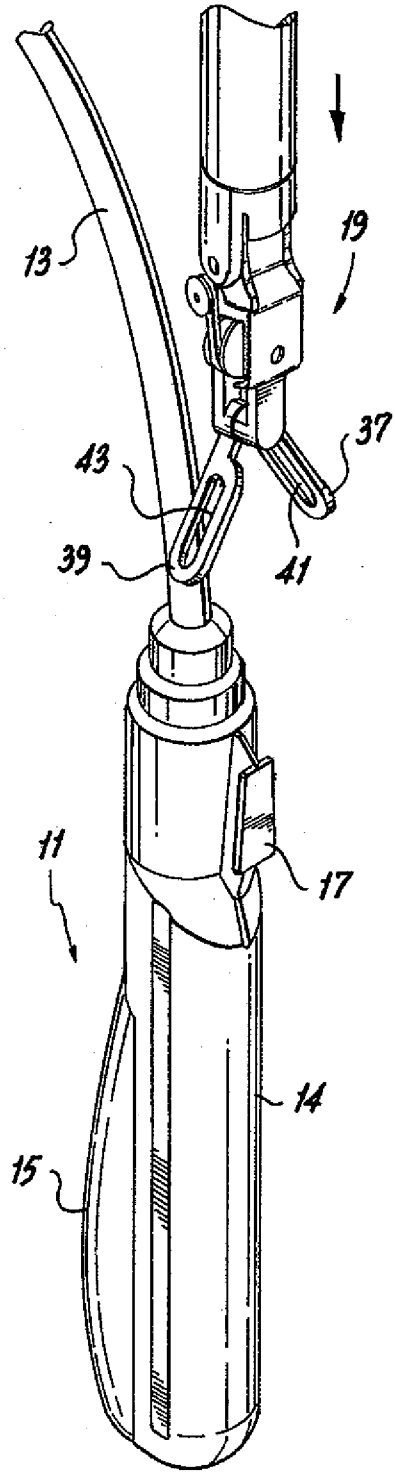


Fig. 9



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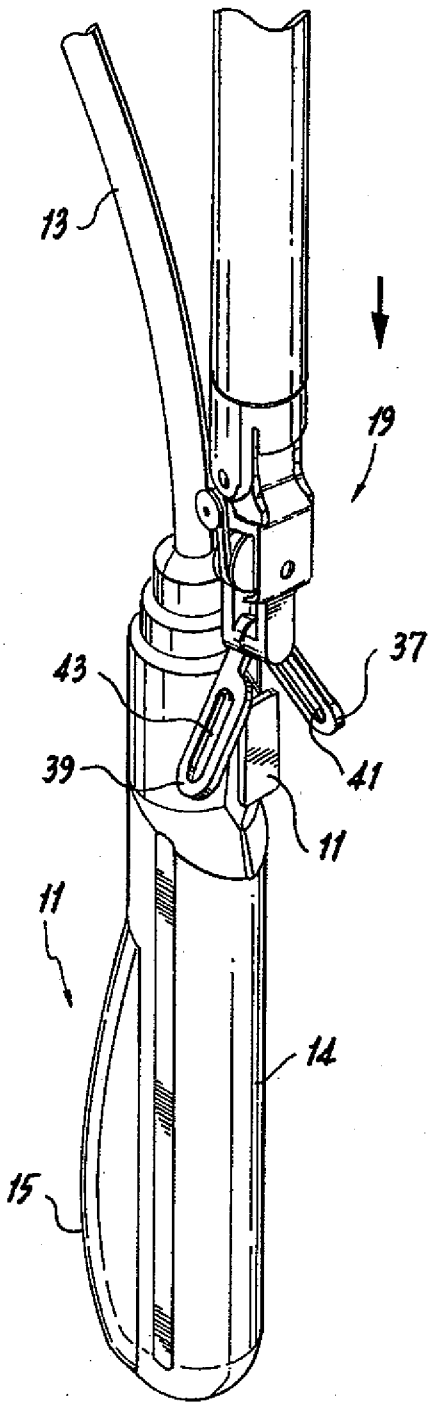
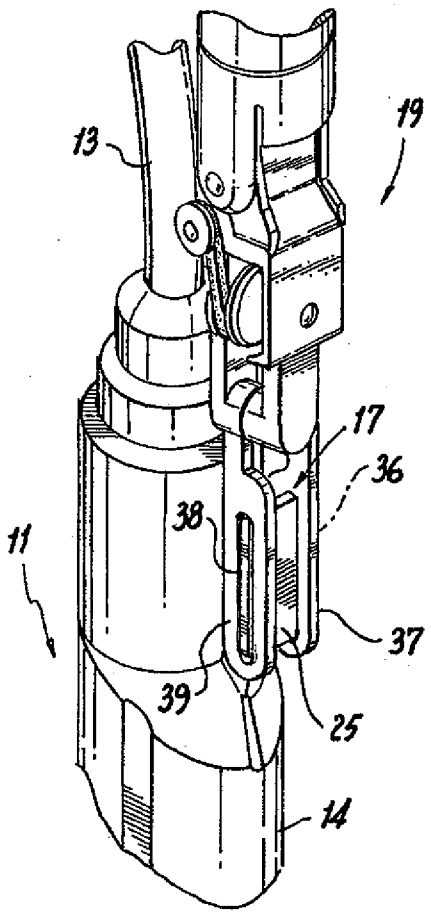


Fig. 11

Fig. 12



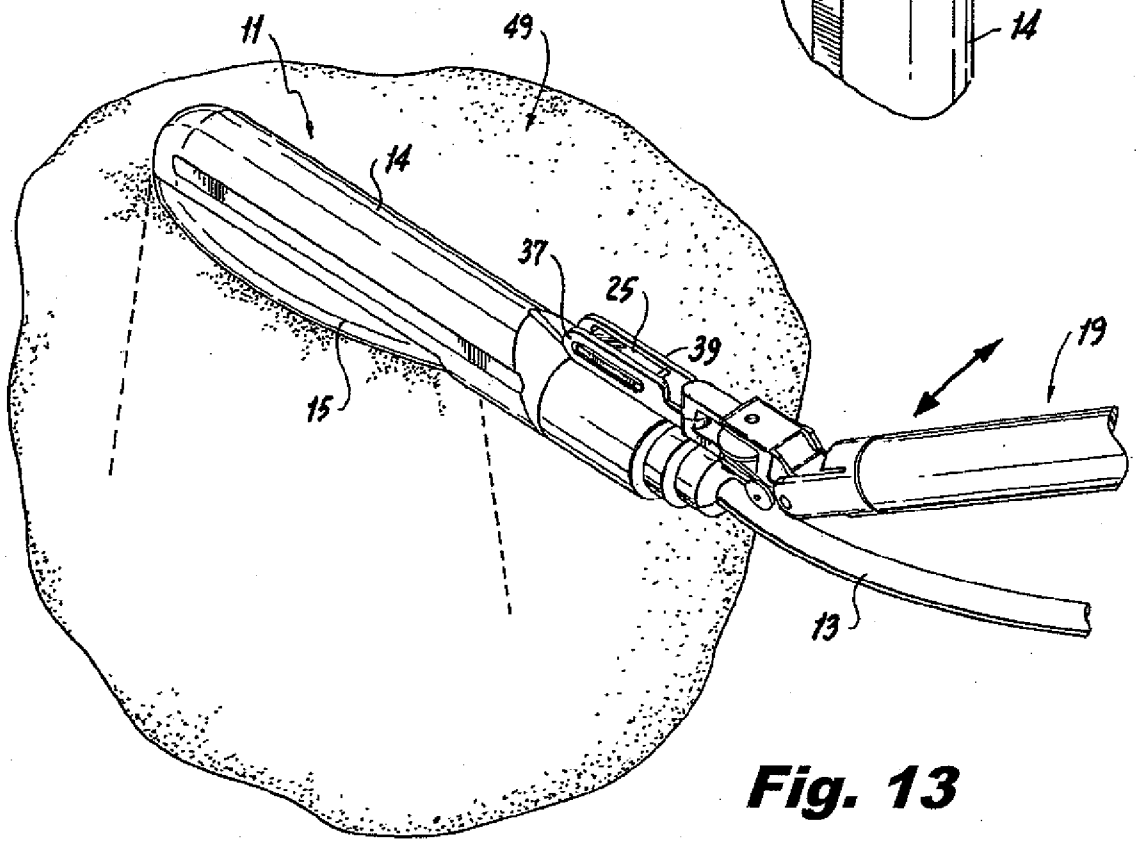
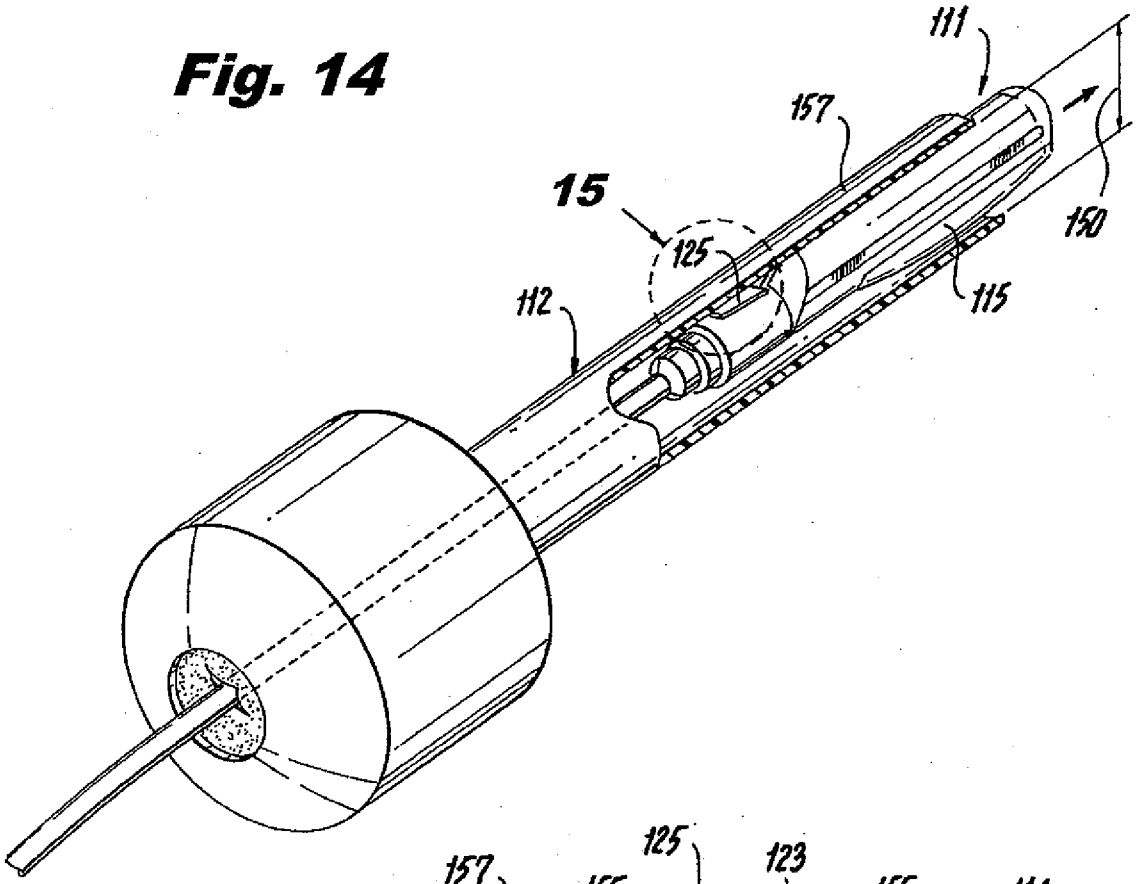


Fig. 13

Fig. 14



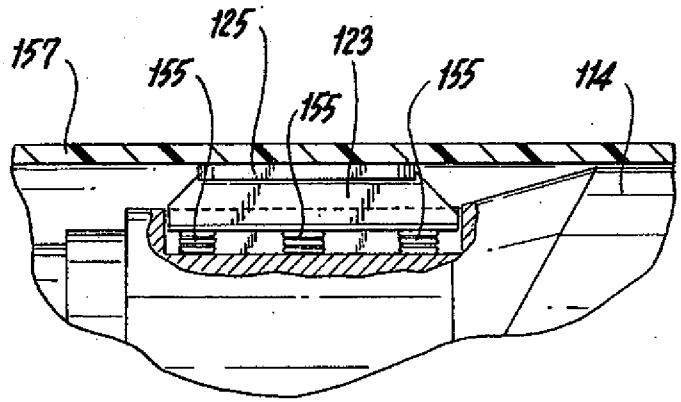


Fig. 15

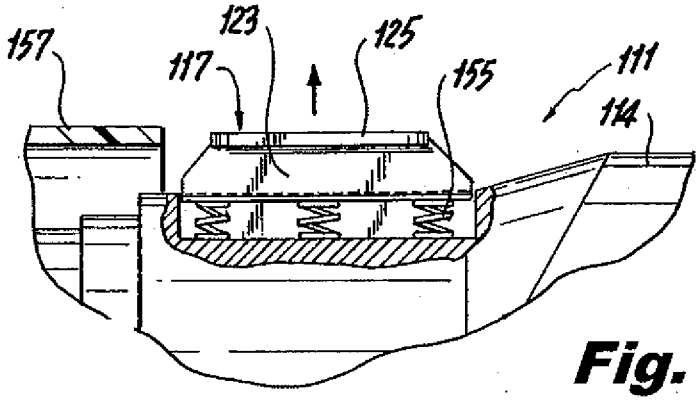
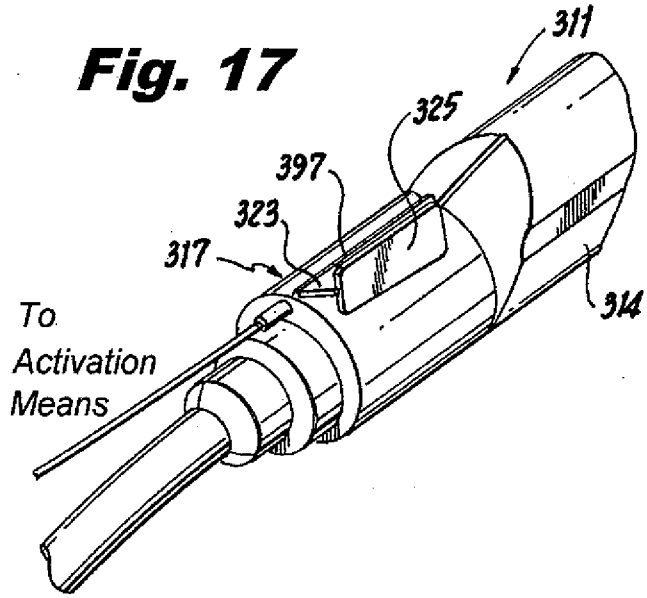


Fig. 16

Fig. 17



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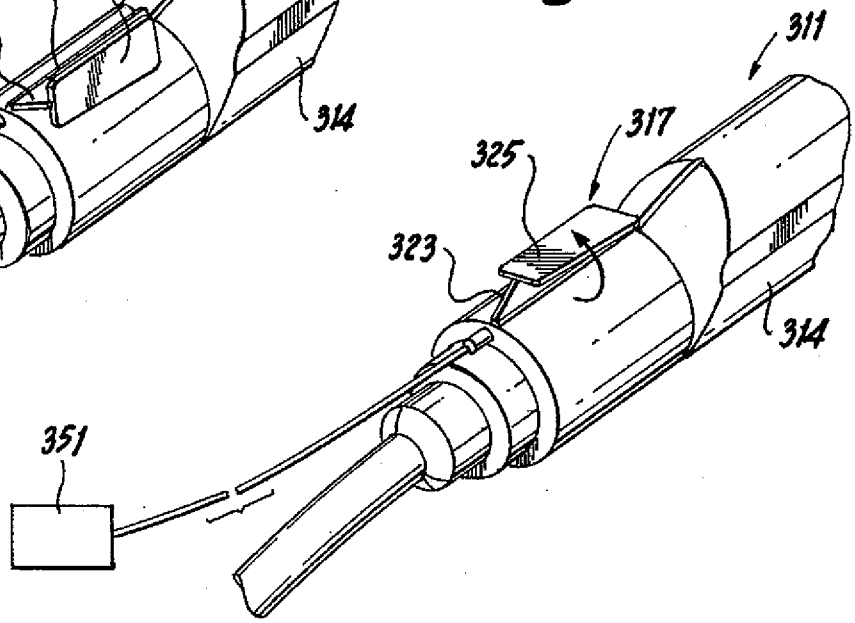


Fig. 19

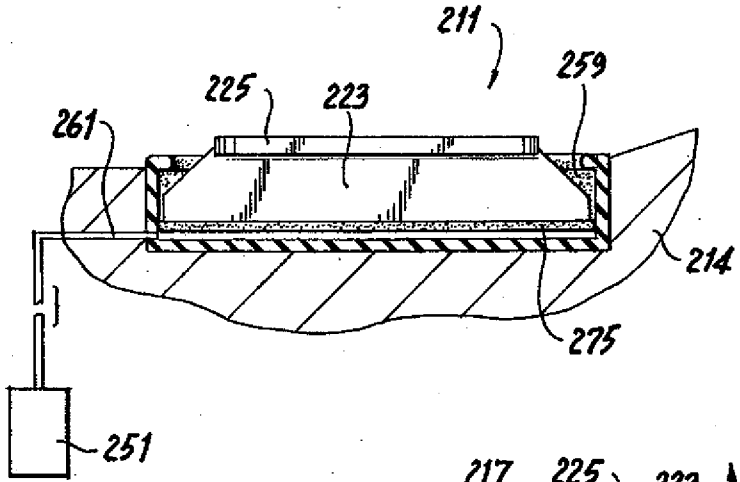
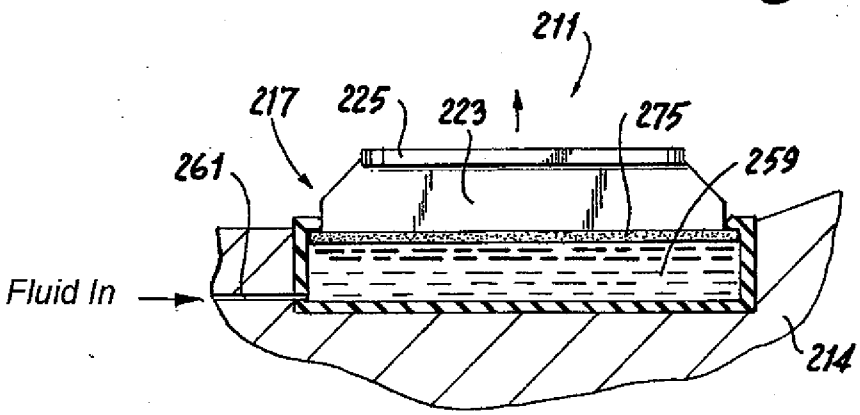
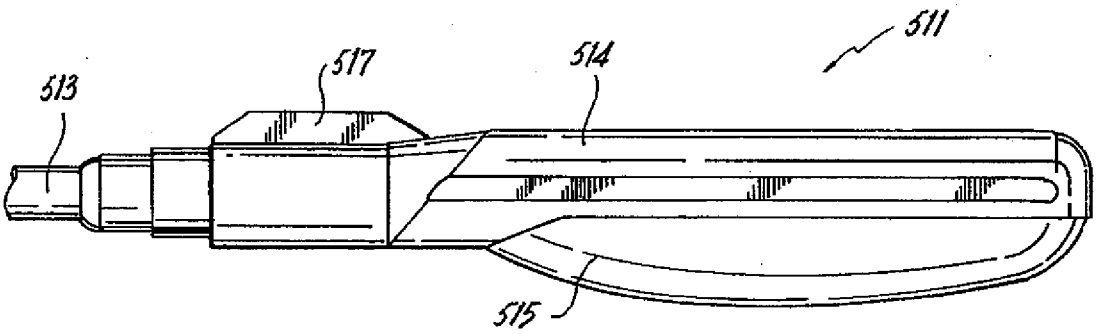


Fig. 20





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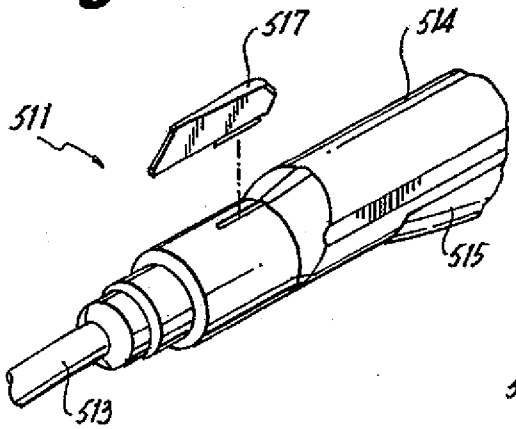

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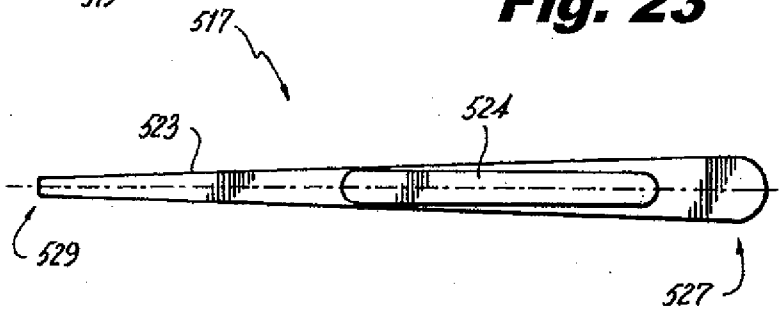

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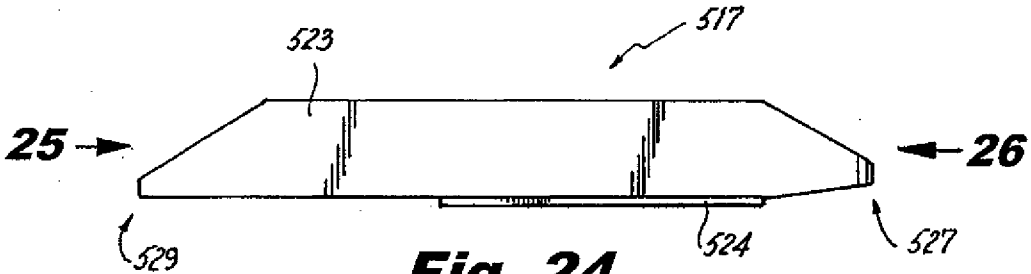

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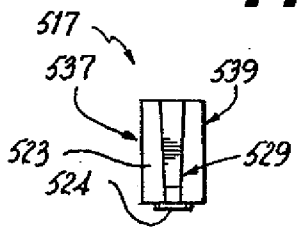

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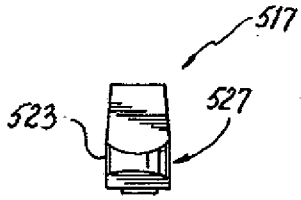

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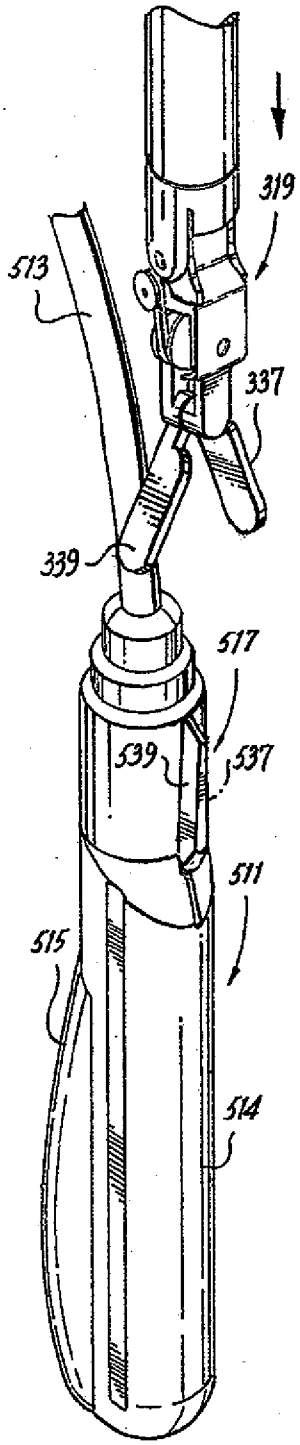
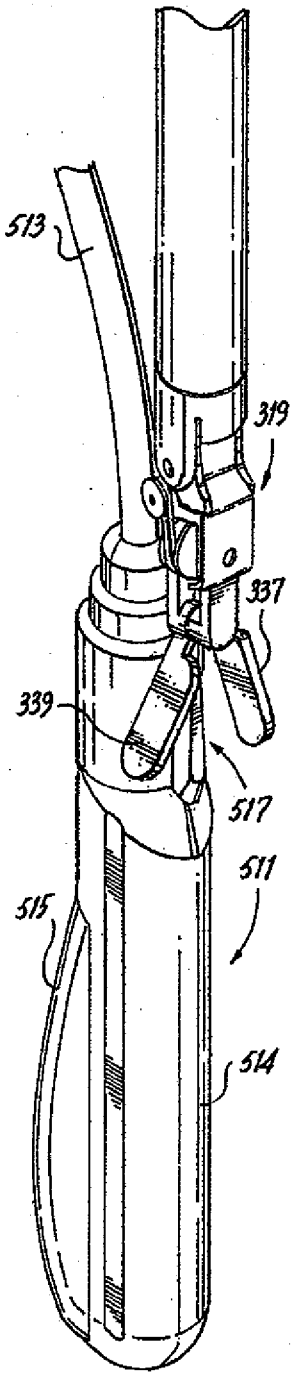


Fig. 27



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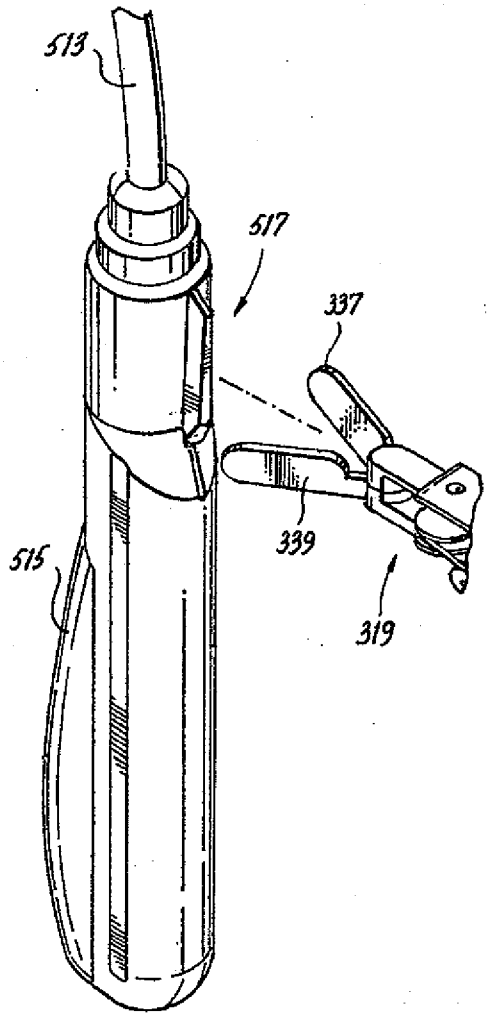
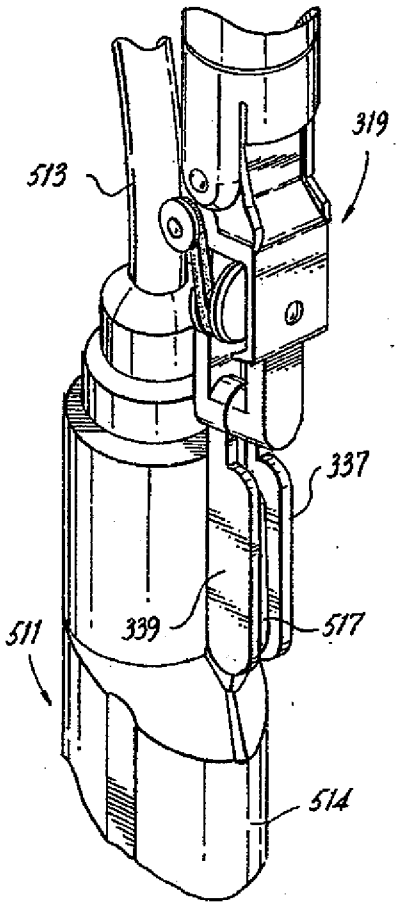
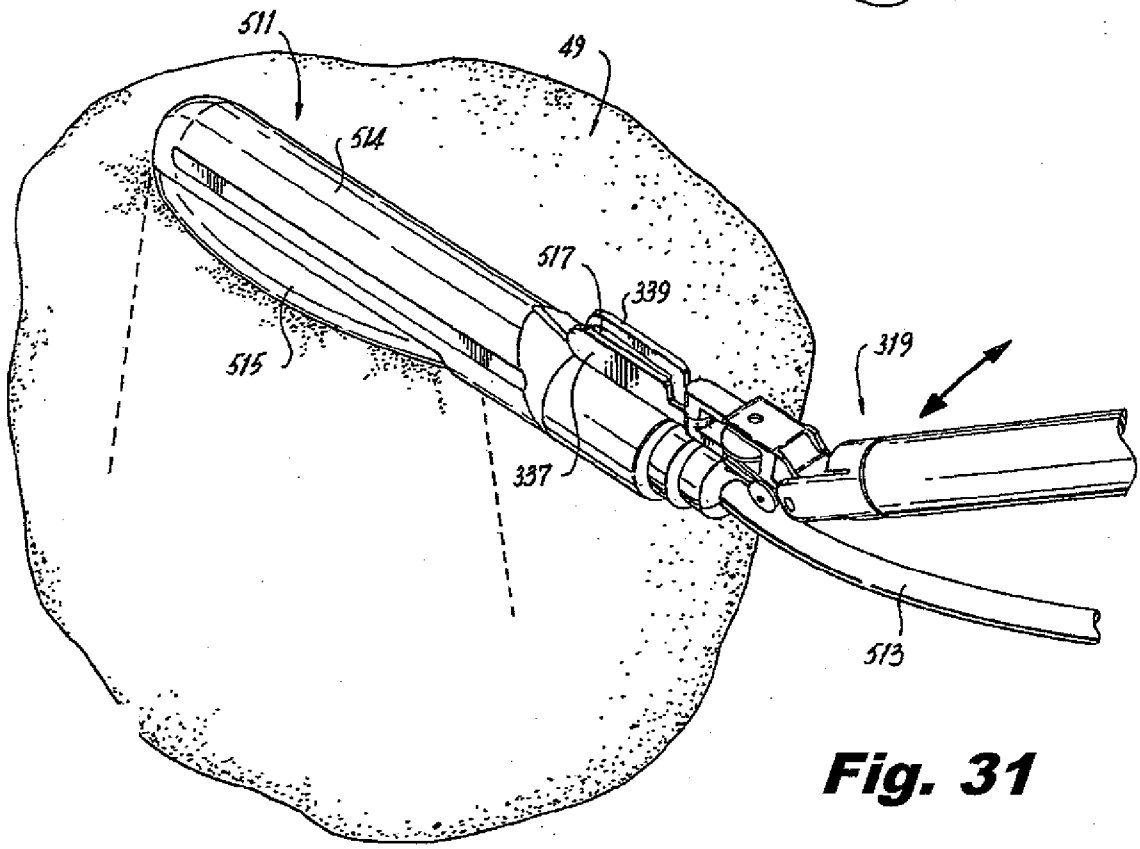


Fig. 29

Fig. 30





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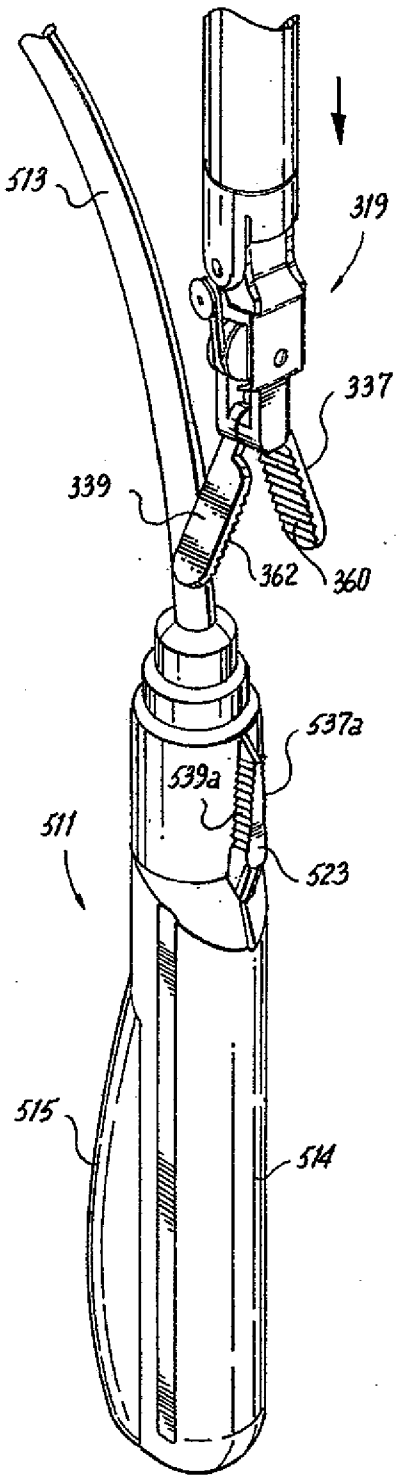
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539a
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Fig. 32

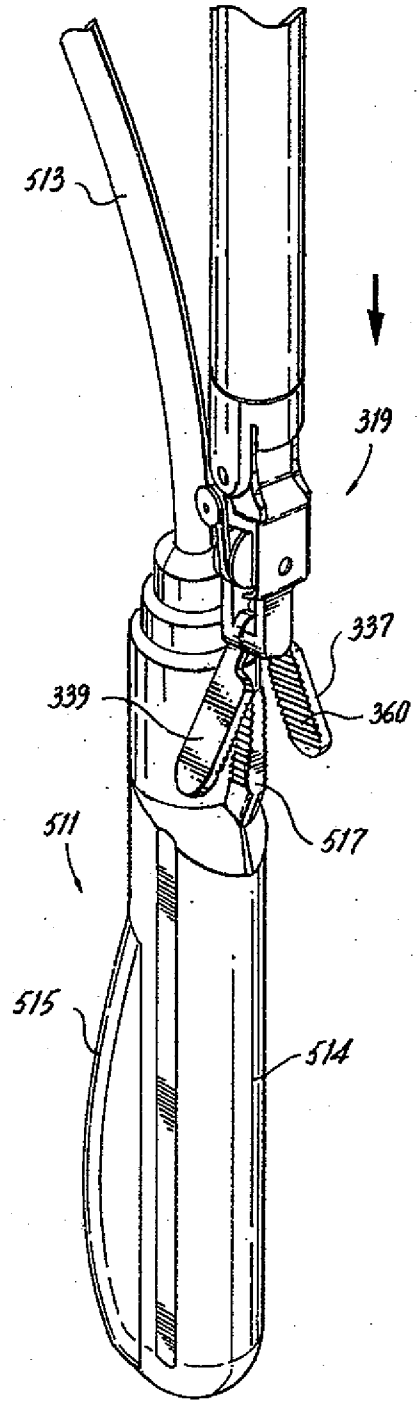
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Fig. 33

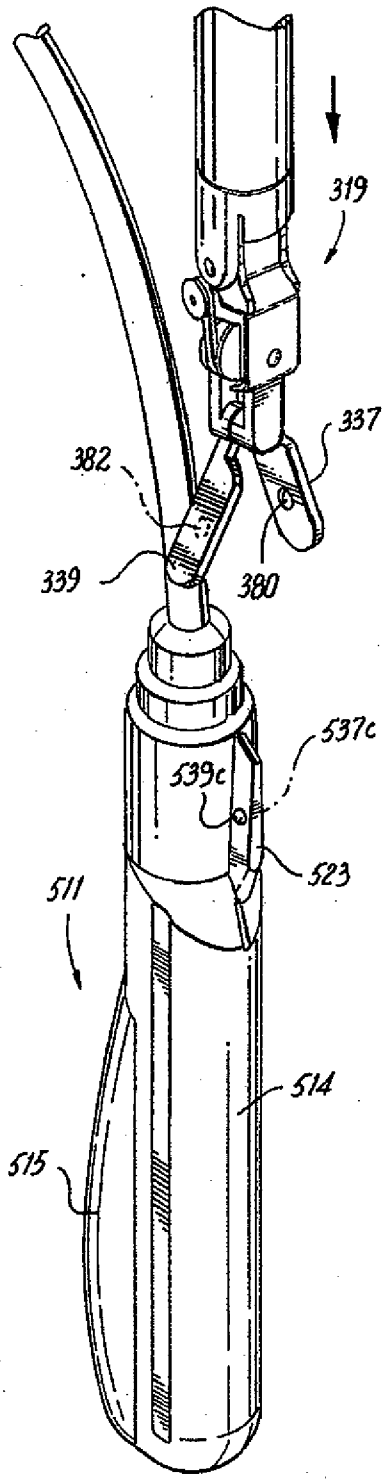
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Fig. 34

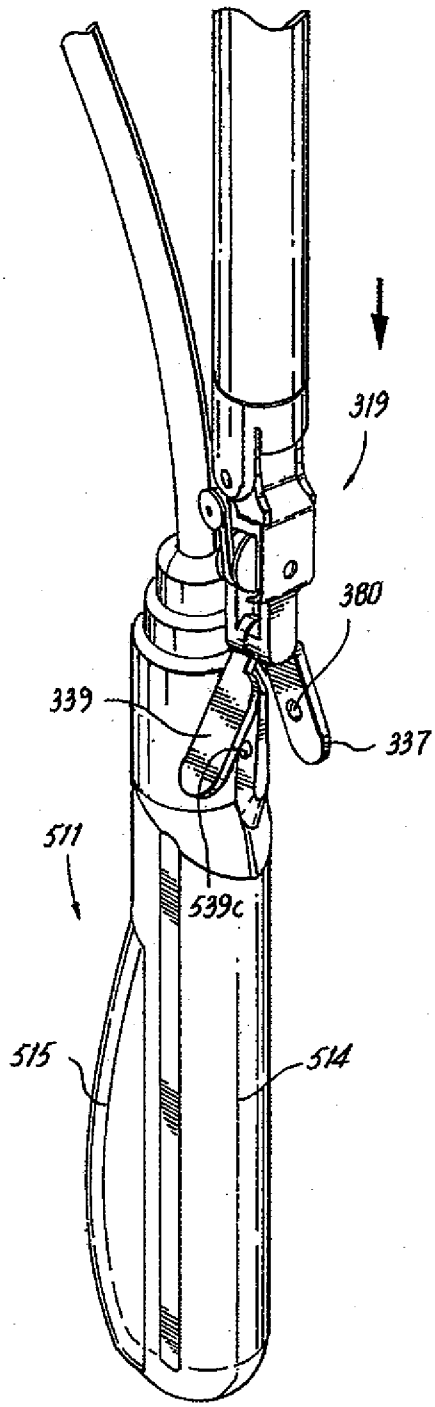
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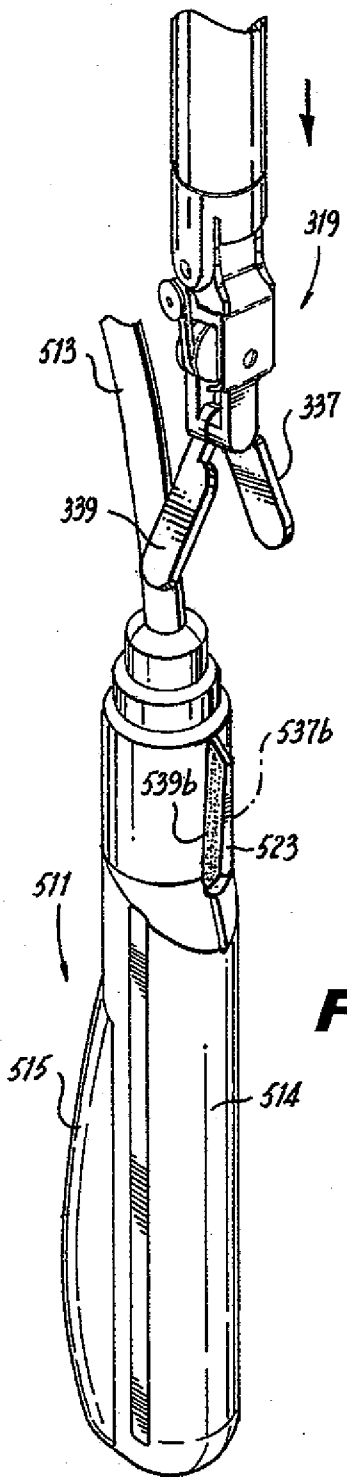
Fig. 35



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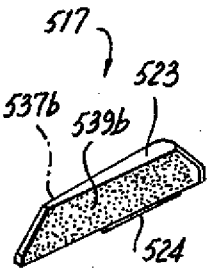
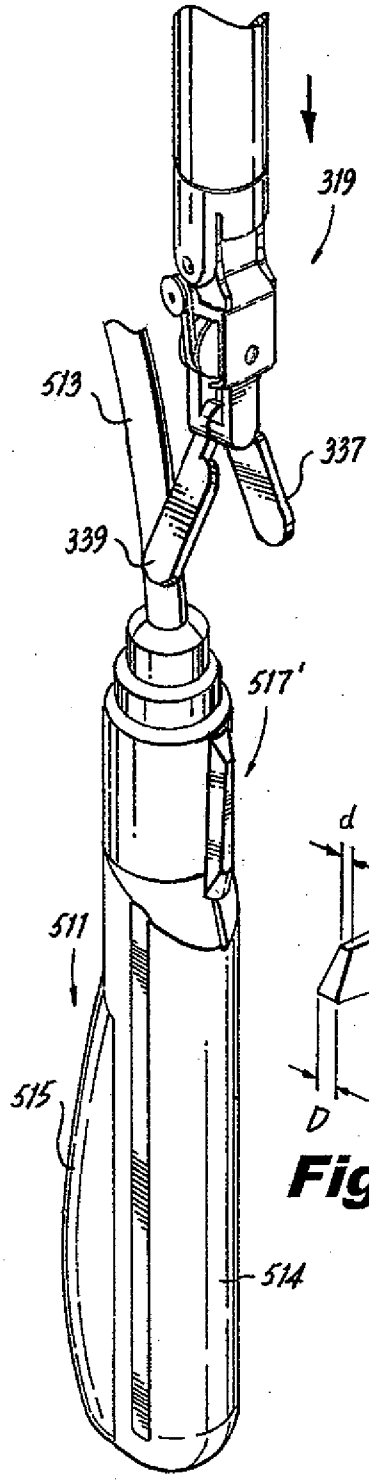


Fig. 36a



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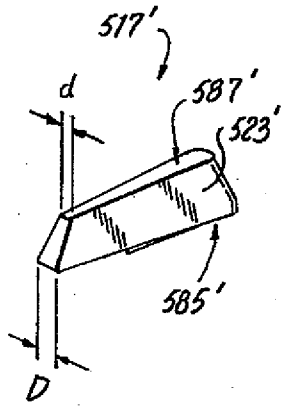

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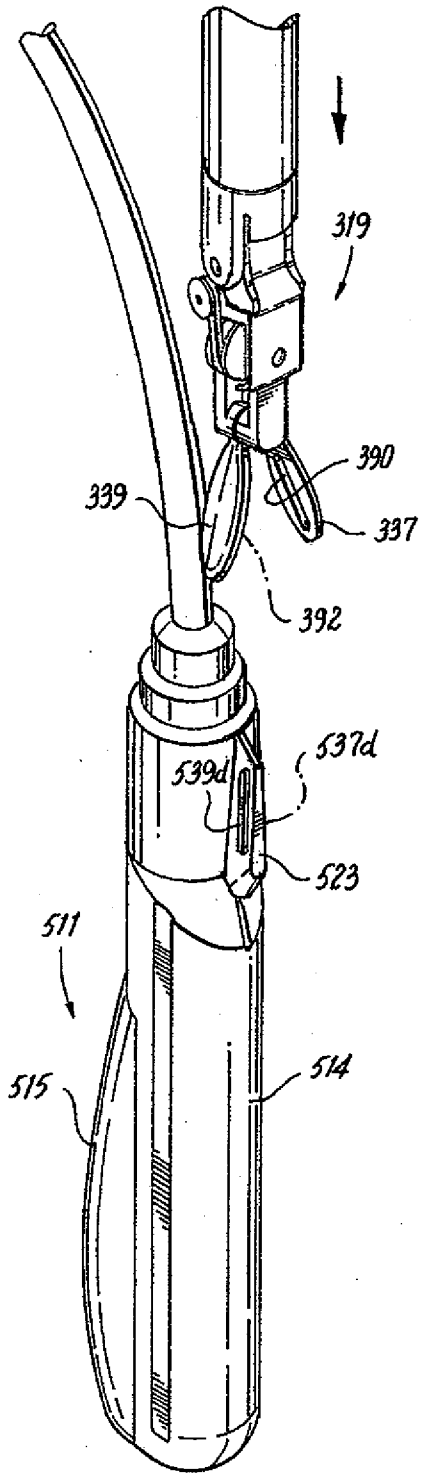
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Fig. 38

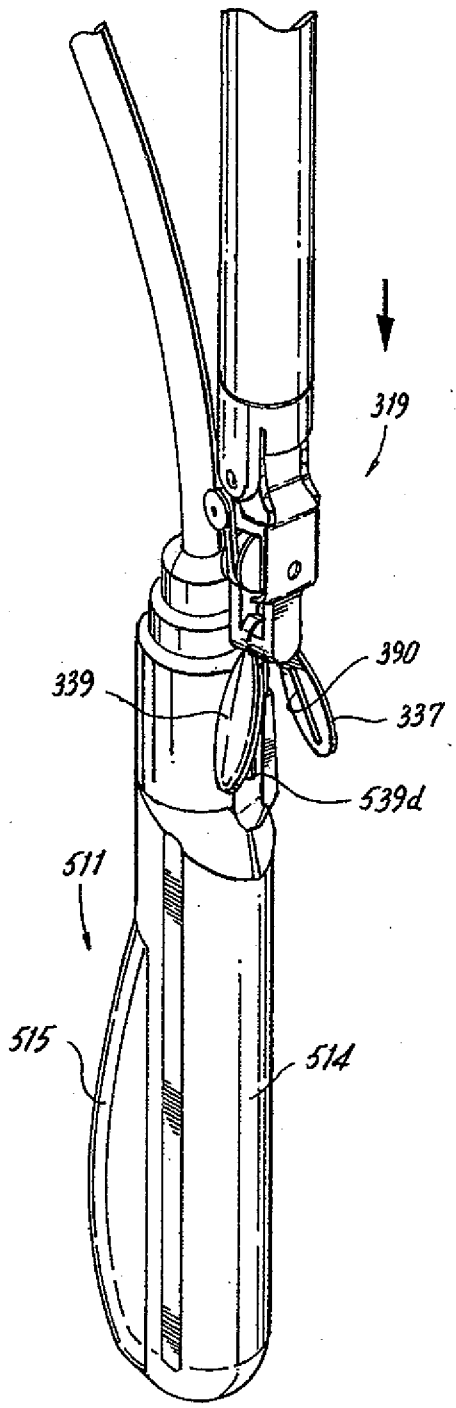
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Fig. 39

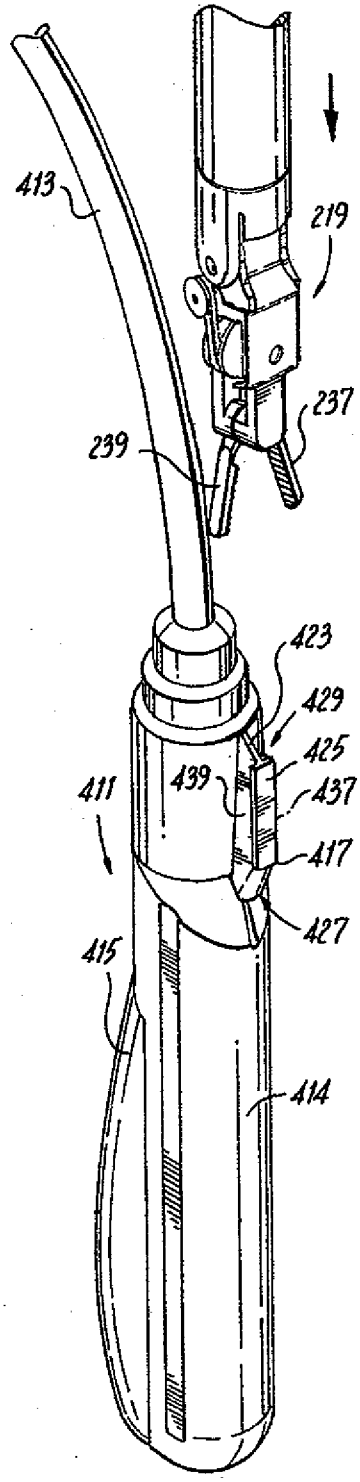

Fig. 40

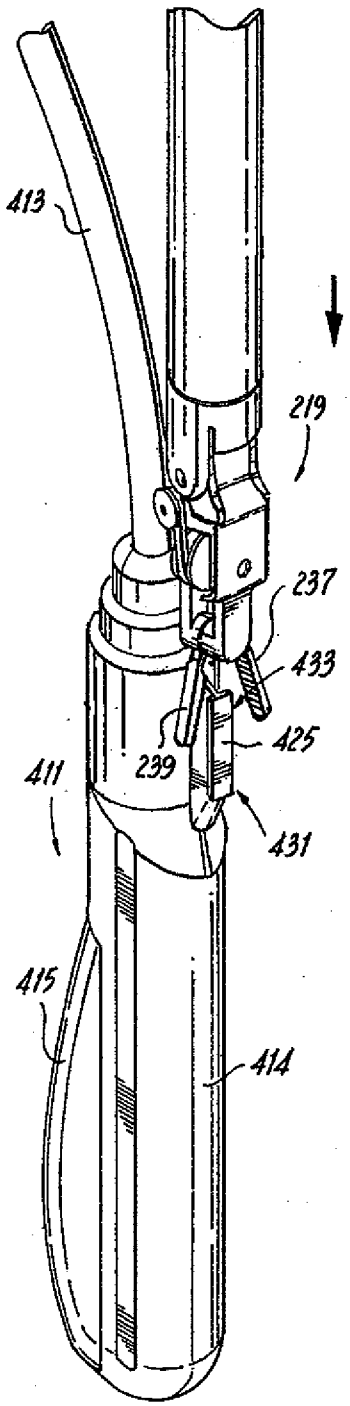

Fig. 41

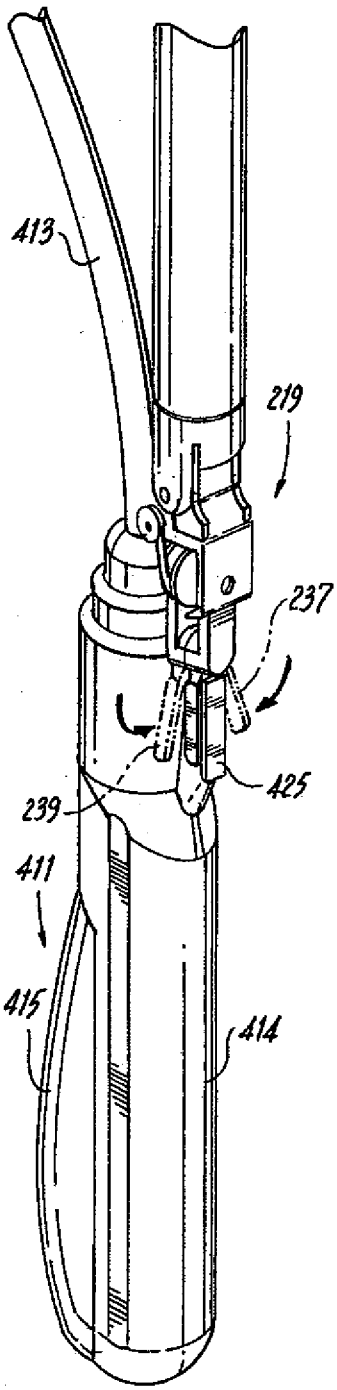

Fig. 42

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/063082

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61B 19/00 (2012.01)
USPC - 606/130
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A61B 8/14, 19/00; A61N 7/00 (2012.01)
USPC - 600/459, 466; 606/130

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent, Freepatentsonline, Google Patents, ScienceDirect

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0027464 A1 (MOLL et al) 31 January 2008 (31.01.2008) entire document	1-26
Y	US 5,013,304 A (RUSSELL et al) 07 May 1991 (07.05.1991) entire document	1-26
Y	US 5,857,964 A (KONSTORUM et al) 12 January 1999 (12.01.1999) entire document	1-26
Y	US 2009/0138025 A1 (STAHLER et al) 28 May 2009 (28.05.2009) entire document	5, 15, 25, 26
A	(SATAV) How the Future of Surgery is Changing: Robotics, Telesurgery, Surgical Simulators and Other Advanced Technologies. Jurnalul de Chirurgie (2009), Vol. 5(4), pg. 311-325. entire document	1-26
A	(LANDMAN) "Laparoscopic Partial Nephrectomy" 09 October 2010 [retrieved 05 March 2012] entire document, retrieved from the internet: <URL: http://www.kidneycancerinstitute.com/PDFs/Aesculap-Nader-partial-nephrectomy%20manuscript.pdf>.	1-26

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 March 2012	21 MAR 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774