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(21) International Application Number: PCT/IE93/00001 (22) International Filing Date: 7 January 1993 (07.01.93) (30) Priority data: 920037 7 January 1992 (07.01.92) IE (71)(72) Applicant and Inventor: LEAHY, Austin [IE/IE]; 59 Wesley Lawns, Dundrum, Dublin 16 (IE). (74) Agents: O'CONNOR, Donal, H. et al.; Cruickshank & Co., 1 Holles Street, Dublin 2 (IE). (81) Designated States: AT, AU, BB, BG, BR, CA, CH, DE, DE (Utility model), DK, DK (Utility model), ES, FI, GB, HU, JP, KP, KR, LK, LU, MG, MN, MW, NL, NO, PL, RO, RU, SD, SE, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, SN, TD, TG).		Published <i>Without international search report and to be republished upon receipt of that report.</i>
(54) Title: A SURGICAL DEVICE (57) Abstract A surgical device for the precise placement of a surgical instrument such as a suturing instrument with a body cavity during endoscopic surgery. The device (1) has a needle (2) with suture material (16) attached mounted at a free end (21) of a tubular holder (3). The holder (3) is in turn slidably mounted within a tubular carrier (4) which has a pointed body penetrating head (5) at one end and a handle (6) at its other end. A bore (7) passing through the carrier has an outlet opening (8) adjacent a tip of the head (5). With the needle (2) and holder (3) in a retracted position within the bore (7) the head (5) can be pushed through the body wall of a patient into a body cavity. Then by sliding the holder (3) within the bore (7) the needle is advanced out of the opening (8) ready for suturing within the body cavity.		

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- 1 -

"A Surgical Device"Introduction

This invention relates to a surgical device for use in minimal access and endoscopic surgery, and in particular to a suturing device for intracavitary suturing such as is
5 carried out in minimal access surgery or endoscopic surgery.

Minimal access and endoscopic surgery is now widely used for a number of operations as it is less painful, less disabling and more cosmetic for the patient than
10 conventional open surgical techniques. In endoscopic surgery small incisions are made for the introduction of ports which pass through the patient's skin into the body cavity within which surgery is to be carried out. The ports are typically cannulas of 5-10 mm diameter through
15 which surgical instruments are passed.

The suturing of tissues within the body cavity requires considerable technical proficiency on the part of the surgeon and is often a time consuming task. A needle with suturing material attached is grasped in a forceps and led
20 through a port into the body cavity. Within the cavity the needle is then gripped by a second forceps (inserted through a separate port) for suturing. It is necessary to grip the needle with the second forceps in a suitable orientation which facilitates suturing the internal
25 tissues. As the needle is relatively small it is easily dropped when transferring it to the second forceps and may be difficult to locate and pick up again. Also, as the second forceps grips the needle, the needle can turn out of position and it may be necessary to manipulate the
30 needle between the two forceps for some time to correctly position the needle on the second forceps for presentation

- 2 -

to the tissues for suturing. In carrying out this necessary manipulation of the needle within the body cavity there is an increased risk of damaging viscera adjacent the tissues to be sutured. Further, the suture material within the body cavity can become entangled or even knotted as the needle is manipulated within the cavity by the forceps.

It is an object of the present invention to provide a suturing device which overcomes these problems.

10 A further object of the invention is to provide a suturing device which facilitates the introduction of suture material into a body cavity and its presentation in a proper orientation for fine suturing.

15 The term "suture material" as used in this patent specification includes suture thread, staples or any other device or materials used for anastomosing or ligating tissues.

Statements of Invention

20 According to the invention, there is provided a surgical device for placement and operation of an instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, the carrier having means for carriage of an instrument through an opening created by the penetrating head, and means for movement of the instrument relative to the carrier between a retracted stored position and an extended in-use position.

30 In one embodiment of the invention there is provided a surgical device for placement and operation of an

- 3 -

instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, and an instrument carried by the carrier for
5 passage through an opening created by the penetrating head and movable relative to the carrier between a retracted stored position and an extended in-use position.

Advantageously, the device according to the invention allows the accurate placement of an instrument within a
10 body cavity relatively quickly and easily and in a desired orientation for operation of the instrument within the cavity.

In a particularly preferred embodiment of the invention the device is a suturing device for placement and
15 operation of a suturing instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, the carrier having means for carriage of a suturing instrument through an opening
20 created by the penetrating head, and means for movement of the suturing instrument relative to the carrier between a retracted stored position and an extended in-use position.

Advantageously, the suturing device of the invention allows the suturing of tissues within a body cavity in a
25 relatively simple, quick and accurate manner. Conveniently, the device facilitates the introduction of suturing material into the body cavity and its presentation in a proper orientation for fine suturing. The surgeon advantageously has good control as the
30 suturing instrument can be controlled by manipulating the device from outside the patients body. A further advantage is that a separate cannula is not required for insertion of the device into the body cavity. Further, the outer

- 4 -

diameter of the carrier can be sized such that entry holes made by the carrier in the body wall will be small enough such that they do not require stitching when the carrier is removed.

- 5 In another embodiment the carrier has a bore in the head for reception of the instrument which is movable between a retracted stored position housed within the carrier bore and an extended position extending outwardly of the bore.

10 Thus, the instrument is conveniently protected on the carrier during the insertion of the carrier through the body wall and can be readily easily presented for use once within the body cavity.

Preferably, the instrument is detachably securable to the carrier.

- 15 In a particularly preferred embodiment the device including a holder for mounting the instrument on the carrier, the holder engagable with the carrier for movement of the instrument between the retracted stored position and the extended in-use position. Preferably, the
20 carrier bore extends through the carrier between the head and the rear end of the carrier and the holder is movable through the bore. Conveniently, the holder is slidably engagable within the bore. The holder advantageously allows the carriage of a relatively small needle on the
25 carrier in a secure and controllable manner.

In another embodiment the holder has a hand grip at one end which projects outwardly of a rear end of the carrier. Thus it can be readily easily gripped for movement within the bore.

- 5 -

In a further embodiment the holder has a free end opposite the hand grip with means to support a suturing needle, a suture feed passage extending through the holder between the free end and the hand grip.

- 5 In another embodiment the instrument is releasably engageable with the holder. Preferably, the instrument and holder are releasably engageable by means of complementary interengagable formations on the instrument and the holder. Conveniently, the formations comprise a male
10 spigot part and a complementary female socket part, one part formed on the instrument and the other part formed on the holder.

- 15 In a particularly preferred embodiment, a socket is formed at the free end of the holder for reception of a rear end of a suturing needle which is a push fit into engagement with the socket. Thus, the needle is held securely for suturing tissues within the body cavity and the needle can then be readily easily released from the holder for tying the sutures.

- 20 In another embodiment a locking means is provided for locking the instrument on the carrier. Preferably, the locking means is operable to lock the instrument in a fully extended position. Thus the holder can be firmly held on the carrier for accurate and precise manipulation
25 of the needle for suturing.

In a further embodiment the locking means comprises complementary releasably interengagable formations on the holder and the carrier.

- 30 In another embodiment the locking means is a Luer lock having a male part and a complementary female part, one

- 6 -

part being provided on the holder and the other part on the carrier.

Preferably, the locking means is provided adjacent a rear end of the carrier bore.

- 5 In a further embodiment the carrier has stop means engagable with the instrument to define a fully extended position for the instrument. Conveniently, the stop means is a stop land within the bore engagable by the holder when the instrument is in a fully extended position.
- 10 Preferably, a hand grip is provided on an exterior of the carrier at a rear end of the carrier remote from the head to facilitate manipulation of the carrier.

- 15 In a particularly preferred embodiment the instrument is a suturing instrument. The suturing instrument may be a suturing needle with a length of suture material attached there. In another embodiment the instrument is a surgical stapler.

- 20 In another aspect the invention provides a method for the placement and operation of an instrument within a body cavity during minimal access or endoscopic surgery using a surgical device as previously described, comprising mounting the instrument in a stored position, inserting the carrier through a body wall of the patient into the body cavity, moving the instrument into an extended in-use position projecting outwardly of the head of the carrier,
- 25 and operating the instrument within the body cavity by external manipulation.

- 30 In one embodiment of this aspect the invention provides a method for suturing tissues within a body cavity in minimal access or endoscopic surgery using a suturing

- 7 -

device as previously described, comprising mounting a suturing instrument in a stored position, inserting the head of the carrier through a body wall of the patient into the body cavity, moving the suturing instrument into an extended in-use position projecting outwardly of the head of the carrier, and suturing tissues within the body cavity by external manipulation of the suturing instrument.

Preferably, the suturing instrument is a needle with a length of suture material attached thereto, and the suturing is carried out by passing the needle through the tissues to be joined within the body cavity, gripping a free end of the needle with an instrument introduced to the cavity through a separate port, detaching the needle from the carrier, pulling the suture material through the tissues with the needle, grasping the other end of the suture material and tying the suture material.

In a still further aspect the invention provides an intracavitary suturing instrument comprising an elongate suture thread applicator having a pointed head and means for holding suture thread. Preferably, the applicator is a needle having an elongate body terminating in the pointed head. In another embodiment the needle body has a suture thread receiving slot. The slot may extend between the head and an opposite rear end of the body. In one embodiment, the slot is generally U-shaped. In another embodiment the slot is tubular.

In another embodiment the applicator is of two-part construction, comprising a needle detachably mounted on an associated holder. Ideally the holder is tubular for free passage of suture material to the needle which is mounted at an end of the holder.

- 8 -

Detailed Description of the Invention

The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying
5 drawings, in which:-

Fig. 1 is an elevational view of a suturing device according to the invention;

Fig. 2 is a view similar to Fig. 1 showing a suturing
10 instrument portion of the device in an extended working position;

Fig. 3 is a sectional view taking along the line III-III of Fig. 1;

Fig. 4 shows a needle and thread of the suturing instrument;

Fig. 5 is an elevational view of a needle holder
15 portion of the device;

Fig. 6 is an elevational view showing the needle mounted on the needle holder;

Fig. 7 is an enlarged sectional elevational view of the
20 needle and needle holder assembly of Fig. 6;

Fig. 8 is an elevational view of a carrier portion of the device on which the needle and needle holder assembly of Fig. 6 is mounted;

Figs. 9 and 10 are diagrammatic illustrations of the
25 instrument in use for suturing tissues within a body cavity;

- 9 -

Fig. 11 is an elevational view of a suturing needle according to another embodiment of the invention;

5 Fig. 12 is a diagrammatic illustration of a body cavity within which are located tissues which are to be sutured;

Figs. 13 and 14 are diagrammatic illustrations of the body cavity illustrating suturing with the needle of Fig. 11;

10 Fig. 15 to 17 are elevational views of suturing needles according to other embodiments of the invention;

Fig. 18 is a sectional view of another suturing needle according to a further embodiment of the invention;

Fig. 19 is a elevational view a suturing instrument according to another embodiment of the invention;

15 Fig. 20 is a diagrammatic illustration of a body cavity similar to that shown in Fig. 14 showing suturing of the tissues with the suturing instrument of Fig. 19;

Fig. 21 is another suturing instrument according to the invention; and

20 Fig. 22 is a detailed sectional elevational view of another suturing device similar to the one shown in Figs. 1 - 10.

Referring to the drawings, and initially to Figs 1 to 10 thereof, there is shown a suturing device according to the invention indicated generally by the reference numeral 1.
25 The device 1 is of three-part construction having a

- 10 -

suturing needle 2 mounted at one end of a tubular holder 3 which in turn is housed within an associate tubular carrier 4. The carrier 4 has a pointed body penetrating head 5 at one end and a handle 6 at its other end. A bore 7 passes through the carrier 4 between the handle 6 and the head 5 having an outlet opening 8 adjacent across the head 5. The holder 3 is slidably mounted within the bore 7 and is moveable between a retracted position (Fig 1) in which the needle 2 is housed within the carrier 4 and an extended position (Fig 2) in which the needle 2 extends outwardly through the opening 8 in the head 5 of the carrier 4 for suturing.

In more detail, Fig 4 shows the needle 2 with a suture 16 attached. In Fig. 5 the needle holder 3 is shown and comprises an elongate hollow metal tube 20 with a free end 21 for carrying the needle 2 and hand grips 22 at its other end. Fig. 6 shows the needle 2 mounted at the free end 21 of the tube 20 of the holder 3 with the suture 16 passing ^{along} a suture feed passage 23 passing through the tube 20 and handle 21. The mounting of the needle 2 on the holder 3 is shown more clearly in Fig. 7. A spigot 30 at a rear end of the needle 2 is a push fit into a socket 31 formed at the free end 21 of the tube 20. Thus the needle 2 is securely held by the holder 3 for suturing 3 and can be released from the holder 3 by pulling it out of the socket 31 drawing a suture material 16 with it through the suture feed passages 23.

Fig. 8 shows the carrier 4 which comprises an elongate metal tube 25 with a free end forming the head 5 curved to match the needle shape and a plastic handle 15 at its other end. The tube 25 should be at least 14 gauge as it must be firm for penetration of the body wall of a patient.

- 11 -

It will be noted that the bore 7 of the carrier 4 is stepped, having a narrowed portion 35 within the tube 25 and a widened portion 36 within the handle 6. The tube 20 of the holder 3 is a snug sliding fit within a narrowed portion 35 of the bore 7 and the hand grip 22 of the holder 3 is a smooth sliding fit within an widened portion 36 of the bore 29. An annular shoulder 37 forming a transition between the two bore portions 35, 36 forms a stop against which an inner end 38 of the handle 21 of the holder 3 engages when the needle 2 is in the extended position shown in Fig. 2.

Figs. 9 and 10 show the device 1 in use extending through a body wall 9 (typically comprising skin, fat and muscle) of a patient into a body cavity 10 within which are located tissues 11, 12 which are to be sutured.

In use (see Figs. 9 and 10), with the holder 3 in the retracted position, the carrier 4 can be inserted through the body wall 9 of a patient into the body cavity 10. Then by sliding the holder 3 within the carrier 4 into the extended position (Fig. 10) the needle 2 is extended out of the carrier 4 and can be used to transfix tissues 11, 12 within the body cavity 10. Advantageously, the needle can be manoeuvred from outside the patients body by manipulating the handle 6 of the carrier 4. Once through the tissues 11, 12 the needle 2 is grasped by a forceps introduced through a separate port and removed from the holder 3 and pulled out the separate port (not shown) which also extends into the cavity 10. The carrier 4 is then withdrawn and the free end of the suture 16 carried by the needle 2 is grasped and pulled out the same port for an extra- corporeal tie.

It will be noted that the suturing device according to the invention has a number of advantages. A separate cannula

- 12 -

is not required for insertion of the suturing device. Also if the carrier is made such that the tube of the carrier has an outer diameter of approximately 3 mm then there will be no need to sew up the entry holes made by the device when it is inserted into the body cavity as these are small enough to heal themselves. This is particularly important where a large number of sutures have to be inserted in the tissues. The device also allows very fine manipulation and good control of the needle within the body cavity. The needle can be presented accurately to the tissues and firmly held until the tissues are transfixed and then the needle is easily detached from the holder. Further, the device is easy to position, the surgeon can position the device outside the body and then penetrate the body wall into the cavity at an ideal angle for the required suturing.

It will be noted that various needle shapes can be used including straight and curved and the head of the carrier will be provided in a corresponding shape. Various different ways of mounting the needle on the holder are possible. It is also envisaged other types of instruments, such as staplers, forceps, oclifibres and the like may be mounted on a carrier for introduction to the body cavity in similar fashion to the suturing instrument.

Referring now to Figs. 11 to 14 there is illustrated a suturing needle according to another embodiment of the invention indicated generally by the reference numeral 50. The needle 50 has a thin elongate body 52 terminating in a pointed head 53. Immediately behind the head 53 is an eye 54 for attachment of suture thread 55.

Referring now to Fig. 12 there is diagrammatically illustrated portion of a body cavity 10 within which there are tissues 11, 12 to be sutured. The tissues 11, 12 are

- 13 -

located behind layers of muscle 14, fat 15 and skin 16 which form a body wall of the patient

In use, the needle 50 is threaded with suture thread 55 and inserted through the layers of skin 16, fat 15 and muscle 14 into the cavity 10 as shown in Fig. 13. The tissues 11, 12 are transfixed by the needle 50 and the suture thread 55 drawn through the tissues 11, 12. The needle 50 is withdrawn and the ends of the suture thread 55 are then available for knot tying.

Referring now to Fig. 15 there is illustrated another needle 60 having an elongate body 61 with a head 62 and means for attachment of suture thread 63 at the head 62. Use of the needle 60 is similar to that described previously for the needle of Figs. 11 to 14.

Fig. 16 shows another alternative construction of needle 65 having an elongate body 66 with a pointed head 67. Means for attachment of suture thread 68 is provided at a rear end 69 of the body 66. Again use of the needle 65 is similar to that described previously for the needle of Figs. 11 to 14.

Fig. 17 shows another needle 70 having a tubular body 71. A needle 72 is provided at one end of the body 71 and suture thread 73 is delivered through the body 71 to the needle 72. Again use of the needle 70 is similar to that for the needle of Figs. 11 to 14.

Fig. 18 is a sectional view of a needle 75 similar to that shown in Fig. 17. In this case the needle 75 has a body 76 with a U-shaped slot 77 extending along at least a portion of the body 76 with a side entry opening 78 for suture thread 79.

- 14 -

Referring now to Fig. 19 there is illustrated another suturing instrument indicated generally by the reference numeral 80. The instrument 80 is of two-part construction comprising a needle 81 detachably mounted on an associated
5 elongate tubular holder 82. Suture thread 84 can be passed through the body 82 for attachment at a rear end 85 of the needle 81.

Fig. 20 shows a body cavity similar to that shown in Fig. 14 and like parts are assigned the same reference
10 numerals.

In use, the needle 80 is inserted through the skin 16, fat 15 and muscle 14 into the cavity 10. The tissues 11, 12 are transfixated by the needle 81 and then the holder 82 is detached from the needle 81 and removed from the cavity
15 10. The needle 81 can then be manipulated within the cavity 10 for continuous of pursestring suturing of the tissues 11, 12 by an intracavitary technique.

Referring now to Fig. 21 there is illustrated another suturing instrument 90 largely similar to the suturing
20 instrument of Fig. 19. The suturing instrument 90 has a tubular holder 91 with a needle 92 mounted at one end of the holder 91. Suture thread 93 is fed through the holder 91 to a head 94 of the needle 92. Use of the device 90 is similar to that described previously for the device of
25 Fig. 19.

It will be appreciated that the various needles described above are for simplicity illustrated as straight needles. However, the needles may be any other suitable shape - such as curved or angled.

30 Referring now to Fig. 22 there is illustrated portion of another suturing device 100 which is largely similar to

- 15 -

the suturing device shown in Figs. 1 to 10 and like parts are assigned the same reference numerals. In this case, a Luer lock is provided within the handle 6 of the device 100. The Luer lock comprises a male part formed by an inner end of the hand grip 22 of the holder 3 having thread projections 102 for complementary interengagement with a female threaded portion 103 at an inner end of the widened portion 36 of the bore 7. The Luer lock can be engaged when the needle is in the extended position to firmly lock the holder 3 on the carrier 4.

It will be appreciated that the instruments according to the invention will facilitate suturing inside any cavity. They allow a suture to be inserted through the skin, into the cavity. It can then be manipulated from without the cavity, allowing precise placement of the suture in the tissues. The suture can then be tied by an intracavitary or extracavitary technique and cut, or alternatively, a continuous or pursestring suture commenced. They are particularly useful in performing herniorrhaphy, to anastomose hollow viscera such as in a bowel resection, to control haemorrhage, and to suture the stomach wrap in a fundoplication for hiatus hernia.

Advantageously the devices are easy to use and facilitate speed and precision. It will be appreciated that hand manipulation outside of the cavity enhances the ease of the surgical procedures. Avoiding the need for introducing extra endoscopic ports, or manipulation of sutures/needles within the abdomen will speed up the technique of suturing. Further the devices facilitate more accurate and precise suturing within cavities, thus reducing the risk of damage to adjacent viscera.

- 16 -

The invention is not limited to the embodiments hereinbefore described which may be varied in construction and detail.

CLAIMS

1. A surgical device for placement and operation of an instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, the carrier having means for carriage of an instrument through an opening created by the penetrating head, and means for movement of the instrument relative to the carrier between a retracted stored position and an extended in-use position.
2. A device as claimed in claim 1, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, and an instrument carried by the carrier for passage through an opening created by the penetrating head and movable relative to the carrier between a retracted stored position and an extended in-use position.
3. A device as claimed in claim 1 or 2 wherein the device is a suturing device for placement and operation of a suturing instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, the carrier having means for carriage of a suturing instrument through an opening created by the penetrating head and means for movement of the suturing instrument relative to the carrier between a retracted stored position and an extended in-use position.

- 18 -

4. A device as claimed in any preceding claim wherein the device is a suturing device for placement and operation of a suturing instrument within a body cavity, comprising an elongate carrier having a body penetrating head at one end for penetrating through a body wall of a patient into the body cavity, and a suturing instrument carried by the carrier for passage through an opening created by the penetrating head and movable relative to the carrier between a retracted stored position and an extended in-use position.
5. A device as claimed in any preceding claim wherein the carrier has a bore in the head for reception of the instrument which is movable between a retracted stored position housed within the carrier bore and an extended position extending outwardly of the bore.
6. A device as claimed in any preceding claim wherein the instrument is detachably securable to the carrier.
7. A device as claimed in any preceding claim including a holder for mounting the instrument on the carrier the holder engagable with the carrier for movement of the instrument between the retracted stored position and the extended in-use position.
8. A device as claimed in claim 7 wherein the carrier bore extends through the carrier between the head and the rear end of the carrier and the holder is movable through the bore.

- 19 -

9. A device as claimed in claim 8 wherein the holder is slidably engagable within the bore.
10. A device as claimed in claim 8 or 9 wherein the holder has a hand grip at one end which projects outwardly of a rear end of the carrier.
11. A device as claimed in any of claims 7 to 10 wherein the holder has a free end opposite the hand grip with means to support a suturing needle, a suture feed passage extending through the holder between the free end and the hand grip.
12. A device as claimed in any of claims 7 to 11 wherein the instrument is releasably engageable with the holder.
13. A device as claimed in claim 12 wherein the instrument and holder are releasably engageable by means of complementary interengagable formations on the instrument and the holder.
14. A device as claimed in Claim 13 wherein the formations comprise a male spigot part and a complementary female socket part, one part formed on the instrument and the other part formed on the holder.
15. A device as claimed in claim 14 wherein a socket is formed at the free end of the holder for reception of a rear end of a suturing needle which is a push fit into engagement with the socket.
16. A device as claimed in any preceding claim wherein a locking means is provided for locking the instrument on the carrier.

- 20 -

17. A device as claimed in claim 16 wherein the locking means is operable to lock the instrument in a fully extended position.
- 5 18. A device as claimed in claim 16 to 17 wherein the locking means comprises complementary releasably interengagable formations on the holder and the carrier.
- 10 19. A device as claimed in any of claims 16 to 18, wherein the locking means is a luer lock having a male part and a complementary female part, one part being provided on the holder and the other part on the carrier.
- 15 20. A device as claimed in any of claims 16 to 19, wherein the locking means is provided adjacent a rear end of the carrier bore.
21. A device as claimed in any preceding claim wherein the carrier has stop means engagable with the instrument to define a fully extended position for the instrument.
- 20 22. A device as claimed in claim 21 wherein the stop means is a stop land within the bore engagable by the holder when the instrument is in a fully extended position.
- 25 23. A device as claimed in any preceding claim wherein a hand grip is provided on an exterior of the carrier at a rear end of the carrier remote from the head.

- 21 -

24. A device as claimed in any preceding claim wherein the instrument is a suturing instrument.
25. A device as claimed in claim 24 wherein the
5 suturing instrument is a suturing needle with a length of suture material attached thereto.
26. A device as claimed in claim 24 wherein the instrument is a surgical stapler.
27. A method for the placement and operation of an
10 instrument within a body cavity during minimal access or endoscopic surgery using a device as claimed in any preceding claim, comprising mounting the instrument in a stored position, inserting the carrier through a body wall of the patient into the body cavity, moving the
15 instrument into an extended in-use position projecting outwardly of the head of the carrier, and operating the instrument within the body cavity by external manipulation.
28. A method for suturing tissues within a body cavity
20 in minimal access or endoscopic surgery using a device as claimed in any of claims 3 to 23, comprising mounting a suturing instrument in a stored position, inserting the head of the carrier through a body wall of the patient into
25 the body cavity, moving the suturing instrument into an extended in-use position projecting outwardly of the head of the carrier, and suturing tissues within the body cavity by external manipulation of the suturing instrument.
- 30 29. A method as claimed in claim 28 wherein the suturing instrument is a needle with a length of

- 22 -

5 suture material attached thereto, and the suturing is carried out by passing the needle through the tissues to be joined within the body cavity, gripping a free end of the needle with an instrument introduced to the cavity through a separate port, detaching the needle from the carrier, pulling the suture material through the tissues with the needle, grasping the other end of the suture material and tying the suture material.

10 30. An intracavitary suturing instrument comprising an elongate suture thread applicator having a pointed head and means for holding suture thread.

15 31. A suturing instrument as claimed in claim 30 wherein the applicator is a needle having an elongate body terminating in the pointed head.

32. A suturing instrument as claimed in claim 31 wherein the needle body has a suture thread receiving slot.

20 33. A suturing instrument as claimed in claim 32 wherein the slot extends between the head and an opposite rear end of the body.

34. A suturing instrument as claimed in claim 33 wherein the slot is generally U-shaped.

25 35. A suturing instrument as claimed in claim 33 wherein the slot is tubular.

36. A suturing instrument as claimed in claim 30 wherein the applicator is of two-part construction comprising a needle detachably mounted on a holder.

- 23 -

37. A suturing instrument as claimed in claimed 36 wherein the holder is tubular for free passage of suture material to the needle which is mounted at an end of the holder.

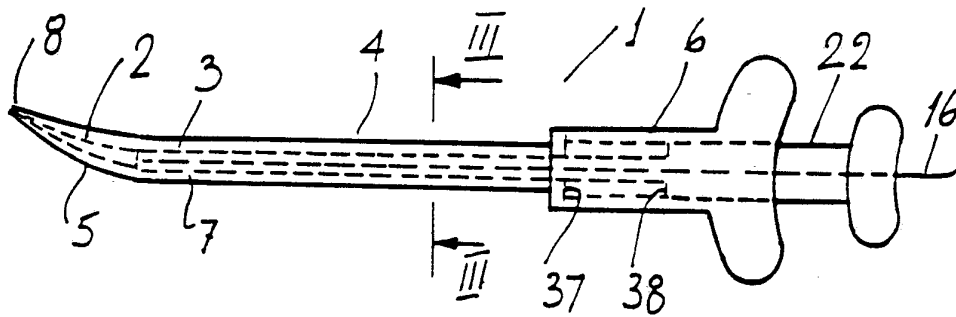


Fig. 1

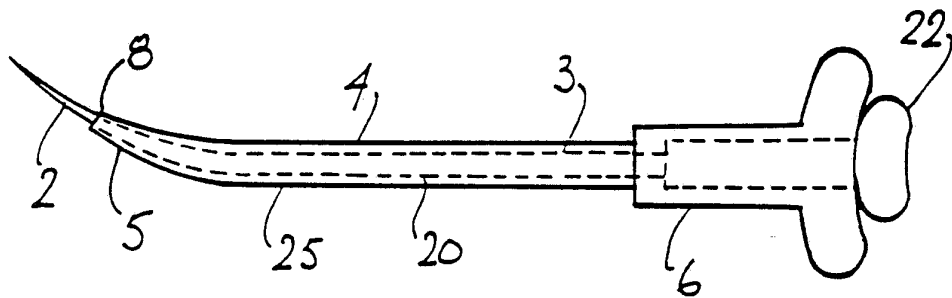


Fig. 2

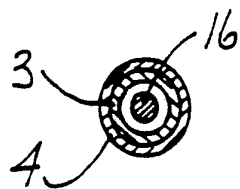


Fig. 3



Fig. 4

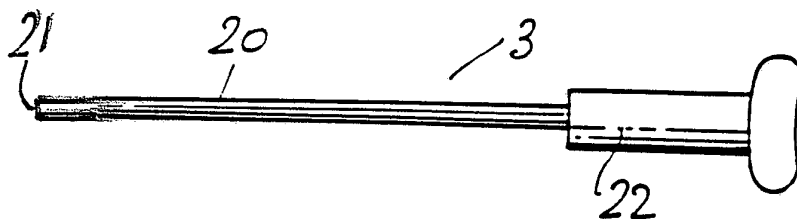


Fig. 5

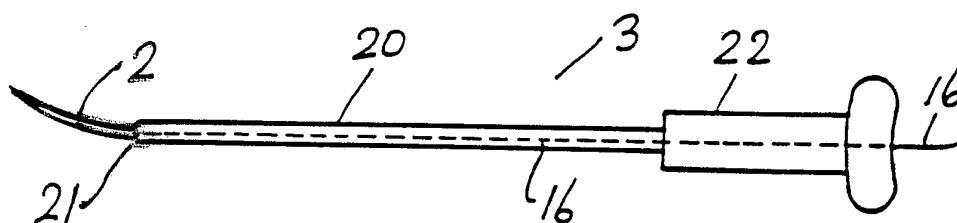


Fig. 6

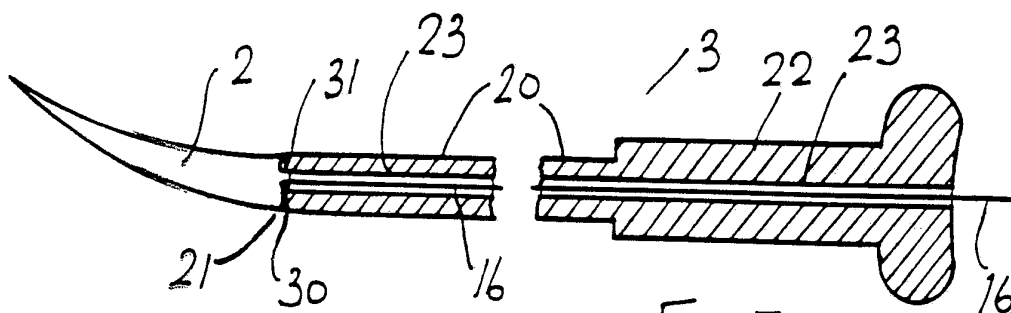


Fig. 7

3 / 6

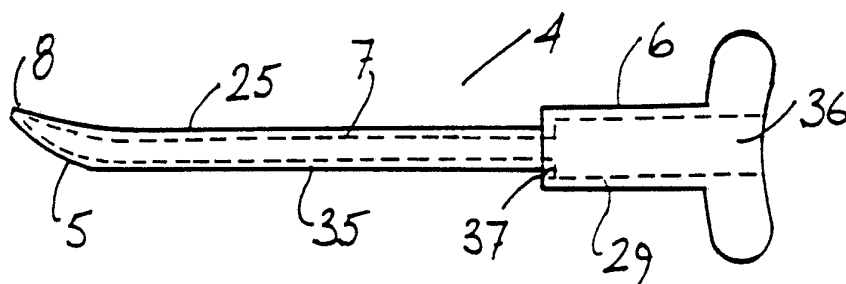


Fig. 8

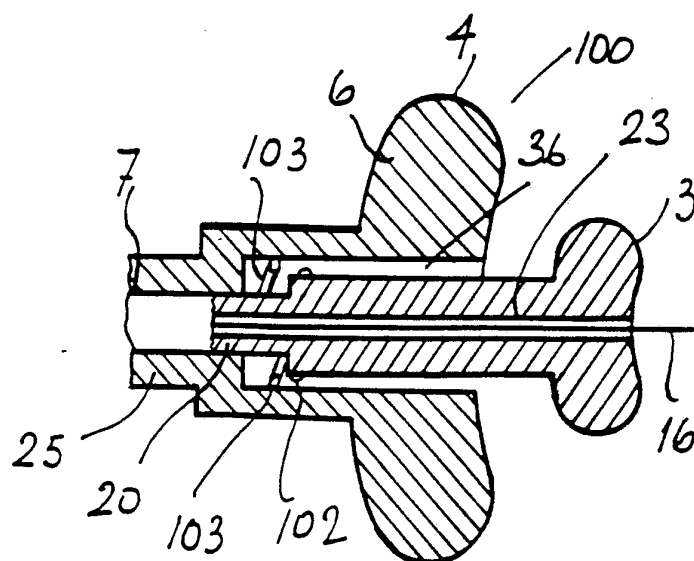


Fig. 22

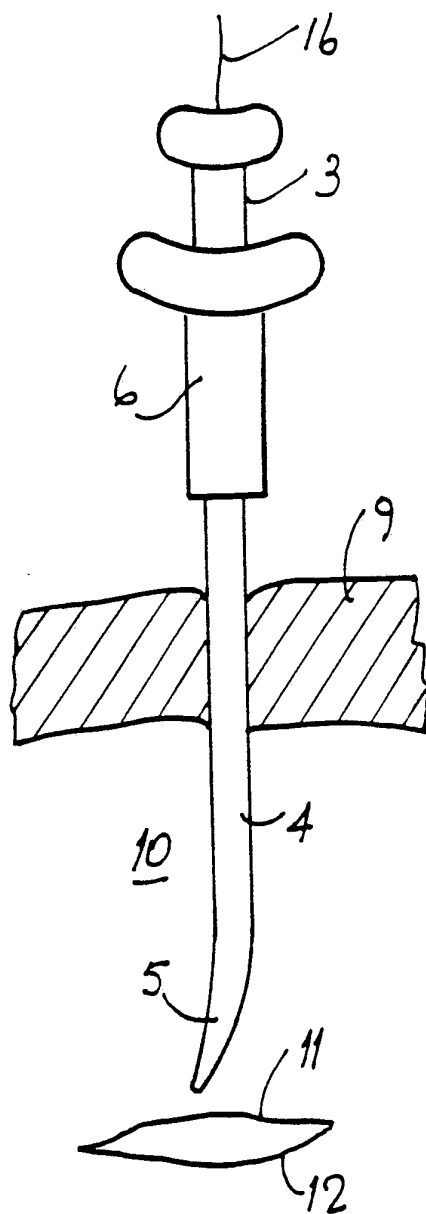


Fig. 9

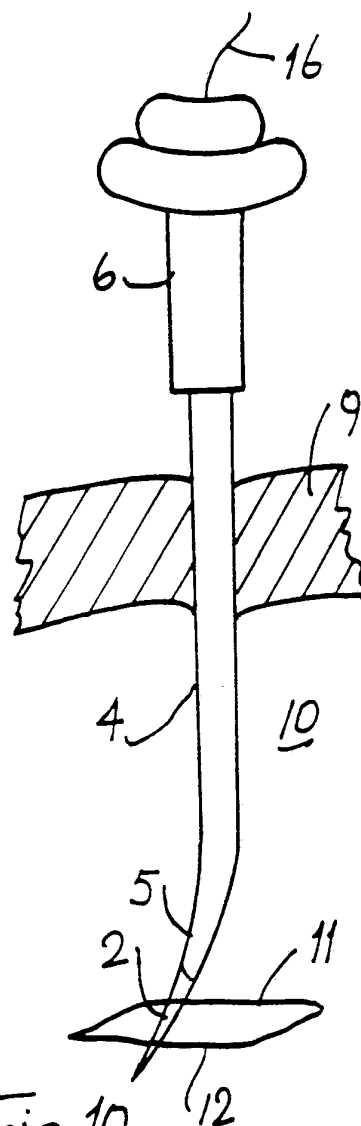


Fig. 10

5/6

