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(54) **ENDOSCOPIC TOOL ASSEMBLY**

(75) Inventor: **Pavel Menn**, Marblehead, MA (US)

Correspondence Address:
GREENBLUM & BERNSTEIN, P.L.C.
1950 ROLAND CLARKE PLACE
RESTON, VA 20191 (US)

(73) Assignee: **MICROLINE PENTAX INC.**, Beverly, MA (US)

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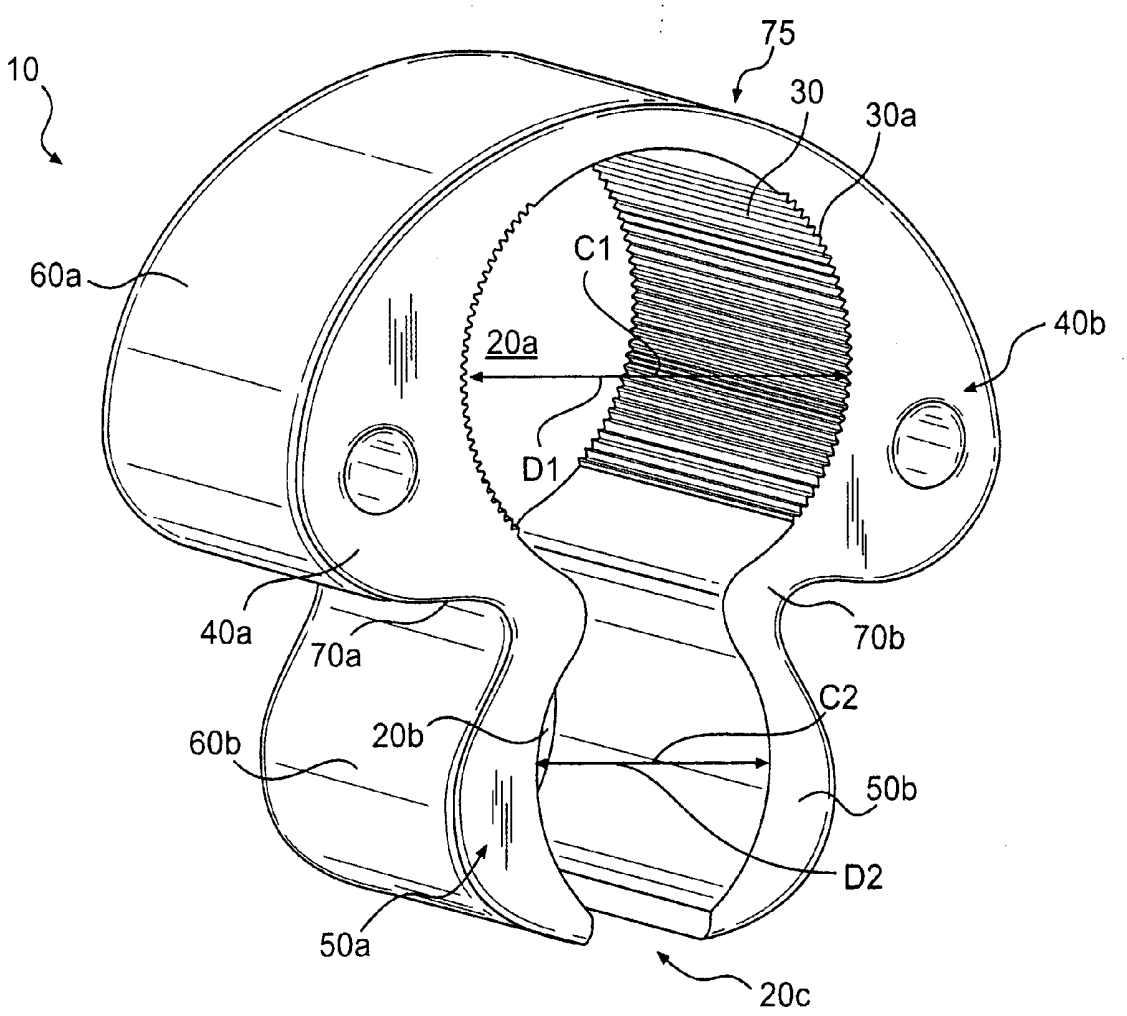
(57) **ABSTRACT**

A surgical tool assembly is provided having a surgical tool, a scope; and a detachable clip which couples the tool and scope. The clip includes a first grip which engages a peripheral surface of the tool and a second grip which engages a peripheral surface of the scope. Additionally, the first and second grips may be formed continuously with one another.



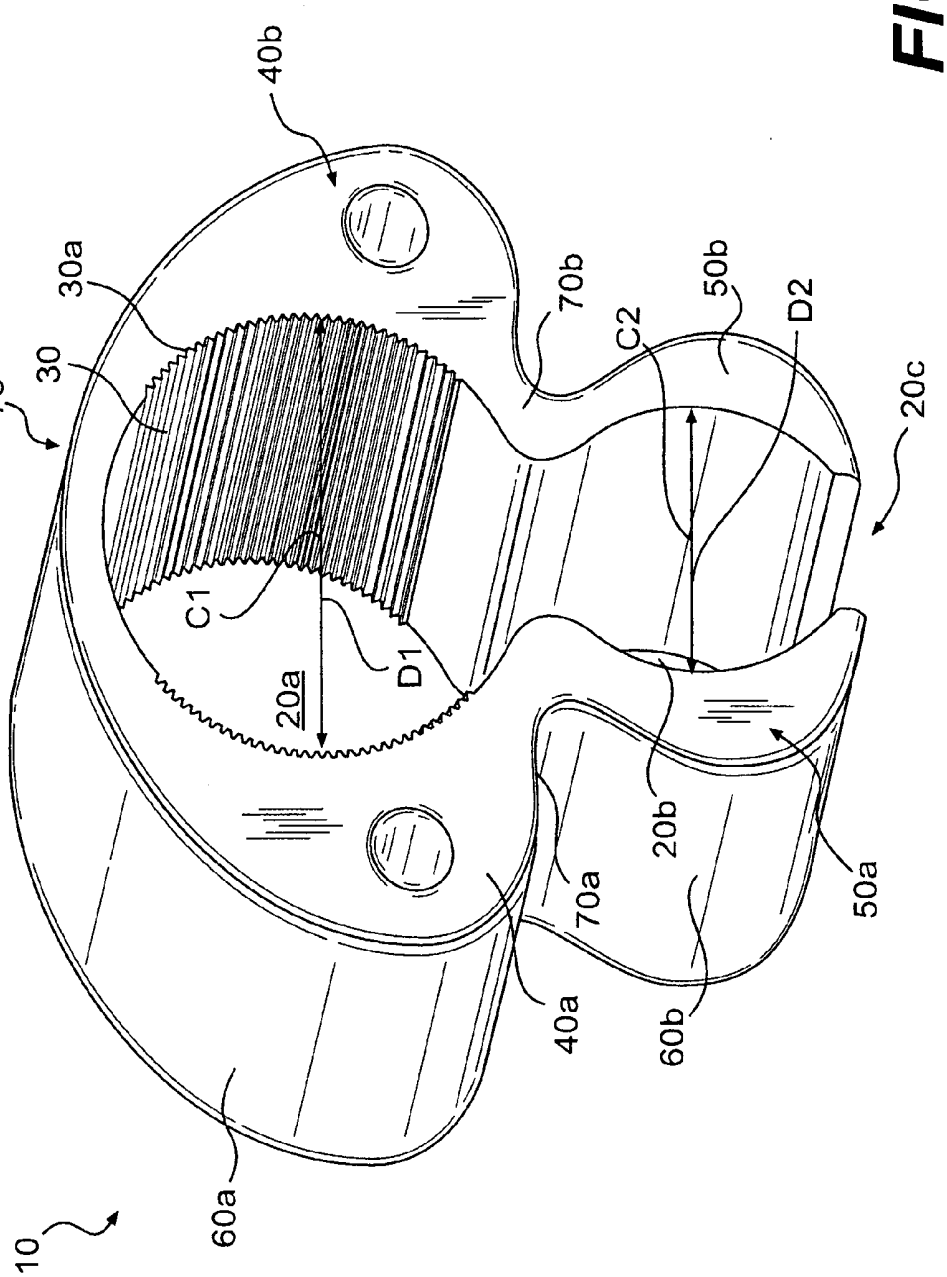

40b
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FIG. 1

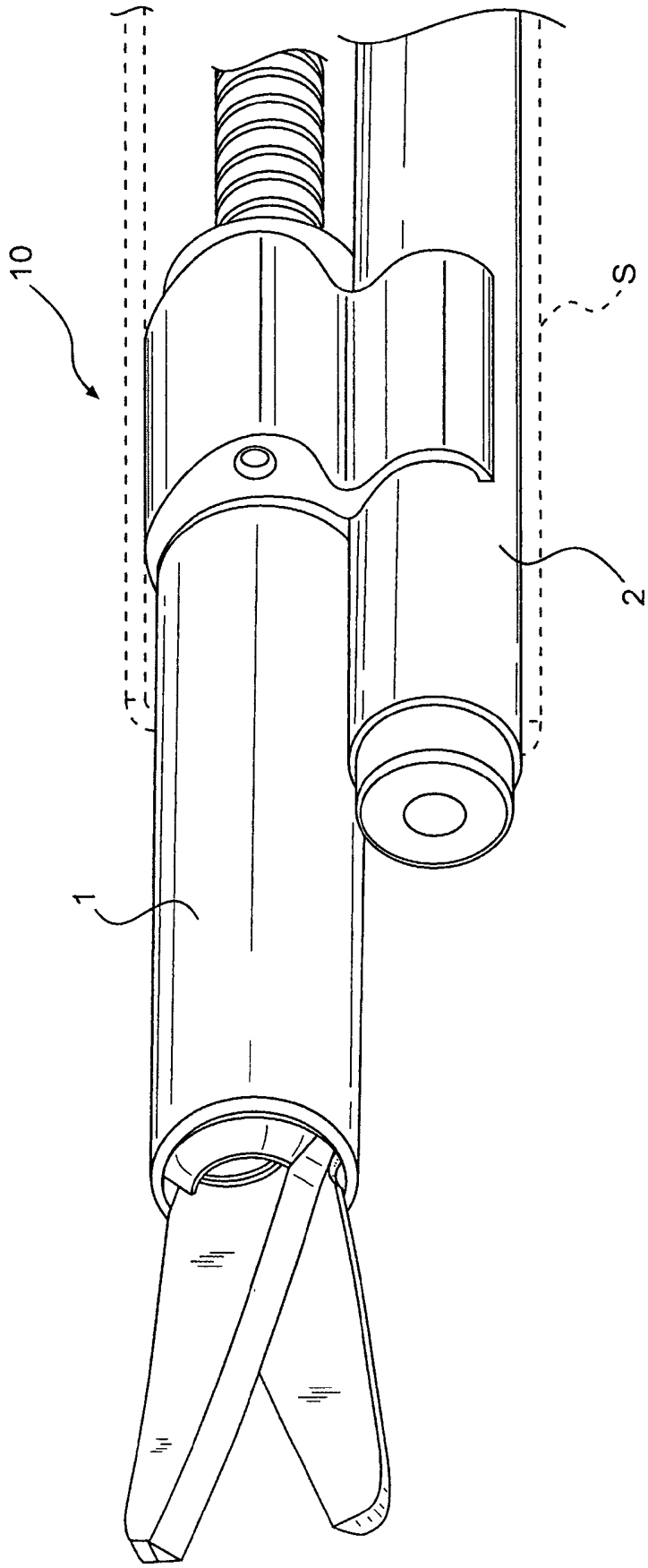
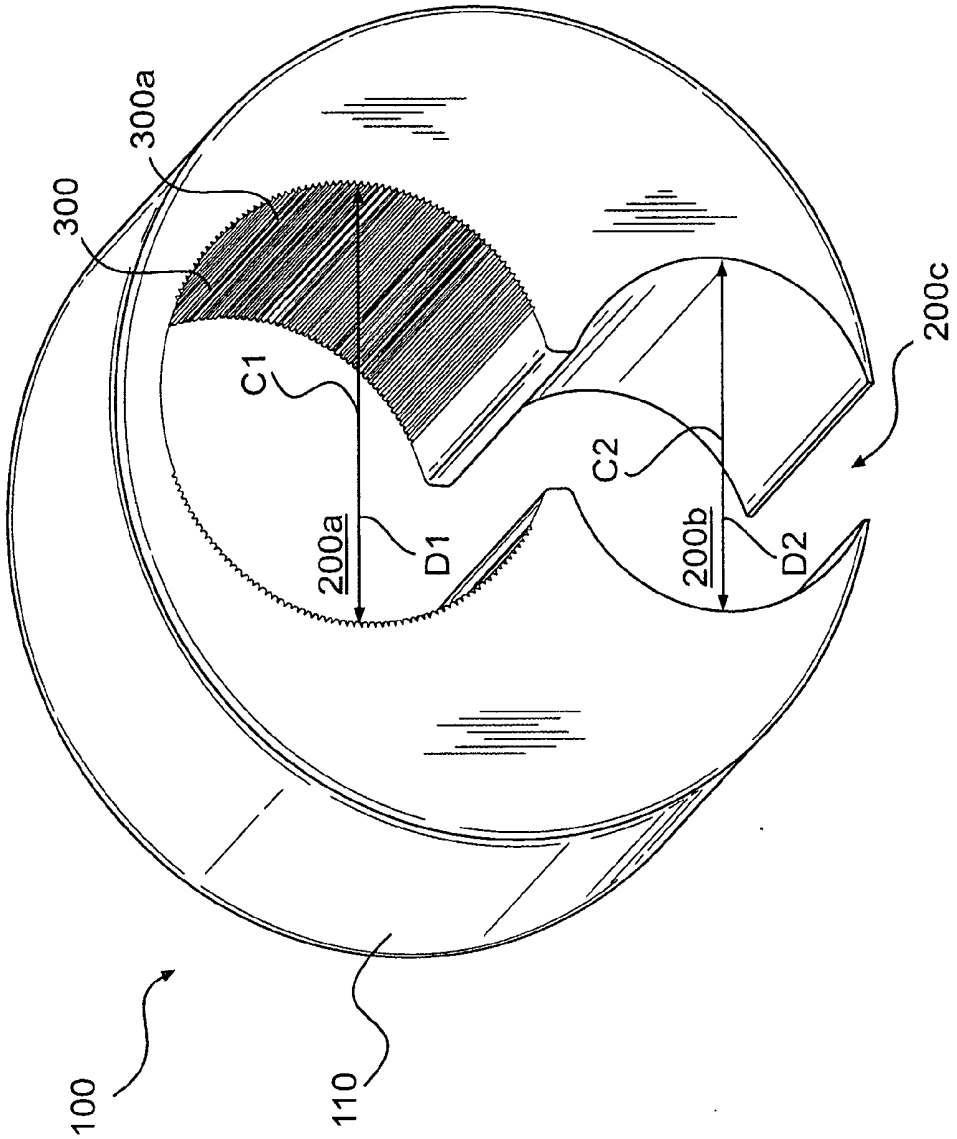


FIG. 2

FIG. 3



ENDOSCOPIC TOOL ASSEMBLY

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an endoscopic tool assembly, and more particularly, to a clip which detachably couples a endoscopic tool and an endoscope to provide an endoscopic tool assembly.

[0003] 2. Description of the Background Art

[0004] Endoscopic surgery has recently become a widely-practiced surgical procedure. For example, laparoscopic surgery (i.e., one type of endoscopic surgery) generally involves small incisions through the navel and abdominal wall to view or operate on organs or tissue located in the abdominal cavity. Additionally, a camera, optical fiber or lens (i.e., scope) is placed in the area to aid the surgeon in guiding the endoscopic instrument to the particular area to be observed or operated upon.

[0005] In the conventional art, endoscopic surgery is generally preformed using elongated instruments slidably inserted through a trocar. The trocar generally includes a cannula or trocar sleeve (i.e., a hollow sheath or sleeve with a central lumen) and a sharp obturator received in the cannula. The trocar may be used to penetrate the abdominal wall or chest. The obturator is withdrawn from the cannula after the intra-abdominal end of the trocar is in the abdominal cavity, and the cannula remains in the abdominal wall throughout the surgical procedure, allowing the introduction of various surgical instruments (e.g., an endoscopic tool). Trocars are available in different sizes, as are cannulae, to accommodate various instruments. However, in some cases endoscopic surgery is performed in a naturally-occurring body cavity (e.g., the uterus).

[0006] Manipulation of the instruments (including an endoscopic tool) during endoscopic surgery is generally observed through the scope which may be inserted through a separate trocar into the operating cavity. Alternatively, the scope may be contained within a surgical tube which also contains surgical instruments. In any event, the operator must perform the surgical manipulations using an effector unit, such as scissors, dissectors, graspers and retractors located on the end of the surgical instrument remotely located from the operator's hands and confined within a relatively small cavity created for the operation. Therefore, the images provided by the endoscope must be accurate and reliable.

[0007] However, because the endoscope is typically inserted into the surgical area adjacent to the surgical instrument, the parallax resulting from the acute angle formed between the endoscope and the surgical instrument may restrict or distort the surgeon's view of the surgical site. Thus, the surgeon may have only a limited view of the working end of the surgical instrument.

[0008] Further, because the endoscopic tool must often be rotated to perform an appropriate surgical procedure, what is needed in the art is a surgical instrument assembly or clip, which is capable of reliably and accurately detachably coupling a scope and an endoscopic tool such that relative movement between the endoscope and endoscopic tool, as well as undesirable parallax resulting from an acute angle formed between the endoscope and endoscopic tool, may be prevented.

SUMMARY OF THE INVENTION

[0009] Accordingly, a non-limiting feature of the present invention provides a surgical instrument assembly including a clip, an endoscopic tool, and an endoscope coupled together, thereby allowing for accurate positioning and reliable coupling between the instruments. Thus, the negative effects caused by parallax may be prevented.

[0010] Another feature of the present invention provides a clip which accurately and reliably couples an endoscope and an endoscopic tool. Thus, existing endoscopic tools, whether single or multiple use, may be retrofitted with an endoscope.

[0011] A non-limiting feature of the present invention provides an endoscopic tool assembly including a clip for coupling an endoscopic tool and an endoscope together. As described herein, the term "endoscope" includes all types of scopes to be used in surgical procedures, including but not limited to cameras, endoscopes, and fiber scopes. The endoscopic tool assembly includes a surgical tool, a scope; and a detachable clip which couples the tool and the scope, the clip may have a first opening (i.e., grip) which engages a surface (e.g. an outer surface) of the tool and a second opening (i.e., grip) which engages a surface (e.g., an outer surface) of the scope. Additionally, the first and second openings maybe formed continuously with one another, and the clip may include a bottom opening.

[0012] According to an additional feature, the first opening may be provided with a knurled surface which engages said peripheral surface of said tool. Additionally, the knurled surface may include generally elongated protrusions extending in a direction generally perpendicular to a first diameter of the first opening. Further, the elongated protrusions may have a generally triangular cross-section.

[0013] In an additional feature, the knurled surface may be provided only on a portion of a circumference of the first opening. Further, the clip may include generally oppositely facing first and second lobes provided on a circumference of the first opening. Additionally, the clip may have generally oppositely facing third and fourth lobes provided on a circumference of the second opening. In accordance with another feature, the first and second lobes may be formed larger than each of the third and fourth lobes.

[0014] According to an additional feature, the clip may be formed of a resilient material.

[0015] In yet still another feature, the first lobe, the second lobe, and the first opening together may form a upper clip body. Further, similar to the upper clips body, the third lobe, the fourth lobe, and the second opening together may form a lower clip body. Additionally, a concavity may connect the upper clip body to the lower clip body thereby forming a generally mushroom-shape. Further, the assembly may include a sheath configured to be inserted into a mammalian body, and an inner surface of the sheath may be configured to engage an outer surface of the clip.

[0016] Another feature includes, the upper body being formed having a generally semi-circular shape. In an additional feature, the second opening may be provided between the concavity and the bottom opening; wherein the first and second openings are provided next to each other such that the first radial center of the first opening is radially spaced from

the second radial center of the second opening. Additionally, the first diameter may be larger than the second diameter.

[0017] In an additional feature, the first opening may be provided in an upper clip body and the second opening may be provided in a lower clip body. In this regard, the concavity hingedly connects the upper clip body to the lower clip body. Further, the second opening may be configured to contract and expand due to the flexing of the concavity. Additionally, the upper clip body may include a connector which hingedly connects a first half of the clip to a second half of the clip. In this regard, the first and second halves may be generally mirror images of each other. Additionally, the first opening may be configured to contract and expand due to the flexing of the connector.

[0018] In a further embodiment, an endoscopic tool assembly may include a surgical tool, a scope, and a detachable clip which couples the tool and scope. Further, the clip may have a generally cylindrical body including first and second openings (i.e., grips) which engage the surgical tool and scope, respectively. Additionally, a surface (e.g., an outer surface) of the cylindrical body may be configured to engage an inner surface (e.g., a circumferential inner surface) of a sheath which is configured to receive the tool assembly therein.

[0019] Another feature includes providing the first opening with a knurled surface which engages a peripheral surface of the tool. Additionally, the knurled surface may have generally elongated protrusions extending in a direction generally perpendicular to a first diameter of the first grip, and the elongated protrusions may have a generally triangular cross-section. Further, the knurled surface may be provided only on a portion of a circumference of the first opening. Additionally, as in the case of the first embodiment, the clip may be formed of a resilient material.

[0020] According to an additional feature, the first and second opening may be formed continuously with one another, and the clip may include spaced apart distal ends. Further, the first opening may have a first radial center and a first diameter, and the second opening may have a second radial center and a second diameter. In this regard, the second may be provided between the concavity and the distal ends. Further, the first and second openings may be provided next to each other such that the first radial center of the first opening is radially spaced from said second radial center of the second opening, and the first diameter may be larger than the second diameter.

[0021] Additionally, the tool may be actuable within a patient's body, and may be one of a clip applier, forceps, scissors, grasper, punch (e.g., biopsy punch), specula (e.g., endocervical specula), a laparoscopic instrument, or clamp (e.g., a hysterectomy clamp).

[0022] Other exemplary embodiments and advantages of the present invention may be ascertained by reviewing the present disclosure and the accompanying drawings, and the above description should not be considered to limit the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The present invention is further described in the detail description which follows, in reference to the noted plurality of drawings, by way of non-limiting examples of preferred embodiments of the present invention, in which like characters represent like elements throughout the several views of the drawings, and wherein:

[0024] FIG. **1** is a perspective view of a clip of the endoscopic tool assembly according to an embodiment of the present invention;

[0025] FIG. **2** is a perspective view of the endoscopic tool assembly of the present invention; and

[0026] FIG. **3** is a perspective view of a clip of the endoscopic tool assembly according to a second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] The particulars shown herein are by way of example and for purposes of illustrative discussion of the embodiments of the present invention only and are presented in the cause of providing what is believed to be the most useful and readily understood description of the principles and conceptual aspects of the present invention. In this regard, no attempt is made to show structural details of the present invention in more detail than is necessary for the fundamental understanding of the present invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the present invention may be embodied in practice.

[0028] Referring to the drawings, wherein like characters represent like elements, FIG. **1** shows a perspective view of a clip **10** of a first embodiment of the endoscopic tool assembly, having first **20***a* and second **20***b* openings (i.e., first and second grips) according to a non-limiting embodiment of the present invention. The first opening **20***a* may have a first radial center C_1 and a first diameter D_1, and engages a peripheral surface of the endoscopic tool **1**. The second opening **20***b* may have a second radial center C_2 and a second diameter D_2, and engages a peripheral surface of the endoscope **2** (as illustrated in FIG. **2**). The clip **10**, when coupling the tool **1** and/or scope **2**, is configured to be held within and engage inner surfaces of a sheath S. Further, it is appreciated by one of skill in the art that the sheath S may be configured to be inserted into a mammalian body, and an inner surface of the sheath S may be configured to engage an outer surface of the clip. While FIG. **2** shows the clip being used with a rigid tool **1** and scope **2**, those skilled in the art will readily appreciate that flexible tools and scopes may be used with the clip in alternative embodiments. The second opening **20***b* may be provided between the first opening **20***a* and a bottom opening **20***c* of the clip **10**. In this regard, the first **20***a* and second **20***b* openings may be provided next to each other such that the first radial center C_1 of the first opening is radially spaced from the second radial center C_2 of the second opening. In addition, the first diameter D_1 may be larger than the second diameter D_2.

[0029] In addition, the first opening **20***a* may be provided having a knurled surface **30** configured to engage the peripheral (or outer) surface of the endoscopic tool **1** to restrict rotation of the tool within the clip. In this regard, the knurled surface **30** may include generally elongated protrusions **30***a* extending in a direction generally perpendicular to the first diameter D_1 although it is understood by those of skill in the art that the knurled surface may include any surface configured to restrict rotation of the tool **1**, including but not limited to circular protrusions, diagonally extending protrusions, and the like. Further, the elongated protrusions **30***a* may have a generally triangular cross-section although those of skill in the art would appreciate that other suitable cross-sections may be used in alternative embodiments, including but not limited to trapezoidal, semicircular, rectangular and the like.

The knurled surface **30** may also be provided only on a portion of a circumference of the first opening **20***a*. That is, by providing the knurled surface **30** improved engagement between the first opening **20***a* and an endoscopic tool **1** can be achieve, thereby further preventing, e.g., rotational and translational movement between the clip **10**, the endoscopic tool **1**, and the endoscope **2**. However, one of ordinary skill in the art would recognize that any suitable arrangement or structure for positively coupling the clip to either one of an endoscopic tool or endoscope may be employed without departing from the spirit and scope of the present invention.

[0030] Also, in one non-limiting example, the endoscope may be provided having an outer diameter of about 1.0 mm to about 2.0 mm; the tool may be provided having an outer diameter of about 5.0 mm; and the sheath S may be provided having an outer diameter of about 10.0 mm and a length of about eight inches. However, one of ordinary skill in the art would recognize that any suitable size scope, tool, and sheath S may be employed without departing from the spirit and scope of the present invention.

[0031] Further, as illustrated in FIG. **1**, the clip **10** of the endoscopic tool assembly may be provided with generally oppositely facing first **40***a* and second **40***b* lobes provided on a circumference of the first opening **20***a*. Additionally, generally oppositely facing third **50***a* and fourth lobes **50***b* may be provided on a circumference of the second opening **20***b*. In this regard, each of the first **40***a* and second lobes **40***b* may be provided to be larger than each of the third **50***a* and fourth lobes **50***b*. The clip **10** may be formed of a resilient material, e.g., plastic, rubber, elastomer, or any other suitable resilient materials and mixtures thereof.

[0032] The first lobe **40***a*, the second lobe **40***b*, and the first opening **20***a* together may form a upper clip body **60***a*; and the third lobe **50***a*, the fourth lobe **50***b*, and the second opening **20***b* together may form a lower clip body **60***b*. A concavity in the form of concavities **70***a*, **70***b* may be provided on each respective side of the clip to connect the upper clip body **60***a* to the lower clip body **60***b* thereby forming a generally mushroom-shaped clip **10** which couples the endoscopic tool **1** and the endoscope **2** together. In other words, concavity **70***a* flexibly connects (e.g., by a living hinge) the first lobe **40***a* to the third lobe **50***a*, and concavity **70***b* flexibly connects (e.g., by a living hinge) the second lobe **40***b* to the forth lobe **50***b*. It is appreciated by those skilled in the art that by providing a clip having the aforementioned features, a clip having sufficient strength and resiliency properties can be achieved; thereby ensuring that the clip **10**, endoscopic tool **1**, and endoscope **2** are reliably coupled together (i.e., thereby forming a secure and reliable endoscopic tool assembly), as illustrated in FIG. **2**. It is also appreciated by those skilled in the art that, while a pair of concavities **70***a*, **70***b* is shown, a number of cavities which are fewer or greater than the two cavities may be present without departing from the spirit and scope of the present invention.

[0033] It is appreciated, by those skilled in the art that the tool may be configured to be any suitable surgical tool. For example, the tool may be a clip applier having a body assembly which may include a handle and a squeezable trigger, a barrel having a first end extending into the body assembly, a pair of jaws arranged on a second end of the barrel, the jaws being actuable by squeezing action of the trigger, the second end of the barrel and the pair of jaws configured to be inserted into a body cavity, and a loading port in communication with the barrel. The barrel may be configured to alternatively accept the insertion, through the loading port, of a first cartridge type containing a plurality of clips of a first size and/or shape, or a second cartridge type containing a plurality of clips of a second size and/or shape, the first size and/or shape being different from the second size and/or shape. Also, the pair of jaws may be configured to accept one clip of the plurality of clips of the first size by opening to a first jaw gap, wherein the pair of jaws is further configured to accept a clip of the plurality of clips of the second size by opening to a second jaw gap. A non-limiting example of such a clip applier is described in U.S. Pat. No. 6,277,131, which is expressly incorporated by reference herein. Additionally, the tool may be configured as a rigid or flexible grasper, as disclosed in U.S. Pat. No. 6,620,184, which is expressly incorporated by reference herein.

[0034] Additionally, the upper clip body **60***a* may be formed having a generally semi-circular shape. In this regard, the first lobe **40***a*, the second lobe **40***b*, and the first opening **20***a* may together form the generally semi-circular shape, thereby providing the clip **10** with appropriate strength characteristics, e.g., for positively retaining the endoscopic tool **1** and coupling the endoscope **2** thereto. However, one of ordinary skill in the art would recognize that any shape of form for positively retaining the endoscopic tool and coupling the endoscope thereto may be employed without departing from the objects of the present invention. Further, it is appreciated by one of skill in the art that the sheath S may be configured to be inserted into a mammalian body, and an inner surface of the sheath S may be configured to engage an outer surface of the clip.

[0035] Additionally, as illustrated in FIG. **1** the first opening **20***a* of the clip **10** may be provided in an upper clip body **60***a* and the second opening **20***b* may be provided in a lower clip body **60***b*. In this regard, the concavities **70***a*, **70***b* connect the upper clip body **60***a* to the lower clip body **60***b*. Further, the second opening **20***b* may be configured to contract and expand due to the flexing of the concavities **70***a*, **70***b*. Additionally, the upper clip body **60***a* may include a connector **75** (e.g., a living hinge) which connects a first half of the clip to a second half of the clip. In this regard, the first and second halves may be generally mirror images of each other (i.e., as shown by the symmetrical line "A" in FIG. **1**). Additionally, the first opening **20***a* may be configured to contract and expand due to flexing of the connector **75**. In other words, the flexing of the connector **75** causes the distance between the first lobe **40***a* and second lobe **40***b* to be adjusted to accommodate a tool. Also, the flexing of the concavities **70***a*, **70***b* causes the distance between the third lobe **50***a* and the fourth lobe **50***b* to be adjusted to accommodate a scope, without adjusting the distance between the first lobe **40***a* and the second lobe **40***b*.

[0036] The clip **10** is configured to provide a dual spring function such that the clip can accept tools and scopes of various sizes. Therefore, tools and scopes of various sizes may be used together. That is, the connector **75** may provide the clip with a first spring function by allowing the first opening **20***a* to contract and expand due to the flexing of the connector **75**; and the concavities **70***a*, **70***b* may provide the clip with a second spring function by allowing the second opening **20***b* to contract and expand due to flexing of the concavities **70***a*, **70***b*. Because the connector **75** may flex independently of the concavities **70***a*, **70***b*, and the concavities **70***a*, **70***b* may flex independent of the connector **75**, the clip **10** allows for scopes and tools to be used together regard-

less of the size variations therebetween. For example, a smaller diameter scope may be replaced in the clip with a larger diameter scope, thereby causing the concavities **70***a*, **70***b* to flex outwardly to accommodate the larger diameter scope, without causing the connector **75** to flex outwardly as well (which would otherwise loosen the grip of the first opening **20***a* on the tool **1**), allowing both tool and scope to be securely held by the clip. Thus, the tool assembly of the present invention may be provided with a dual spring function.

[0037] As illustrated in the further non-limiting embodiment of FIG. **3**, a clip **100** which couples an endoscopic tool **1** and an endoscope **2** together to form an endoscopic tool assembly may be provided having a generally cylindrical body **110**. The generally cylindrical body **110** may be provided having first **200***a* and second **200***b* openings which engage the endoscopic tool **1** and the endoscope **2**, respectively. A peripheral surface of the cylindrical body **110** may be configured to engage an inner circumferential surface of a sheath S configured to receive the endoscopic tool **1** and the endoscope **2** therein, thereby preventing fluid passage between peripheral surfaces of the endoscopic tool **1** and endoscope **2**, and an inner circumferential surface of the sheath S. For example, the aforementioned generally cylindrical clip **100** may be provided as a custom clip provided with an outer periphery formed to engage (e.g., to matingly engage) an inner circumferential surface of a sheath employed in a particular application, to thereby prevent the passage of fluid past the clip **100**. However, one of ordinary skill in the art would recognize that the cylindrical clip **100** may also be provided in various sizes (i.e., without customization) in which an appropriate size is selected for a suitable application.

[0038] Further, as illustrated in FIG. **3**, the first opening **200***a* provided in the generally cylindrical body **110** may also have a knurled surface **300** which engages the peripheral surface of the endoscopic tool **1**. The knurled surface **300** may include generally elongated protrusions **300***a* extending in a direction generally perpendicular to a first diameter D_1 of the first opening although the knurled surface may be provided having any suitable shape or form (e.g., circular protrusions, diagonally extending protrusions, and the like). The elongated protrusions **300***a* may have a generally triangular cross-section, although other suitable cross-sectional configurations may be used, including but not limited to trapezoidal, semicircular, rectangular and the like. Additionally, the knurled surface **300** may be provided only on a portion of a circumference of the first opening **200***a*. Further, the clip **100** may be formed of a resilient material. However, one of ordinary skill in the art would recognize that any suitable arrangement or structure for positively coupling the clip to either one of an endoscopic tool or endoscope may be employed without departing from the spirit and scope of the present invention.

[0039] As illustrated in FIG. **3**, the first opening **200***a* may have a first radial center C_1 and a first diameter D_1, and the second opening **200***b* may have a second radial center C_2 and a second diameter D_2. Further, the second opening **200***b* may be provided between the first opening **200***a* and a bottom opening **200***c* provided in the clip **100**. In this regard, the first **200***a* and second **200***b* openings may be provided next to each other such that the first radial center C_1 of the first opening **200***a* is radially spaced from the second radial center C_2 of the second opening **200***b*. Additionally, the first diameter D_1 may be provided to be larger than the second diameter D_2. Further, in an alternative embodiment, the clip **100** may be provided without the bottom opening **200***c*.

[0040] Additionally, the tool may be actuable within a patient's body, and may be any type configured to be used in surgical procedures, including but not limited to a clip applier, forceps, scissors, grasper, punch (e.g., biopsy punch), specula (e.g., endocervical specula), a laparoscopic instrument, or clamp (e.g., a hysterectomy clamp).

[0041] Further, one of ordinary skill in the art would appreciate that either one of the clips, **10** and **100**, respectively, may be formed with the respective openings (i.e., **20***a* and **20***b*, & **200***a* and **200***b*) not being in communication with each other (i.e., provided separately with the clip).

[0042] It is further noted that the foregoing examples have been provided merely for the purpose of explanation and are in no way to be construed as limiting of the present invention. While the present invention has been described with reference to a preferred embodiment, it is understood that the words which have been used herein are words of description and illustration, rather than words of limitation. Changes may be made, within the purview of the appended claims, as presently stated and as amended, without departing from the scope and spirit of the present invention in its aspects. Although the present invention has been described herein with reference to particular means, materials and embodiments, the present invention is not intended to be limited to the particulars disclosed herein; rather, the present invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims.

What is claimed is:

1. A surgical tool assembly comprising:
a surgical tool;
a scope; and
a detachable clip which couples said tool and scope, said clip having a first grip which engages a surface of said tool and a second grip which engages a surface of said scope, wherein said first and second grips are formed continuously with one another.

2. The surgical tool assembly according to claim **1**, wherein said clip comprises a bottom opening.

3. The surgical tool assembly according to claim **1**, wherein said first grip comprises a knurled surface which engages said peripheral surface of said tool.

4. The surgical tool assembly according to claim **3**, wherein said knurled surface comprises generally elongated protrusions extending in a direction generally perpendicular to a first diameter of said first grip, said elongated protrusions having a generally triangular cross-section.

5. The surgical tool assembly according to claim **3**, wherein said knurled surface is provided only on a portion of a circumference of said first grip.

6. The surgical tool assembly according to claim **1**, wherein said clip comprises generally oppositely facing first and second lobes provided on a circumference of said first grip.

7. The surgical tool assembly according to claim **1**, further comprising a sheath configured to be inserted into a mammalian body, wherein an inner surface of said sheath is configured to engage an outer surface of said clip.

8. The surgical tool assembly according to claim **6**, wherein said clip comprises generally oppositely facing third and fourth lobes provided on a circumference of said second grip.

9. The surgical tool assembly according to claim **8**, wherein each of said first and second lobes are larger than each of said third and fourth lobes.

10. The surgical tool assembly according to claim **8**, wherein said first lobe, said second lobe, and said first grip together form a upper clip body, and wherein said third lobe, said fourth lobe, and said second grip together form a lower clip body.

11. The surgical tool assembly according to claim **8**, wherein said clip further comprises a concavity which connects said upper clip body to said lower clip body.

12. The surgical tool assembly according to claim **11**, wherein said upper and lower clip bodies form a generally mushroom-shape.

13. The surgical tool assembly according to claim **10**, wherein said upper clip body has a generally semi-circular shape.

14. The surgical tool assembly according to claim **1**, wherein said clip is formed of a resilient material.

15. The surgical tool assembly according to claim **2**, further comprising:

a concavity connecting said first and second grips;

said first grip having a first center and a first diameter;

said second grip having a second center and a second diameter; and

wherein said second grip is provided between said concavity and said bottom opening; wherein said first and second grips are provided next to each other such that said first radial center of said first opening is radially spaced from said second radial center of said second opening, and wherein said first diameter is larger than said second diameter.

16. The surgical tool assembly according to claim **1**, wherein said tool is actuable within a patient's body.

17. The surgical tool assembly according to claim **1**, wherein said tool is one of a clip applier, forceps, scissors, grasper, punch, specula, a laparoscopic instrument, or clamp.

18. The surgical tool assembly according to claim **1**, wherein said first grip is provided in an upper clip body and said second grip is provided in a lower clip body, and wherein a concavity hingedly connects said upper clip body to said lower clip body.

19. The surgical tool assembly according to claim **18**, wherein said second grip is configured to contract and expand as a result of flexing of said concavity.

20. The surgical tool assembly according to claim **18**, wherein said upper clip body comprises a connector which hingedly connects a first half of the clip to a second half of the clip, the first and second halves being generally mirror images of each other, and wherein said first grip is configured to contract and expand as a result of flexing of said connector.

21. The surgical tool assembly according to claim **19**, wherein said upper clip body comprises a connector which hingedly connects a first half of the clip to a second half of the clip, the first and second halves being generally mirror images of each other, and wherein said first grip is configured to contract and expand as a result of flexing of said connector.

22. A surgical tool assembly comprising:

a surgical tool;

a scope;

a detachable clip which couples said tool and endoscope, said clip having a generally cylindrical body including first and second grips which engage said surgical tool and scope, respectively; and

wherein a surface of said cylindrical body is configured to engage an inner surface of a sheath configured to receive said tool assembly therein.

23. The surgical tool assembly according to claim **22**, wherein said clip comprises a bottom opening.

24. The surgical tool assembly accordingly to claim **22**, wherein said first opening comprises a knurled surface which engages a peripheral surface of the tool.

25. The surgical tool assembly accordingly to claim **24**, wherein said knurled surface comprises generally elongated protrusions extending in a direction generally perpendicular to a first diameter of said first grip, said elongated protrusions having a generally triangular cross-section.

26. The surgical tool assembly accordingly to claim **24**, wherein said knurled surface is provided on only a portion of a circumference of said first grip.

27. The surgical tool assembly accordingly to claim **22**, wherein said clip is formed of a resilient material.

28. The surgical tool assembly accordingly to claim **22**, wherein said first and second grips are formed continuously with one another.

29. The surgical tool assembly according to claim **28**, wherein said clip comprises spaced apart distal ends.

30. The surgical tool assembly accordingly to claim **29**, further comprising:

a concavity connecting said first and second grips; and

wherein said first grips has a first radial center and a first diameter, wherein said second grip has a second radial center and a second diameter, wherein said second grip is provided between said concavity and distal ends, wherein said first and second grips are provided next to each other such that said first radial center of said first opening is radially spaced from said second radial center of said second opening, and wherein said first diameter is larger than said second diameter.

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专利名称(译)	内窥镜工具组件		
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当前申请(专利权)人(译)	MICROLINE外科INC.		
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发明人	MENN, PAVEL		
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摘要(译)

提供一种手术工具组件，其具有手术工具，窥镜;和一个可拆卸的夹子，它连接工具和范围。夹子包括第一把手和第二把手，第一把手接合工具的外周表面，第二把手接合示波器的外周表面。另外，第一和第二把手可以彼此连续地形成。