

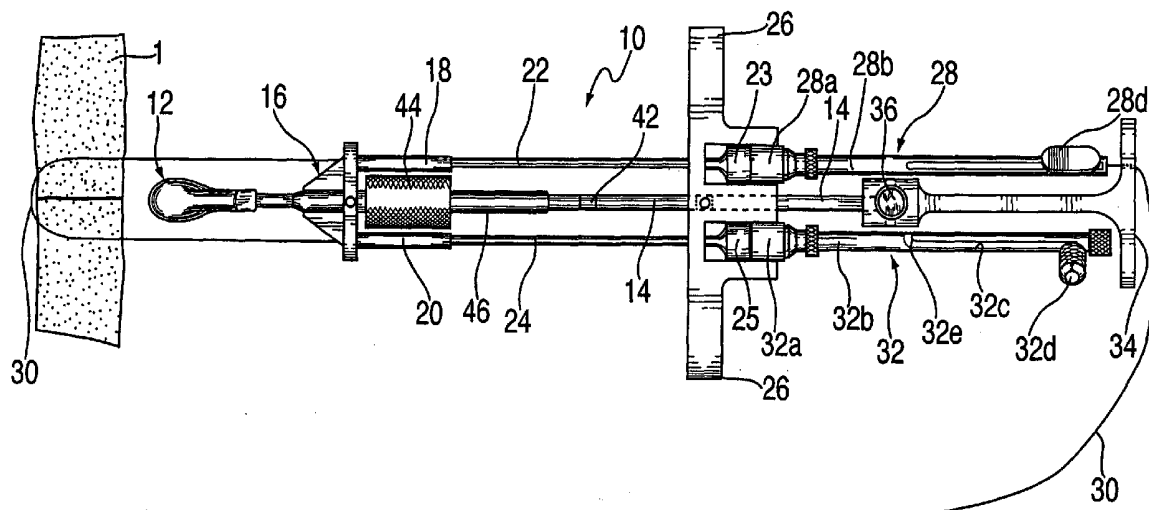


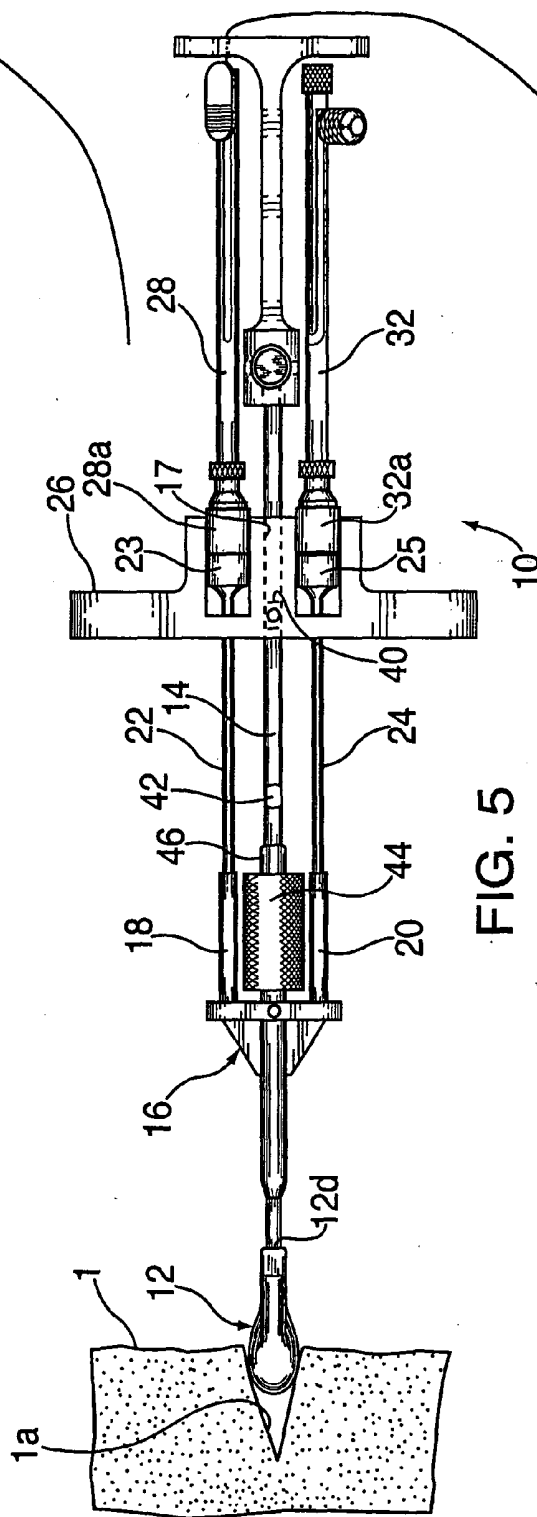
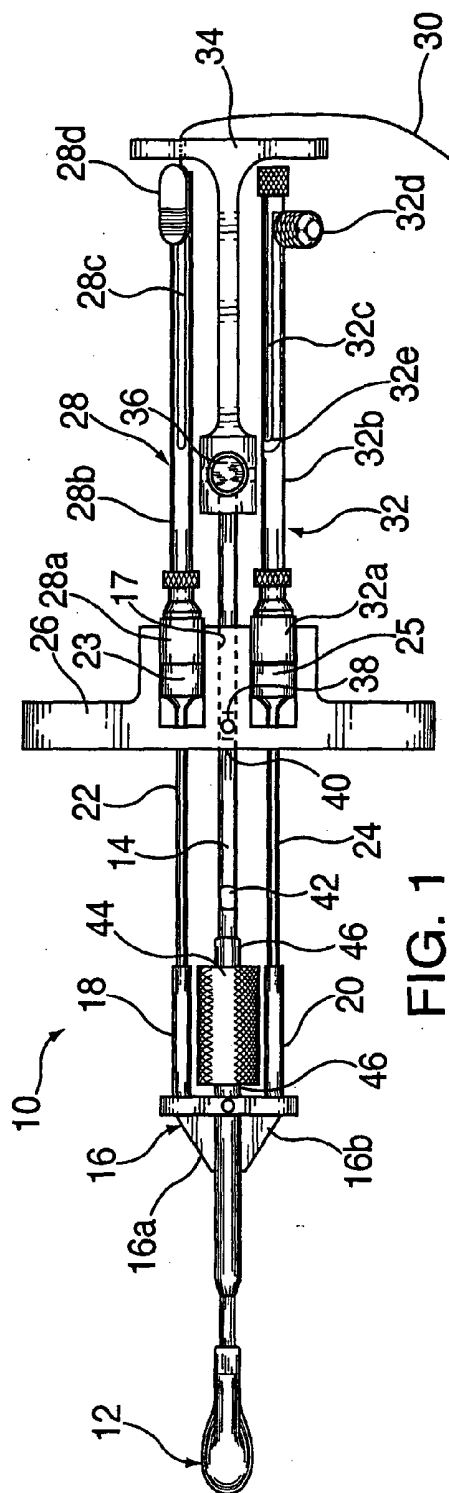
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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0043746 A1**  
(43) **Pub. Date: Feb. 24, 2005**  
**Pollak et al.**(54) **METHODS AND INSTRUMENTS FOR  
CLOSING LAPAROSCOPIC TROCAR  
PUNCTURE WOUNDS**(52) **U.S. Cl. .... 606/144; 606/139**(76) **Inventors: Stanley B. Pollak, Nesconset, NY  
(US); Anthony D. Costabile, Setauket,  
NY (US)**(57) **ABSTRACT**

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An instrument for applying a suture to a trocar wound includes an obturator coupled to a central shaft and a coaxially disposed skin pressure plate. The obturator and skin pressure plate are movable relative to each other, and function together to position the tissue and needles relative to each other. The skin pressure plate is provided with two spaced apart needle guides. A pair of hollow needles, held in the guides of the pressure plate are coupled to a needle mounting plate which is movable over the central shaft. One of the needles is provided with a suture control mechanism for moving a suture through the needle and the other needle is provided with a snare control mechanism for moving a snare through the needle.

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A61B 17/12**



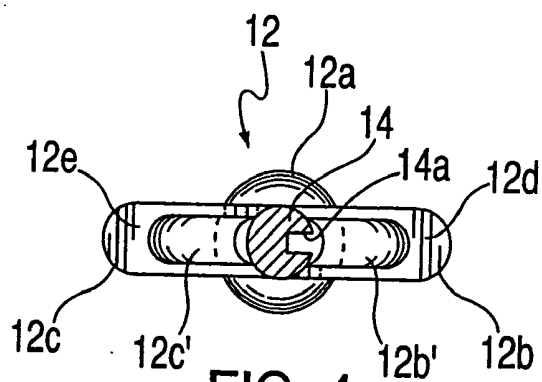


FIG. 4

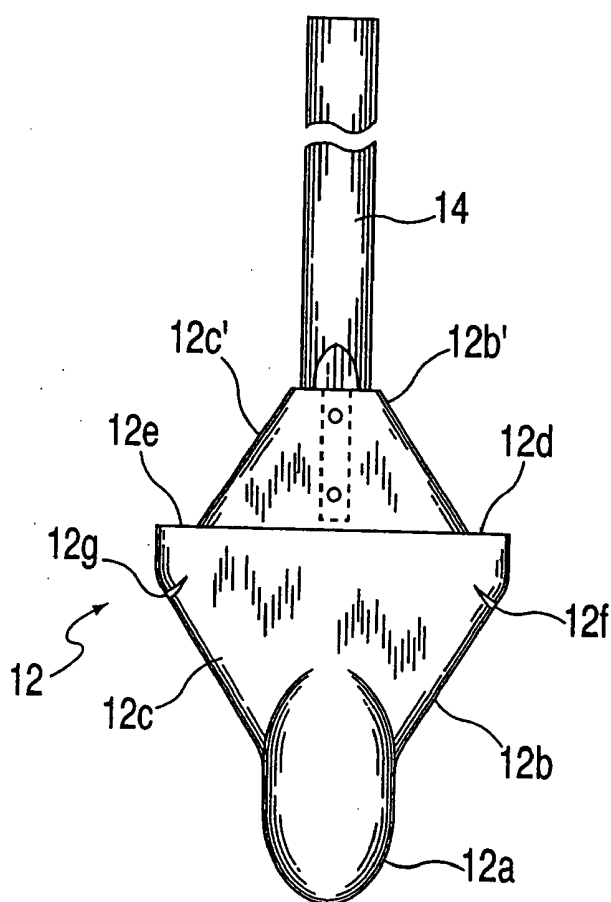


FIG. 2

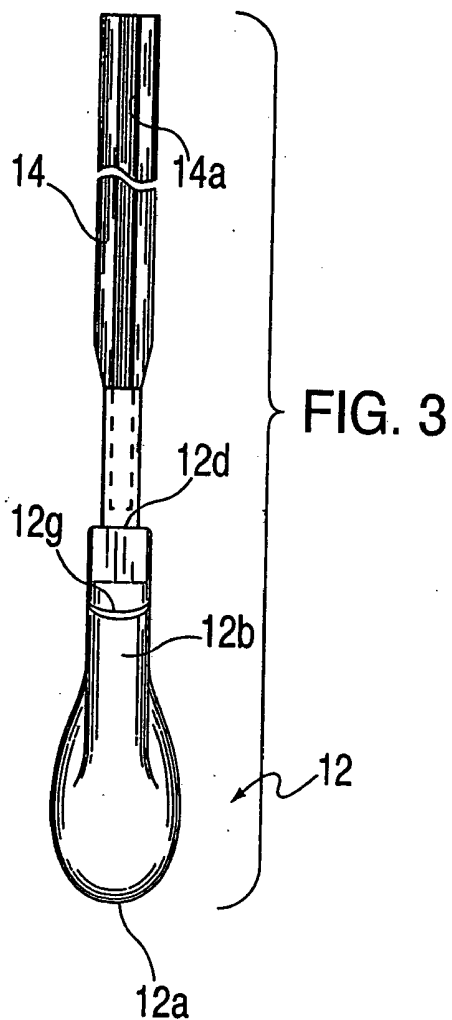
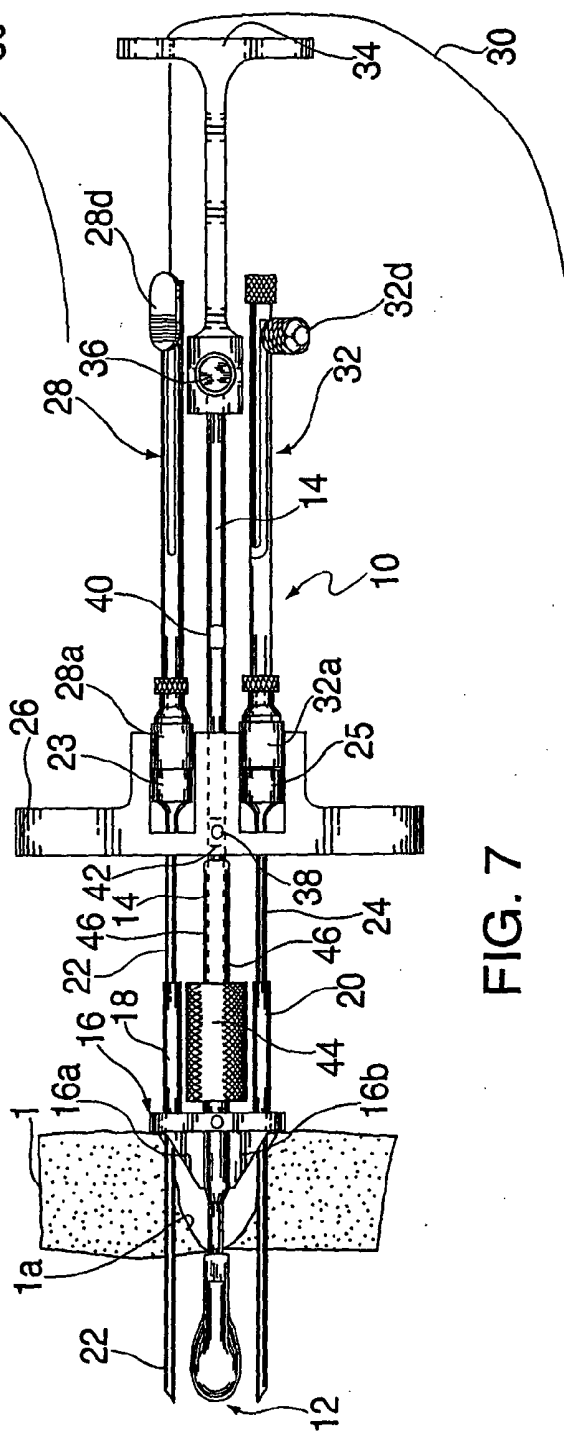
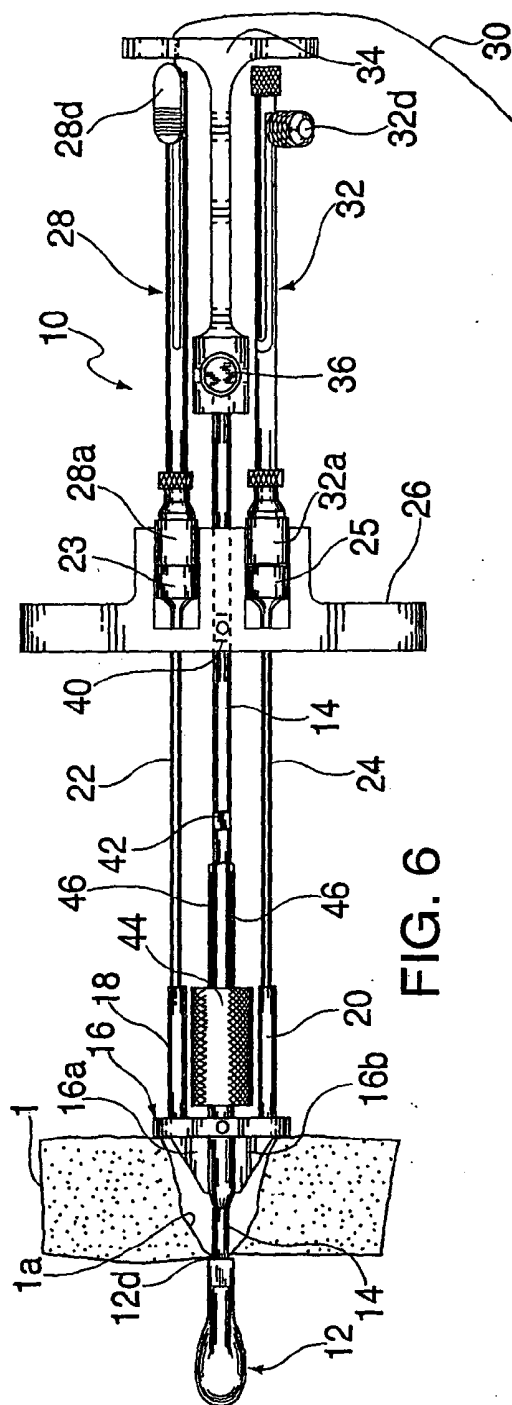


FIG. 3



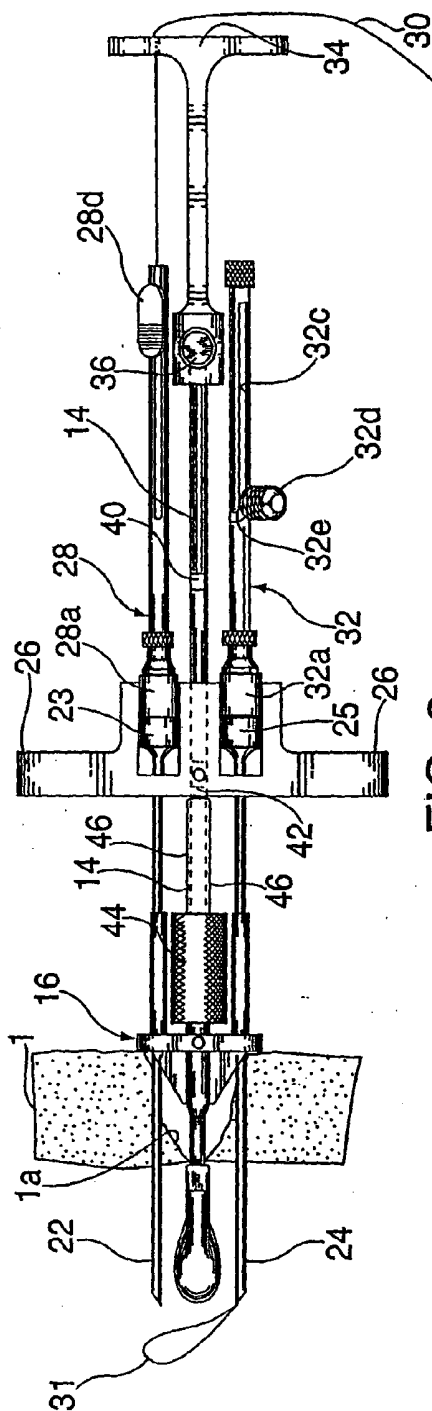


FIG. 8

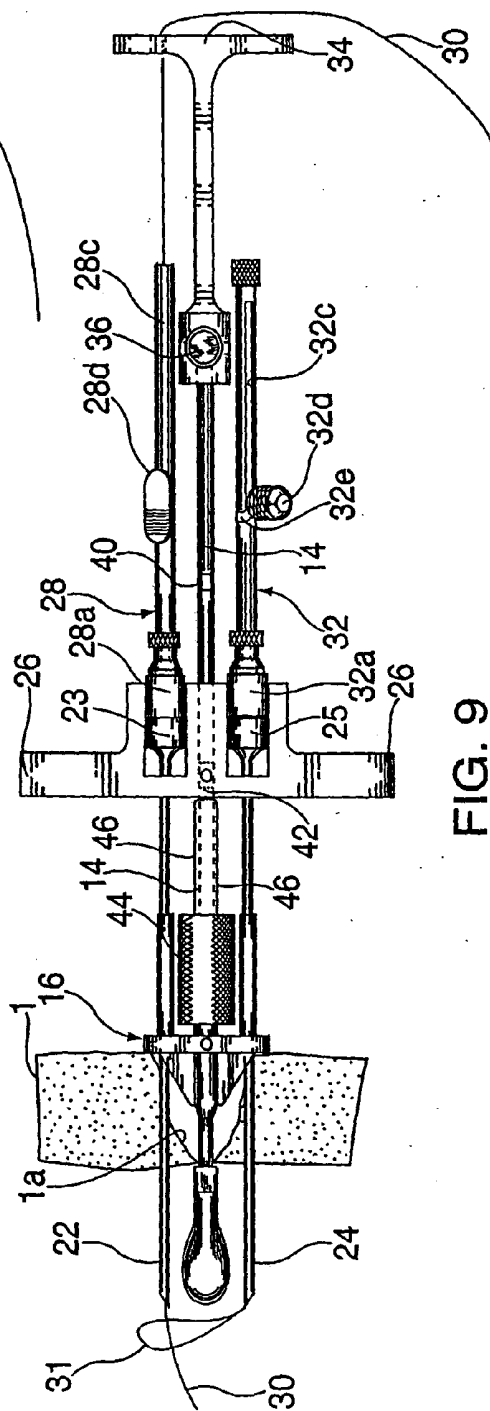
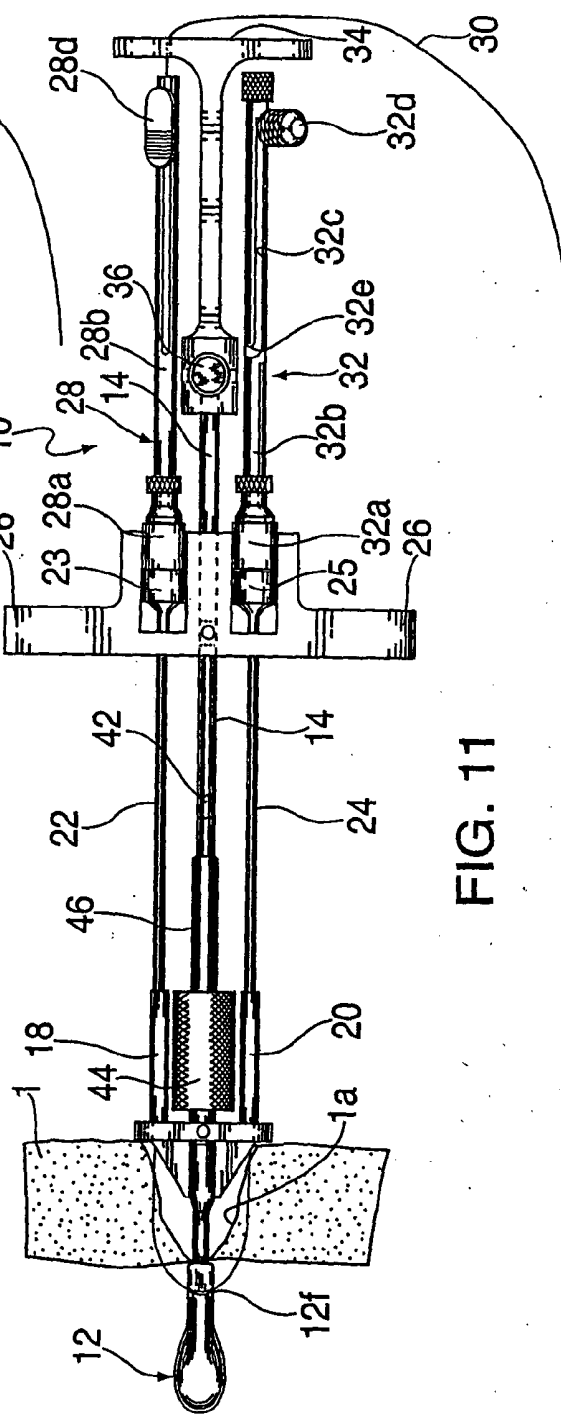
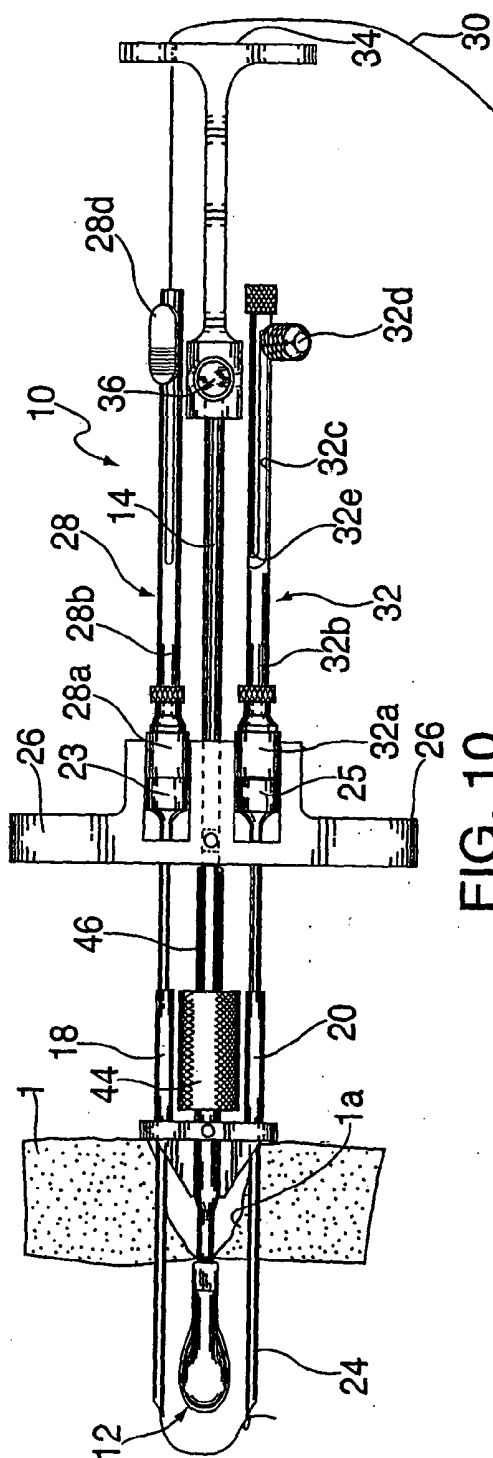


FIG. 9



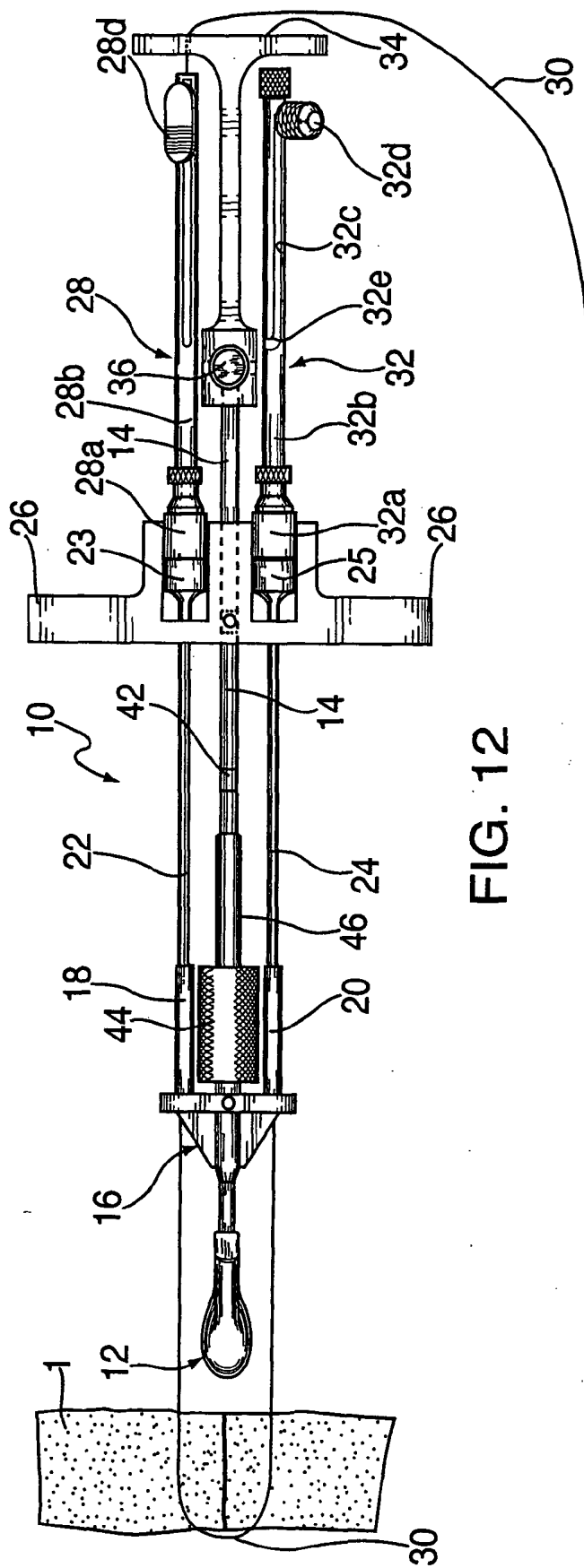


FIG. 12

## METHODS AND INSTRUMENTS FOR CLOSING LAPAROSCOPIC TROCAR PUNCTURE WOUNDS

### BACKGROUND OF THE INVENTION

#### [0001] 1. Field of the Invention

[0002] This invention relates to methods and instruments for suturing puncture wounds and more particularly to instruments for closing trocar puncture wounds formed during endoscopic and laparoscopic surgical procedures.

#### [0003] 2. State of the Art

[0004] During laparoscopic and endoscopic surgery, one or more small incisions or punctures are made in the patient's body to provide access for one or more tubes or cannula devices. These cannulae, together with the removable puncturing devices which fit into the cannulae, are referred to as trocars. Once extended into the patient's body, the cannulae allow for insertion of various surgical instruments such as scissors, dissectors, retractors, or biopsy instruments together with an endoscope or laparoscope to perform diagnostics and/or surgery. Upon completion of the surgical procedure, the remaining trocar wounds are preferably sutured to close the wound.

[0005] Many devices and procedures have been proposed for the efficient and aesthetic closing of trocar wounds. For example, U.S. Pat. No. 5,403,329, issued Apr. 4, 1995 to Hinchcliffe, discloses an instrument for closing trocar puncture wounds having a handle assembly with a stationary portion and a movable portion; an elongated portion attached at a proximal end thereof to the stationary portion of the handle assembly; and needle deploying means associated with the elongated portion. The needle deploying means includes: an actuator member having a proximal end operably connected to the movable portion of the handle assembly and a distal end disposed adjacent a distal end of the elongated portion, the actuator member being slidable between a first position and a second position; and at least one needle carrier member mounted adjacent the distal end of the actuator member, the needle carrier being slidable relative to the actuator member upon movement thereof, between a retracted position substantially within the elongated portion and an extended position substantially without the elongated portion. The instrument also provides a suture retaining feature including at least one elongated channel disposed along the actuator member such that a length of suture may be received and retained within the channel and carried therein, between the elongated portion and the actuator member.

[0006] Although the Hinchcliffe device was an improvement over many of the devices prior to it, the Hinchcliffe device still has several disadvantages. One serious disadvantage is that the apparatus is not self-sufficient. It requires the use of forceps or other grasping tools to move needles carrying the suture material.

[0007] U.S. Pat. No. 5,462,560, issued Oct. 31, 1995 to Stevens, discloses a double needle ligature device for efficiently creating a loop suture for closing wounds, such as trocar wounds. The device preferably includes a double rod-in-needle assembly to ensure that the suture is positively held in place during needle retraction. Although the Stevens device has some advantages over the Hinchcliffe device, it still has its disadvantages. The suture must be introduced by

dragging it into the abdominal cavity alongside the introducing needle. The suture must be manually threaded through the snare loop. The device is unable to secure the wound and maintain pneumoperitoneum. The device is unable to automatically position tissue relative to the needles.

[0008] U.S. Pat. No. 5,474,568, issued Dec. 12, 1995 to Scott, discloses a surgical instrument for applying sutures through body tissue including a handle assembly, an elongated housing removably mounted to said handle assembly and having a proximal end portion and a distal end portion, at least one needle carrier operatively mounted in the distal end portion and movable between a retracted position and a deployed position, and a needle releasably retained in the needle carrier member. The instrument may also include a retaining mechanism adapted to retain the at least one needle carrier in the partially deployed position. Although the Scott instrument has the advantage of being able to plug the trocar wound during closure, it has several disadvantages. It can only place a single loop suture. It has no facility for rotating or resetting.

[0009] U.S. Pat. No. 5,476,470, issued Dec. 19, 1995 to Fitzgibbons, Jr., discloses a device for suturing closed laparoscopic trocar sites to reduce the incidence of incisional herniation. A pair of needles, hollow and having an eyelet adjacent the pointed end, are secured to a clip which may be fastened over a trocar sheath (cannula). The clip is then forced to slide down the sheath and the two needles penetrate the fascia and underlying muscle surrounding the hole formed by the trocar. The needles may also be spread somewhat after passing within the skin to gain a better bite on the tissue surrounding the trocar sheath. A suture is then threaded down through one hollow needle and passed through the eyelet of the second needle, utilizing the laparoscope and a second accessory sheath. When the device is then withdrawn, the suture remains, passing through the peritoneum, muscle and fascia and may be tightened to close the site upon removal of the sheath. Though interesting in concept, the Fitzgibbons, Jr. device is difficult to operate and can only deploy a single loop of suture.

[0010] U.S. Pat. No. 5,573,542, issued Nov. 12, 1996 to Stevens, discloses a surgical tool for endoscopic suture placement which permits a surgeon to place controlled and precise internal ligatures. The tool utilizes a drive rod including an articulating or deflecting portion. When forced to an extended position, the deflecting or articulating portion forms a hook or J-shaped needle, the tip of which can be used to accurately position the suture. Although the Stevens device may be useful in some applications, it does not automatically deploy a suture, it merely aids in its deployment.

[0011] U.S. Pat. No. 5,591,180, issued Jan. 7, 1997 to Hinchcliffe, discloses an apparatus for suturing body tissue comprising first and second elongated body halves detachably connected to one another and first and second needles movable with respect to the first and second body halves. Each of the needles has a penetrating tip facing in a distal direction. At least one actuator is provided which is operatively associated with each of the first and second needles, wherein actuation of the at least one actuator advances the first and second needles into body tissue. The needles are



advanced through the body tissue positioned in the window formed in each of the body halves to engage a ferrule having a suture connected thereto.

[0012] U.S. Pat. No. 5,722,981, issued Mar. 3, 1998 to Stevens, discloses a double needle ligature device for efficiently creating a loop suture for closing wounds, such as trocar wounds. The device preferably includes a double needle assembly to ensure that the suture is positively held in place during needle retraction. This patent improves upon Stevens' earlier device in that the suture is carried inside a hollow needle rather than alongside a needle. However, it still suffers from the other disadvantages of Stevens' earlier two-needle device.

#### SUMMARY OF THE INVENTION

[0013] It is therefore an object of the invention to provide methods and apparatus for closing trocar puncture wounds.

[0014] It is another object of the invention to provide an apparatus for placing a loop suture that engages the inner layers of the abdominal wall but not the skin and the outer layers.

[0015] It is still another object of the invention to provide an apparatus for quickly and accurately suturing trocar puncture wounds.

[0016] It is yet another object of the invention to provide an apparatus which functions automatically with a minimum of user input.

[0017] In accord with these and other objects which will be discussed in detail below, the apparatus of the present invention includes an obturator coupled to a central shaft and a coaxially disposed skin pressure plate. The obturator and skin pressure plate are movable relative to each other. The skin pressure plate is provided with two spaced apart needle guides. A pair of hollow needles, held in the guides of the pressure plate are coupled to a needle mounting plate which is movable over the central shaft. One of the needles is provided with a suture control mechanism for moving a suture through the needle and the other needle is provided with a snare control mechanism for moving a snare through the needle. The central shaft is preferably coupled to a handle and is preferably provided with detents which are engaged by the needle mounting plate. The skin pressure plate is preferably coupled to the central shaft with a collar which clamps onto the central shaft by means of a split threaded clamp mechanism.

[0018] Methods for using the apparatus of the invention include starting with the needles and the skin pressure plate fully retracted, placing the obturator through the puncture wound, advancing and securing the skin pressure plate, and extending the pair of needles. With the needles extended, the snare is advanced through one needle and then the suture is advanced through the other needle and into the snare. The snare is withdrawn, capturing the suture and holding it against the tip of the needle. The needles are retracted and the apparatus is removed from the body. The suture is released and tied. The suturing procedure may then be repeated.

[0019] Additional objects and advantages of the invention will become apparent to those skilled in the art upon reference to the detailed description taken in conjunction with the provided figures.

#### BRIEF DESCRIPTION OF THE DRAWING

[0020] FIG. 1 is a side elevation view of the apparatus of the invention in its configuration prior to use;

[0021] FIG. 2 is an enlarged broken top view of the obturator;

[0022] FIG. 3 is an enlarged broken side view of the obturator;

[0023] FIG. 4 is an end view of the obturator;

[0024] FIG. 5 is a view similar to FIG. 1 illustrating a first step in operating the apparatus of the invention;

[0025] FIG. 6 is a view similar to FIG. 1 illustrating a second step in operating the apparatus of the invention;

[0026] FIG. 7 is a view similar to FIG. 1 illustrating a third step in operating the apparatus of the invention;

[0027] FIG. 8 is a view similar to FIG. 1 illustrating a fourth step in operating the apparatus of the invention;

[0028] FIG. 9 is a view similar to FIG. 1 illustrating a fifth step in operating the apparatus of the invention;

[0029] FIG. 10 is a view similar to FIG. 1 illustrating a sixth step in operating the apparatus of the invention;

[0030] FIG. 11 is a view similar to FIG. 1 illustrating a seventh step in operating the apparatus of the invention; and

[0031] FIG. 12 is a view similar to FIG. 1 illustrating an eighth step in operating the apparatus of the invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] Turning now to FIG. 1, a suturing apparatus 10 according to the invention includes an obturator 12 coupled to the distal end of a central shaft 14 and a coaxially disposed skin pressure plate 16. As used herein, distal means farthest from the practitioner and closest to the surgical site. Proximal means closest to the practitioner. The obturator 12 and skin pressure plate 16 are movable relative to each other. The skin pressure plate 16 is provided with two spaced apart needle guides 18, 20. A pair of hollow needles 22, 24, held in the guides 18, 20 of the pressure plate 16 are coupled to a needle mounting plate 26 which is movable over the central shaft. One of the needles is provided with a suture control mechanism 28 for moving a suture 30 through the needle 22 and the other needle 24 is provided with a snare control mechanism 32 for moving a snare 31 (FIG. 7) through the needle 24 as described in more detail below.

[0033] The proximal end of the central shaft 14 is preferably coupled to a handle 34 by a set screw 36. The needle mounting plate 26 is preferably provided with a biased pin 38 which alternately engages detents 40, 42 on the central shaft 14. The skin pressure plate 16 has a central bore 17 and is preferably coupled to the central shaft via knurled locking nut 44 threadably received on a threaded split collar 46 centrally mounted on skin pressure plate 16 about central bore 17 so as to be co-axially arranged with central bore (not shown) and mounted on central shaft 14. Locking nut 44 tightens the split collar 46 against shaft 14 thereby fixing the skin pressure plate 16 to central shaft 14. The skin pressure

plate has two skin stretching fins **16a**, **16b** which are described in more detail below with reference to **FIGS. 6-11**.

[0034] The suture control mechanism **28** is mounted onto the hub **23** of needle **22** by way of a conventional Luer lock **28a**. The suture control **28** includes a sleeve **28b** having a guiding slot **28c** and a finger slide **28d**. The finger slide **28d** is coupled to the suture **30** as described in more detail below and is preferably biased to the proximal position shown by a spring (not shown). When the finger slide **28d** is depressed, it is moved distally by manual control moving a pre-measured length of suture through the end of needle **22**. The spring returns the finger slide to its starting position.

[0035] The snare control mechanism **32** is mounted onto the hub **25** of the needle **24** by way of a conventional luer lock fitting **32a**. The snare control includes a sleeve **32b** having a guiding slot **32c** and a sliding pin **32d**. The pin **32d** is coupled to a snare (shown and described in more detail below with reference to **FIGS. 8-12**) and is movable along the slot **32c**. The pin **32d** is biased proximally, i.e., to the position shown in **FIG. 1** by a spring (not shown). The distal end of the slot **32c** is provided with a stop **32e** to hold the pin **32d** when pressed forward and rotated. When pressed forward and rotated into the stop **32e**, the pin **32d** delivers the snare through the needle **24** to the appropriate capture position.

[0036] Turning now to **FIGS. 2-4**, the obturator **12** is a small, sculpted mass which is designed to be placed into and through the puncture wound **1a** in the abdominal wall that remains after a laparoscopic trocar is removed. In particular, the obturator **12** has a bulbous tip **12a** and a pair of proximally flared spreading fins **12b**, **12c**, **12b'**, **12c'**. The fins terminate in fascia supporting shelves **12d**, **12e**. Suture capturing notches **12f**, **12g** are present on fins **12b** and **12c** to control the position of the suture during removal of the device.

[0037] As described in more detail below with reference to **FIGS. 5-7**, the dimensions and shape of the obturator **12** permit it to pass through the wound easily with a minimum of effort. Once introduced, gentle retraction on the obturator **12** allows the fascia spreading fins **12b'**, **12c'** to increase the tension and change the shape of the wound. The fascia supporting shelves **12d**, **12e** allow upward tension to be applied to the fascia to resist the pressure applied by the needles during their entry.

[0038] As seen best in **FIGS. 3 and 4**, the central shaft **14** is provided with an alignment groove **14a** which is engaged by the movable components so that the components remain angularly disposed in the correct manner relative to each other.

[0039] **FIGS. 5-12** illustrate the methods for using the apparatus **10** of the invention as well as additional features of the invention mentioned briefly above.

[0040] Starting with the needles **22**, **24** and the skin pressure plate **16** fully retracted to their proximal most position, the obturator **12** is inserted in the puncture wound **1a**, as shown in **FIG. 5**. As mentioned above, the fins **12b'**, **12c'** of the obturator result in the linear stretching of the round or irregular wound that is to be closed. This stretching permits the needles **22**, **24** to engage the inner layers of the abdominal wall properly. In particular, the needles penetrate

the fascia and peritoneum of the abdominal wall. The tightened tissues allow the needles to be passed through them and change the shape of the wound from a round or irregular hole to a stretched linear defect so that an adequate amount of the tissue can be engaged by the needles.

[0041] As shown in **FIG. 6**, after the obturator **12** is installed, the skin pressure plate **16** is advanced by moving the pressure plate **16** along the shaft **14** and is secured by tightening the knurled locking nut **44**. As the locking nut **44** is rotated it pinches the split collar **46** against the shaft **14**, and locks the pressure plate in position. As mentioned above, the skin pressure plate **16** has a pair of skin stretching fins **16a**, **16b** which are substantially orthogonal to the fins on the obturator **12** and which guide the proper alignment of the device **10** relative to the skin **1** and skin incision **1a**. Also, the fins **16a**, **16b** stretch the skin incision **1a** and allow the needle guide apertures **18**, **20** to be positioned within the soft tissue of the wound **1a**. It is important that the needles **22**, **24** do not engage the outer surface of the body wall, i.e., skin **1**, when they are inserted. The type of needles used will not penetrate the skin easily and a properly placed suture should only include the two deepest layers of the abdominal wall, the fascia and peritoneum. The needle guides **18**, **20** run along the edge of the skin stretching fins **16a**, **16b**. These guides **18**, **20** store and guide the needles **22**, **24** during their movements as well as hiding the sharp tips of the needles when retracted.

[0042] Referring now to **FIGS. 6 and 7**, with the obturator **12** and the skin pressure plate **16** in place, the needle mounting plate **26** is moved distally until it engages the second detent **42** on the central shaft **14**. This advances the needles **22**, **24** through the body wall until the ends of the needles **22**, **24** are approximately even with the tip of the obturator **12** (**FIG. 7**).

[0043] Turning now to **FIG. 8**, with the needles **22**, **24** now extended, the pin **32d** of the snare control mechanism **32** is moved distally against the spring (not shown) through the slot **32c** and rotated into the stop **32e**. This advances the snare **31** through needle **24** and rotates it to the proper position relative to needle **22**.

[0044] The relationship between the snare **31** and the snare control mechanism **32** is predetermined so that the snare protrudes the correct distance and rotates through the correct arc each time the pin **32d** is pushed to the end of the slot **32c** and rotated into the lock **32e**.

[0045] With the snare **31** now in place, the suture **30** is delivered as shown in **FIG. 9**. In particular, the finger slide **28d** is manually advanced through the slot **28c** against the action of the spring (not shown). The suture control mechanism **28** works in synchrony with the snare control mechanism **32** to enable the passage of the suture **30** through the tissue engaged by the needles **22**, **24**.

[0046] Prior to use, the suture **30** is pre-positioned in the suture control mechanism **28** so that the suture material extends to just within the tip of the needle **22**. Once the device is properly positioned and the snare **31** is in the proper position, the suture control mechanism **28** is advanced and the suture **30** is automatically inserted through the needle **22** and into the waiting snare **31** as shown in **FIG. 9**.

[0047] After the suture is inserted by the suture control mechanism **28**, the snare collar pin **32d** is manually tripped

out of the lock 32e and is automatically retracted back along slot 32c by the spring (not shown) to capture the suture 30 with the snare 31 in the needle 24 as shown in FIG. 10. The needles 22, 24 are then pulled back as shown in FIG. 11 and the suture 30 is caught by one of the suture capturing notches, 12f, 12g.

[0048] After the device 10 is removed from the patient as shown in FIG. 12, the suture 30 is pulled out of its locked condition by a gentle pulling motion at the snare end, is cut at the suture needle end, and is then tied (not shown). The procedure may be repeated as necessary.

[0049] Although not essential to the invention, according to the presently preferred embodiment, the handle 34 facilitates gross movements of the device and is attached to the central shaft by way of a thumbscrew 36 that fits into a cut-out on the central shaft 14. A suture storage reel (not shown) can be built into the handle and holds enough suture for several wound closures.

[0050] Also according to the presently preferred embodiment, the needles 22, 24 are 16 gauge 4 inch Huestead epidural needles which are fitted into the needle mounting plate 26 and pass through the skin pressure plate 16 to facilitate the correct placement of the suture 30. These needles are standard surgical instruments and are not modified prior to their use. The curved tips of the needles are intended to pass through the tissue without becoming impacted with fatty material and will also reduce the risk of injury to the abdominal viscera if inadvertent contact occurs. The hub of each needle has flat surfaces that fits into the needle mounting plate 26 and accepts a set screw (not shown).

[0051] The preferred suture is the string-like material that is positioned by the device in such a way that the structural elements of the abdominal wall are securely approximated once the suture is tied using standard surgical techniques. A variety of suture materials may function properly and be suitable for use with the invention. An example of a suture material with the desirable physical characteristics in terms of strength and flexibility is O Prolene (polypropylene) manufactured by Ethicon. The suture is fed off a reel which holds approximately 48 inches of suture material, enough to place four separate suture loops. The suture is grasped by hand as the device is removed from the body cavity and cut-off using a standard surgical suture scissors at approximately 12 inches of length. By cutting the suture at the exit point of the suture needle, with the slide in the proximal position, the suture control mechanism is in the start position for repeated use.

[0052] There have been described and illustrated herein methods and instruments for suturing the wound caused by a trocar in laparoscopic or endoscopic surgery. While particular embodiments of the invention have been described, it is not intended that the invention be limited thereto, as it is intended that the invention be as broad in scope as the art will allow and that the specification be read likewise. It will therefore be appreciated by those skilled in the art that yet other modifications could be made to the provided invention without deviating from its spirit and scope as so claimed.

1. An apparatus for applying a suture to a wound, comprising:

- a) a central shaft having a proximal end and a distal end;
- b) an obturator coupled to the distal end of said shaft;
- c) a pair of hollow needles slidably coupled to said central shaft, each of said needles having a sharp end and being movable from a first position where said sharp ends are distant from said obturator to a second position where said sharp ends are close to said obturator;
- d) a suture control mechanism coupled to one of said needles for delivering suture material through the sharp end of the needle; and
- e) a snare control mechanism coupled to the other of said needles for delivering a snare through the sharp end of the needle.

2. An apparatus according to claim 1, further comprising:

- f) a skin pressure plate mounted on said shaft and movable relative to said obturator.

3. An apparatus according to claim 2, further comprising:

- g) a needle mounting plate secured to said skin pressure plate having a threaded split collar coaxially disposed on said central shaft; and

- h) a rotatable locking nut, wherein

said rotatable locking nut is threadably received on said split collar of said needle mounting plate and, upon tightening, locks said needle mounting plate and, in turn, said skin pressure plate to said central shaft.

4. An apparatus according to claim 1, wherein:

said obturator has a bulbous distal end and a pair of fascia stretching fins.

5. An apparatus according to claim 4, wherein:

said fascia stretching fins taper proximally.

6. An apparatus according to claim 4, wherein:

said fascia stretching fins terminate in a fascia supporting shelf.

7. An apparatus according to claim 2, wherein:

said skin pressure plate has a pair of skin stretching fins.

8. An apparatus according to claim 7, wherein:

said fins taper distally.

9. An apparatus according to claim 7, wherein:

the sharp ends of said needles pass through said fins.

10. A method for applying a suture to a trocar wound, said method comprising:

- a) inserting an obturator into the wound so that the wound is stretched;

- b) inserting a pair of hollow needles on opposite sides of the obturator;

- c) passing a snare through one of the needles;

- d) passing a suture through the other needle;

- e) capturing the suture with the snare; and

- f) withdrawing the needles with the suture and the snare.

11. The method according to claim 10, further comprising:

- g) prior to inserting the needles, placing a pressure plate on top of the wound, the pressure plate having skin stretching means for stretching the skin in a direction different to the direction stretched by the obturator.

12. The method according to claim 11, wherein:  
the pressure plate and the obturator stretch the skin in mutually orthogonal directions.
13. The method according to claim 11, wherein:  
the stretching of the skin allows the needles to penetrate the fascia and peritoneum of the abdominal wall.
14. The method according to claim 11, further comprising:  
h) removing the pressure plate; and  
l) removing the obturator.
15. An apparatus for applying a suture to a wound, comprising:  
a) an obturator;  
b) a pair of hollow needles, each of said needles having a sharp end and being movable from a first position where said sharp ends are distant from said obturator to a second position where said sharp ends are close to said obturator;  
c) a suture control mechanism coupled to one of said needles for delivering suture material through the sharp end of the needle; and  
d) a snare control mechanism coupled to the other of said needles for delivering a snare through the sharp end of the needle.
16. An apparatus according to claim 15, further comprising:  
e) a skin pressure plate movable relative to said obturator.
17. An apparatus according to claim 14, wherein:  
said obturator has a bulbous distal end and a pair of fascia stretching fins.
18. An apparatus according to claim 17, wherein:  
said fascia stretching fins taper proximally.
19. An apparatus according to claim 17, wherein:  
said fascia stretching fins terminate in a fascia supporting shelf.
20. An apparatus according to claim 16, wherein:  
said skin pressure plate has a pair of skin stretching fins.
21. An apparatus according to claim 20, wherein:  
said fins taper distally.
22. An apparatus according to claim 20, wherein:  
the sharp ends of said needles pass through said fins.

\* \* \* \* \*

专利名称(译)	闭合腹腔镜套管针穿刺伤的方法和仪器		
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发明人	POLLAK, STANLEY B. COSTABILE, ANTHONY D.		
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其他公开文献	US7320693		
外部链接	<a href="#">Espacenet</a> <a href="#">USPTO</a>		

#### 摘要(译)

用于将缝合线施加到套管针伤口的器械包括连接到中心轴的闭塞器和同轴设置的皮肤压力板。闭塞器和皮肤压力板可相对于彼此移动，并一起起作用以使组织和针相对于彼此定位。皮肤压力板设有两个间隔开的针引导件。保持在压力板的导向件中的一对空心针连接到针安装板，该针安装板可在中心轴上移动。其中一个针具有缝合线控制机构，用于使缝合线移动通过针，另一个针具有用于使圈套器通过针移动的圈套控制机构。

