US006723088B2

(12) **United States Patent**
Gaskill, III et al.

(10) **Patent No.: US 6,723,088 B2**
(45) **Date of Patent: Apr. 20, 2004**

(54) **LAPAROSCOPIC PORTING**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/027,123**

(22) Filed: **Dec. 20, 2001**

(65) **Prior Publication Data**

US 2003/0149443 A1 Aug. 7, 2003

(51) **Int. Cl.**[7] **A61B 17/00**
(52) **U.S. Cl.** **606/1**
(58) **Field of Search** 604/513, 264, 604/539; 600/204, 206, 208; 606/108, 1

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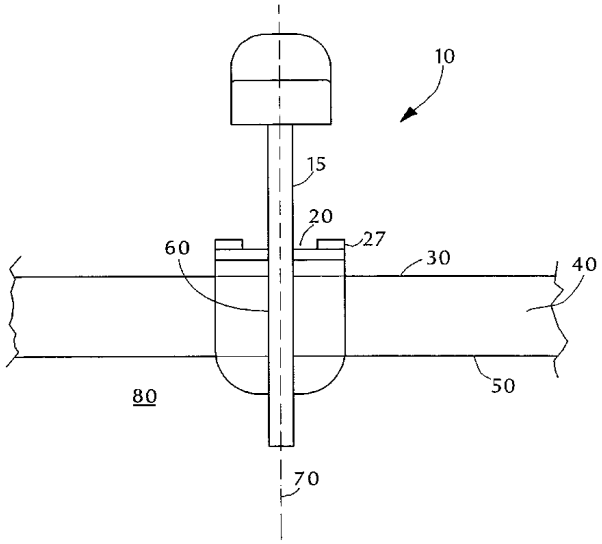
(57) **ABSTRACT**

A retaining collar for laparoscopic surgery includes a compressible and elastic body that has an inner periphery and an outer periphery where the inner periphery forms a conduit for receiving and securing a tubular device. The retaining collar also includes a rigid portion attached to the compressible and elastic body. The rigid portion has an inner periphery, an outer periphery and a cam lock where the inner periphery forms an aperture that aligns with the conduit and the cam lock receives and retains a suture.

11 Claims, 2 Drawing Sheets



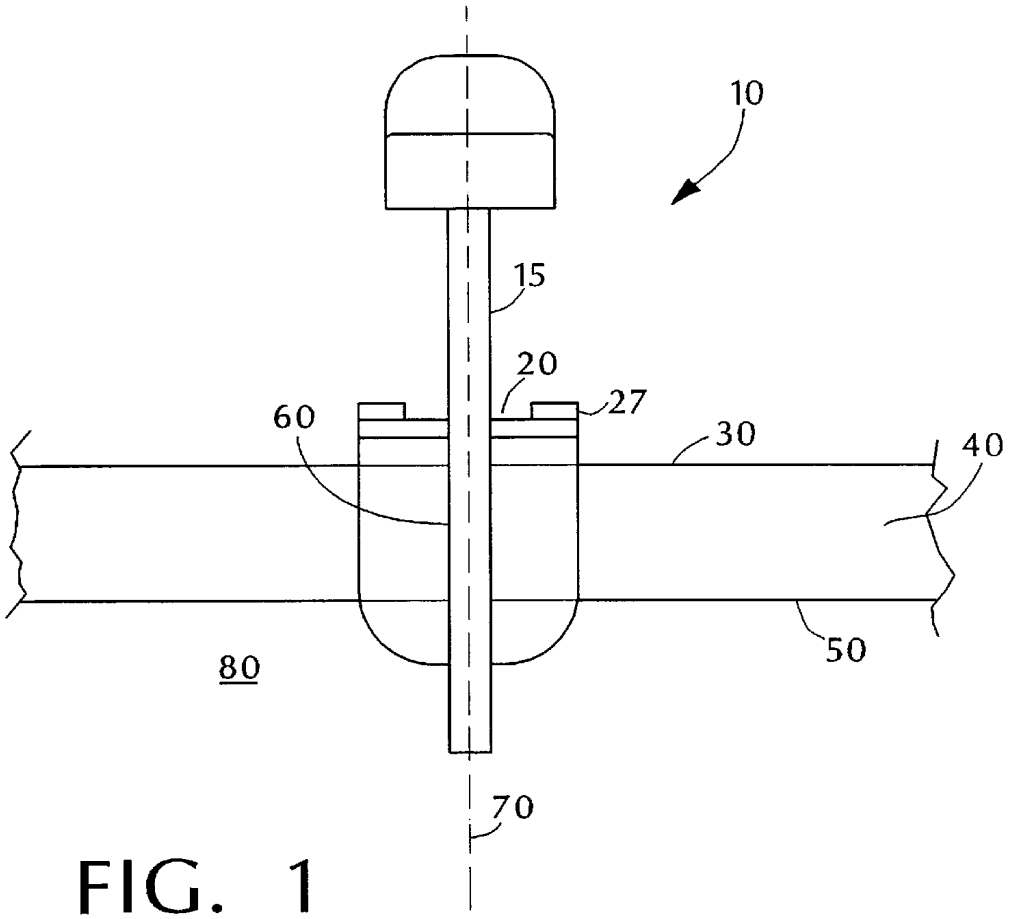


FIG. 1

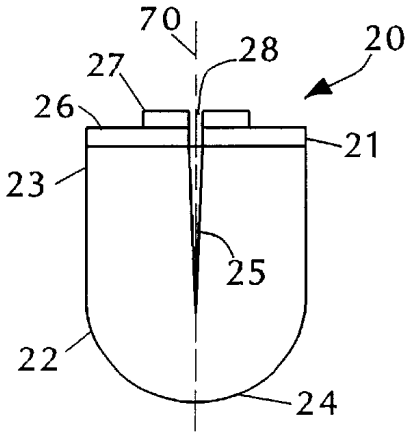


FIG. 2

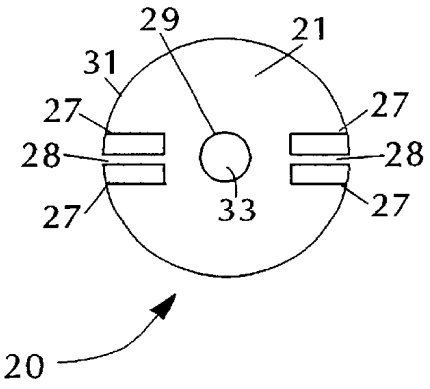


FIG. 3

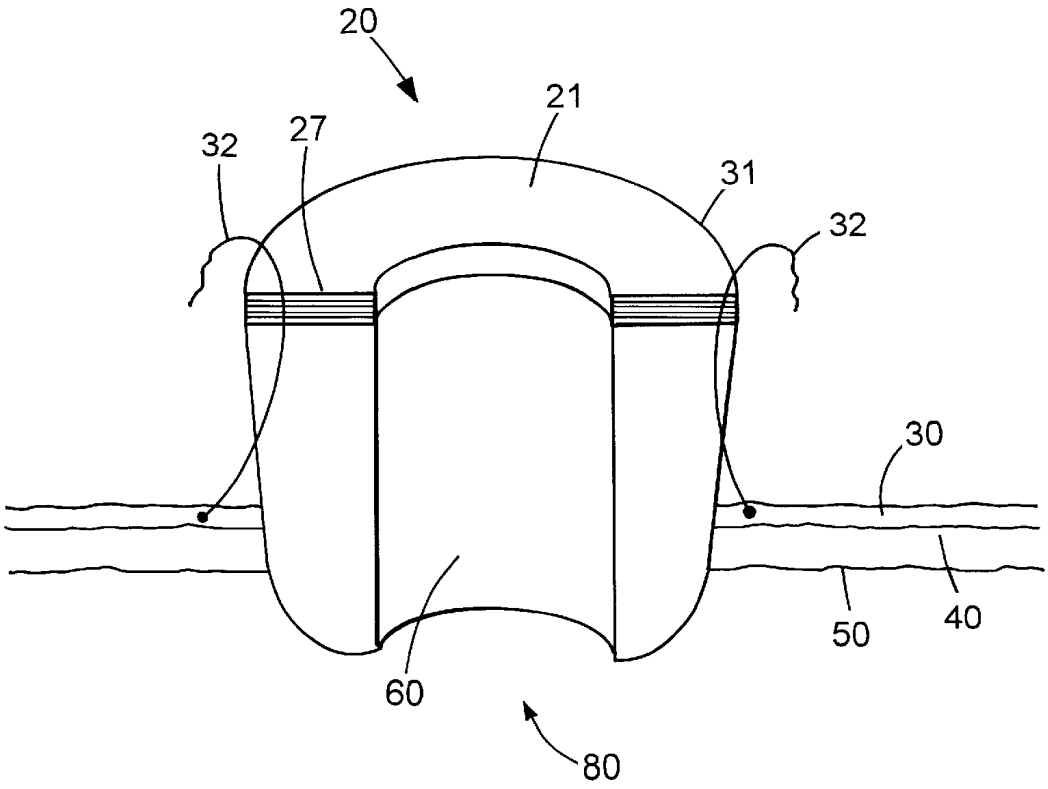


FIG. 4

LAPAROSCOPIC PORTING

This invention relates to laparoscopic surgery and in particular to laparoscopic porting.

BACKGROUND OF THE INVENTION

Laparoscopic surgical methods require that a portal of entry be created in an abdominal wall. This portal of entry is used to introduce an inert gas, such as carbon dioxide, into an abdominal cavity in a process called insufflation. By blowing-up the abdominal cavity like a balloon, a space is created inside the abdominal cavity that allows the surgeon to easily view and access the operative field. This portal of entry is also used for the sequential introduction and removal of surgical instruments such as video imaging devices, scissors, graspers, and devices for suctioning and irrigation of the abdominal cavity.

Methods of placing these portals are well known to surgeons. One method is to make an incision in the skin of the abdominal wall with a knife or other cutting instrument. This incision is carried down to a fascia or an inner fibrous layer of the abdomen. An opening is then created in the fascia large enough to accommodate a cannula or a port device. Surgical sutures are then placed in the edges of the opening of the fascia. The cannula or port device is then inserted through the incision in the skin, through the hole in the fascia, and into the abdominal cavity. The sutures are then wrapped or tied around the port device to retain it during the operation. The port device then acts as a conduit for surgical instruments as described above.

It is an important object of the invention to provide improved laparoscopic porting.

BRIEF SUMMARY OF THE INVENTION

In one aspect, the invention is a retaining collar for laparoscopic surgery. The retaining collar includes a compressible and elastic body that has an inner periphery and an outer periphery where the inner periphery forms a conduit for receiving and securing a tubular device. The retaining collar also includes a rigid portion attached to the compressible and elastic body. The rigid portion has an inner periphery, an outer periphery and a cam lock. The inner periphery forms an aperture, that aligns with the conduit. The cam lock receives and retains a suture.

The invention may have one or more of the following features. The outer surface of the compressible and elastic body has a slit for receiving the suture. The outer periphery of the rigid portion having a slot for receiving the suture. The compressible and elastic body is constructed from polyurethane. The compressible and elastic body forms a sealing bias during carbon dioxide insufflation. The tubular device is a surgical device used in an abdominal area. The collar is conically shaped. The collar is bullet shaped.

In another aspect, the invention is a method of performing laparoscopic surgery. The method includes inserting a tubular device through a collar where the collar includes a compressible and elastic body having an inner periphery and an outer periphery. The inner periphery forms a conduit for receiving and securing the tubular device. The collar also includes a rigid portion attached to the compressible and elastic body where the rigid portion has an inner periphery, an outer periphery, and a cam lock. The inner periphery forms an aperture that is aligned with the conduit. The method also includes pulling a suture through the cam lock and retaining the suture using the cam lock.

One or more of the following features may be included in the invention. The method includes pulling the suture through the slit formed on the outer surface of the compressible and elastic body and pulling the suture through a slot of the outer periphery of the rigid portion. The method includes stitching through a tissue. The method includes forming a sealing bias during insufflation. The method includes passing surgical instruments through the tubular device.

The retaining collar provides a seal between the retaining collar and the opening in the abdominal wall to prevent the escape of carbon dioxide gas during insufflation due to the shape and compressible nature of the compressible and elastic body. In addition, the conduit through the compressible and elastic body of the retaining collar secures the tubular device while allowing variation in the diameter of the port device as well as adjustments in depth and position of the device while also maintaining a seal. Finally, the cam lock allows for easy accessibility in suturing an incision.

Other features, objects and advantages will become apparent from the following detailed description when read in connection with the accompanying drawing in which:

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. **1** is a cross-sectional view of a laparoscopic system with a retaining collar;

FIG. **2** is side view of a retaining collar for laparoscopic surgery;

FIG. **3** is a top view of the retaining collar for laparoscopic surgery; and

FIG. **4** is a side view of one-half of the retaining collar positioned in an abdomen.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. **1**, a laparoscopic system **10**, used in a laparoscopic surgical procedure, includes a retaining collar **20** inserted into an incision. Retaining collar **20** extends through a skin tissue layer **30** and a subcutaneous tissue **40** down to a fascia tissue layer **50**. A tubular device **15** is inserted through retaining collar **20** through a conduit **60**. Conduit extends along a longitudinal axis **70**. Tubular device **15** can be a trocar, a cannula, an obturator, or any tubular structure for surgical procedures performed in an abdominal area **80**. As will be explained below, retaining collar **20** is constructed to act as a sealing bias against a loss of an inert gas (e.g., carbon dioxide) during insufflation while also securing tubular device **15**. In addition, cam locks **27** of retaining collar **20** secure a suturing thread **32** (FIG. **4**) used in suturing the incision.

Cam locks **27** and other cam-type locking devices incorporate two opposing curved surfaces held in opposition by a pivoting or flexing component. The opposing surfaces are characterized by a curved or spiral cross-section. The geom-

etry of these devices produces a gripping action of increasing strength when tension is placed on a cord or suture placed between the opposing surfaces. The design of these cam locking devices is described in the literature pertaining to rope-retaining devices well-known to manufacturers of nautical equipment.

Referring to FIGS. **1** and **2**, retaining collar **20** includes a rigid top portion **21** and a flexible body **22**. Flexible body **22** is bullet shaped so that after insertion into abdominal area **80**, a wider end **23** of flexible body **22** is outside abdominal area **80**, and a smaller end **24** of flexible body **22** is within subcutaneous tissue **40**. The bullet shape accommodates and compensates for variations in the size of the opening into abdominal area **80**. Flexible body **22** is made of a compressible material (e.g., compressible and elastic rubber, polyurethane, expanded latex, etc.). Flexible body **22** has slits **25** that begin extend from rigid portion **21** along longitudinal axis **70**. In other embodiments, flexible body **22** is conically shaped.

Referring to FIGS. **2** and **3**, rigid top portion **21** has cam locks **27** positioned on a top surface **26** of the rigid top portion. Along a periphery **21** of rigid top portion **21** is a gap **28** that is aligned with a slit **25** of flexible body **22** along longitudinal axis **27**. Rigid top portion **21** is made of plastic or other like rigid material capable of being sterilized for surgical procedures. An inner periphery **29** of rigid top portion **21** forms an aperture **33**. Aperture **33** is aligned with conduit **60** forming a continuous passageway. Slit **25** can also be a groove.

During surgery, the surgeon makes the incision through skin **30** and subcutaneous tissue **40** to fascia **50**. The diameter of the incision is smaller than the diameter of retaining collar **20**. One or more retaining sutures **32** are then placed in the edges of the opening in the fascia **30**. The surgeon inserts tubular device **15** through conduit **60**. Conduit **60** has a diameter that is smaller than a diameter of tubular device **15**. When tubular device **15** is inserted into retaining collar **20**, conduit **60** expands to receive the tubular device.

When retaining collar **20** is inserted into the incision, the retaining collar is compressed circumferentially by the surrounding tissue and longitudinally by the retaining sutures as a natural consequence of securing the collar within the incision. The bullet shape and the compressible material of body **22** provides a snug and secure fit with skin **30**, subcutaneous tissue **40** and fascia **50** to form a sealing bias. The sealing bias prevents the release of the inert gas from abdominal area **80** during insufflation.

A suture thread **32** stitched through skin **30** is brought through slit **25**, through gap **28** and through cam locks **27**. The placement of suture thread **32** through slit **25** and gap **28** and between cam locks **27** is accomplished by a mere tugging of anchored suture threads **32** up through cam locks **27**. Suture thread **32** can be released to remain secure between cam locks **27**. Tubular device **15** is then held securely by retaining collar **20**. In this embodiment, slits **25** extend far enough along longitudinal axis **70** so that the suture thread **32** may easily be inserted between gap **28** and cam locks **27** without obstruction.

After the surgical procedure is complete, the surgeon uses the retaining sutures placed through fascia **30** to close the incision. The sutures are tied and knotted in the usual fashion for closing surgical incisions.

Other embodiments not described here are also within the scope of the following claims.

What is claimed is:

1. A retaining collar for laparoscopic surgery, comprising:

a compressible and elastic body having an inner periphery and an outer periphery, the inner periphery forming a conduit for receiving and securing a tubular device; and

a rigid portion attached to the compressible and elastic body, the rigid portion having an inner periphery, an outer periphery and a cam lock; the inner periphery forming an aperture, the aperture aligning with the conduit, the outer periphery having a slot for receiving a suture, the cam lock receiving and retaining the suture;

wherein the outer periphery of the compressible and elastic body has a slit for receiving the suture.

2. The collar of claim **1**, wherein the outer periphery of the rigid portion has a slot for receiving the suture.

3. The collar of claim **1**, wherein the compressible and elastic body is constructed from polyurethane.

4. The collar of claim **1**, wherein the compressible and elastic body forms a sealing bias during carbon dioxide insufflation.

5. The collar of claim **1**, wherein the tubular device is a surgical device used in an abdominal area.

6. The collar of claim **1**, wherein the collar is conically shaped.

7. The collar of claim **1**, wherein the collar is bullet shaped.

8. A method of performing laparoscopic surgery, comprising:

inserting a tubular device through a collar, the collar includes;

a compressible and elastic body having an inner periphery and an outer periphery, the inner periphery forming a conduit for receiving and securing the tubular device; and

a rigid portion attached to the compressible and elastic body, the rigid portion having an inner periphery, an outer periphery and a cam lock; the inner periphery forming an aperture, the aperture aligning with the conduit;

pulling a suture through the cam lock;

retaining the suture using the cam lock;

pulling the suture through a slit formed on the outer periphery of the compressible and elastic body; and

pulling the suture through a slot of the outer periphery of the rigid portion.

9. The method of claim **8**, further comprising stitching through tissue.

10. The method of claim **9**, further comprising forming a sealing bias during insufflation.

11. The method of claim **8**, further comprising passing surgical instruments through the tubular device.

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专利名称(译)	腹腔镜移植		
公开(公告)号	US6723088	公开(公告)日	2004-04-20
申请号	US10/027123	申请日	2001-12-20
[标]申请(专利权)人(译)	GASKILL HAROLD V		
申请(专利权)人(译)	GASKILL HAROLD V.		
当前申请(专利权)人(译)	摄政板，得克萨斯大学		
[标]发明人	GASKILL III HAROLD V GASKILL IV HAROLD V		
发明人	GASKILL, III, HAROLD V. GASKILL, IV, HAROLD V.		
IPC分类号	A61B17/34 A61B17/00		
CPC分类号	A61B17/3421 A61B17/3423 A61B17/34 A61B2017/3419 A61B2017/347 A61B2017/3492		
代理机构(译)	FISH & RICHARDSON P.C.		
其他公开文献	US20030149443A1		
外部链接	Espacenet USPTO		

摘要(译)

用于腹腔镜手术的保持套环包括可压缩和弹性体，其具有内周边和外周边，其中内周边形成用于接收和固定管状装置的导管。保持套环还包括附接到可压缩弹性体的刚性部分。刚性部分具有内周边，外周边和凸轮锁，其中内周边形成与导管对准的孔，并且凸轮锁接收并保持缝合线。