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(54) Title: LAPAROSCOPIC GUIDE

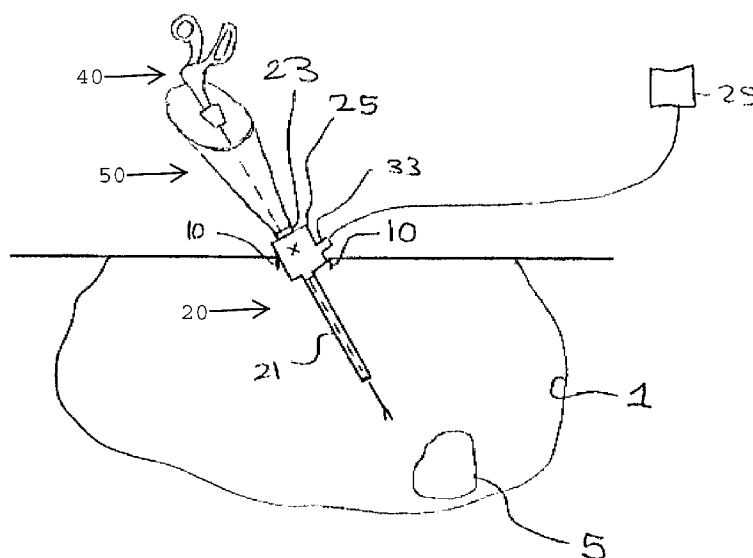


Fig. 1

(57) Abstract: A laparoscopic guide comprises a hollow body having a longitudinal mid-plane and a cross sectional area that tapers from a proximal end to a distal end thereof. The distal end has a distal end face being oriented substantially perpendicular to the longitudinal mid-plane. The distal end face is adapted for communication with an inlet of a trocar port. The proximal end is adapted for receiving a laparoscopic surgical instrument or the like therein prior to the laparoscopic surgical instrument passing through the trocar port. The proximal end comprises an open end face that is oriented obliquely relative to the distal end face.



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LAPAROSCOPIC GUIDE

Field

[0001] The invention relates to a laparoscopic guide for use in the field of laparoscopic surgery and to a method of guiding a laparoscopic surgical instrument or the like.

Background

[0002] Laparoscopic surgery is a form of keyhole surgery in which operations are performed at an operation site, generally in the abdominal cavity or pelvic cavity of a patient, via one or more small incisions that are located some distance from the operation site. A laparoscope is used to relay an image of the operation site to a display screen so that the surgeon performing the laparoscopic surgery can view the operation site as he conducts the surgery. The surgeon typically manipulates the laparoscope and a number of laparoscopic surgical instruments, tools or the like, through the incisions for use in performing the surgery at the operation site. The instruments and tools are each engaged through a trocar that is positioned in an incision and which provides a means of holding the instrument or tool in place in the incision and in the abdominal or pelvic cavity. In general, the trocar comprises a trocar port at a proximal end and a cannula extending distally therefrom. During surgery, the trocar port rests above the incision and provides access for the instrument and/or tool into the cannula which extends to the operation site.

[0003] Laparoscopic surgery is increasing in popularity due to the advantages it can provide to the patient in terms of a smaller post-surgical physical scar, pain reduction and swifter recovery time in comparison with open surgery. However, the surgeon has to manipulate one or more of the laparoscopic surgical instruments and tools during the surgery, which requires dexterity and precision, particularly when it is required to remove one instrument from the trocar and replace it with another instrument or tool. The surgeon must watch the operation site on a display screen associated with the laparoscope whilst simultaneously removing or engaging a surgical instrument quickly and efficiently. The laparoscopic surgical instruments and tools typically include surgical scissors, forceps and suckers/irrigators that are elongate and narrow in their general shape. The trocar port typically has a small aperture in which the instruments and tools are received. Although it is important for instruments and tools to be inserted in the trocar port in

a timely and efficient manner during surgery, it can be difficult to quickly find the small aperture of the trocar port with the instrument or tool. The trocar port also has a tendency to move as the laparoscopic surgical instrument is removed therefrom, meaning that the surgeon must reposition it to continue the surgery. This creates further inefficiency in the surgical procedure.

[0004] Laparoscopic techniques are improving, however increasingly challenging cases are being faced by surgeons in terms of body habitus (fat) and pathology (larger, more inflamed cases). There is therefore also a need to improve the ease of surgical procedure and the outcome for challenging cases.

Object of Invention

[0005] It is the object of the present invention to substantially overcome or at least ameliorate one or more of the above disadvantages or to substantially meet the above need.

Summary of Invention

[0006] According to a first aspect of the invention, there is disclosed herein a laparoscopic guide comprising a hollow body having a longitudinal mid-plane and a cross sectional area that tapers from a proximal end to a distal end thereof, the distal end having a distal end face being oriented substantially perpendicular to the longitudinal mid-plane, the distal end face being adapted for communication with an inlet of a trocar port, and the proximal end being adapted for receiving a laparoscopic surgical instrument or the like therein prior to the laparoscopic surgical instrument passing through the trocar port, wherein the proximal end has an open end face that is arranged obliquely relative to the distal end face.

[0007] The obliquely oriented open end face is thus advantageously larger than would be the case if the opening was parallel to the distal end face, providing a large area into which the surgical instrument or tool can be engaged. The tapering of the hollow body towards the distal end easily guides the surgical instrument into the trocar and the surgeon is able to manipulate the surgical instrument through a wide range of movement at the proximal open end face to achieve the desired positioning of the surgical instrument at the operation site. Furthermore, the oblique slant of the open end face of the laparoscopic guide maximises access to the trocar without limiting the reach of the surgeon when engaging the surgical instrument into the trocar.

[0008] Preferably, the hollow body has a generally conical or part conical shape. In an embodiment, the hollow body is radially symmetrical about a longitudinal axis thereof. In an alternative embodiment, the hollow body is radially asymmetrical about the longitudinal axis.

[0009] Preferably, the longitudinal mid-plane is a horizontal mid-plane and an angle subtended by a plane defined by the open end face of the proximal end and the horizontal mid-plane is 45 degrees or less. More preferably, the angle is 30 degrees or less. In an embodiment, the angle is 5 degrees or less.

[0010] Preferably, the distal end of the laparoscopic guide is engageable with an inlet portion of a trocar port. In an embodiment, the distal end is engageable by a push fit with the inlet end of the trocar port. Alternately, the distal end is engageable with the inlet of the trocar port via a quick release mechanism, for example a simple releasable clip and recess mechanism.

[0011] In an alternative embodiment, the distal end of the laparoscopic guide is formed integrally with an inlet portion of the trocar port.

[0012] According to a second aspect of the invention, a method of guiding a laparoscopic surgical instrument or the like into an inlet of a trocar port comprises engaging the laparoscopic surgical instrument or the like into the open end face of the proximal end of a laparoscopic guide as described above and thereafter engaging the laparoscopic surgical instrument or the like into the trocar port.

Brief Description of Drawings

[0013] Preferred embodiments of the present invention will now be described, by way of examples only, with reference to the accompanying drawings, wherein:

[0014] Figure 1 is a schematic cross-sectional representation of a laparoscopic guide attached to a trocar *in situ* at an operation site;

[0015] Figure 2 is a side view of a typical trocar comprising a trocar port and cannula;

[0016] Figure 3 is a schematic cross-sectional view of the trocar port and cannula of Figure 2;

[0017] Figure 4 is a schematic enlarged view of the laparoscopic guide fitted to the trocar port of Figures 2 or 3;

[0018] Figure 5 is an enlarged view of an embodiment of the laparoscopic guide fitted to the trocar port of Figures 2 or 3 with a push fit attachment;

[0019] Figures 6a to 6c show schematic cross-sectional views of embodiments of the laparoscopic guide of Figure 1;

[0020] Figure 7 is an enlarged view of a further embodiment of the laparoscopic guide fitted to the trocar port with a quick release attachment; and

[0021] Figure 8 is a schematic representation of a still further embodiment of a laparoscopic guide that is formed integrally with the trocar port.

Description of Embodiments

[0022] Throughout the disclosure herein, as is traditional when referring to relative positioning on a surgical instrument, the term “proximal” refers to the end which is closer to the surgeon and the term “distal” refers to the end which is further away from the surgeon.

[0023] Figure 1 shows a schematic representation of a laparoscopic surgery taking place at an operation site 5 in the abdominal cavity 1 of a patient. An incision 10 has been made in the patient's abdomen. A trocar 20 is engaged into the abdominal cavity 1 via the incision 10. The trocar 20 has a trocar port 25 at a proximal end thereof and an elongate cannula 21 extending distally therefrom. As shown in Figure 1, the trocar port 25 rests above the incision 10 and the cannula 21 extends into the abdominal cavity 1. The trocar port 25 is shown more clearly in Figures 2 and 3. The trocar port 25 has a plastic body having a central conduit 26 extending from an inlet end 27 to an outlet end 28 thereof. The conduit 26 includes a valve (not shown) therein that is designed to create a seal around a laparoscopic surgical instrument or the like, for example surgical scissors 40, engaged into the trocar port 25 during a surgical procedure. The valve seals the outlet end 28 of the port 25 from the atmosphere during the laparoscopic surgical

procedure. The trocar port 25 includes a shallow plastic inlet portion 23 at a proximal end thereof, having a concaved surface 23a that includes an inlet aperture 24 at a centre thereof. The inlet aperture 24 is in communication with the conduit 26 for admission of the surgical scissors 40 or the like into the trocar port 25, through the valve and thereafter into the trocar cannula 21 and into the abdominal cavity 1.

[0024] A CO₂ port 33 extends from one side of the trocar port 25. The CO₂ port 33 is in fluid communication with a CO₂ conduit 34 that extends from the CO₂ port 33 and through the plastic body of the trocar port 25 to the outlet end 28 thereof. The CO₂ conduit 34 is also in fluid communication with the trocar cannula 21. During a laparoscopic procedure, a CO₂ supply 29 is connected to the CO₂ port 33 for providing CO₂ to the abdominal cavity 1. The abdominal cavity 1 is insufflated with the carbon dioxide gas in order to maintain the abdominal cavity wall away from the operation site 5. This creates a working and viewing area around the operation site 5 within the abdominal cavity 1, remote from the incision 10. The valve, in sealing the outlet end 28 of the trocar port 25 from the atmosphere, prevents the egress of CO₂ gas from the trocar port 25 to the atmosphere during the laparoscopic surgical procedure.

[0025] A laparoscopic guide 50 is attached to the inlet portion 23 of the trocar port 25 for guiding the surgical scissors 40 or other surgical instrument or laparoscopic tool into the inlet aperture 24 of the concaved surface 23a of the trocar port 25 and through the cannula 21. In the embodiments of Figures 1 and 4 to 8 shown herein, the laparoscopic guide 50 has a generally conical, or funnel, shaped elongate hollow body 52. The hollow body 52 tapers from the proximal end 55 to a distal end 60 thereof. The distal end 60 is cylindrical in shape and is adapted to push fit over the inlet portion 23 of the port 25 for attachment thereto.

[0026] The hollow body 52 flares outwardly towards the proximal end 55 and terminates in an open end face through which the surgical scissors 40 are received during the laparoscopic surgical procedure. The hollow body 52 has a longitudinal mid-plane X-X that extends from the proximal end 55 to the distal end 60 of the hollow body 52 as shown in Figures 6a-6c and includes a longitudinal axis of the hollow body 52. The distal end is defined by a distal end face 60 that, in this embodiment, is an open end face. The distal end face 60 is therefore adapted to communicate with the inlet aperture 24 of the trocar port 25. The open end face at the proximal end 55 is arranged obliquely relative to the distal end face 60 of the hollow body, as best seen in Figures 6a-6c. In Figures 6a-6c, the longitudinal mid-plane is a horizontal mid-plane and an

angle θ subtended by a plane defined by the open end face of the proximal end 55 and the horizontal mid-plane that will depend on the requirement of the particular surgery. For example, it is envisaged that the angle θ could be more than 45 degrees in some instances, or it may be very low e.g. 10 degrees or less such that the guide takes the form of a shallow scoop, or any suitable angle in between. The oblique open end face of the proximal end 55 is thus larger than would be the case if the opening was parallel to the distal end face 60. The smaller the angle θ , the larger the opening at the open end face. Consequently, a large area is provided into which the surgical scissors 40 or other instrument or tool can be engaged therein. The tapering of the hollow body 52 towards the distal end 60 quickly guides the surgical scissors into the inlet aperture 24 of the concaved surface 23a of the trocar port 25. The skilled person will note that the surgeon is able to manipulate the surgical scissors 40 through a wide range of movement at the open end face of the proximal end 55 to achieve the desired positioning of the surgical scissors 40 at the operation site 5. Furthermore, the oblique slant of the open end face of the proximal end 55 of the laparoscopic guide 50 maximises access to the trocar port 25 without limiting the reach of the surgeon when engaging the surgical scissors 40 into the trocar port 25.

[0027] The ease of insertion of the surgical scissors 40 into the laparoscopic guide 50 and thereby into the trocar port 25 and trocar cannula 21 allows the surgeon to quickly change instruments and tools without spending valuable time aligning the instruments and tools with the inlet aperture 24 of the trocar port 25. The surgical scissors 40 can be engaged and removed from the trocar port 25 and cannula 21 in a stable manner.

[0028] In variations of the laparoscopic guide 50, the hollow body 52 may have an asymmetrical cross-sectional area as shown schematically in Figure 6a or other suitably shaped cross-sectional area without departing from the scope of the claimed invention. Furthermore, a shallower angle θ will provide a larger open end face of the proximal end 55 than will a larger angle θ , improving the reach of the surgeon relative to the trocar port 25. The hollow body 52 can be as long or as short as necessary to stably guide specific surgical instruments into the concaved surface 23a of the trocar port 25.

[0029] In other variations of the laparoscopic guide 50, the hollow body 52 may be fully or partially formed from a semi translucent material and internally illuminated by a light source disposed therein such that the surgeon is able to readily locate the hollow body 52 during surgery, especially in the dark. This allows the surgeon to easily insert the surgical scissors 40 or

other surgical instrument or laparoscopic tool into the laparoscopic guide 50 and thereby into the trocar port 25 and trocar cannula 21. In other variations of the laparoscopic guide 50, the hollow body 52 may be fully or partially formed from a flexible material.

[0030] In an alternative embodiment of the laparoscopic guide shown in Figure 7, the distal end face 60 of the laparoscopic guide 150 has a pair of quick release clips thereon that releasably clip into corresponding recesses 65 arranged in a proximal surface 67 of the trocar port 125. The skilled person will appreciate that other suitable means of attaching the laparoscopic guide 150 to the port 125 are also possible.

[0031] In a further alternative embodiment shown in Figure 8, the laparoscopic guide 250 is formed integrally with the trocar port 225 such that the interior of the hollow body 252 communicates directly with the conduit 226 of the trocar port 225 and the open distal end face 60 is integral with the trocar port 225.

[0032] Persons skilled in the art will appreciate that the above specific embodiments described are merely examples of the present disclosure. Persons skilled in the art will appreciate that the various features described in relation to different embodiments may be used in combination or as alternatives. Persons skilled in the art will also appreciate various other modifications and alternatives to the embodiments described.

CLAIMS

1. A laparoscopic guide comprising
a hollow body having a longitudinal mid-plane and a cross sectional area that tapers from a proximal end to a distal end thereof,
the distal end having a distal end face being oriented substantially perpendicular to the longitudinal mid-plane, the distal end face being adapted for communication with an inlet of a trocar port,
and the proximal end being adapted for receiving a laparoscopic surgical instrument or the like therein prior to the laparoscopic surgical instrument passing through the trocar port,
wherein the proximal end comprises an open end face that is oriented obliquely relative to the distal end face.
2. The laparoscopic guide of claim 1, wherein the hollow body has a generally conical or part conical shape.
3. The laparoscopic guide of claim 2, wherein the hollow body is radially symmetrical about a longitudinal axis thereof.
4. The laparoscopic guide of claim 2, wherein the hollow body is radially asymmetrical about a longitudinal axis thereof.
5. The laparoscopic guide of any one of claims 1 to 4, wherein an angle subtended by a plane defined by the open end face of the proximal end and the longitudinal mid-plane is 45 degrees or less.
6. The laparoscopic guide of claim 5, wherein the angle is 30 degrees or less.
7. The laparoscopic guide of claim 5 or claim 6, wherein the angle is 10 degrees or less.
8. The laparoscopic guide of any one of claims 1 to 7, wherein the distal end face is engageable with an inlet portion of the trocar port.

9. The laparoscopic guide of claim 8, wherein the distal end face is an open end face that is engageable with the inlet portion of the trocar port via a push fit therewith.
10. The laparoscopic guide of claim 9, wherein the distal end face is engageable with the inlet portion of the trocar port via a quick release mechanism.
11. The laparoscopic guide of claim 10, wherein the quick release mechanism comprises at least one clip associated with either one of the distal end face or the trocar port and at least one recess in the other of the distal end face or the trocar port.
12. The laparoscopic guide of any one of claims 1 to 7, wherein the distal end face is an open end face and wherein the distal end is formed integrally with the inlet portion of the trocar port.
13. The laparoscopic guide of any one of claim 1 to 12, further comprising a light source disposed in the hollow body, and wherein the light source is configured to illuminate the hollow body.
14. The laparoscopic guide of any one of claims 1 to 13, wherein the hollow body is substantially formed from a semi translucent material.
15. The laparoscopic guide of any one of claims 1 to 13, wherein the hollow body is substantially formed from a flexible material.
16. A method of guiding a laparoscopic surgical instrument or the like into an inlet of a trocar port, the method comprising engaging the laparoscopic surgical instrument or the like into the open end face of the proximal end of the laparoscopic guide of any one of claims 1 to 15 and thereafter engaging the laparoscopic surgical instrument or the like into the trocar port.

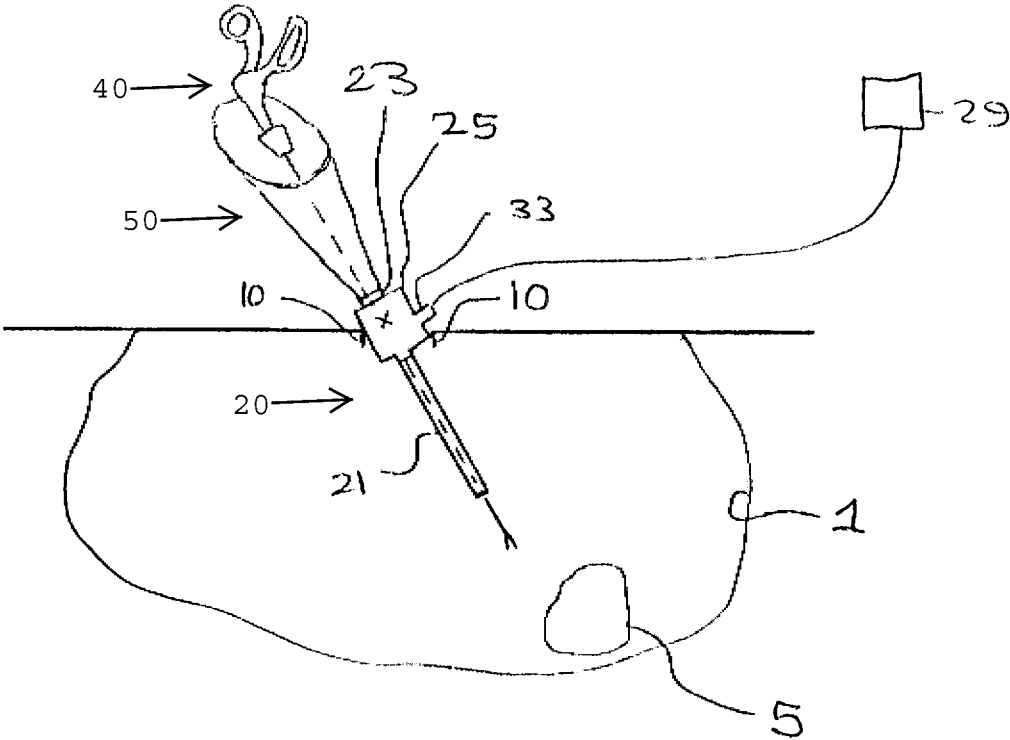


Fig. 1

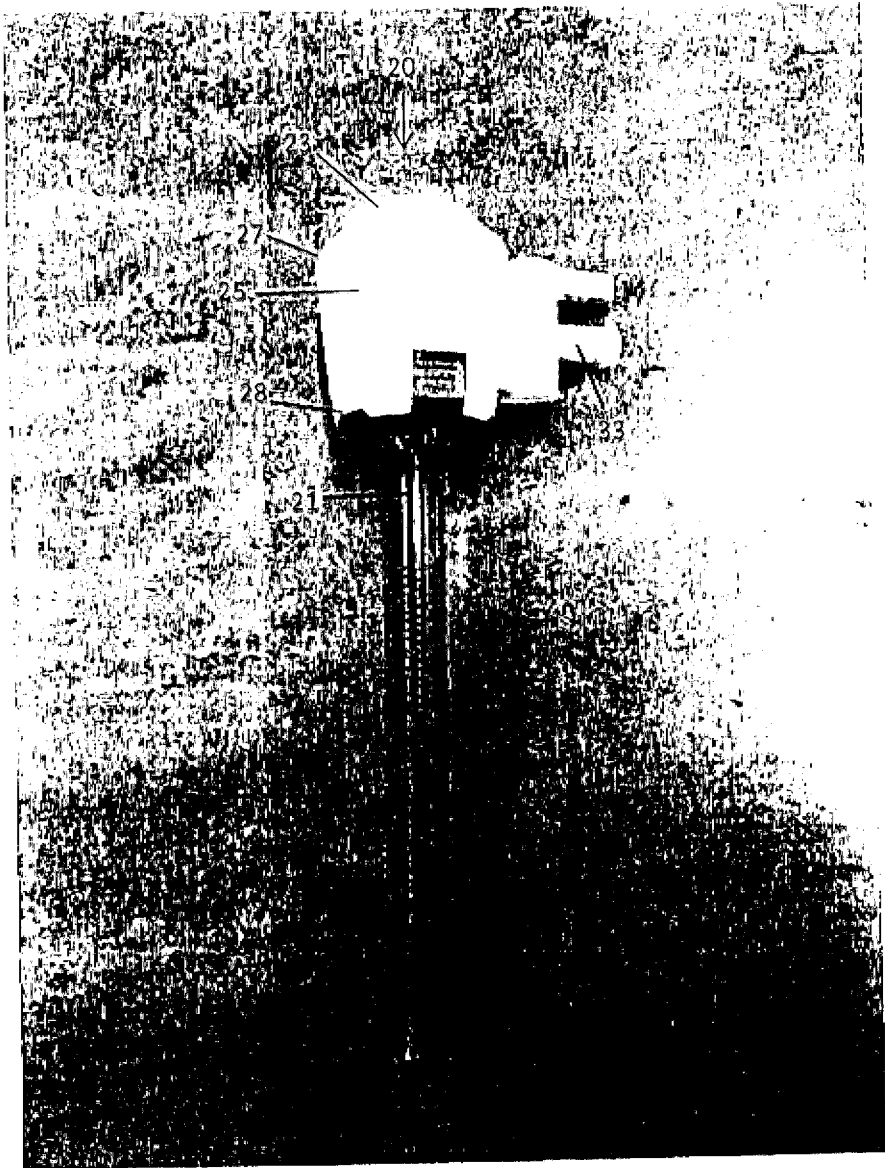


FIG. 2

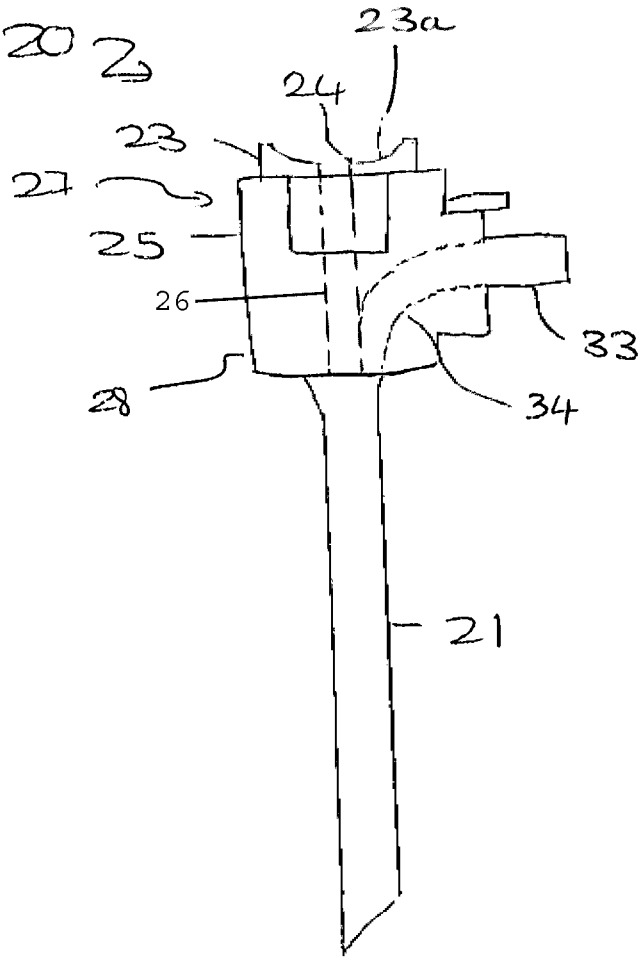


Fig. 3

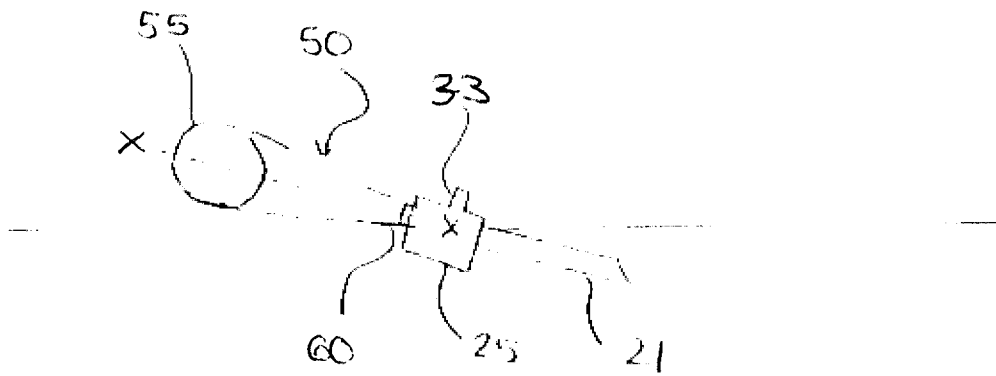


Fig. 4

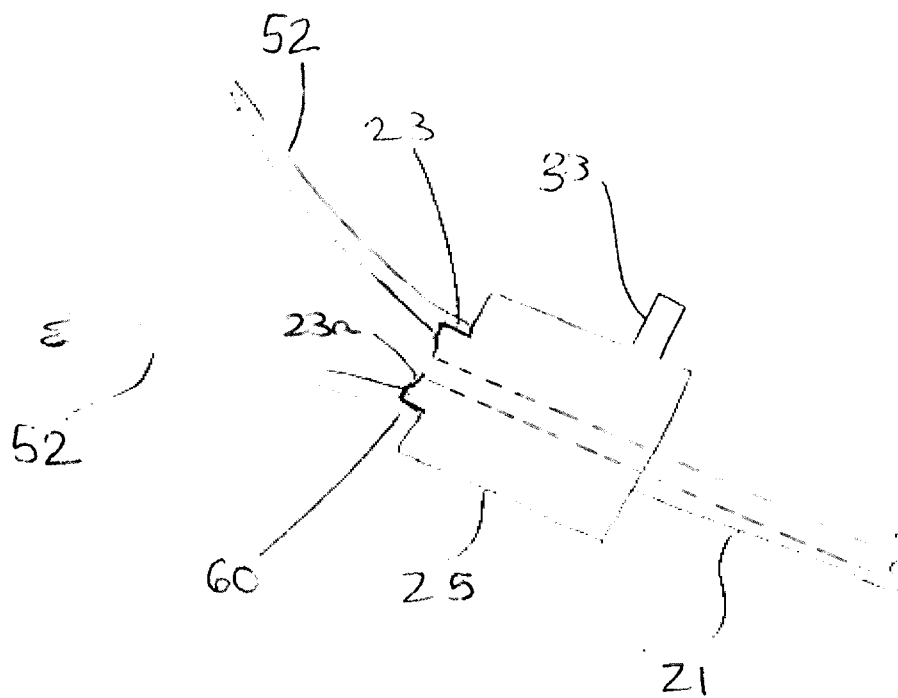


Fig. 5

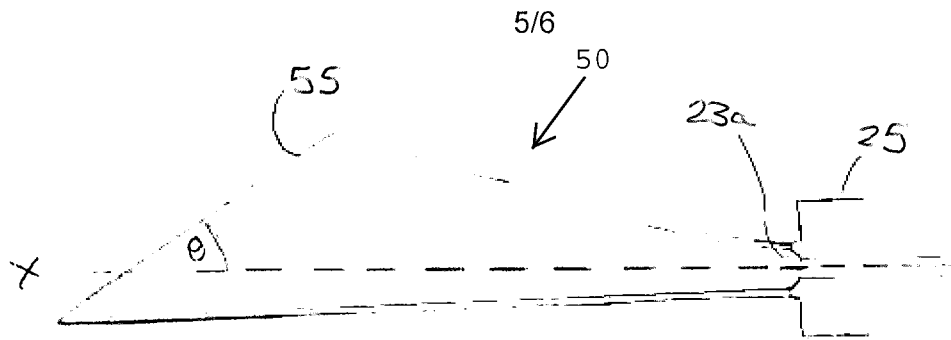


Fig. 6a

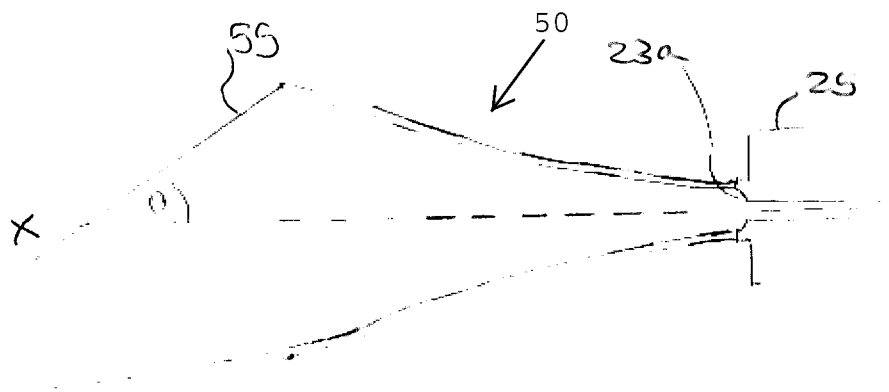


Fig. 6b

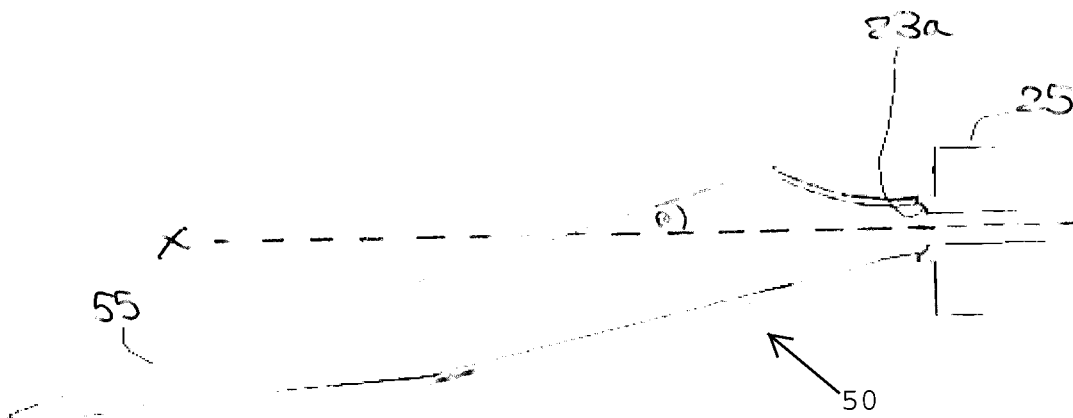


Fig. 6c

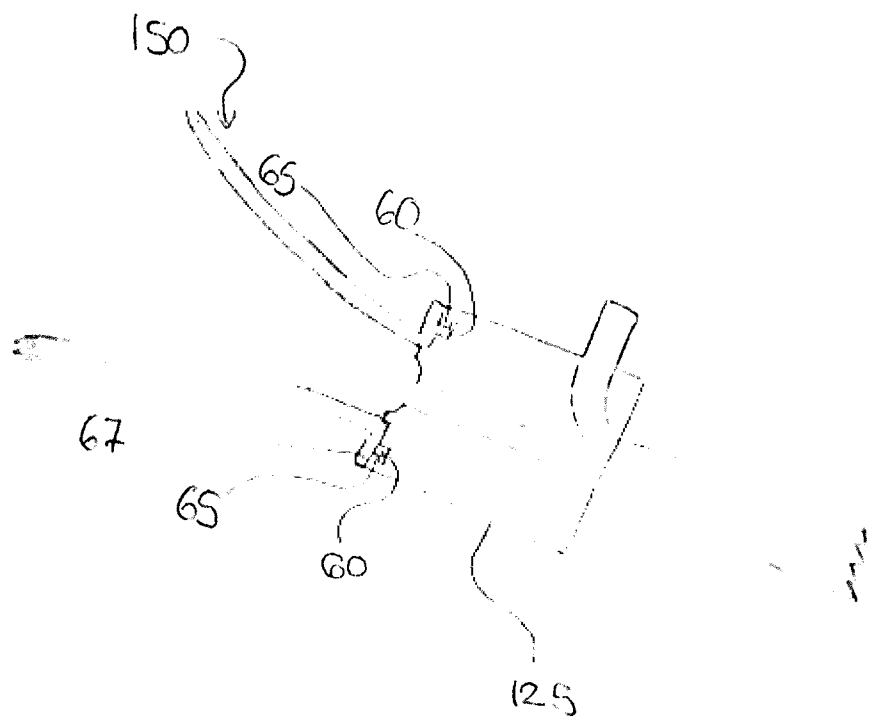


Fig. 7

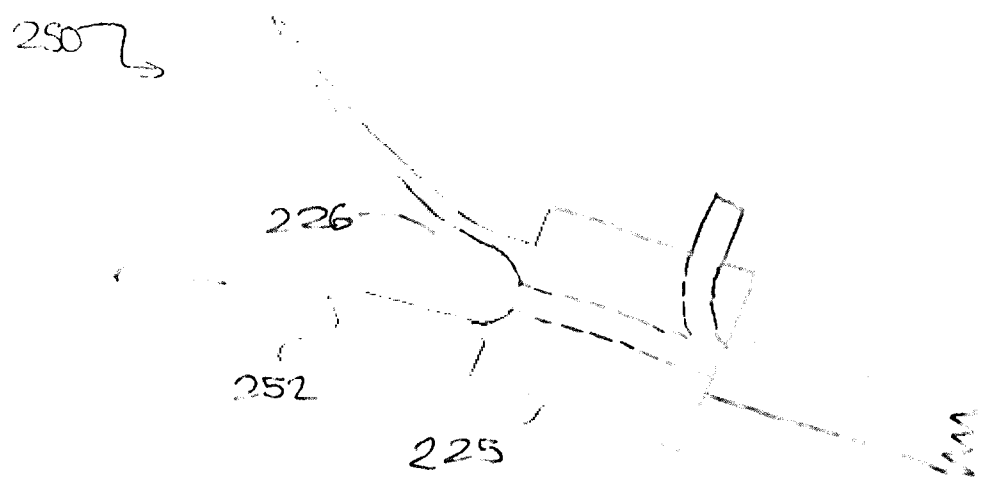


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2017/000159

A. CLASSIFICATION OF SUBJECT MATTER A61B 17/34 (2006.01)		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PATENW: IPC: A61/LOW, A61B17/34/LOW. CPC: A61B17/3423, A61B17/3462/LOW, A61B1/00154, A61B2017/3445, A61B2017/3433, A61B17/34/LOW. Keywords: conical, funnel, taper, guide, scope, instrument, laparoscope, trocar, proximal, port, inlet, oblique, lock, radius, expand, and like terms. GOOGLE PATENT: KEYWORDS: laparoscopic, guide, conical, funnel, accuracy, trocar, oblique, and like terms. ESPACENET: CPC: A61B17/3462, A61B2017/3445. Applicant/Inventor names searched in PATENW, BIOSIS, CABA, EMBASE; FSTA, MEDLINE, COMPENDEX, INSPEC and in internal databases provided by IP Australia.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	
☒ Further documents are listed in the continuation of Box C ☒ See patent family annex		
* "A"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search 4 September 2017		Date of mailing of the international search report 04 September 2017
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaustalia.gov.au		Authorised officer Heather Abulafia AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262832360

INTERNATIONAL SEARCH REPORT		International application No.
C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		PCT/AU2017/000159
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2017/000159	
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Form PCT/ISA/210 (Family Annex)(July 2009)

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2017/000159	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

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Form PCT/ISA/210 (Family Annex)(July 2009)

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2017/000159	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
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INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2017/000159	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
Publication Number	Publication Date	Publication Number	Publication Date
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Form PCT/ISA/210 (Family Annex)(July 2009)

INTERNATIONAL SEARCH REPORT		International application No.	
Information on patent family members		PCT/AU2017/000159	
This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.			
Patent Document/s Cited in Search Report		Patent Family Member/s	
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.			

专利名称(译)	腹腔镜指南		
公开(公告)号	EP3493754A1	公开(公告)日	2019-06-12
申请号	EP2017836083	申请日	2017-08-03
申请(专利权)人(译)	麦考瑞大学		
当前申请(专利权)人(译)	麦考瑞大学		
[标]发明人	CARTMILL JOHN ANTHONY GILMORE ANDREW		
发明人	CARTMILL, JOHN, ANTHONY GILMORE, ANDREW		
IPC分类号	A61B17/34		
CPC分类号	A61B17/3417 A61B17/3462 A61B90/30 A61B2017/00902 A61B2017/00907 A61B17/320016 A61B17/3201 A61B17/3468 A61B17/3474 A61B2017/00477		
优先权	2016903078 2016-08-04 AU		
其他公开文献	EP3493754A4		
外部链接	Espacenet		

摘要(译)

腹腔镜引导件包括中空主体，该中空主体具有纵向中平面和从其近端到远端逐渐变细的横截面区域。远端具有远端面，该远端面基本垂直于纵向中平面定向。远端面适于与套管针端口的入口连通。近端适于在腹腔镜手术器械穿过套管针端口之前在其中接收腹腔镜手术器械等。近端包括开口端面，该开口端面相对于远端面倾斜定向。