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(54) **REUSABLE LAPAROSCOPIC RETRIEVAL POUCHTITLE**

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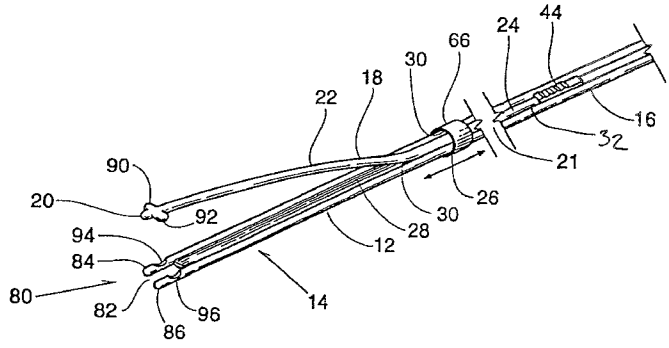
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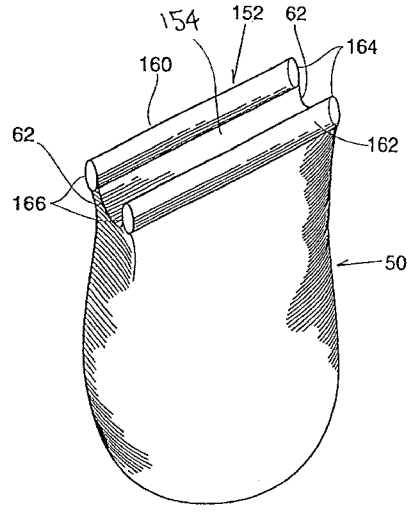
(51) **Int. Cl.**[7] **A61B 10/00**; A61B 17/50

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(57) **ABSTRACT**

Various embodiments of a reusable surgical device for retrieving a mass during laparoscopic surgery are shown and described. The surgical device has a wand, a rod attached to the wand near the front by a disengaging connector and extending generally parallel to the wand, and a pouch or bag attached to the wand and rod. A portion of the rod is flexible for bowing out from the wand when the rod is pushed forward. The flexible portion straightens to come close to the wand when the rod is pulled backward. The back of the may be slidably connected to the wand. A bag suitable for sterilizing may be attached to the rod and wand for receiving a mass during surgery. When the rod bows out, the bag is opened. When the rod straightens, the bag is closed to form a seal. Methods of using the surgical device include attaching a bag, engaging the disengaging connector, and inserting the device through a laparoscopic sleeve for enclosure, manipulation, and retrieval of the mass. Further steps include, removing the surgical device from the body cavity, disengaging the disengaging connector, removing the bag, disposing of the mass, and sterilizing the rod, wand and/or bag. Alternatively, the wand and rod may each be comprised of two individual coaxial sections, with each section being arranged for disengagable, end-to-end attachment with one another.





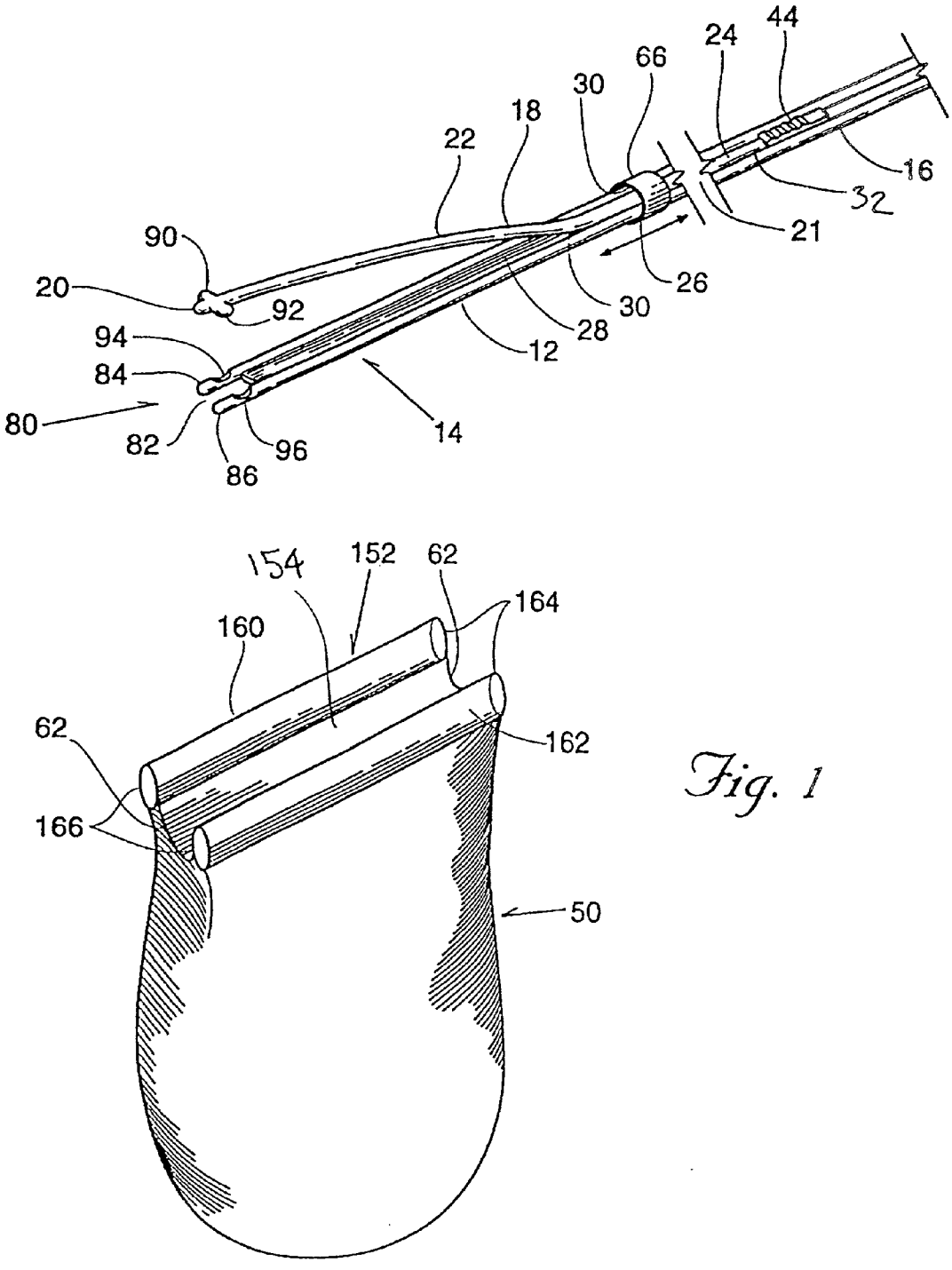

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Fig. 1

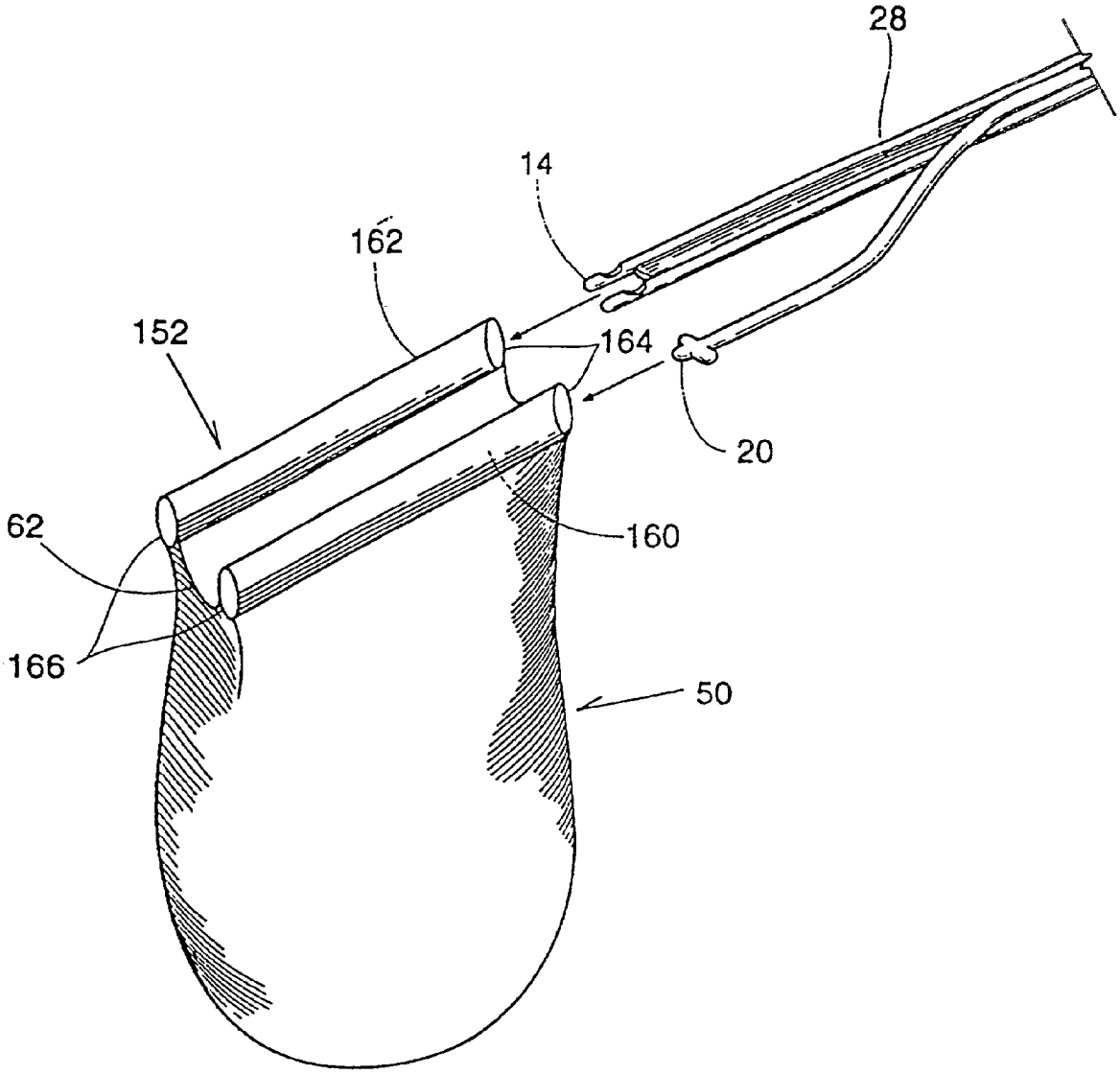


Fig. 2

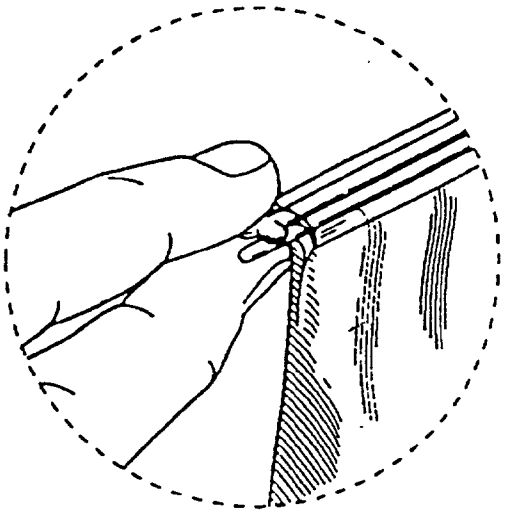


Fig. 3a

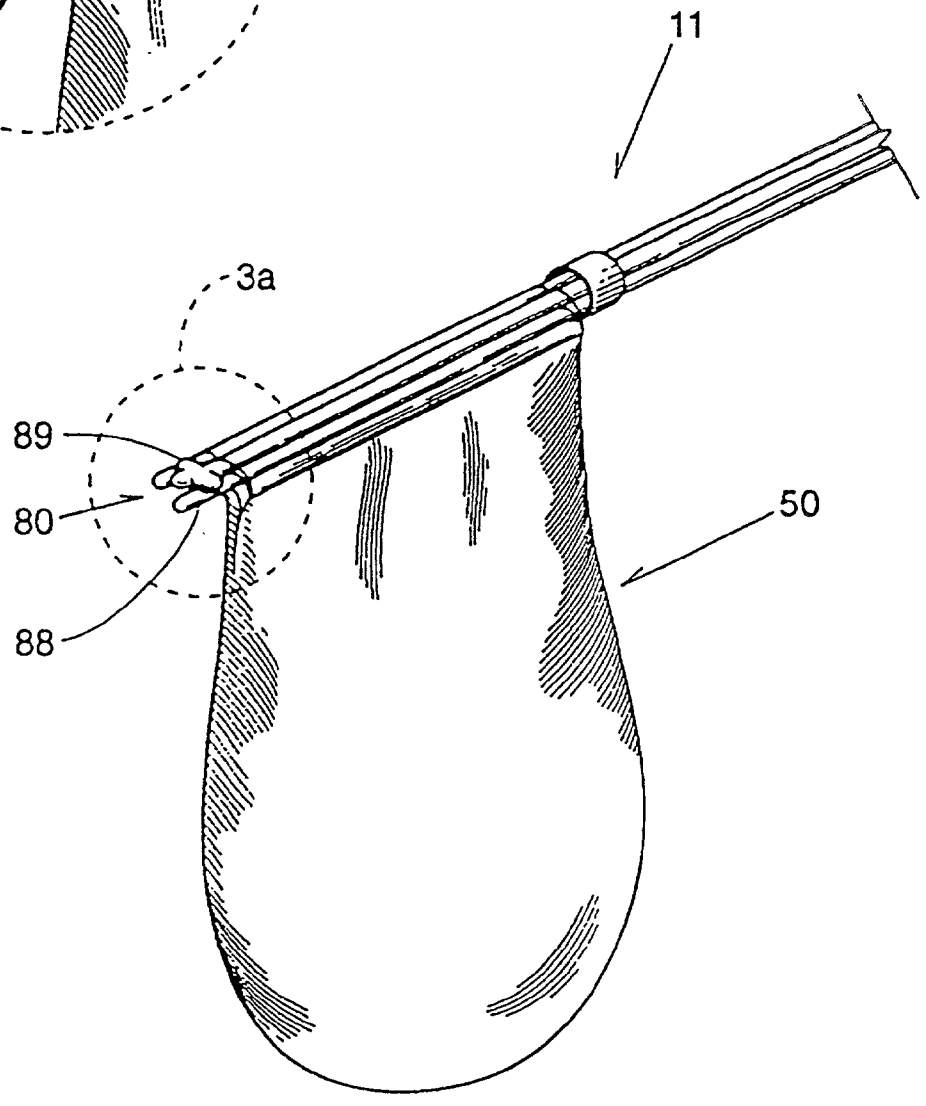


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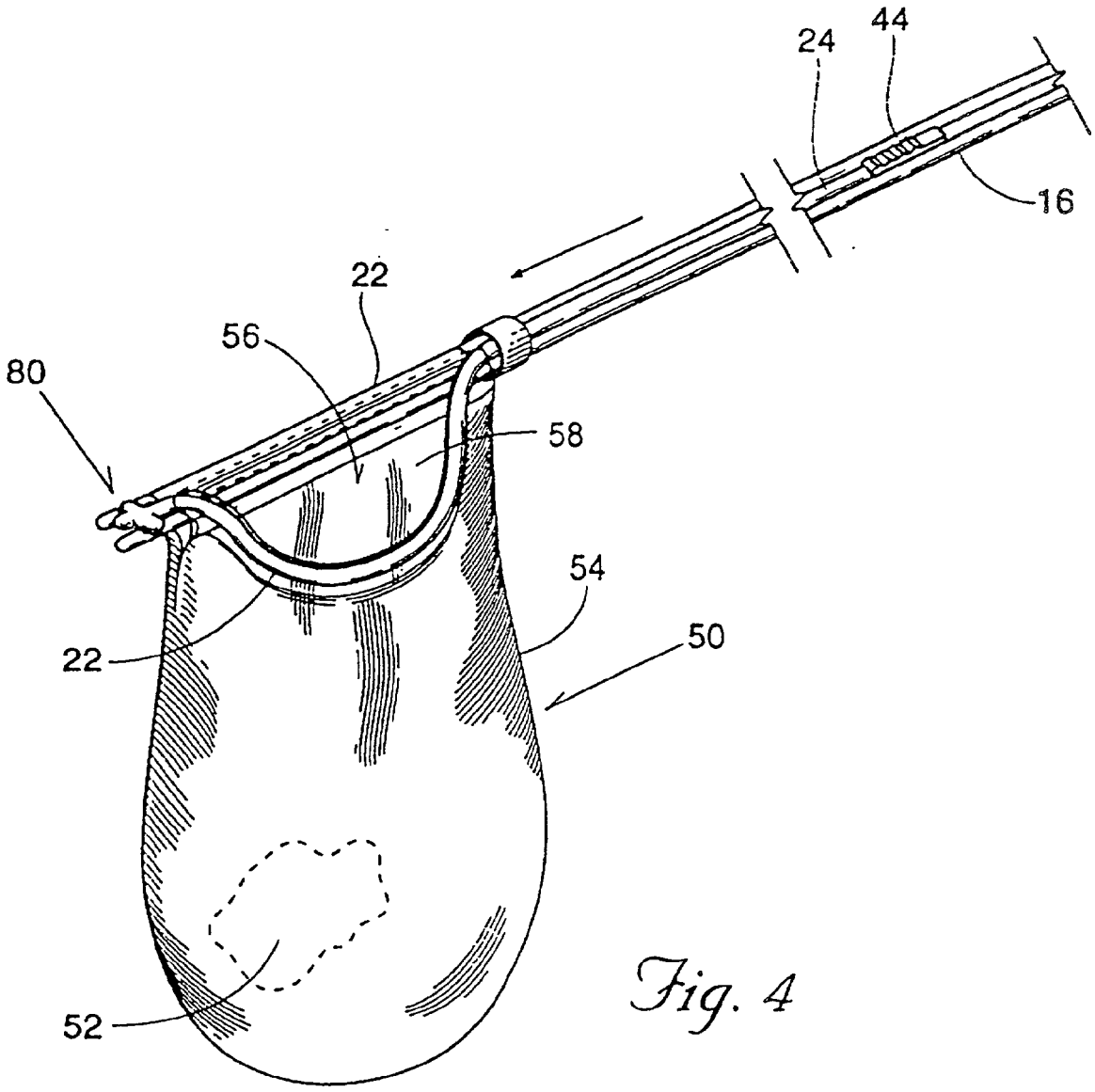


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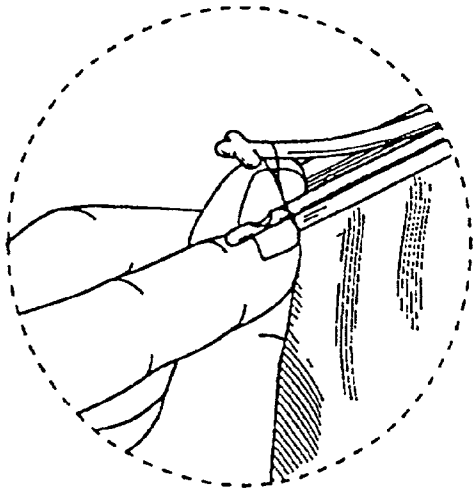


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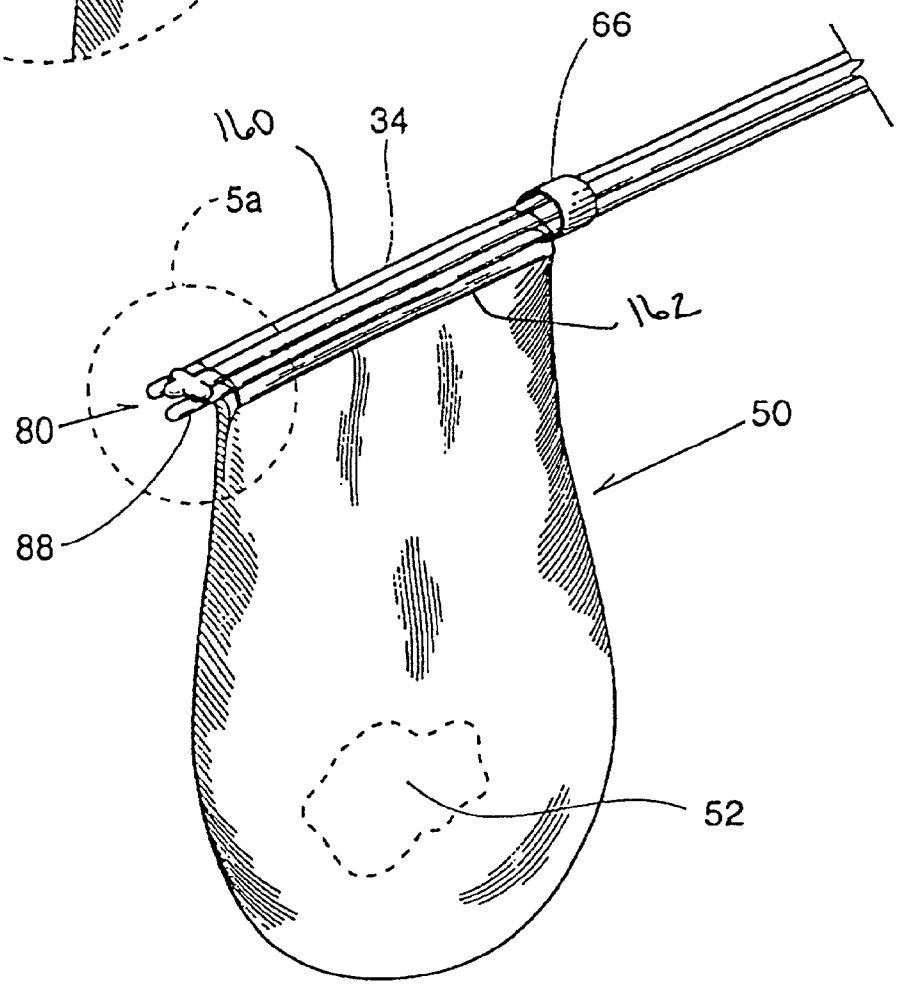


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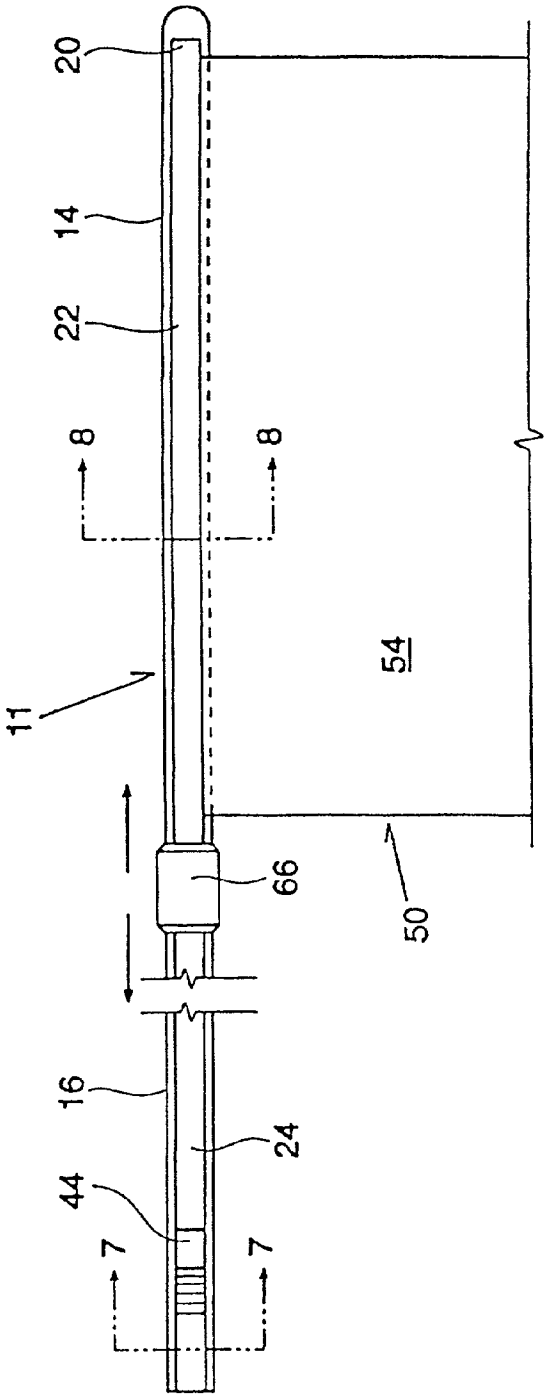


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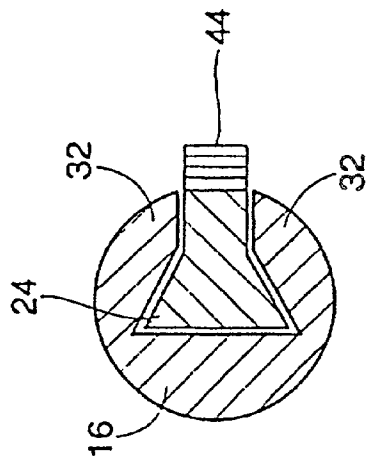


Fig. 7b

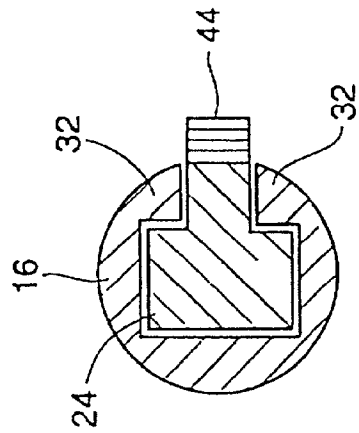


Fig. 7a

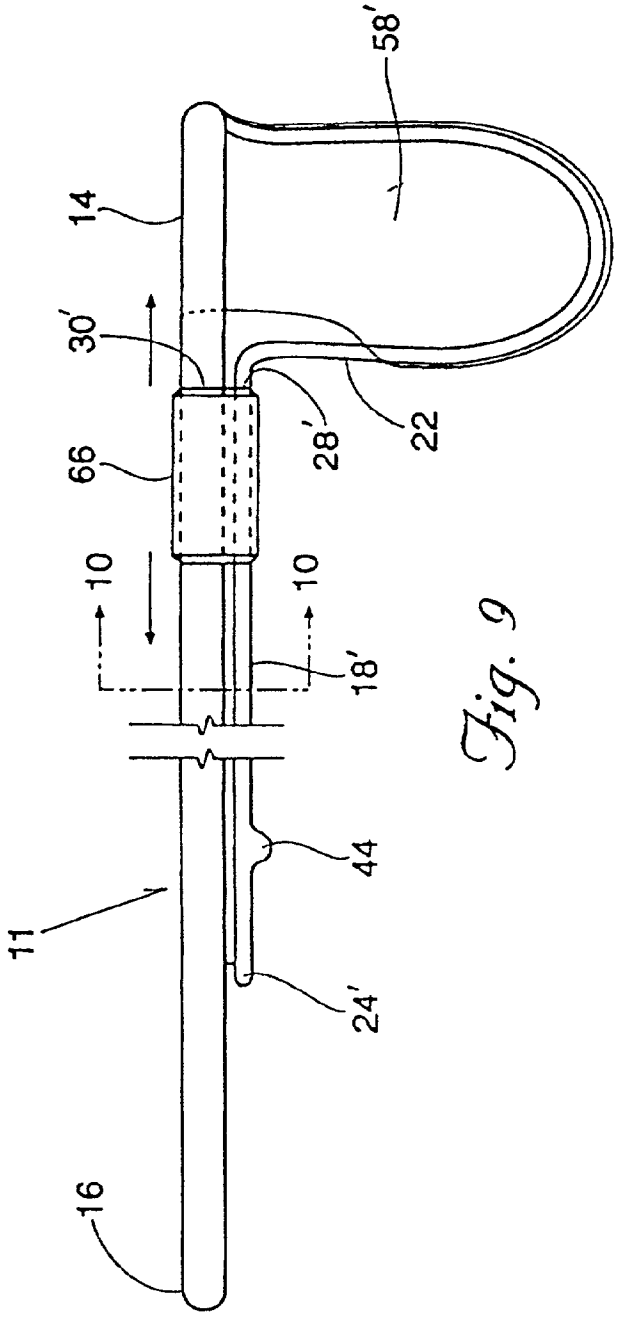


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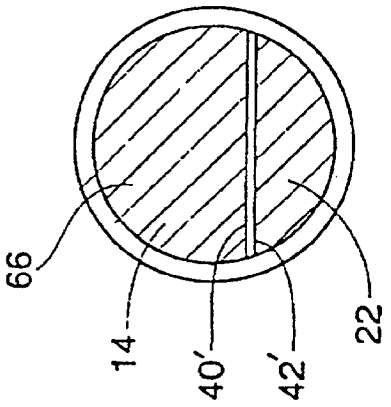


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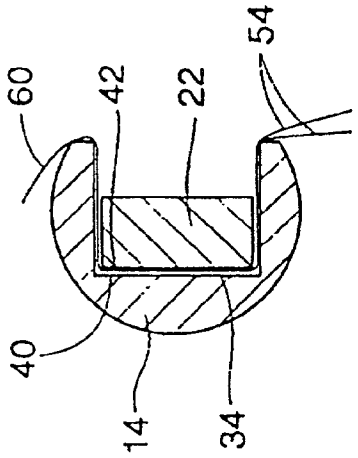


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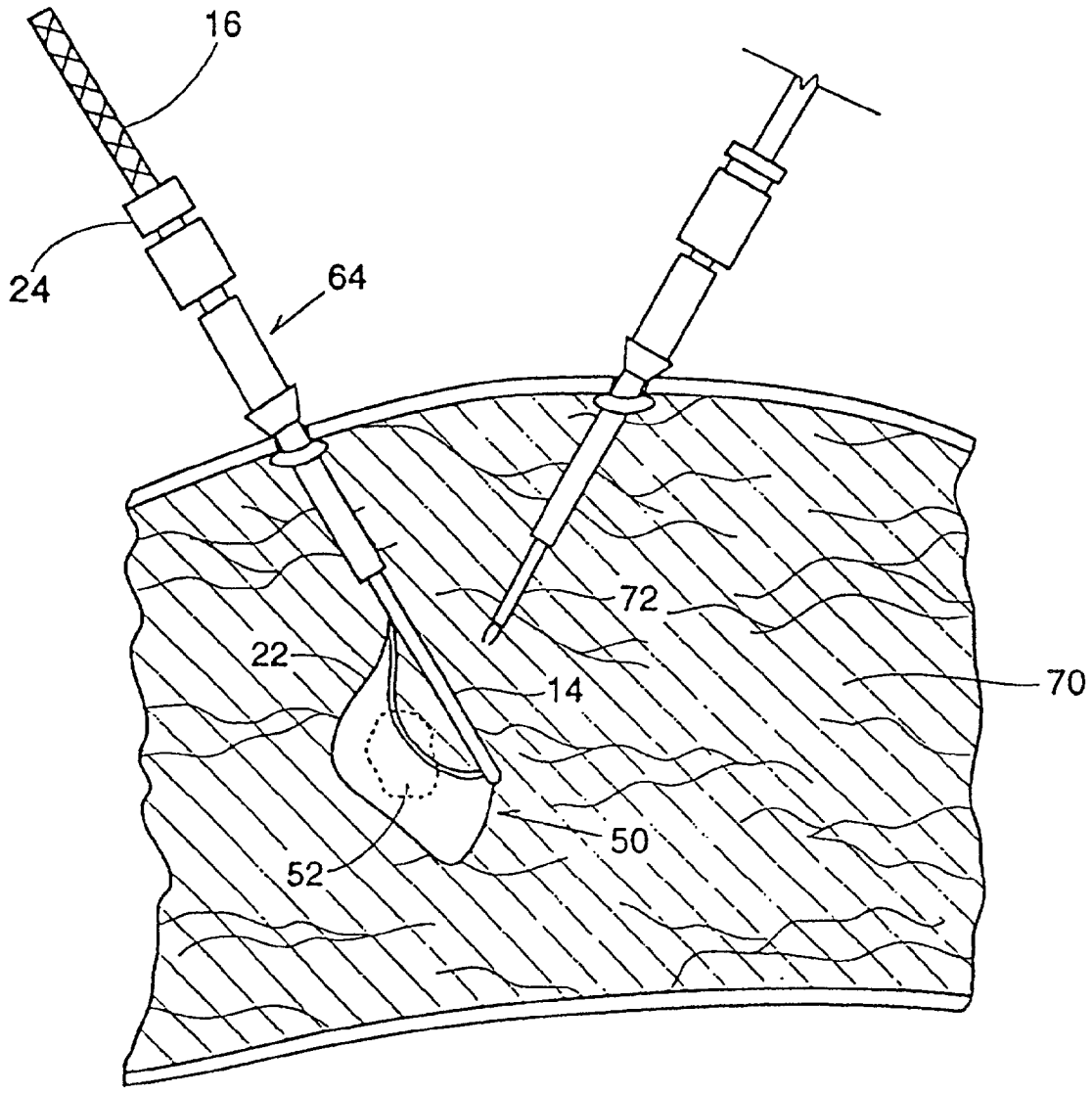


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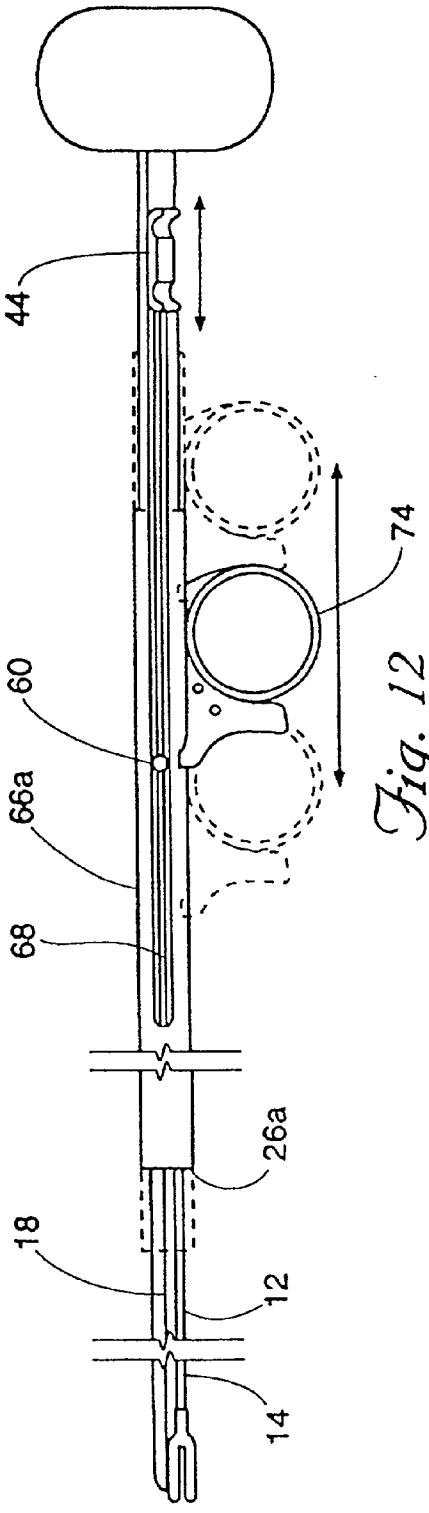


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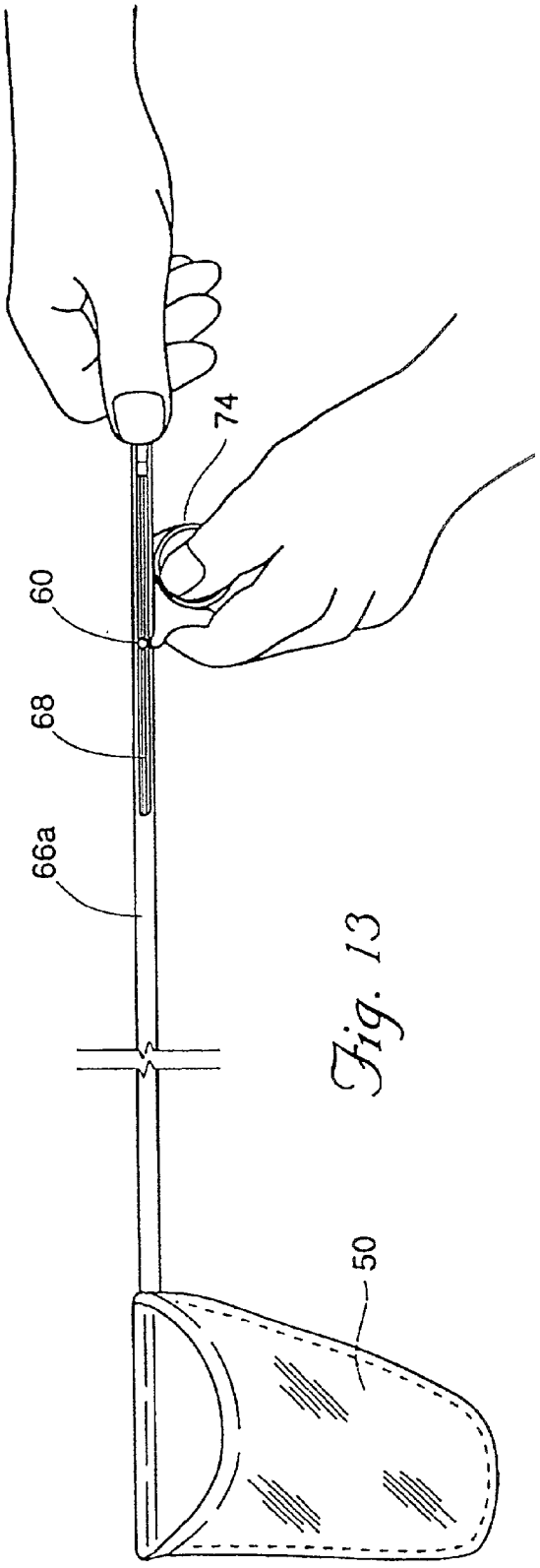


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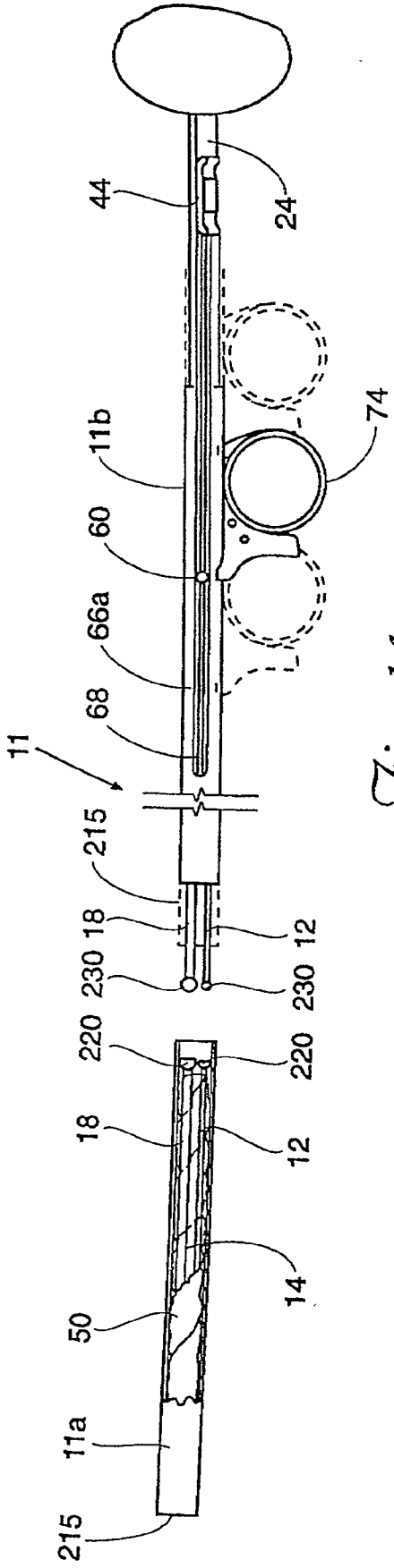

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Fig. 14

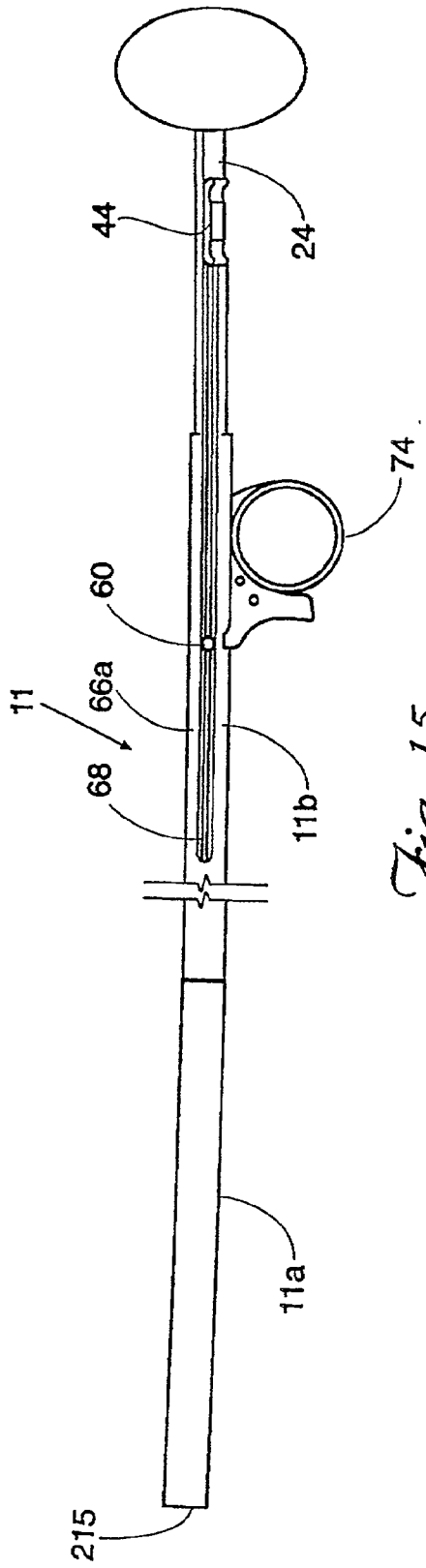

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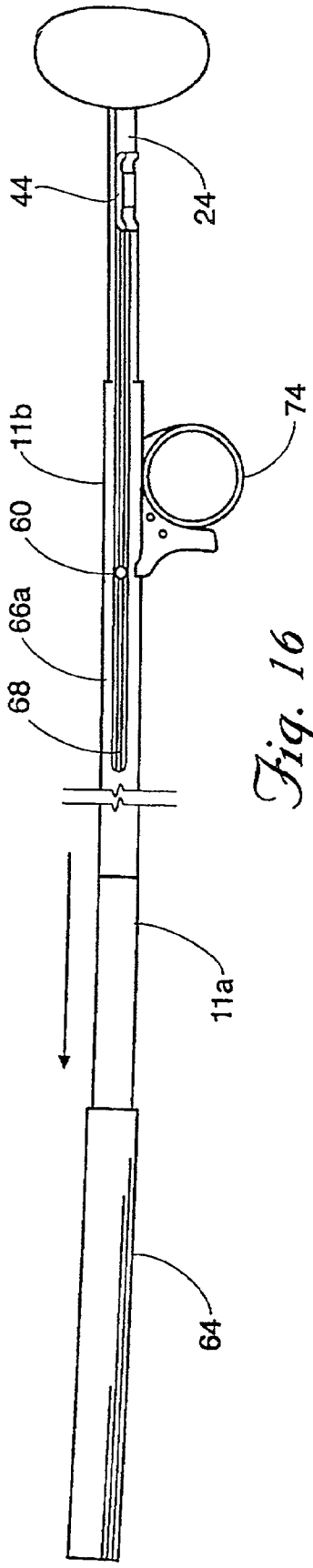

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Fig. 16

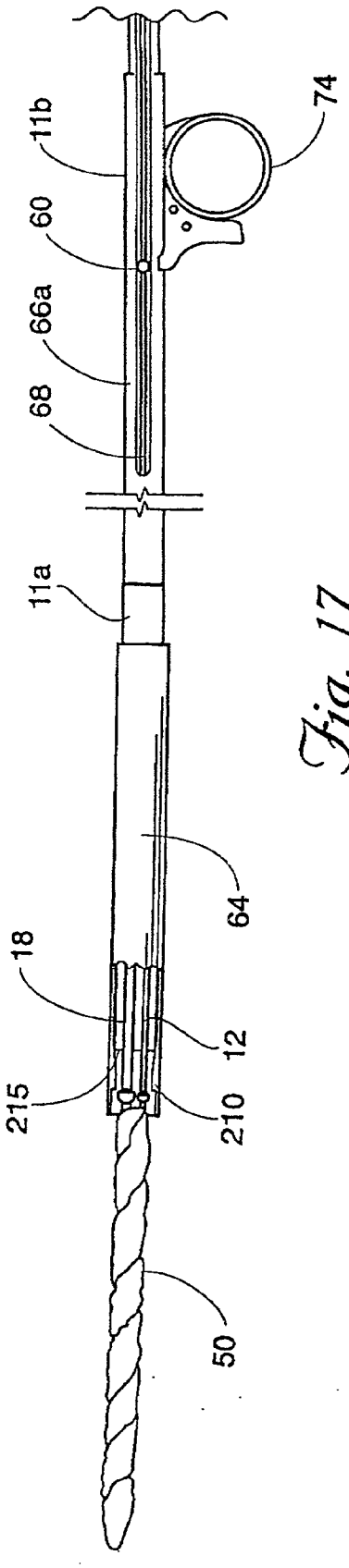

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Fig. 17

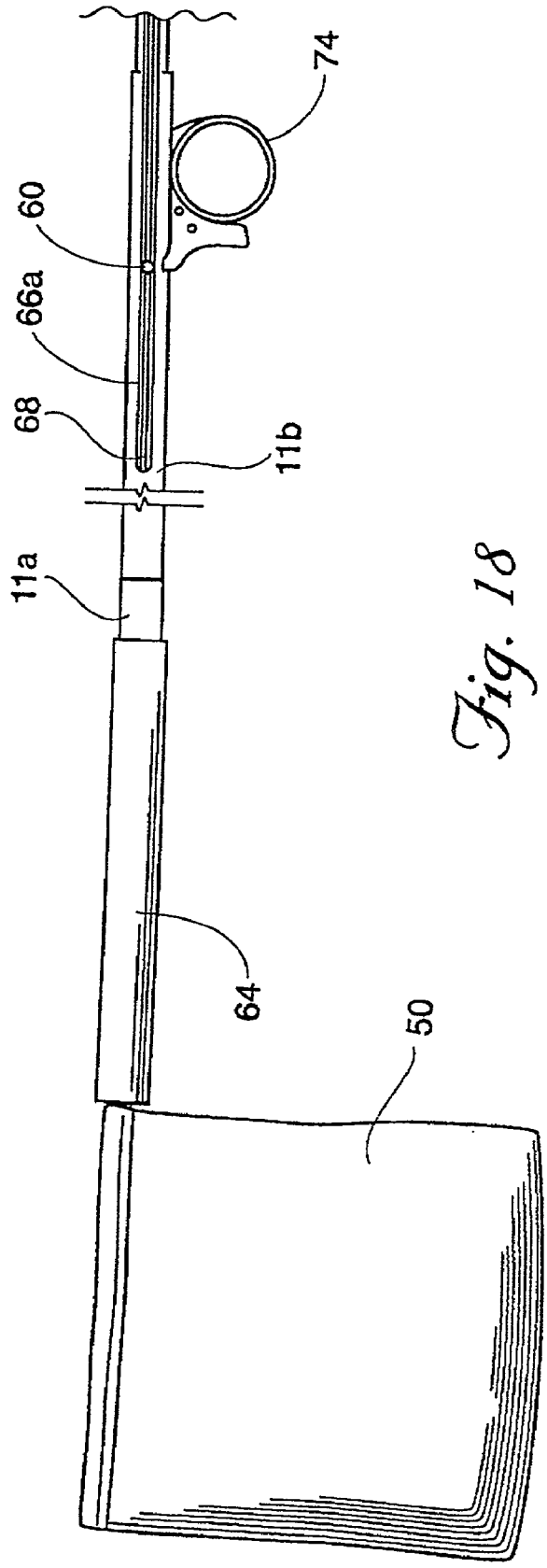


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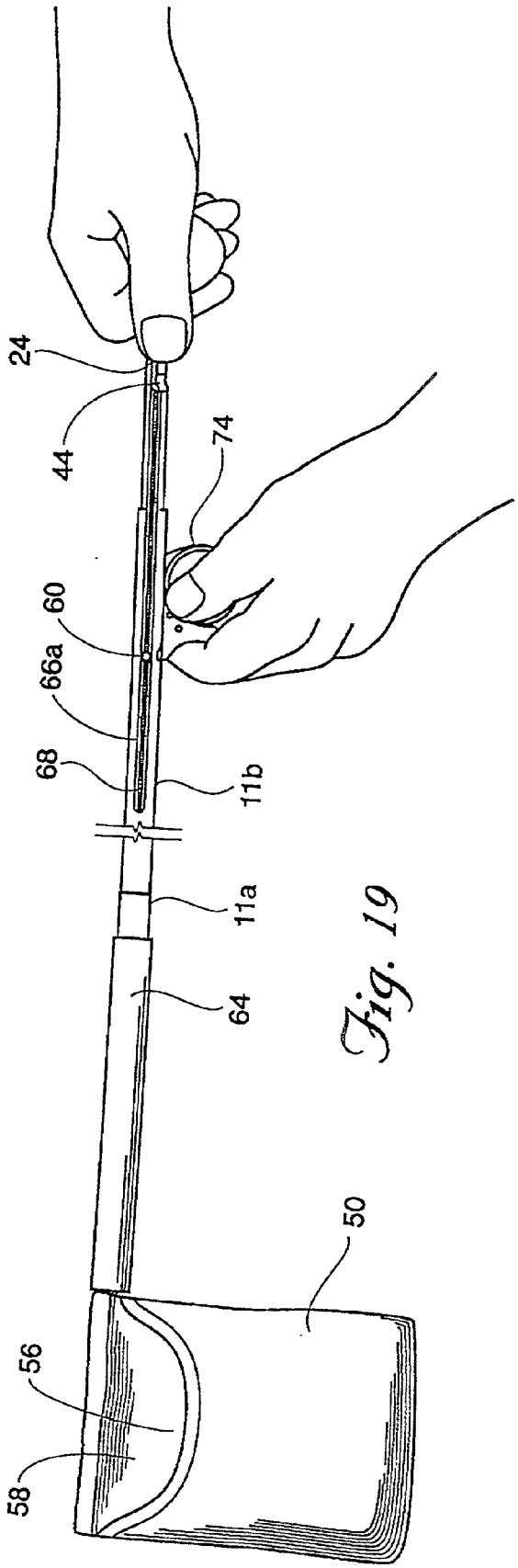


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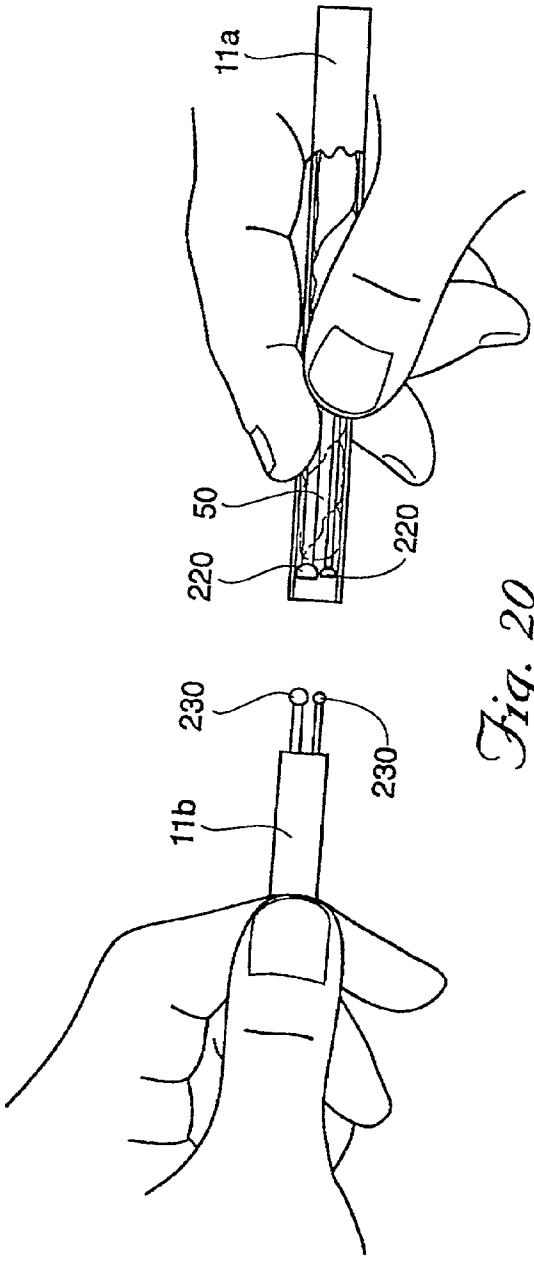


Fig. 20

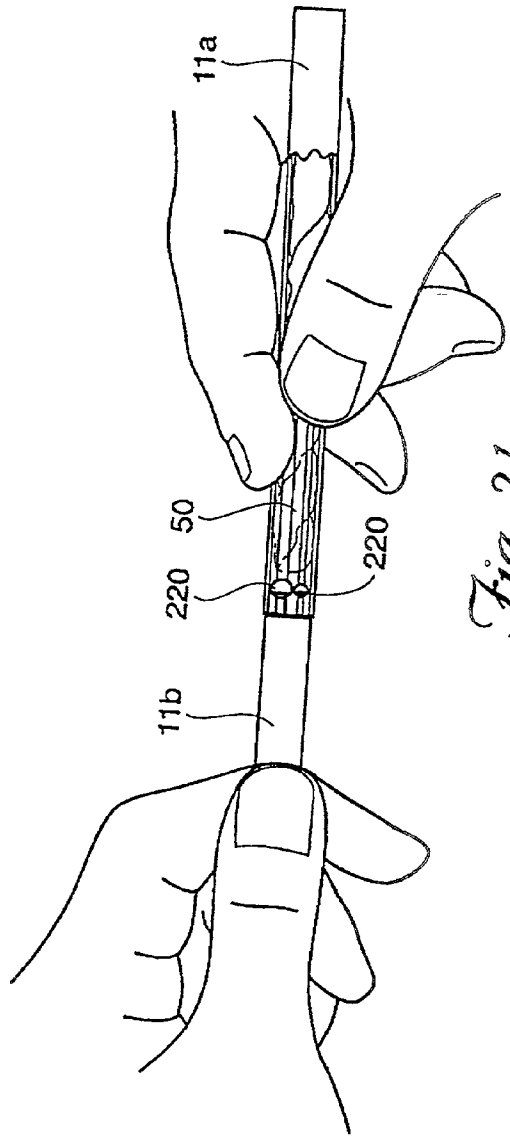


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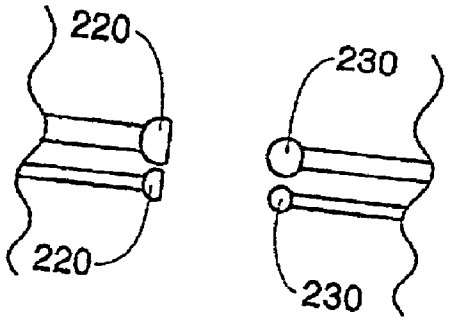


Fig. 22

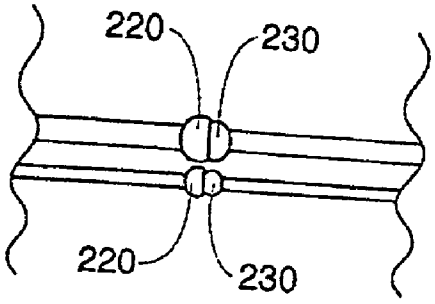


Fig. 23

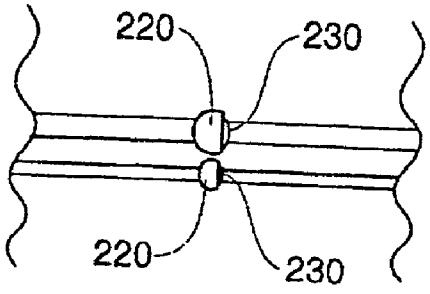


Fig. 24

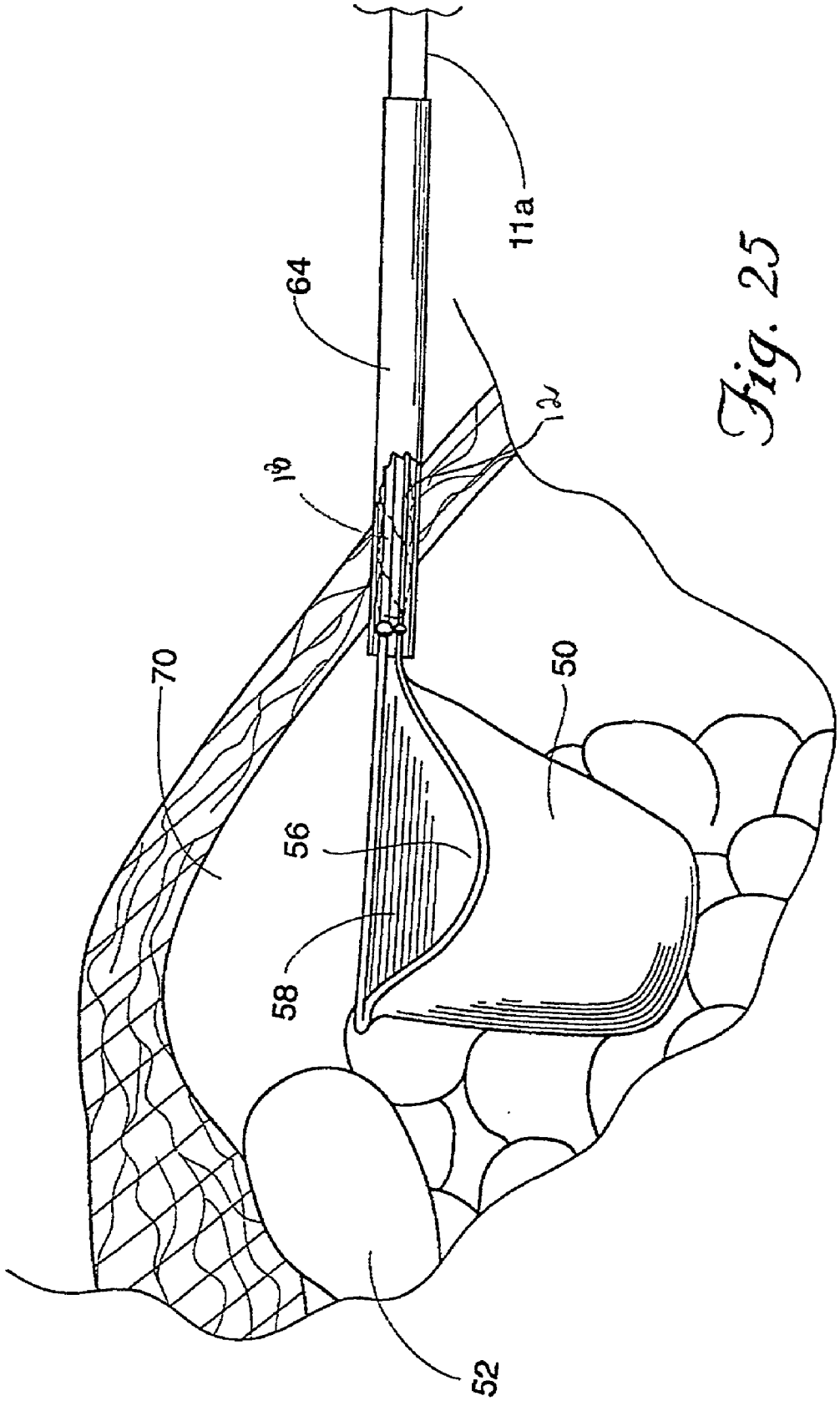


Fig. 25

REUSABLE LAPAROSCOPIC RETRIEVAL POUCHTITLE

RELATED APPLICATION

[0001] This is a continuation-in-part patent application of U.S. Continuation-in-Part patent application Ser. No. 09/461,317 filed on Dec. 15, 1999 which in turn is a continuation-in-part of U.S. patent application Ser. No. 09/197,045, filed Nov. 20, 1998, for Reusable Laparoscopic Retrieval Mechanism and Method for Use, now U.S. Pat. No. 6,059,793. These applications are not abandoned and are commonly owned by the assignee hereof.

FIELD OF THE INVENTION

[0002] This invention relates generally to internal surgery and, more specifically, to a reusable surgical device and methods for accessing and retrieving tissue or other mass from a body cavity.

BACKGROUND OF THE INVENTION

[0003] In recent years, the applications for laparoscopic surgery have expanded to include many different procedures. A benefit of laparoscopic operations is the relatively quick recovery period experienced by patients, due to the small incisions that are made in the body. These incisions reduce the trauma and the required healing compared to traditional surgery. Laparoscopic tubes and sleeves with diameters on the order of 10 millimeters are inserted in the body cavity. Various instruments and a video camera are typically directed through laparoscopic sleeves for performing and monitoring the surgical steps.

[0004] A particular concern in laparoscopic surgery is the transporting of tissues and other masses that are cut away or retrieved during a surgery. While moving, manipulating, or cutting up a removed mass within the body cavity, pieces of infected or cancerous mass, blood, bile, and other liquids may escape into the body cavity and pose infection problems or other complications. It is desirable to contain these materials in a bag or similar enclosure within the body cavity before removal to minimize the risk of infection or other complications. It is important that the containment of the materials be accomplished as quickly as possible with minimal disturbance to the surgical site.

[0005] Instruments with membranes or bags have been designed in an attempt to avoid the complications associated with the removal of tissue during laparoscopic surgery. These devices typically fall into two categories, those that have a bag coiled around an introducing rod that must be unfurled by various maneuvers, and those that pop open a bag using a spring, wire, or other mechanism. A device that falls into the second category is a pouch disclosed in Pagedas (U.S. Pat. No. 5,368,597), which utilizes a flexible rod slidably connected to a wand to create a reclosable pouch. When the rod bows out, the bag is opened. When the rod straightens, the bag is closed to form a seal.

[0006] However, the specimen retrieval instruments that are currently on the market, especially the more practical devices, are designed for a single use. Not only does this create a disposal problem, but disposable instruments are not always cost effective. In this era of cost containment, the need often arises for reusable instruments, especially a laparoscopic retrieval pouch that can be sterilized and reused. A second failing of the current specimen retrieval instruments is that they are limited as to the specimen size that can be safely retrieved. A reusable instrument that can employ different size bags and allow rapid removal and replacement of a retrieval pouch would increase surgical efficiency. A third shortcoming of disposable specimen retrieval instruments is that specimen bags are often ruptured by morcelating instruments or pressure distention against the base of the retrieval bag. A reusable device warrants the additional cost of heavier gauge materials that can withstand the burden of a larger mass, the rigors of morcelation, and the stress of sterilization.

[0007] U.S. Pat. No. 5,368,597 (Pagedas) is incorporated herein by reference. Although Pagedas (U.S. Pat. No. 5,368,597) alludes to an option where one may slip a sleeve styled bag onto its device, no specific embodiment is given. Moreover, no mention is made of a reusable bag that may be sterilized.

[0008] For the foregoing reasons, there is a need for a reusable surgical device, and a method of using such a device, that allows efficient access and retrieval of tissue or other mass from a body cavity.

SUMMARY

[0009] According to the present invention, the foregoing and following objects and advantages are achieved by providing a reusable surgical device for safely manipulating and retrieving tissue from a body cavity in operations such as laparascopic surgery, and also a method for using the surgical device. A surgical device having features of the present invention comprises an elongated wand having a front end and a back end, a rod having a flexible portion and a handle portion, and a removable bag. The flexible portion includes a second end attached to the handle portion, and a pivot end near the front end of the wand by a disengaging connector. The handle portion of the rod and the back end of the wand are close to each other so that they can be manipulated from outside a body cavity. Preferably the bag for enclosing and retrieving material during surgery is coupled to the front of the wand and the flexible portion of the rod. The bag may be opened by pushing the rod forward relative to the wand to bow out the flexible portion and may be closed by pulling the rod backward relative to the wand to straighten the flexible portion.

[0010] Another object is to provide a surgical device that may be accurately manipulated and controlled with one hand.

[0011] Another object is to provide a surgical device that has an adjustable opening that seals when closed.

[0012] Another object of the invention is to provide a surgical device that may be sterilized and reused. The reusable portions that can be sterilized may include the wand, the rod, and/or the bag.

[0013] Another object of the invention is to provide a surgical device that includes a lock that may be engaged so that a surgeon does not have to hold the device at the desired bag position. Bag positions may include a degree of openness ranging from completely closed to wide open, depending on the extent to which the flexible portion of the rod is bowed.

[0014] Another object of the invention is to provide a surgical device that includes a thumb grip to facilitate moving the rod.

[0015] Another object of the invention is to provide a surgical device with a pre-loaded cartridge for containing a rolled bag and having means for releasable engagement with an adjustable handpiece.

[0016] Methods of using the surgical device comprise the steps of attaching a bag to the front end of the wand and flexible portion of the rod, engaging the disengaging connector, directing the device into a body cavity, opening the bag by pushing the rod forward to cause the flexible portion to bow out, receiving a mass from the body cavity into the bag, and closing the bag by pulling the rod backwards to cause the flexible portion to straighten and form a seal against the wand. Additional steps may include morcelating the removed mass, removing the surgical device from the body cavity, disengaging the disengaging connector, removing the bag, disposing of the removed mass, and sterilizing the wand, rod and/or bag for reuse.

[0017] Accordingly, the present invention provides an economical means for achieving greater efficiency, control and safety in containing materials within, and removing materials from, a body cavity during laparoscopic surgery.

[0018] These and other features, aspects and advantages of the present invention will become better understood with regard to the following description. Other objects, advantages and novel features of the invention will become apparent to those skilled in the art. As will be realized, the invention is capable of other and different embodiments and use in other applications, and its several details are capable of modification in various obvious respects, all without departing from the invention. Accordingly, the drawings and descriptions are to be regarded as illustrative in nature and not restrictive.

DESCRIPTION OF THE DRAWINGS

[0019] **FIG. 1** is a perspective view of one embodiment of the surgical device showing the bag removed from the wand and rod.

[0020] **FIG. 2** is a perspective view of one embodiment of the surgical device depicting the bag being attached to the wand and rod.

[0021] **FIG. 3** is a perspective view of one embodiment of the surgical device showing the bag attached to the wand and rod.

[0022] **FIG. 3A** shows how one embodiment of the disengaging connector is engaged.

[0023] **FIG. 4** is a perspective view of one embodiment of the surgical device showing the bag in an opened position.

[0024] **FIG. 5** is a perspective view of one embodiment of the surgical device showing the bag in a closed position.

[0025] **FIG. 5A** shows how one embodiment of the disengaging connector is disengaged.

[0026] **FIG. 6** is a right side elevational view of one embodiment of the invention in a closed position and including an adjustable connector.

[0027] **FIG. 7A** is a cross-sectional view of one embodiment of the back end of the wand and the handle portion of the rod, taken along line **7-7** in **FIG. 6**.

[0028] **FIG. 7B** is a cross-sectional view of one embodiment of the back end of the wand and the handle of the rod, taken along line **7-7** in **FIG. 6**, illustrating a dovetail-shaped channel system.

[0029] **FIG. 8** is a cross sectional view of the front end of the wand and the flexible portion of the rod, taken along line **8-8** in **FIG. 6**.

[0030] **FIG. 9** is a top plan view of another embodiment of the invention with a bag attached and in the open position.

[0031] **FIG. 10** is a cross-sectional view of one embodiment of the back end of the wand and the handle portion of the rod, taken along line **10-10** in **FIG. 9**.

[0032] **FIG. 11** is a view of one embodiment of the surgical device directed through a laparoscopic sleeve into a body cavity and opened for use in laparoscopic surgery.

[0033] **FIG. 12** is a side elevational view of an alternative embodiment of the surgical device and showing a longitudinally extending collar having adjustable locking means.

[0034] **FIG. 13** is a perspective view of an alternative embodiment of the surgical device showing the bag in opened position.

[0035] **FIG. 14** is a side elevational view of an alternative embodiment of the surgical device having a longitudinally extending collar, and showing a partially cut-away, pre-loaded, snap-on cartridge in position to be attached to the device.

[0036] **FIG. 15** is a side elevational view of the alternative embodiment of the surgical device of **FIG. 14**, and showing a pre-loaded, snap-on cartridge attached to the device.

[0037] **FIG. 16** is a side elevational view of an alternative embodiment of the surgical device seen in **FIG. 14** and showing a pre-loaded, snap-on cartridge attached to the device with the cartridge being inserted in an abdominal port.

[0038] **FIG. 17** is a side elevational view of an alternative embodiment of the surgical device seen in **FIG. 14** and showing the bag extending through an abdominal port and in the furled position.

[0039] **FIG. 18** is a side elevational view of an alternative embodiment of the surgical device seen in **FIG. 14** and showing the bag extending through an abdominal port and in an unfurled position.

[0040] **FIG. 19** is a side elevational view of an alternative embodiment of the surgical device seen in **FIG. 14** and showing the bag extending through an abdominal port and in an unfurled and open position.

[0041] **FIG. 20** is a side view with partially cut away cartridge of the device seen in **FIG. 14** and showing the handpiece and pre-loaded cartridge in position for connection.

[0042] **FIG. 21** is a side view with partially cut away cartridge of the device seen in **FIG. 14** and showing the handpiece and pre-loaded cartridge releasably coupled.

[0043] **FIG. 22** is a fragmentary view of the device seen in **FIG. 14** and showing the handpiece connector ball and cartridge socket prior to connection.

[0044] **FIG. 23** is a fragmentary view of the device seen in **FIG. 14** and showing the handpiece connector ball and cartridge socket during the connection process.

[0045] **FIG. 24** is a fragmentary view of the device seen in **FIG. 14** and showing the handpiece connector ball and cartridge socket in a connected position.

[0046] **FIG. 25** is a view of the alternative embodiment surgical device of FIGS. **14-24** showing the device directed through a laparoscopic sleeve, into a body cavity, and opened for use in laparoscopic surgery.

DETAILED DESCRIPTION

[0047] Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. While the preferred embodiment has been described, the details may be changed without departing from the invention, which is defined by the claims.

[0048] As shown in **FIG. 1**, the preferred embodiment of the surgical device **11** includes an elongated wand **12** with a front end **14** and a back end **16**. The wand front end **14** and back end **16** serve as reference points for this discussion, so that "forward" and "front" refer to those movements or locations toward the front end **14** and "backward" and "back" refer to those movements toward the back end **16**. The surgical device **11** further includes an elongated rod **18** that has a handle portion **24** connected to a flexible portion **22**. The handle portion **24** lies close and generally parallel to the wand **12** and may be coupled to the wand **12** in some fashion. The flexible portion **22** includes a pivot end **20** and a second end **21**. The second end **21** of the flexible portion **22** is connected to the handle portion **24**, and the pivot end **20** is coupled to the wand's front end **14** using a disengaging connector **80**. The surgical device further comprises a removable bag **50** that may be sterilized and reused.

[0049] In the preferred embodiment a slot system serves as a connector for holding the handle portion **24** close to the back end **16** of the wand and to set the transition point **26** where the flexible portion **22** transitions from lying close to the wand **12** to bowing out from the wand **12**. This transition point **26** may be anywhere on the flexible portion **22** between the pivot end **20** and the second end **21**. However, designing a surgical device **11** with the transition point **26** very close to the pivot end **20** would give little longitudinal distance in which the flexible portion could bow. Therefore, the connector preferably extends forward to about the middle of the flexible portion **22**.

[0050] As shown in **FIG. 1**, the slot system includes a channel **28** and a lip **32**. The channel **28** extends along the longitudinal axis of the wand **12** from the back end **16** and forward preferably to the corresponding location of the rod's pivot end **20**. The rod **18** is received in the channel **28**. The lip **32** extends partially over the channel **28** for slidably holding the rod **18** in the channel **28** forward up to the location of the front extremity **30**. At the front extremity **30**, the rod **18** may come out of the channel system as illustrated in **FIG. 1**.

[0051] As shown in **FIG. 6**, the channel **28** preferably extends all the way to the location where the pivot end **20** attaches to the front end **14**, so that when the flexible portion **22** straightens, it may be received in the channel **28** to form a seal **34** (**FIG. 5**) between the front end **14** and the flexible portion **22**, or between the first portion **160** and the second portion **162** of the bag **50**. Other designs may be used to allow the front end **14** and the flexible portion **22** to cooperate to form a seal **34**, such as the embodiment in **FIGS. 9 and 10** in which the front end **14** and flexible portion **22** inner surfaces **40**, **42** are flat.

[0052] To bow out the flexible portion **22**, the surgeon pushes the handle portion **24** forward, preferably using a thumb grip **44** or some other means that aids comfortable operation. Because it is anchored at the pivot end **20**, the rod **18** responds to being pushed by bowing out. To straighten the flexible portion **22** and the bring it closer to the wand **12**, the surgeon pulls the handle **24** backwards. Alternatively, the flexible portion **22** may be biased in the closed or unbowed position by allowing the flexible portion **22** to spring back to the unbowed position when pressure on the thumb grip **44** is released.

[0053] Regarding the flexibility of the wand **12**, there are several options. The wand front end **14** may be rigid in some embodiments and somewhat flexible in other embodiments. For example, the front end **14** may be somewhat flexible for operations in which the surgeon needs to temporarily bend the wand to reach a particular location in the body cavity **70** at a particular angle. However, the wand **12** should be less flexible than the flexible portion **22** of the rod **18**, so that the flexible portion **22** bows out from the wand **12** when the handle portion **24** is pushed, rather than the flexible portion **22** and the wand front end **14** bending together in the same direction and thus producing either no opening of the bag **50** or a partial and difficult-to-control opening.

[0054] Regarding the flexibility of the rod **18**, there are also several options. The flexible portion **22** should be of a flexibility in the outward direction that causes it to bow out relative to the wand **12** when it is pushed. The rod **18** may have a rigid handle portion **24** which may be held close to the wand **12** either by the hand of the person using it or by the laparoscopic sleeve **64**. The rod **18** may also be flexible back to and including the handle portion **24**, as long as a connector is included to hold and guide the handle portion **24** when it is being pushed and as long as the handle portion **24** flexibility is limited to a range which does not cause buckling and binding of the rod **18** inside the connector. In other words, the rod **18** may have a flexible portion **22** near the pivot end **20** and a relatively rigid handle portion **24**, or may be a flexible rod with a flexible portion **22** and a flexible handle portion **24** which cooperates with a connector that holds and guides the handle portion **24**.

[0055] Optionally, embodiments with a rigid handle portion **24** may also include a connector, such as the collar **66** shown in **FIGS. 1 and 7**, for additional guiding of the handle portion **24**. **FIG. 1** shows an example of the optional adjustable feature for a connector, the adjustable feature being for changing the longitudinal location of the connector front extremity **30** to change the rod transition point **26**. The collar **66** may be moved forward or backward to select a transition point **26** and then may be locked into place, for example with a set screw (not shown), in such a way that the

rod **18** may still slide through the collar. An adjustable connector such as the collar **66** may also be added to embodiments having a slot system, as shown in **FIG. 6**.

[**0056**] With reference to **FIGS. 12 and 13**, an improved embodiment of the invention is depicted. The improvement includes a longitudinally extending collar **66***a* as illustrated. The collar **66***a* has a slot **68** substantially coextensive of its length and surrounds both the wand **12** and the rod **18** illustrated in previous figures. The collar **66***a* may be moved forward or backward to select a transition point **26***a* and may be locked into place, for example, with a setscrew **60**. A thumb loop **74** may also be provided for ease in positioning. With an adjustable connector, a surgeon may use a wand **12** and rod **18** with differently-sized bags or bags with differently-shaped entryways.

[**0057**] The preferred materials for the wand **12** and rod **18** are any materials that fulfill the various flexibility and rigidity requirements while also being safe for sterilization and internal surgery use. Surgical steel could be machined to meet those needs.

[**0058**] In the preferred embodiment, the pivot end **20** of the flexible portion **22** is attached to the front end **14** of the wand **12** by a disengaging connector **80**. Preferably, the disengaging connector **80** comprises the front end **14** of the wand having a longitudinal slot **82** forming a first prong **84** and a second prong **86**. A first notch **94** is formed in the first prong **84**, and a second notch **96** is formed in the second prong **86**. The flexible portion **22** of the rod **18** includes a first perpendicular spur **90** and an opposing second perpendicular spur **92**. As shown in **FIG. 3**, to engage the disengaging connector **80**, the first and second spurs **90**, **92** are pressed into the first and second notches **94**, **96** respectively. As the handle portion **24** is pushed forward, preferably using a thumb grip **44**, and the flexible portion **22** bows out, spurs **90** and **92** rotate in notches **94** and **96**, respectively, creating a hinge action. To disengage the connector **80**, one pops out the spurs **90**, **92** from the notches **94**, **96** by applying pressure to the underside **88** of the connector **80** as shown in **FIG. 5A**.

[**0059**] Although the preferred embodiment includes a disengaging connector **80** with a hinge action, any connector may be used to connect the front end **14** to the pivot end **20** so long as the disengaging connector **80** will not disengage under the stress necessary to bow out the flexible portion **22**, yet may be efficiently disengaged to remove the bag **50** for disposal or sterilization. Other such connectors may include a snap, a slot and groove arrangement, other notch and spur configurations, or other comparable cooperating systems.

[**0060**] The preferred embodiment includes a bag **50** for enclosing a mass **52**, which may be opened and closed by bowing and straightening action of the flexible portion **22**. The bag **50** has a wall **54** for surrounding an interior space **56**, and an edge **38** that surrounds the entryway **58**. The bag **50** can be disposable or reusable. The preferred materials for the bag **50** should also meet sterility and safety requirements for internal surgery. Transparent plastics, flexible fabrics, and netting could be used. The preferred materials have some memory for tending to stay in a somewhat expanded state rather than tending to collapse, because this feature aids in the quick opening or unwrapping of the bag **50**. The preferred materials are impermeable to liquid or are liquid-resistant, for containing infected liquids, but netting or loosely-woven materials could also be of benefit for some surgical procedures. Where morcelating is necessary, a bag **50** may include a fine denier brand fiber that is puncture resistant and able to withstand the cutting of a mass.

[**0061**] In one embodiment having a detachable bag **50**, the bag **50** includes a sleeved rim **152** with at least one opening **154**. In the preferred embodiment, the bag **50** includes a sleeved rim **152** divided into a first part **160** and a second part **162**, each part having a first opening **164** and a second opening **166**. The first part **160** and second part **162** are divided by an unsupported section **62**. The unsupported section **62** allows the flexible portion **22** to slide forward without tearing the bag **50** and to slide backward without pulling the bag **50** underneath the lip **32**. As shown in **FIG. 2**, to attach the bag **50**, one slips the flexible portion **22** into the first opening **164** of the first part **160** of the sleeved rim **152**, and slips the front end **14** of the wand **12** into the first opening **164** of the second part **162** of the sleeved rim **152**. The flexible portion **22** and the front end **14** of the wand **12** slip through the sleeved rim **152** and out the second opening **166** of the sleeved rim **152** at which time the disengaging connector **80** is engaged as shown in **FIG. 3** by applying pressure to the underside **88** and topside **89** of the connector **80**.

[**0062**] The method of using the surgical device **11** includes attaching a bag **50** to the front end **14** of the wand **12** and the flexible portion **22** of the rod **18**, and directing the surgical device **11** into a body cavity **70**, preferably through a laparoscopic sleeve **64**, so that the back end **16** and handle portion **24** are accessible by the surgeon. As shown in **FIG. 4**, the bag **50** is opened by pushing the handle portion **24** forward, preferably using a thumb grip **44**. The bag **50** is directed relative to the mass **52** so that the mass **52** moves through the entryway **58** into the interior space **56** of the bag **50**. This may be done by moving the bag **50** to the mass **52** and scooping it up or by inserting the mass **52** into the bag **50** with another tool **72**. The bag **50** may be closed for further manipulation of the mass **52** or for removal of the surgical device **11** and mass **52** from the body cavity **70**. To facilitate removal from the laparoscopic sleeve **64**, the bag **50** may be wrapped around the front **14** flexible portion **22** to form a compact and smooth unit. Optionally, a grinding, cutting, or other surgical tool **72** may be inserted into the interior space **56** of the bag **50** for further manipulation of the mass **52**, for example, to cut a large mass into pieces that will fit through the laparoscopic sleeve **64**. The surgical tool **72** may be inserted before the bag **50** is closed, or after the bag **50** is closed if the flexible portion **22**, front end **14**, or bag **50** is adapted to allow a surgical tool **72** to pass through the seal **34**. Preferably, the flexible portion **22**, front end **14**, or bag **50** would also be adapted to maintain a good seal around the inserted surgical tool **72** to prevent escape of mass and liquid. Optionally, a surgical tool **72** could be inserted into the body cavity **70** through the same laparoscopic sleeve **64** as the surgical device **11**, or through a hollow passage in the wand **12**.

[**0063**] Another alternative embodiment surgical device **11** may be viewed in FIGS. **14-25**, inclusive. For convenience, the surgical device **11** seen in FIGS. **14-25** has been separated into its two main components, a pre-loaded cartridge member **11***a* and handpiece **11***b*. It is further noted that like elements are referenced by like numerals throughout this disclosure. As seen in **FIG. 14**, the cartridge member **11***a* is

preferably pre-loaded with a bag **50**, which is furled about the front end **14** of wand **12** and the flexible portion **22** of rod **18**. The wand **12** and rod **18** each include an attachment end, which is modified to provide means for coupling to the cooperating attachment means of wand **12** and rod **18** in the handpiece **11***b*. As seen particularly in the views of **FIGS. 14, 17, 20-25** the means for coupling located at the attachment ends of the wand **12** and rod **18** located in cartridge **11***a*, is illustrated as cup-like sockets **220**. Cooperating ball members **230** are located at the attachment ends of the wand **12** and elongated rod **18** in the handpiece **11***b*. The socket **220** includes a socket opening smaller than the corresponding ball **230** dimension to provide a snap fit. In the preferred embodiment, and as seen in these views, the ball members **230** are preferably mounted on the attachment ends of the wand **12** and the elongated rod **18** in the handpiece **11***b*, while the sockets **220** are located on the attachment ends of the wand **12** and rod **18** located in the cartridge **11***a*. This arrangement is preferred due to the greater resilience of the ball members **230** to wear during cleaning for reuse. The ball members **230** are less likely to wear or crack during repeated use, and are therefore better suited for position in the reusable handpiece **11***b*. It is presently believed preferable that the cup-like sockets **220** be positioned on the disposable cartridge **11***a* thereby eliminating the need for cleaning and reuse of the more fragile sockets **220** as the cartridge **11***a* is preferably a disposable item. Although it is preferable that the ball members **230** and the sockets be located on the handpiece **11***b* and cartridge **11***a*, respectively, it is to be understood that an alternative arrangement wherein the ball members **230** and the sockets **220** are located on the cartridge **11***a* and the handpiece **11***b* respectively, is within the scope of this disclosure.

[**0064**] As seen particularly in FIGS. **22-24**, the ball **230** and socket **220** arrangement allows the cartridge member **11***a* and handpiece **11***b* to be securely coupled during laparoscopic procedure (as seen in **FIG. 25**) but allow for disengagement if a differently sized bag **50** is needed during surgery, if the bag **50** being used is full, or after completion of surgery. This feature allows the medical technician the flexibility of discarding the cartridge member **11***a* after use or cleaning and reusing the entire device **11**. While the ball **230** and socket **220** arrangement is the preferred attachment configuration, it is to be understood that other configurations having snap-fit connection may be contemplated.

[**0065**] With reference to **FIGS. 16 and 17**, it can be seen that, during operation, the surgical device **11** with its pre-loaded cartridge **11***a* is inserted into a laparoscopic port **64**, wherein the cartridge **11***a* travels into the body cavity **70** (seen in **FIG. 25**). As seen particularly in **FIG. 17**, the cartridge **11***a* with pre-loaded bag **50** is pushed through the port **64** until it reaches narrowed area **210** at which point the leading edge **215** of cartridge **11***a* abuts the narrowed area **210** and further forward motion of the cartridge **11***a* is stopped. As may be further seen in **FIG. 17**, as the technician continues to urge the rod **18** and wand **12** forward, the furled bag **50** is pushed past the abutted leading edge **215** of cartridge **16**, out of the port **64** and into the body cavity **70** (not seen in this view) being accessed.

[**0066**] With reference to **FIG. 18**, the bag **50** is seen unfurled while **FIG. 19** depicts the bag **50** in the open position and presenting an entry way **58** to the interior space **56**, used for collection of masses (not seen in this view).

[**0067**] The method of using the surgical device **11** shown in FIGS. **14-25** includes providing a handpiece **11***b* having a snap fitting attachment member, providing a cartridge **11***a* having a preloaded, furled bag **50** and a snap fitting attachment member, snap fitting the cartridge **11***a* to the handpiece **11***b* in snap fit engagement, directing the device **11** into a body cavity **70**, preferably through a laparoscopic port or sleeve **64**, so that the handle portion **24** is accessible by the surgeon, pushing a handle portion **24** forward, preferably using a thumb grip **44** to open a bag **50**, and directing a mass **52** through the entry way **58** and into the interior space **56** of the bag **50**.

[**0068**] The above-described embodiments of this invention are merely descriptive of its principles and are not to be limited. The scope of this invention instead shall be determined from the scope of the following claims, including their equivalents.

[**0069**] In describing the embodiments disclosed herein the inventor has also described all the various alternative structures which are equivalent to one or more elements or limitations of the claimed invention. Beyond what is expressly described herein the inventor has no prior knowledge of any other structures which are equivalent to the invention claimed. Accordingly, the determination of structures, methods, or compositions of matter which are equivalent to the claimed invention shall not be limited to only the alternative structures identified herein, but shall include other structures whether or not they are presently known or unknown.

What is claimed is:

1. A surgical device comprising:

an elongated wand having a front end and a back end;

an elongated rod including a handle portion lying generally parallel to said back end of said wand, and a flexible portion having a pivot end and a second end, said second end connected to said handle portion;

a disengaging connector coupling said front end of said elongated wand to said pivot end of said flexible portion;

a means of slidably connecting said handle portion to said back end of said wand;

a bag coupled to said front end and said flexible portion; and

said means of slidably connecting said handle portion to said back end of said wand comprising a tubular collar surrounding and slidably receiving said wand and said rod, said collar being movable from a first position to a second position relative to said wand, the leading edge of said collar being arranged to be located at a transition point for the second end of said flexible portion.

2. A surgical device comprising:

an elongated wand having a front end and a back end;

an elongated rod including a handle portion lying generally parallel to said back end of said wand, and a flexible portion having a pivot end and a second end, said second end connected to said handle portion;

a disengaging connector coupling said front end of said elongated wand to said pivot end of said flexible portion;

a means of slidably connecting said handle portion to said back end of said wand;

a bag coupled to said front end and said flexible portion;

said means of slidably connecting said handle portion to said back end of said wand comprising a tubular collar surrounding and slidably receiving said wand and said rod, said collar being movable from a first position to a second position relative to said wand, the leading edge of said collar being arranged to be located at a transition point for the second end of said flexible portion; and

wherein said collar includes a longitudinally extending portion and being provided with a longitudinal slot extending along a portion thereof;

said collar including an adjustable locking means arranged for longitudinal movement of said collar relative to said rod.

3. The surgical device of claim 1 further comprising a manually operated thumb loop secured to said tubular collar and arranged for longitudinal movement of said collar in relationship to said elongated rod.

4. The surgical device of claim 2 further comprising a manually operated thumb loop secured to said tubular collar and arranged for longitudinal movement of said collar in relationship to said elongated rod.

5. In a surgical device having an elongated wand having a front end and a back end, an elongated rod including a handle portion lying generally parallel to said back end of said wand, and a flexible portion having a pivot end and a second end, said second end connected to said handle portion;

a disengaging connector coupling said front end of said elongated wand to said pivot end of said flexible portion;

a means of slidably connecting said handle portion to said back end of said wand;

a bag coupled to said front end and said flexible portion;

the improvement comprising:

a tubular collar surrounding and slidably receiving said wand and said rod, said collar being movable from a first position to a second position relative to said wand, the leading edge of said collar being arranged to be located at a transition point for the second end of said flexible portion.

6. In a surgical device having an elongated wand having a front end and a back end, an elongated rod including a handle portion lying generally parallel to said back end of said wand, and a flexible portion having a pivot end and a second end, said second end connected to said handle portion;

a disengaging connector coupling said front end of said elongated wand to said pivot end of said flexible portion;

a means of slidably connecting said handle portion to said back end of said wand;

a bag coupled to said front end and said flexible portion;

a tubular collar surrounding and slidably receiving said wand and said rod, said collar being movable from a first position to a second position relative to said wand, the leading edge of said collar being arranged to be located at a transition point for the second end of said flexible portion, the improvement comprising;

said collar including a longitudinally extending portion and being provided with a longitudinal slot extending along a portion thereof; and

said collar including an adjustable locking means arranged for longitudinal movement of said collar relative to said rod.

7. The surgical device of claim 1 wherein said wand and said rod are each comprised of two individual coaxial sections, each section being arranged for disengagable, end-to-end attachment with one another; and means for detachably securing the respective sections of said wand and said rod in end-to-end relationship.

8. The surgical device of claim 7, wherein the detachable securing means comprises individual ball and socket coupling attachment members arranged for separable attachment relative to one another.

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