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(54) **MATHIS LAPAROSCOPIC INGUINAL HERNIA ILLUMINATOR**

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

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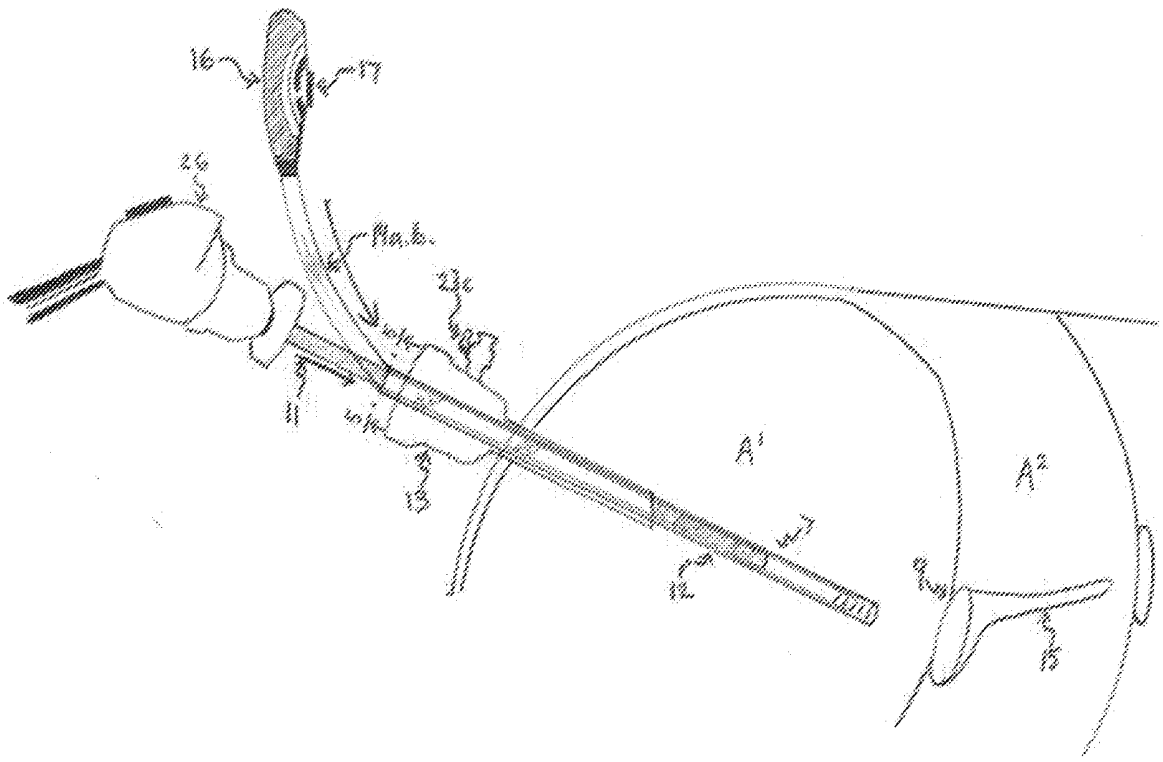
(57) **ABSTRACT**

An apparatus for a surgery that has a sleeve extending between a first end and a second end and defining a passage there through, a first band extending from the first end of the sleeve and connecting the sleeve to a light source, and at least one fiber optic filament defined at least partially in the first band and being incorporated into the sleeve, the fiber optic filament extending from the light source. The fiber optic filament extends from the light source to the second end of the sleeve to thereby direct light generated by the light source out of the second end.



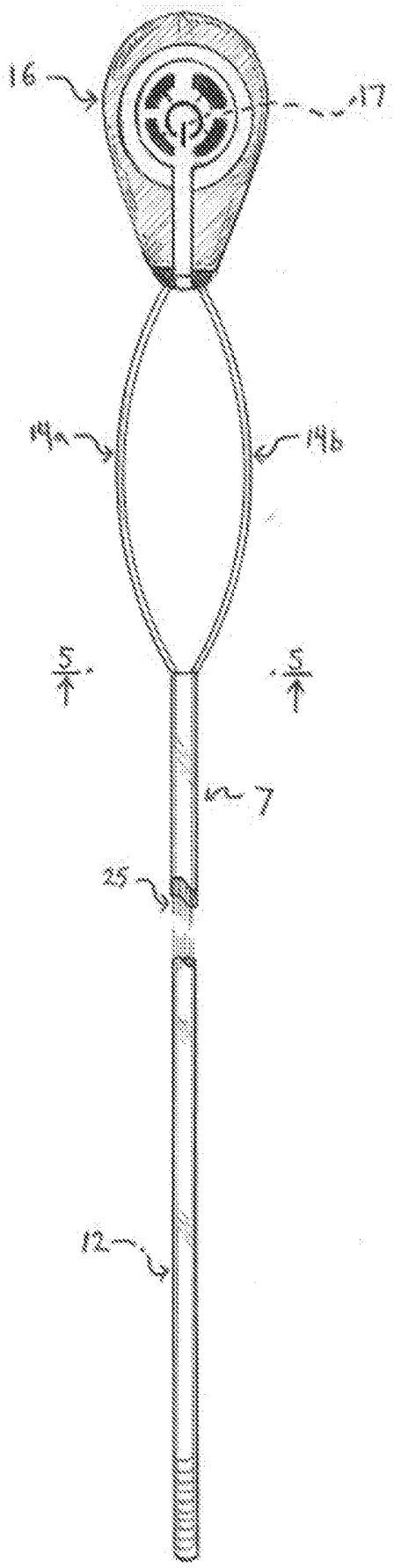


FIG. 1

FIG. 2a

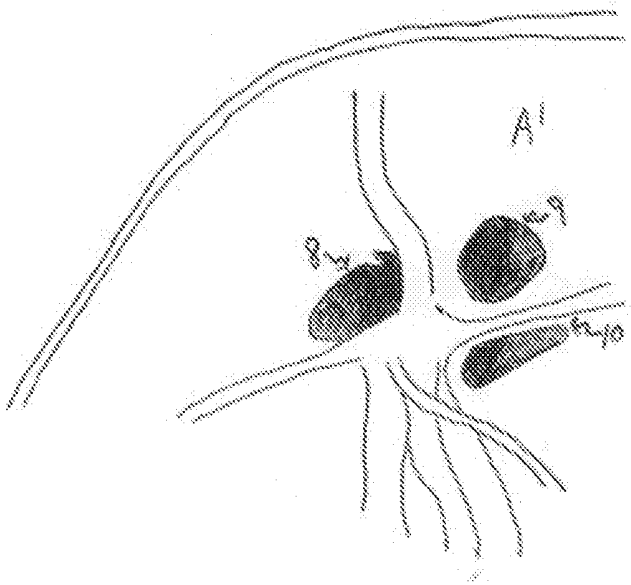


FIG. 2b

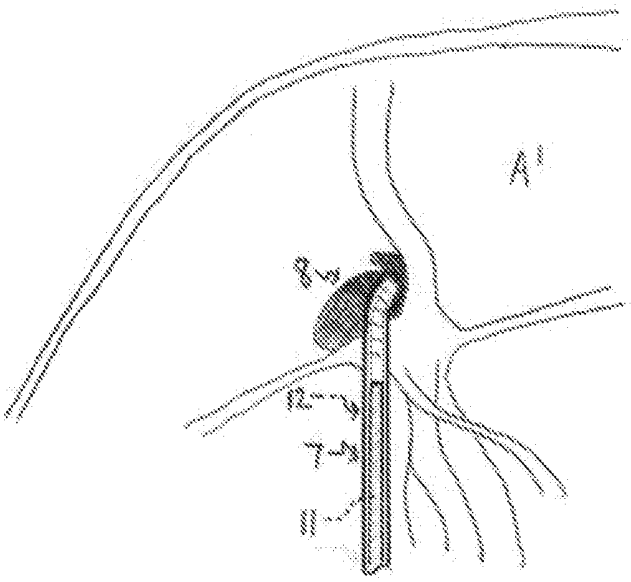


FIG. 2c

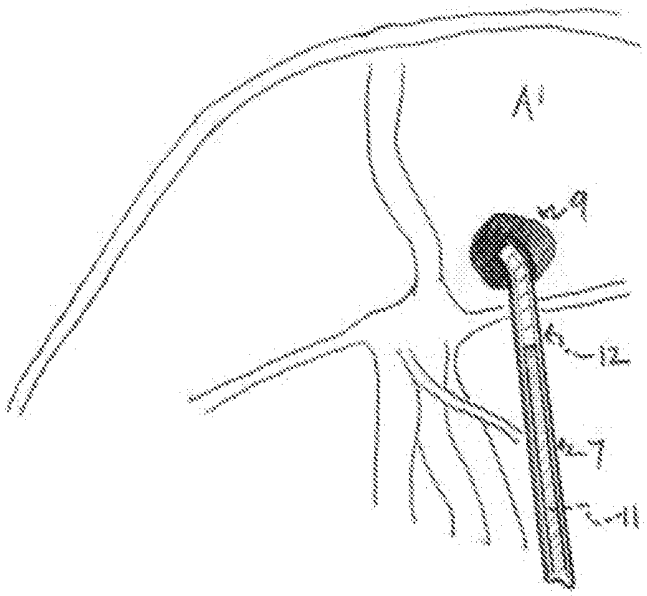
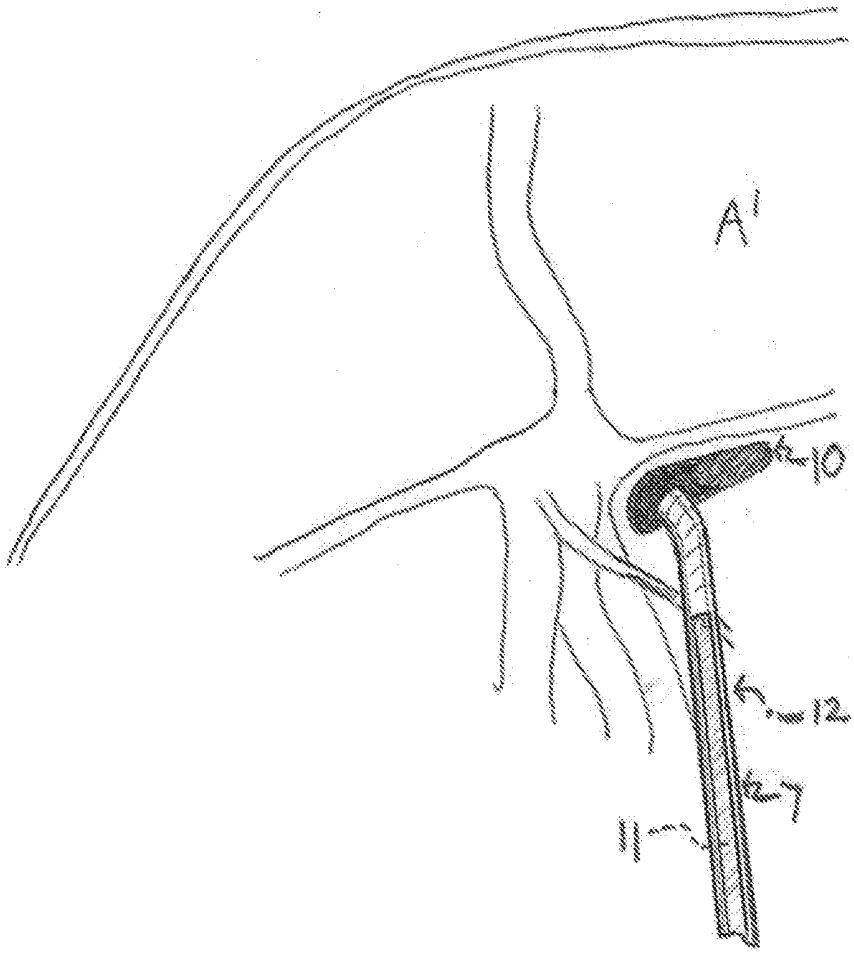


FIG. 2d



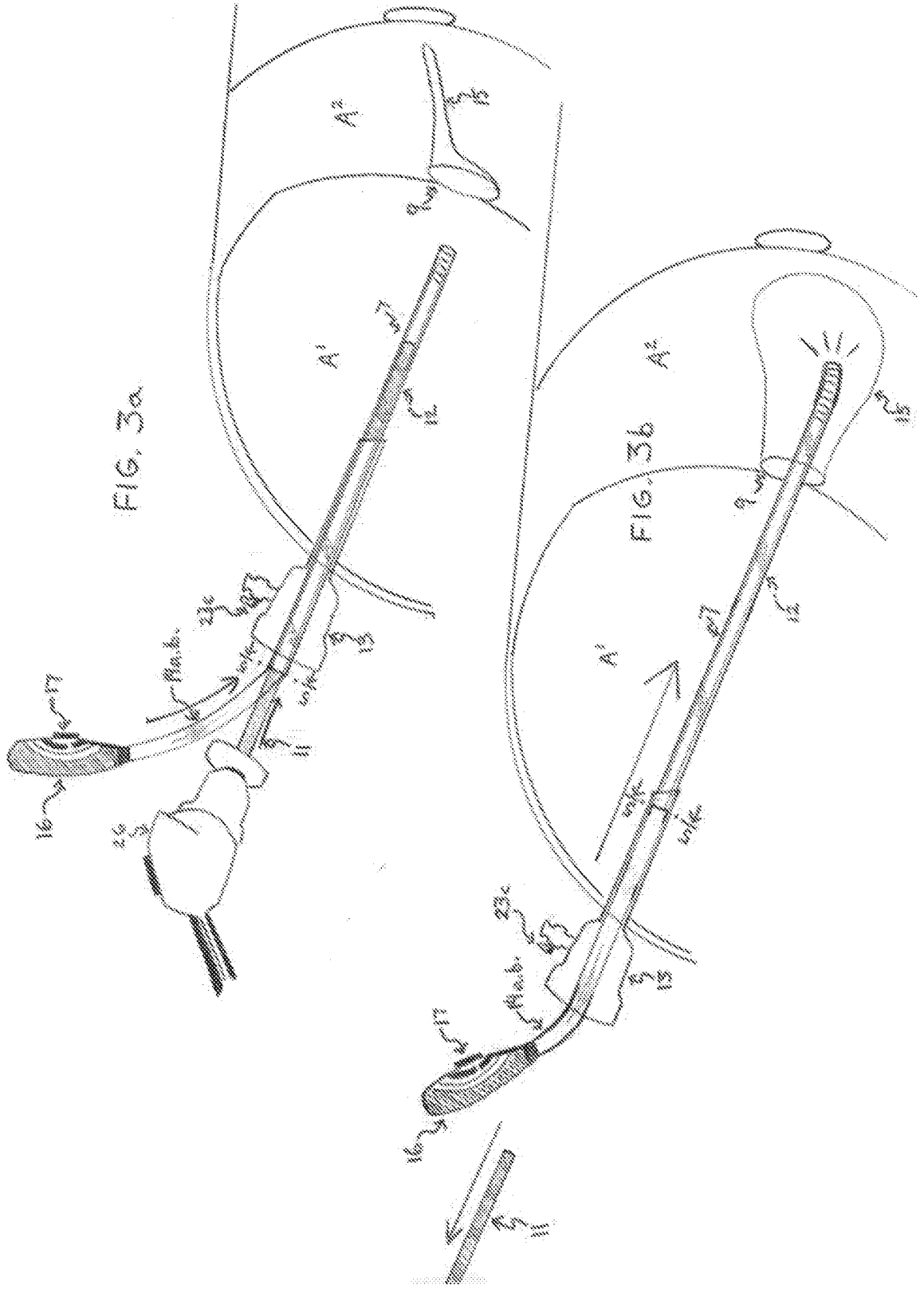


FIG. 3a

FIG. 3b

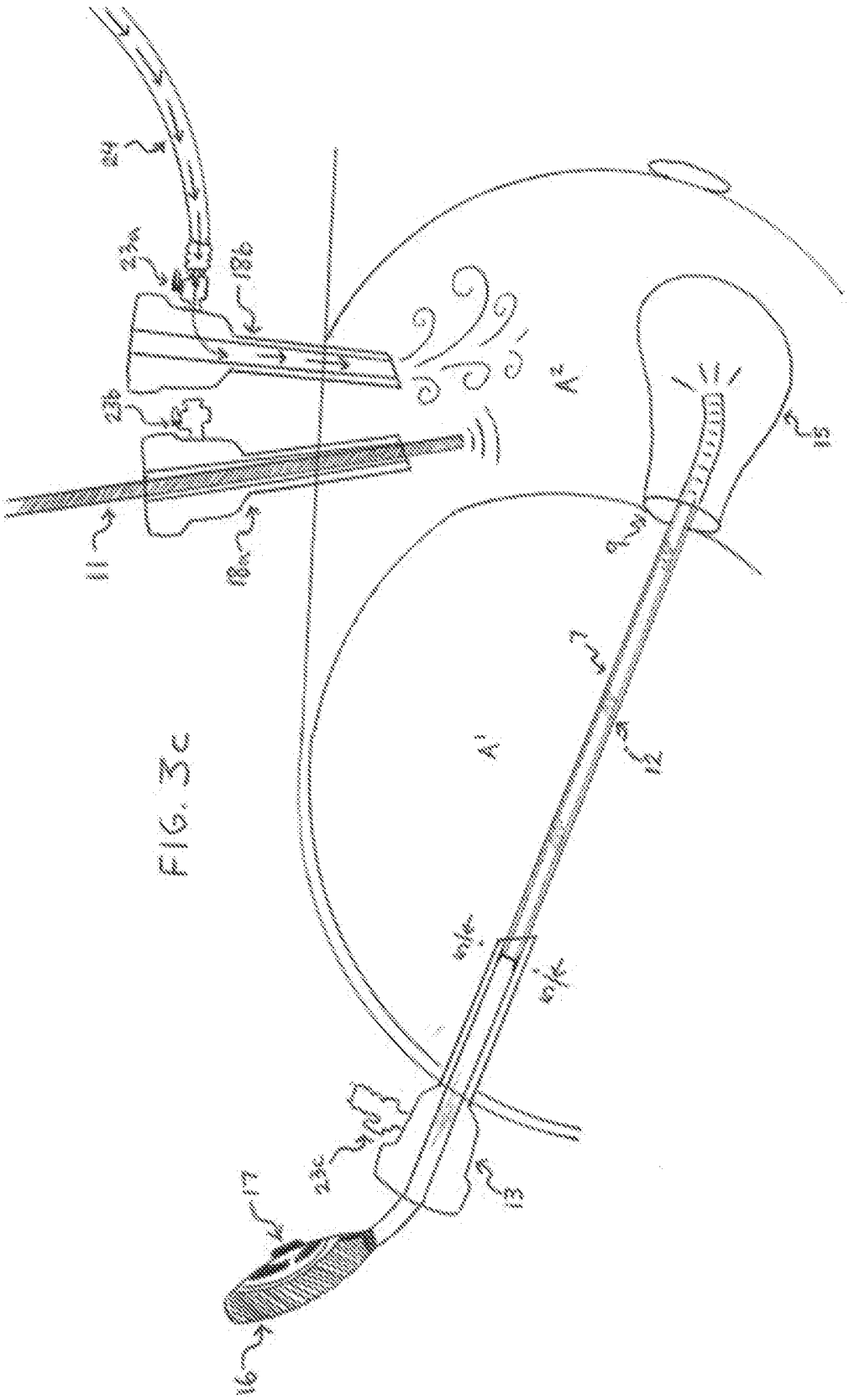


FIG. 3C

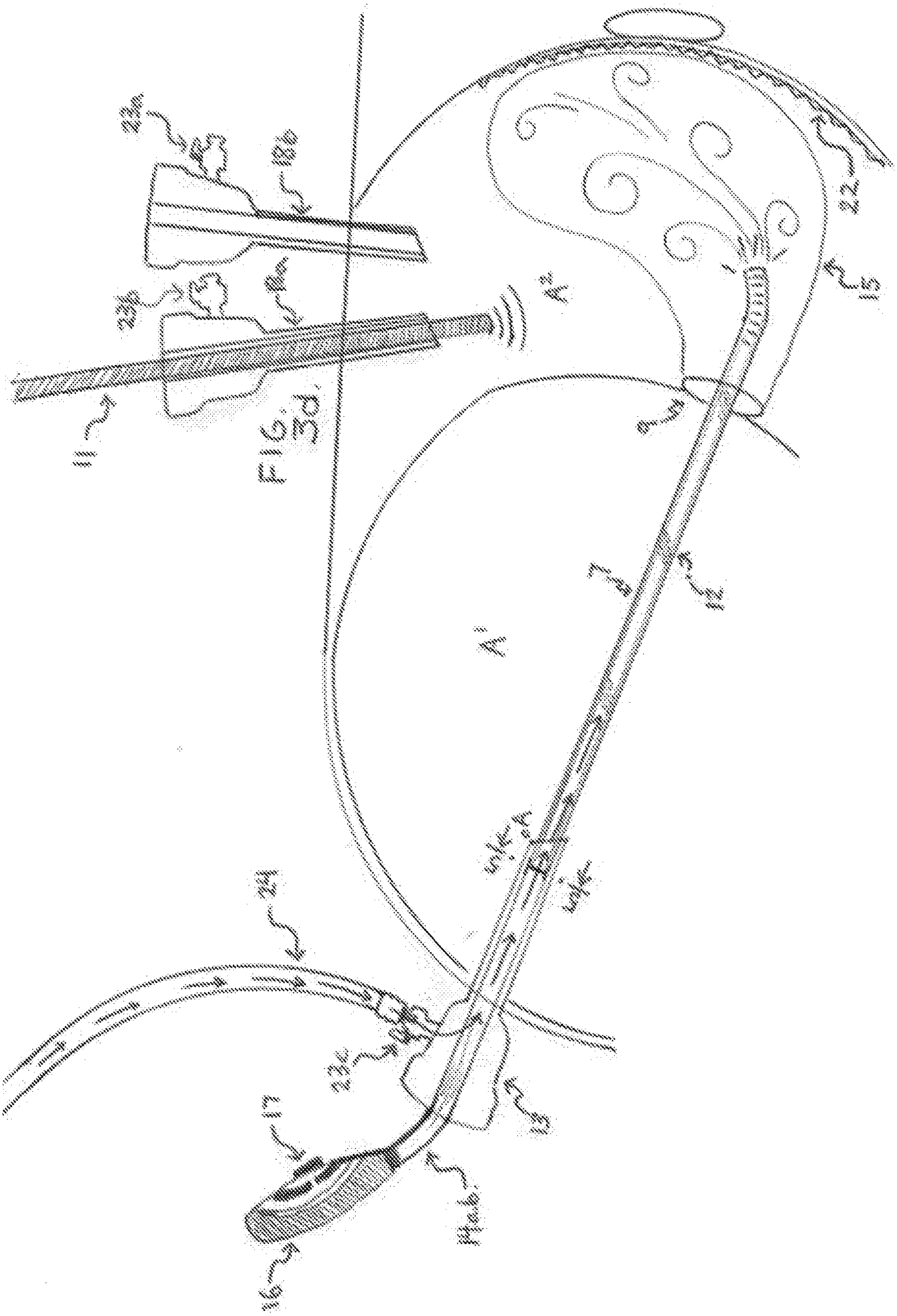


FIG. 3d
11
15
22
A1
A2
24
13
17
16
Hub

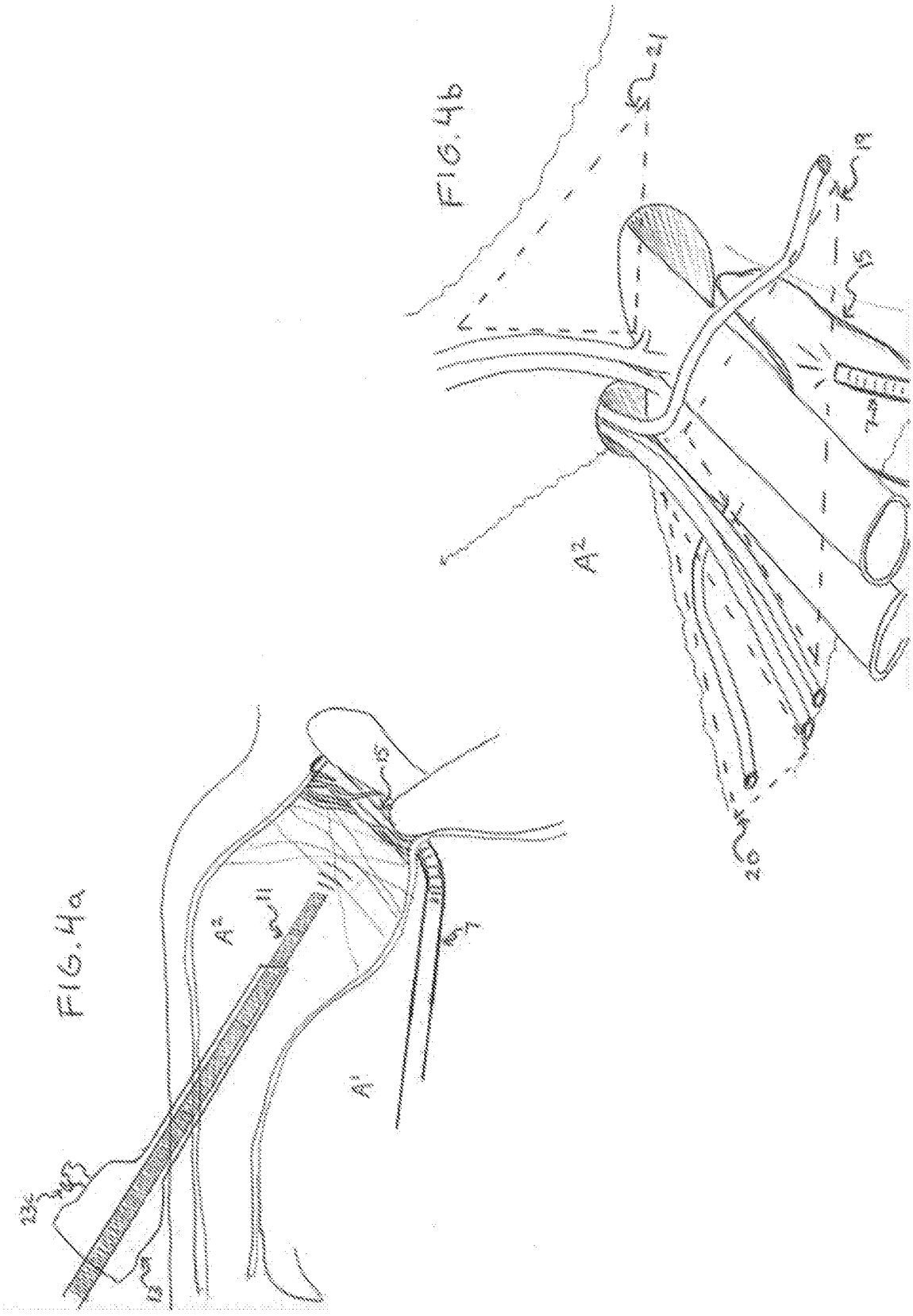


FIG. 4b
FIG. 4a

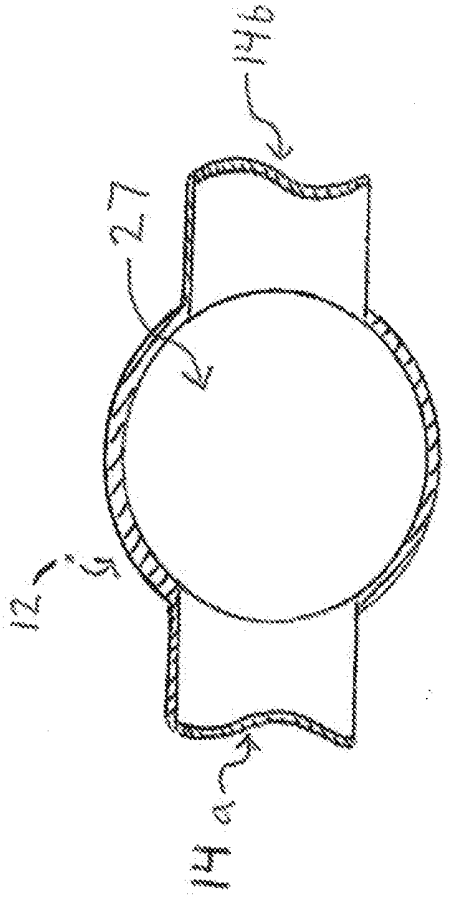


FIG. 5b

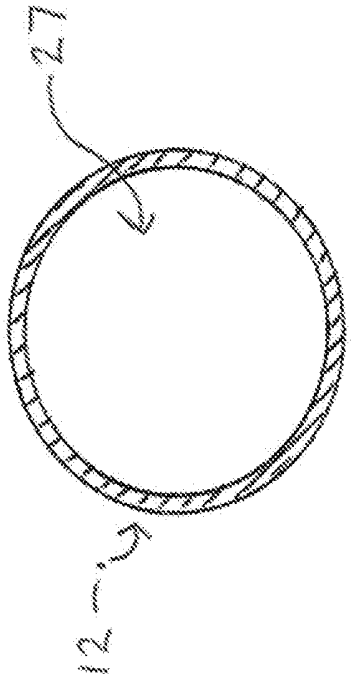


FIG. 5a

MATHIS LAPAROSCOPIC INGUINAL HERNIA ILLUMINATOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present disclosure claims the benefit of U.S. Provisional Application No. 62/726,479 filed on Sep. 4, 2018.

TECHNICAL FIELD

[0002] The present teachings are related to the illumination and insufflation of an inguinal hernia sac into the preparitoneal space from an intra-abdominal approach through a laparoscopic port.

BACKGROUND

[0003] The goal of a total extraperitoneal ("TEP") laparoscopic inguinal hernia repair is to locate and identify the hernia sac, followed by the reduction of the sac, and the placement of mesh in the preparitoneal space. In the performance of a TEP laparoscopic inguinal hernia repair, a supraumbilical incision is made followed by the insertion of a laparoscopic port into the abdominal cavity. A camera lens is then inserted through the port and into the abdominal cavity where the inguinal hernia is located and confirmed. An infraumbilical incision in the anterior fascia is made lateral to the linea alba exposing the posterior rectus sheath. A balloon dissector or a laparoscopic atraumatic dissector is then used to open up the preperitoneal space under direct visualization from the camera. An angled scope can be used to place two additional ports under direct visualization in the infraumbilical midline. Blunt dissection is then used to expose and identify landmarks among surrounding tissue and eventually the hernia sac. Care is taken to avoid injury to the area containing critical vessels, cord structures, and nerves known in the industry as the "Triangle of Doom," "Triangle of Pain," and "Hesselbach's Triangle." Once the hernia sac is located and identified, it is then reduced and a mesh is placed.

[0004] In the prior art, the process of dissecting through the preperitoneal space in search of the hernia sac is critical and time consuming due to the risk of injury to major surrounding structures. It is not unusual to be misled in identifying the hernia sac's location during the dissection due to common appearances of tissues and scarring.

[0005] The present disclosure allows for immediate identification of the hernia sac's location, whether direct, indirect, or femoral, upon entering the preparitoneal space among other things.

SUMMARY

[0006] This disclosure relates to laparoscopic surgery and in particular to an apparatus and method employed in laparoscopic herniorrhaphy, wherein the laparoscopic tissue structure is identified via illumination by the apparatus. The laparoscopic inguinal hernia illuminator comprises a flexible fiber optic sleeve that is made of three interconnected components. The control end of the illuminator includes a battery powered, push-button LED light source that provides illumination to the device's fiber optic filaments. Stemming from the light source are two divided semi-rigid fiber optic bands. The bands carry the fiber optic filaments from the light source to the fiber optic sleeve, and provide stability for advancing the sleeve along a camera lens placed in an intra-abdominal laparoscopic port and into the hernia sac. The bands are also used to withdraw the sleeve from the intra-abdominal space and out of a laparoscopic port. The bands are divided in two parallel segments to provide a space for a camera head to be advanced to the sleeve's proximal opening, and still allow the sleeve to be advanced along the lens and through the intra-abdominal space. Continuing from the bands is a flexible fiber optic sleeve. The sleeve's function is to be advanced along a laparoscopic camera lens, through the intra-abdominal space, and into an inguinal hernia sac. Incorporated into the sleeve are the fiber optic filaments which transmit light through to the distal end of the sleeve providing illumination to the hernia sac. The sleeve itself is to be inserted into a 5 mm laparoscopic port while, in addition, the sleeve's channel allows for a 5 mm laparoscopic camera lens to be advanced through it. The sleeve may also be used as a channel by which direct insufflation to the hernia sac may be performed.

[0007] In operation, a 5 mm laparoscopic camera lens may be inserted into the illuminator's flexible fiber optic sleeve until the camera head contacts the proximal opening of the sleeve. The lens and sleeve may then be inserted through an intra-abdominal 5 mm laparoscopic port and into the insufflated abdominal cavity. The lens and sleeve may then be advanced through the abdominal cavity to the opening of the inguinal hernia where the hernia is then identified. The illuminator's semi-rigid bands are then grasped by hand and used to advance the sleeve further into the abdominal cavity, gliding beyond the distal tip of the camera lens, and gently presenting the distal portion of the flexible sleeve into the hernia sac. At any time leading up to this point, the illuminator's fiber optic light source can be activated. With the light source activated, the illuminator's sleeve is left in place with its distal end resting in the inguinal hernia sac. While holding fast the illuminator's semi-rigid fiber optic bands, the camera and lens are then drawn back out of the illuminator's sleeve, abdominal cavity, and laparoscopic port, leaving the distal end of the illuminator's sleeve in the hernia sac with its fiber optic filaments illuminating the hernia sac. Steps are then taken to enter the preperitoneal space where the hernia sac is located and the hernia sac may be immediately located and identified because it is illuminated by the illuminator. Blunt dissection may then be performed to advance toward the desired location, reduce the hernia sac, and provide space for the placement of a mesh patch.

[0008] With the illuminator's sleeve resting in the hernia sac, the sleeve can then be used as a channel between the intra-abdominal laparoscopic port and the hernia sac to directly insufflate the sac into the preparitoneal space from an intra-abdominal approach. This can be performed at any time during dissection of the preparitoneal space, reduction of the sac, and placement of mesh. Insufflation of the sac can aid in placing the mesh by identifying the hernia sac's reduced position. The aid of the illuminator will also reduce the risk of mistakenly dissecting through the peritoneal membrane.

[0009] Accordingly, it is an object of this disclosure to provide a new apparatus for identifying the location and position of hernia sac tissue in laparoscopic surgery.

[0010] Another object of this disclosure is to provide a way to illuminate an inguinal hernia sac in the preparitoneal space from an intra-abdominal approach with the use of the flexible fiber optic sleeve so that the tissue may be located

and identified safer, faster, and more efficiently throughout an operation. This greatly reduces the risk of injury to critical structures due to the elimination of needless and or mistaken dissection.

[0011] A further object of this disclosure is to provide a new way to directly insufflate a hernia sac into the preparitoneal space from an intra-abdominal approach by using the sleeve as a channel for insufflation, while maintaining a direct view into the insufflated preparitoneal space. This will aid in identifying the hernia sac's reduced position, which in turn aids in the positioning of the implanted mesh.

[0012] In one non-exclusive example from the present disclosure, the immediate identification of the hernia sac's location upon entering the preparitoneal space is accomplished with the illumination of the hernia sac from an intra-abdominal approach, which in turn provides a safer, faster, and more efficient dissection of the surrounding tissues as well as the reduction of the sac itself. Further approximation of the hernia sac's positioning can be observed by using devices and methods disclosed herein to create a channel through which direct insufflation of the sac may be performed in the preparitoneal space from the intra-abdominal approach. The illumination and insufflation of the sac can be performed before, during, and with the placement of a mesh.

DESCRIPTION OF THE DRAWINGS

[0013] The above-mentioned aspects of the present disclosure and the manner of obtaining them will become more apparent and the disclosure itself will be better understood by reference to the following description of the embodiments of the disclosure, taken in conjunction with the accompanying drawings, wherein:

[0014] FIG. **1** is a front view of one embodiment of an illuminator of this disclosure with portions cutaway;

[0015] FIG. **2***a* is an illustrative view of an intra-abdominal area with three possible herniated areas of an inguinal canal in which the illuminator of FIG. **1** can be inserted;

[0016] FIG. **2***b* is an illustrative view of the illuminator of FIG. **1** entering an indirect inguinal hernia;

[0017] FIG. **2***c* is an illustrative view of the illuminator of FIG. **1** entering a direct inguinal hernia;

[0018] FIG. **2***d* is an illustrative view of the illuminator of FIG. **1** entering a femoral hernia;

[0019] FIG. **3***a* is an illustrative view of a laparoscopic camera inserted into a sleeve of the illuminator of FIG. **1**, both being inserted simultaneously through an intra-abdominally placed port, and presenting the illuminator's sleeve into the opening of the inguinal hernia;

[0020] FIG. **3***b* is an illustrative view of a camera lens being withdrawn from the sleeve of the illuminator of FIG. **1** and leaving the distal portion of the sleeve at rest in the hernia sac with the illuminator's light activated;

[0021] FIG. **3***c* is an illustrative view of the distal portion of an illuminator's sleeve at rest in a hernia sac with the illuminator's light activated while two other working ports are directed toward the hernia sac from in the preparitoneal space;

[0022] FIG. **3***d* is an illustrative view of the illuminator of FIG. **1** working as a channel to directly insufflate the hernia sac into the preparitoneal space from an intra-abdominal approach;

[0023] FIG. **4***a* is an illustrative view of a laparoscopic camera lens entering the preparitoneal space with the distal portion of an illuminator's sleeve illuminating a hernia sac from an intra-abdominal approach;

[0024] FIG. **4***b* is an illustrative view of the illuminator of FIG. **1** in a hernia sac in relation to major vessels, cord structures, triangle of doom, triangle of pain, and hesselbach triangle;

[0025] FIG. **5***a* is a cross sectional view of a distal end of a sleeve of the illuminator of FIG. **1**; and

[0026] FIG. **5***b* is a cross sectional view along the line **5-5** of FIG. **1** at the point the bands join the sleeve at the sleeve's proximal end.

[0027] Corresponding reference numerals are used to indicate corresponding parts throughout the several views.

DETAILED DESCRIPTION

[0028] The above-mentioned aspects of the present application and the manner of obtaining them will become more apparent and the teachings of the present application itself will be better understood by reference to the following description of the embodiments of the present application taken in conjunction with the accompanying drawings.

[0029] Referring now to the drawings, the Mathis Laparoscopic Inguinal Hernia Illuminator **7** is used particularly in laparoscopic herniorrhaphies, wherein the illuminator **7** allows for immediate identification of the hernia sac's **15** location, whether indirect **8**, direct **9**, or femoral **10**, upon entering the preparitoneal space A**2** as shown in FIGS. **2***a-d*. This is accomplished with the illumination of the hernia sac **15** by the illuminator **7**, which in turn provides a safer, faster, and more efficient dissection of the surrounding tissues as well as the reduction of the sac **15** itself, see FIG. **3***c*. Further approximation of the hernia sac's **15** positioning can be observed by using the illuminator **7** as a channel through which direct insufflation of the sac **15** may be performed in the preparitoneal space A**2** from the intra-abdominal A**1** approach, see FIG. **3***d*. The illumination and insufflation of the sac **15** can be performed before, during, and with the placement of a mesh **22** as shown in FIG. **3***d*.

[0030] The illuminator **7** is shown in FIG. **1** and includes a flexible fiber optic sleeve **12** that may be made of three interconnected components. The control end of the illuminator **7** includes a battery powered, push-button **17** LED light source **16** that provides illumination to the device's fiber optic filaments **25**. Stemming from the light source **16** are two divided semi-rigid fiber optic bands **14***a* and **14***b*. The bands **14***a* and **14***b*, carry the fiber optic filaments **25** from the light source **16** to the fiber optic sleeve **12**, and provide stability for advancing the sleeve **12** along a camera lens **11** placed in an intra-abdominal laparoscopic port **13** and into the hernia sac **15**.

[0031] The bands **14***a* and **14***b*, are also used to withdraw the sleeve **12** from the intra-abdominal space A**1** and out of a laparoscopic port **13**. The bands **14***a* and **14***b* are divided in two parallel segments to provide a space for a camera head **26** to be advanced to the sleeve's proximal opening **5-5**, and still allow the sleeve **12** to be advanced along the lens **11** and through the intra-abdominal space A**1**. Continuing from the bands **14***a* and **14***b* may be the flexible fiber optic sleeve **12**. The sleeve **12** may be advanced along a laparoscopic camera lens **11**, through the intra-abdominal space A**1**, and into an inguinal hernia sac **15**. Incorporated into the sleeve **12** are fiber optic filaments **25** which transmit light through to the distal end of the sleeve **12** providing illumination to the hernia sac **15**. The sleeve **12** itself is to

be inserted into a laparoscopic port while, in addition, the sleeve's channel **27** allows for a laparoscopic camera lens **11** to be advanced there through. The sleeve **12** may also be used as a channel by which direct insufflation to the hernia sac **15** may be performed. In other words, the sleeve **12** may provide a substantially fluidly sealed passage that extends from the bands **14***a*, **14***b* to a distal end of the sleeve **12**.

[0032] In one aspect of this disclosure, the bands **14***a*, **14***b* may have a length that is less than the length of the laparoscopic port **13** to ensure that the sleeve **12** does not become positioned entirely outside of the distal opening of the laparoscopic port **13**. In this configuration, at least a portion of the sleeve **12** remains within the laparoscopic port **13** even when the illuminator **7** is inserted fully into the laparoscopic port **13**. More specifically, a portion of the housing of the light source **16** may contact a proximal end of the laparoscopic port **13** before the sleeve **12** exits the distal end of the laparoscopic port **13**. With the bands **14***a*, **14***b* sized to remain within the laparoscopic port **13**, the risk of damaging tissue when withdrawing the illuminator **7** from the laparoscopic port **13** is reduced. In one non-exclusive example, the bands **14***a*, **14***b* have a length that is about the same, or less than the length of the laparoscopic port **13**. In another non-exclusive example, the length of the bands **14***a*, **14***b* may be about nine to thirteen centimeters. In yet another example, the length of the bands **14***a*, **14***b* is about eleven centimeters.

[0033] Similarly, the length of the sleeve **12** may be such that allows the sleeve **12** to extend from the distal end of the laparoscopic port **13** at least partially into the hernia sac **15** as illustrated in FIG. **3***b*. While the sleeve **12** may be different lengths to accommodate different anatomies, in one non-exclusive example the sleeve **12** is between about twenty-three and thirty-three centimeters long. In yet another example, the sleeve **12** is about twenty-eight centimeters long. A person skilled in the art understands that the length of the bands **14***a*, **14***b* and the sleeve **12** are such to allow the distal end of the sleeve **12** to at least partially enter the hernia sac **15** without requiring the bands **14***a*, **14***b* to exit the distal end of the laparoscopic port **13**. While specific dimensions are given herein as examples, this disclosure considers applying these teachings to different portions of the anatomy wherein different dimensions of the sleeve **12** and bands **14***a*, **14***b* would be required.

[0034] Further, the sleeve **12** and bands **14***a*, **14***b* may have a thickness that allows the sleeve **12** and bands **14***a*, **14***b* to be positioned in the annular cavity between the laparoscopic port **13** and the camera lens **11**. More specifically, the camera lens **11** may be substantially cylindrical in shape and have about a five millimeter diameter. Similarly, the laparoscopic port **13** may define a cylindrical cavity there through that has about a seven millimeter diameter. In this particular configurations, the sleeve **12** may be sized to occupy the annular cavity between the camera lens **11** and the laparoscopic port **13**. Similarly, the bands **14***a*, **14***b* may have a thickness that is less than the thickness of the annular cavity to thereby allow the bands **14***a*, **14***b* to be positioned between the camera lens **11** and the laparoscopic port **13** as well.

[0035] FIGS. **2***a-d* illustrate the possible locations of which a hernia may located and identified intra-abdominally **A1** as either an indirect **8**, direct **9**, and or a femoral hernia **10**. FIG. **3***a* depicts a laparoscopic camera lens **11** inserted into the flexible fiber optic sleeve **12** of the illuminator **7**, both are advanced into an intra-abdominal port **13**, through an insufflated abdominal cavity **A1**, and presented to the opening of the hernia **9**. The illuminator's **7** semi-rigid fiber optic bands **14***a* and **14***b* are then grasped together between the operator's index finger and thumb and are advanced down into the port **13**, along the camera lens **11**, through the hernia's opening, and into the hernia sac **15**, see FIG. **3***b*. Holding the illuminator **7** by the light source **16**, the power button **17** is pressed, activating the LED bulb and illuminating the fiber optic filaments **25**. With the light source **16** activated, the distal end of the fiber optic sleeve **12** illuminates the hernia sac **15**.

[0036] The light source **16** remains to be held fast while the camera lens **11** is then drawn back out of the sleeve **12** and the port **13**, and free of the abdomen as shown in FIG. **3***b*. The preparitoneal space **A2** is now entered and insufflated using additional laparoscopic ports **18***a* and **18***b*. With additional ports allowing access into the preparitoneal space **A2**, and the illuminator's lights source **16** activated, the location and position of the hernia sac **15** in the preparitoneal space **A2** is immediately identified (see FIG. **3***c*). Blunt dissection of the preparitoneal space **A2** is then used to expose and identify landmarks among surrounding tissue and eventually the hernia sac **15**. Care is taken to avoid injury in the "Triangle of Doom" **19**, Triangle of Pain" **20**, and "Hesselbach's Triangle" **21** which collectively contain critical vessels, cord structures, and nerves (see FIGS. **4***a*-**4***b*). Once the hernia sac **15** is located and identified, it is then reduced and a mesh **22** as shown in FIG. **3***d* is placed in the preparitoneal space **A2**.

[0037] Further approximation of the hernia sac's **15** positioning can be observed by using the illuminator **7** as a channel through which direct insufflation of the sac **15** may be performed in the preparitoneal space **A2** from the intra-abdominal **A1** approach shown in FIG. **3***d*. Insufflation of the hernia sac **15** is performed by first insufflating the preparitoneal space **A2**, then closing the accessing port's insufflation valves **23***a* and **23***b* followed by disconnecting the CO2 insufflation tubing **24**, see FIG. **3***c*. Then the CO2 tubing **24** is attached to the intra-abdominal port's insufflation valve **23***c* while the illuminator's sleeve **12** remains in the hernia sac **15**, see FIG. **3***d*. With the illuminator sleeve's proximal end **5-5** advanced in the port **13** distal to the port's insufflation valve **23***c*, and proximal to the port's distal tip at point A FIG. **3***d*, this will provide a channel that will carry CO2 gas directly to the hernia sac **15**, bypassing the intra-abdominal cavity **A1** as shown in FIG. **3***d*. With the laparoscopic camera lens **11** inserted into the insufflated preparitoneal space **A2**, the hernia sac **15** can be observed inflating and deflating by opening and closing the intra-abdominal port's insufflation valve **23***c*, see FIG. **3***d*. The illumination and insufflation of the sac **15** can be performed before, during, and with the placement of a mesh **22**, see FIG. **3***d*.

[0038] The added risks and consumption of time with searching for the hernia sac **15** are thereby eliminated. Presently, the process of dissecting through the preperitoneal space **A2** in search of the hernia sac **15** is critical and time consuming due to the risk of injury to major surrounding structures. It is not unusual to be misled in identifying the hernia sac's **15** location during the dissection due to common appearances of tissues and scarring. Complications that may evolve with an improperly positioned mesh **22** are also reduced due to the ability of the illuminator **7** to directly insufflate the hernia sac **15**, revealing the hernia sac's presentation.

[0039] Upon completion of the repair, or any point before, the illuminator **7** may be removed by grasping the semi-rigid bands **14***a* and **14***b* and gently withdrawing it back out of the laparoscopic port **13** and free of the abdomen. The position of the sleeve **12** within the hernia sac **15** may also be finely adjusted under direct visualization by reinserting the camera lens **11** through the port **13** and into the sleeve **12**. By insufflating the abdominal cavity A**1** the sleeve can then be manipulated by controlling the semi-rigid bands **14***a* and **14***b*.

[0040] While two semi-rigid bands **14***a*, **14***b* have been described herein throughout, this disclosure considers any number of rigid bands for providing illumination to the distal end of the sleeve **12**. More specifically, a single semi-rigid band may extend from the light source **16** to the tube and house one or more fiber optic cables therein. Further still, in yet another embodiment there may be more than two semi-rigid bands extending between the light source **16** and the sleeve **12**. Accordingly, this disclosure considers using any number of semi-rigid bands.

[0041] While the illuminator **7** is described throughout with specific reference to laparoscopic herniorrhaphies, this disclosure contemplates other uses for the illuminator **7** as well. Accordingly, the teachings described herein are intended to be applied to any type of surgical procedure or the like that may benefit from these teachings. Accordingly, the specific surgical procedure and methods described herein are meant only to be exemplary, and other applications not specifically discussed herein are also considered.

[0042] Further, in one aspect of this disclosure the illuminator **7** and other devices and methods discussed herein may be utilized for a robotic surgery wherein the illuminator **7** is utilized as part of a robotic system. Alternative, medical staff such as doctors, nurses, and the like may implement the teachings discussed herein.

[0043] While this disclosure has been described with respect to at least one embodiment, the present disclosure can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the disclosure using its general principles. Further, this application is intended to cover such departures from the present dis-closure as come within known or customary practice in the art to which this disclosure pertains.

What is claimed is:

1. An apparatus for a surgery comprising:
- a sleeve extending between a first end and a second end and defining a passage there through;
- a first band extending from the first end of the sleeve and connecting the sleeve to a light source; and
- at least one fiber optic filament defined at least partially in the first band and being incorporated into the sleeve, the fiber optic filament extending from the light source;
- wherein, the fiber optic filament extends from the light source to the second end of the sleeve to thereby direct light generated by the light source out of the second end.

2. The apparatus of claim **1**, further wherein the light source is a battery powered LED directed to emit light towards one end of the at least one fiber optic filament.

3. The apparatus of claim **1**, further comprising a second band extending from the first end of the sleeve and connecting the sleeve to the light source, wherein the first and second band are semi-rigid.

4. The apparatus of claim **3**, further wherein the first and second band each carry at least one fiber optic filament from the light source to the sleeve and provide a structure by which the sleeve may be manipulated.

5. The apparatus of claim **4**, further wherein, the first and second bands are transparent and the illuminated fiber optic filaments are visible through the first and second bands.

6. The apparatus of claim **1**, further wherein the sleeve is formed of a flexible material and configured to contour with the path of a hernia canal.

7. The apparatus of claim **1**, further wherein the sleeve is transparent and the at least one fiber optic filament is visible through the sleeve.

8. The apparatus of claim **7**, further wherein the transparent sleeve allows at least some peripheral visualization from a camera lens.

9. A kit for a laparoscopic surgery, comprising;
- a sleeve having a passage defined therein and extending between a first end and a second end;
- a camera lens sized to pass through the passage;
- a fiber optic filament extending between the first and second end and defined at least partially in a wall of the sleeve;
- a light source positioned to illuminate a proximal end of the filament to project light from a distal end of the filament;
- wherein, when the light source illuminates the proximal end of the filament the filament projects light from the second end of the sleeve.

10. The kit of claim **9**, further comprising a port defining a port passage there through, wherein the sleeve has an outer dimension that is sized to allow the sleeve to pass through the port passage.

11. The kit of claim **10**, further wherein the sleeve and camera lens are sized to pass through the port passage when the camera lens is positioned within the passage of the sleeve.

12. The kit of claim **10**, further wherein the passage between the first end and the second end is a substantially fluid-tight passage.

13. The kit of claim **12**, further comprising:
- a plug positioned between the light source and the distal end of the filament and sized to fit in a proximal end of the port passage; and
- a valve defined in the port to selectively provide fluid to the port passage;
- wherein, when the plug is positioned in the proximal end of the port passage fluid introduced through the valve travels through the passage of the sleeve and exits the second end of the sleeve.

14. The kit of claim **13**, further wherein the light source is coupled to the sleeve with a band, wherein the filament travels from the light source to the sleeve through the band.

15. The kit of claim **14**, further wherein the band has a thickness that allows the band to be positioned in the port passage without obstructing passage of the camera lens there through.

16. A method of illuminating an inguinal hernia sac in laparoscopic surgery, comprising:
- providing a light source that directs light out an end of a sleeve, a laparoscopic camera lens sized to pass through the sleeve, and a port sized to allow the sleeve and camera lens to pass there through;
- inserting the sleeve and camera lens through the port;

operating the light source to illuminate the end of the sleeve; and

advancing the sleeve through the port to present the end of the sleeve into a hernia sac to illuminate the hernia sac.

17. The method of claim **16**, further comprising directly insufflating the hernia sac by removing the camera lens from the sleeve, plugging a proximal end of the port, and introducing fluid into the hernia sac through the sleeve via a valve in the port.

18. The method of claim **16** further comprising visualizing the illuminated hernia sac in a preparitoneal space.

19. The method of claim **16**, further wherein the light source directs light out the end of the sleeve with one or more fiber optic filament defined partially through the sleeve.

20. The method of claim **18**, further wherein the fiber optic filament passes from the light source through a band before entering the sleeve.

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专利名称(译)	马西斯腹腔镜腹股沟疝照明器		
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摘要(译)

一种用于外科手术的设备，其具有在第一端和第二端之间延伸并限定穿过其中的通道的套管，从套管的第一端延伸并将套管连接至光源的第一带以及至少一根光纤。 光纤丝至少部分地限定在第一带中并被结合到套筒中，光纤丝从光源延伸。 光纤丝从光源延伸到套管的第二端，从而将光源产生的光引出第二端。