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(54) ULTRASONIC SCALPEL HANDLE

(57) Disclosed is an ultrasonic scalpel handle, comprising a tool bit mounting portion (1), a transducer mounting portion (2) connected to a rear end of the tool bit mounting portion (1), and a handheld portion (3) connected to a rear end of the transducer mounting portion (2). The ultrasonic scalpel handle has two bending structures consisting of a front bending portion (4) and a rear bending portion (5), and the front bending portion (4) and the rear bending portion (5) have opposite bending directions. The ultrasonic scalpel handle of the invention is simple in structure, convenient for fabrication, flexible in operation and of wide range of applications. When the ultrasonic scalpel of the present invention is used in operation, a position for an operator to hold the ultrasonic scalpel is changed, thereby removing a gripping portion which may block a line of sight outside a surgical view, so that a doctor's surgical view is clearer, especially in the field of minimally invasive surgery requiring fine observation, the ultrasonic scalpel handle of the present invention can exert its advantages. The ultrasonic scalpel handle of the present invention has a wider range of applications, shorter operation time, higher surgical safety and less patient suffering.

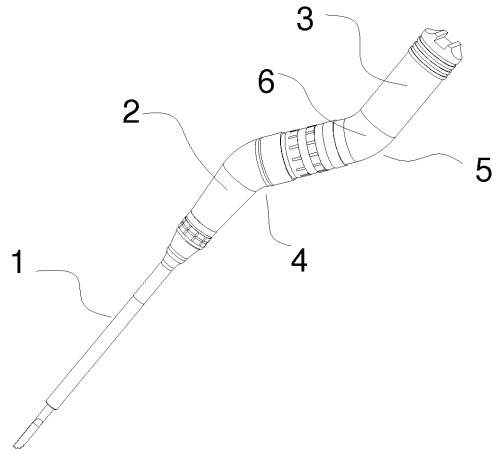

Fig. 1

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of medical instruments and devices, and more particularly to an ultrasonic scalpel handle.

BACKGROUND OF THE INVENTION

[0002] In modern clinical medicine, ultrasonic surgical equipment has been gradually applied in various fields such as orthopedics, neurosurgery, burns, ophthalmology, etc. A surgeon holds an ultrasonic scalpel and performs a surgical operation. Except that an ultrasonic hemostatic scalpel uses a clamping type handle, other types of ultrasonic scalpels typically use straight or bending handles, which has had a wide applications in open surgery. Bending handles can also better meet general requirements for viewing.

[0003] In the current minimally invasive surgery, due to the limitation of holding ways, the straight or curved handle each has a problem of obscuring the doctor's line of sight, which greatly limits the applications of the ultrasonic scalpel, resulting in that this advanced technology cannot be used to a wider range in the field of surgery.

SUMMARY OF THE INVENTION

[0004] In order to solve the above problems in the prior art, the present disclosure provides an ultrasonic scalpel handle having a double-bend structure, the ultrasonic scalpel handle comprises a tool bit mounting portion, a transducer mounting portion connected to a rear end of the tool bit mounting portion, and a handheld portion connected to a rear end of the transducer mounting portion, wherein the ultrasonic scalpel handle has two bending structures consisting of a front bending portion and a rear bending portion, respectively, and the front bending portion and the rear bending portion have opposite bending directions.

[0005] In the ultrasonic scalpel handle of the present invention, preferably, the front bending portion is formed on the transducer mounting portion, and a rear straight segment of the transducer mounting portion having formed with the front bending portion forms an angle with the handheld portion so as to form the rear bending portion.

[0006] In the ultrasonic scalpel handle of the present invention, preferably, the rear straight segment of the transducer mounting portion is connected with the handheld portion by a hinge capable of adjusting a bending angle, and the hinge has a locking mechanism.

[0007] In the ultrasonic scalpel handle of the present invention, preferably, the front bending portion is formed on the transducer mounting portion, and the rear bending portion is formed on the handheld portion.

[0008] In the ultrasonic scalpel handle of the present invention, preferably, the front bending portion is formed on the tool bit mounting portion, and the rear bending portion is formed on the handheld portion.

[0009] In the ultrasonic scalpel handle of the present invention, preferably, a bent tool bit is attached to the tool bit mounting portion to form the front bending portion, and the rear bending portion is formed on the handheld portion.

[0010] In the ultrasonic scalpel handle of the present invention, preferably, the rear bending portion formed on the handheld portion has a hinge for adjusting a bending angle, and the hinge has a locking mechanism.

[0011] In the ultrasonic scalpel handle of the present invention, preferably, a bent tool bit is attached to the tool bit mounting portion to form the front bending portion, and the rear bending portion is formed on the transducer mounting portion.

[0012] In the ultrasonic scalpel handle of the present invention, preferably, a length of the handheld portion is freely adjustable.

[0013] In the ultrasonic scalpel handle of the present invention, preferably, the handheld portion and the transducer mounting portion are of an integral structure or a separate structure.

[0014] The ultrasonic scalpel handle of the invention is simple in structure, convenient for fabrication, flexible in operation and of wide range of applications. When the ultrasonic scalpel of the present invention is used in operation, a position for an operator to hold the ultrasonic scalpel is changed, thereby removing a gripping portion which may block a line of sight, to the outside of a surgical view, so that a doctor's surgical view is clearer, especially in the field of minimally invasive surgery requiring fine observation, the ultrasonic scalpel handle of the present invention can exert its advantages. The ultrasonic scalpel handle of the present invention has a wider range of applications, shorter operation time, higher surgical safety and less patient suffering. The handheld portion of the handle can be produced separately and easily, and the angle and length of the handheld portion are adjustable, making the operation more flexible.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] In order to clearly describe the technical solutions of the embodiments of the present invention or the prior art, a brief description will be made for the drawings to describe the embodiments. Apparently, the drawings provided only show some embodiments of the present invention. For those skilled in the art, other drawings may be obtained according to the disclosed drawings without inventive labor.

Fig. 1 is a schematic perspective view of an ultrasonic scalpel handle according to a first embodiment of the present invention;

Fig. 2 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the first embod-

iment of the present invention;

Fig. 3 is a schematic perspective view of an ultrasonic scalpel handle according to a second embodiment of the present invention;

Fig. 4 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the second embodiment of the present invention;

Fig. 5 is a schematic perspective view of an ultrasonic scalpel handle according to a third embodiment of the present invention; and

Fig. 6 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the third embodiment of the present invention.

List of Reference Numerals:

[0016] 1~tool bit mounting portion; 2~transducer mounting portion; 3~handheld portion; 4~front bending portion; 5~rear bending portion; 6~hinge.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Exemplary embodiments of the present invention will be described hereinafter clearly and completely with reference to the attached drawings. Apparently, the embodiments described herein are only portions of embodiments of the invention, rather than all embodiments of the invention. It is intended that all other embodiments obtained by those skilled in the art according to the disclosed embodiments without inventive labor are all within the scope of the present invention.

[0018] In the description of the present invention, it is to be noted that the terms of "center", "upper", "lower", "left", "right", "vertical", "horizontal", "internal", "external" and the like simply indicate orientational or positional relationship based on the accompanying drawings and are used only for the purpose of facilitating and simplifying the description of the invention, rather than specifying or implying that any devices or elements indicated must have a certain orientation, be configured or operate in a certain orientation. Therefore, these terms will not be interpreted as limiting the present invention. Further, the terms of "first", "second" and "third" and the like are only used for describing purpose, rather than being interpreted as specifying or implying relative importance.

[0019] In the description of the present disclosure, it is to be noted that, unless otherwise specified or defined clearly, the term of "attach", "connect to", "connect with", "couple" and the like should be interpreted broadly. For example, they may refer to fixed connection, or detachable connection, or integral connection; they may refer to mechanical connection, or electrical connection; they may refer to direct connection, or indirect connection through an intermediate agent, or internal communication between two components. For those skilled in the art, the specific meaning of these terms in the present disclosure may be understood in combination with specific situations or contexts.

[0020] Fig. 1 is a schematic perspective view of an ultrasonic scalpel handle according to a first embodiment of the present invention. Fig. 2 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the first embodiment of the present invention. As shown in Figs.1 and 2, the ultrasonic scalpel handle according to the first embodiment of the present invention includes a tool bit mounting portion 1, a transducer mounting portion 2 connected to a rear end of the tool bit mounting portion 1, and a handheld portion 3 connected to a rear end of the transducer mounting portion 2. The ultrasonic scalpel handle has two bending structures, i.e., a front bending portion 4 and a rear bending portion 5, respectively, and the front bending portion 4 and the rear bending portion 5 has opposite bending directions. An ultrasonic tool bit and a water injection sleeve may be attached to the tool bit mounting portion 1. The front bending portion 4 and the rear bending portion 5 together form a double-bend structure that is similar to a bend structure of a human leg. During a surgery, a doctor can hold a vicinity of the rear bending portion 5 with single hand for an operation, or hold the transducer mounting portion 2 and the handheld portion 3 with two hands for an operation. The tool bit mounting portion 1 below the front bending portion 4 is completely exposed to the doctor's field of view, so that the doctor can clearly observe the condition of a site for a surgical operation. On that basis, an amplification apparatus can also be used to assist in a minimally invasive surgery, which greatly expands the range of applications for the ultrasonic scalpel handle, improves safety of the operation, reduces burdens on the doctor, and reduces sufferings of a patient.

[0021] Further referring to Figs. 1 and 2, in the ultrasonic scalpel handle according to the first embodiment of the present invention, the front bending portion 4 is formed on the transducer mounting portion 2, and a rear straight segment of the transducer mounting portion 2 having formed with the front bending portion 4 forms an angle with the handheld portion 3 so as to form a rear bending portion 5. Optionally, the handheld portion 3 and the rear straight segment of the transducer mounting portion 2 may also be connected with each other by a hinge 6 capable of adjusting a bending angle, and a locking member (not shown) may be provided on the hinge 6.

[0022] Further, in the ultrasonic scalpel handle according to the first embodiment of the present invention, alternatively, the front bending portion 4 may be formed on the transducer mounting portion 2, and the rear bending portion 5 may be formed on the handheld portion 3. The handheld portion 3 may be provided with a hinge 6 for adjusting a bending angle, and the hinge 6 may be provided with a locking member (not shown). The main function of the handheld portion 3 is to facilitate an operator to hold the ultrasonic scalpel handle, and there are no electronic devices therein, so that the bending angle of the rear bending portion 5 of the handheld portion 3 can be fixed or adjustable. A length of the handheld portion 3 can be fixed or be freely adjusted, which is convenient

for use. As described above, the rear bending portion 5 on the handheld portion 3 has a hinge 6 for adjusting the bending angle, so that an operator can adjust the hinge 6 into an appropriate angle according to a surgical need, and then lock the locking member to fix the hinge 6 at an angle required in the surgery.

[0023] Fig. 3 is a schematic perspective view of an ultrasonic scalpel handle according to a second embodiment of the present invention, and Fig. 4 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the second embodiment of the present invention. As shown in Figs. 3 and 4, in the ultrasonic scalpel handle according to the second embodiment of the present invention, a front bending portion 4 is formed on the tool bit mounting portion 1, and a rear bending portion 5 is formed on the handheld portion 3. In the second embodiment, since there is no bending formed on the transducer mounting portion 2, the transducer mounting portion 2 has a straight structure, so that a linear ultrasonic transducer can be mounted, which is advantageous for fabricating the ultrasonic transducer and improving the performance of the ultrasonic transducer. Optionally, the rear bending portion 5 on the handheld portion 3 may be provided with a hinge 6 for adjusting a bending angle, and the hinge 6 may be provided with a locking member (not shown). During a surgery, once an operator adjusts the hinge 6 into an appropriate angle according to a surgical need and locks the locking member, the hinge 6 can be fixed at a desired angle to achieve the best surgical effect.

[0024] Further, as a modification of the second embodiment, a bent tool bit may be attached to the tool bit mounting portion 1 to form the front bending portion 4, and the rear bending portion bend 5 may be formed on the handheld portion 3. Also, since there is no bending formed on the transducer mounting portion 2, a linear ultrasonic transducer can be mounted, which is advantageous for fabricating the ultrasonic transducer and for improving the performance of the ultrasonic transducer. Optionally, the rear bending portion 5 on the handheld portion 3 may be provided with a hinge 6 for adjusting a bending angle, and the hinge 6 may be provided with a locking member (not shown). During a surgery, once an operator adjusts the hinge 6 into an appropriate angle according to a surgical need and locks the locking member, the hinge 6 can be fixed at a desired angle to achieve the best surgical effect.

[0025] Fig .5 is a schematic perspective view of an ultrasonic scalpel handle according to a third embodiment of the present invention, and Fig. 6 is a schematic cross-sectional view of the ultrasonic scalpel handle according to the third embodiment of the present invention. As shown in Figs. 5 and 6, in the ultrasonic scalpel handle according to the third embodiment of the present invention, a bent tool bit may be attached to the tool bit mounting portion 1 to form the front bending portion, and the rear bending portion is formed on the transducer mounting portion 2. In this case, since the main function of the handheld portion 3 is to facilitate an operator to hold the ultrasonic scalpel handle, there are no electronic devices therein, so that a bending angle of the rear bending portion of the handheld portion 3 can be fixed or adjusted. A length of the handheld portion 3 can be fixed or freely adjusted to facilitate the operation during a surgery.

[0026] In the above embodiments of the invention, the handheld portion 3 and the transducer mounting portion 2 may be integrally formed to form an integral structure. The integral structure of the handheld portion 3 and the transducer mounting portion 2 is more simple and compact and has a longer service life.

[0027] In the above embodiments of the present invention, the handheld portion 3 and the transducer mounting portion 2 may also have a separate structure. With the separate structure, the handheld portion 3 and the transducer mounting portion 2 can be separately produced, which is easy for fabrication and replacement.

[0028] Compared with the prior art, the embodiments of the present invention have the following advantages: the ultrasonic scalpel handle of the invention is simple in structure, convenient for fabrication, flexible in operation and of wide range of applications. When the ultrasonic scalpel of the present invention is used in operation, a position for an operator to hold the ultrasonic scalpel is changed, thereby removing a gripping portion which may block a line of sight outside a surgical view, so that a doctor's surgical view is clearer, especially in the field of minimally invasive surgery requiring fine observation, the ultrasonic scalpel handle of the present invention can exert its advantages.

[0029] It should be noted that the above embodiments are only used to describe the concept of the present invention, rather than limiting the present invention. Although detailed descriptions of the invention are made with reference to the above embodiments, it would be appreciated by those skilled in the art that various changes or modifications to the above embodiments may be made or equivalent substitutions to portion of or all features in those embodiments may be made. Such changes, modifications or substitutions will not make the spirit of the relevant solutions depart from the scope of the present invention.

Claims

1. An ultrasonic scalpel handle, comprising a tool bit mounting portion, a transducer mounting portion connected to a rear end of the tool bit mounting portion, and a handheld portion connected to a rear end of the transducer mounting portion, wherein
the ultrasonic scalpel handle has two bending structures consisting of a front bending portion and a rear bending portion, and the front bending portion and the rear bending portion have opposite bending directions.

2. The ultrasonic scalpel handle of claim 1, wherein the front bending portion is formed on the transducer mounting portion, and a rear straight segment of the transducer mounting portion having formed with the front bending portion forms an angle with the handheld portion so as to form the rear bending portion.

3. The ultrasonic scalpel handle of claim 2, wherein the rear straight segment of the transducer mounting portion is connected with the handheld portion by a hinge capable of adjusting a bending angle, and the hinge has a locking mechanism.

4. The ultrasonic scalpel handle of claim 1, wherein the front bending portion is formed on the transducer mounting portion, and the rear bending portion is formed on the handheld portion.

5. The ultrasonic scalpel handle of claim 1, wherein the front bending portion is formed on the tool bit mounting portion, and the rear bending portion is formed on the handheld portion.

6. The ultrasonic scalpel handle of claim 1, wherein a bent tool bit is attached to the tool bit mounting portion to form the front bending portion, and the rear bending portion is formed on the handheld portion.

7. The ultrasonic scalpel handle of any one of claims 4 to 6, wherein
the rear bending portion formed on the handheld portion has a hinge for adjusting a bending angle, and the hinge has a locking mechanism.

8. The ultrasonic scalpel handle of claim 1, wherein a bent tool bit is attached to the tool bit mounting portion to form the front bending portion, and the rear bending portion is formed on the transducer mounting portion.

9. The ultrasonic scalpel handle of any one of claims 1 to 6 and 8, wherein
a length of the handheld portion is freely adjustable.

10. The ultrasonic scalpel handle of any one of claims 1 to 6 and 8, wherein
the handheld portion and the transducer mounting portion are of an integral structure or a separate structure.

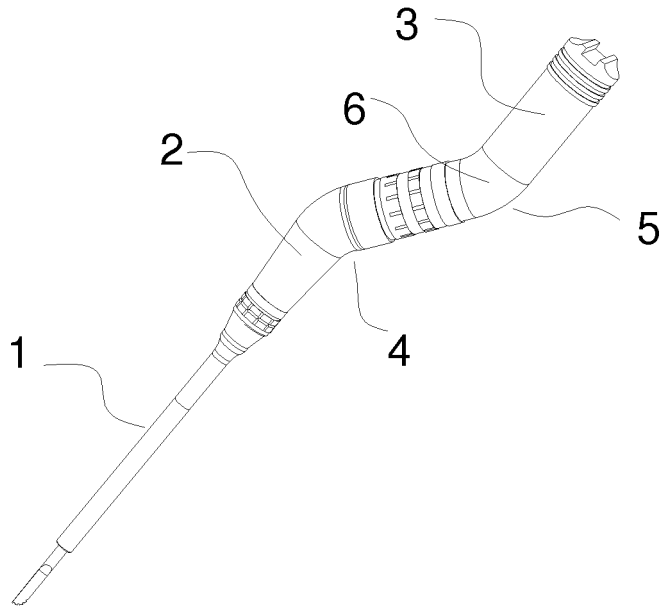

Fig. 1

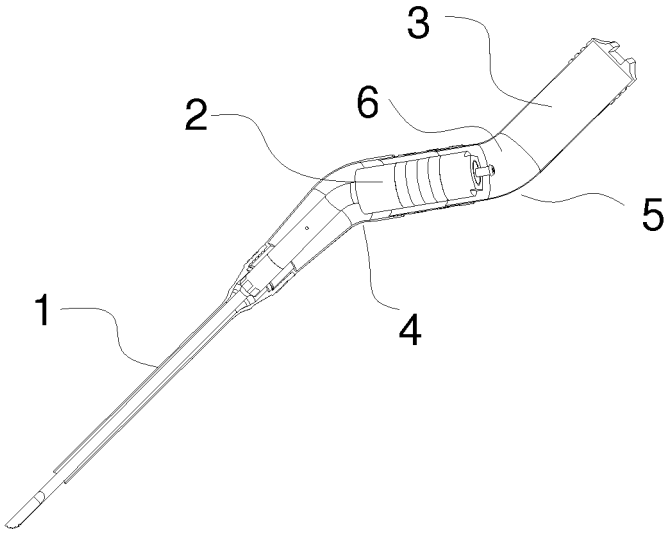

Fig. 2

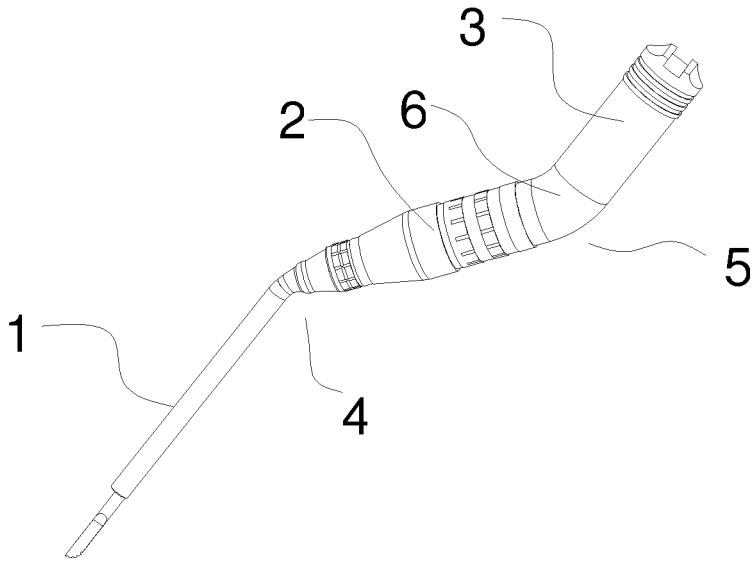

Fig. 3

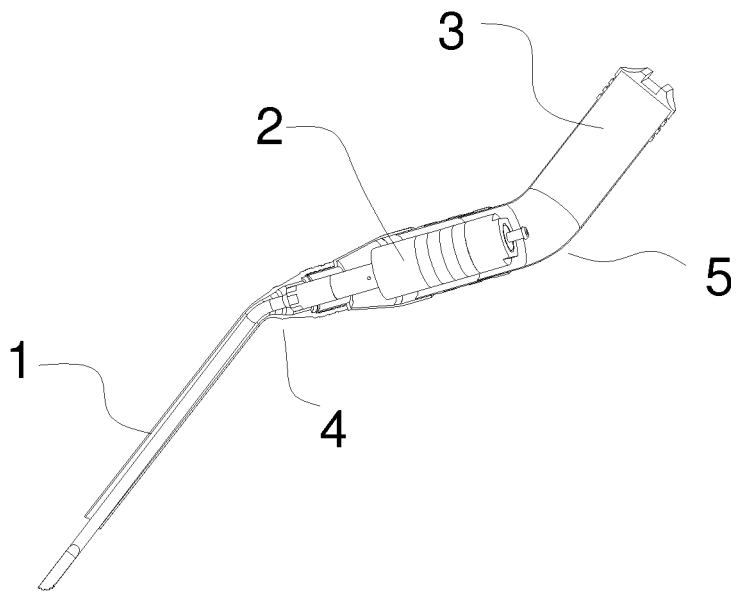

Fig. 4

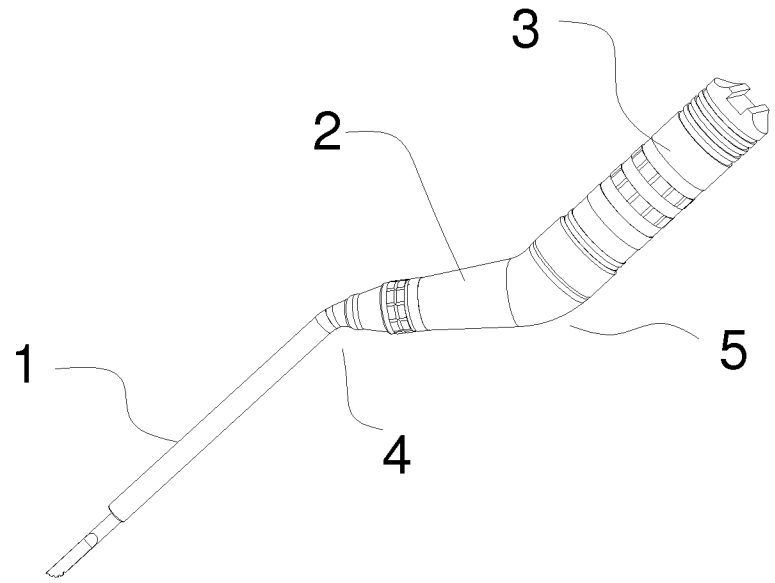

Fig. 5

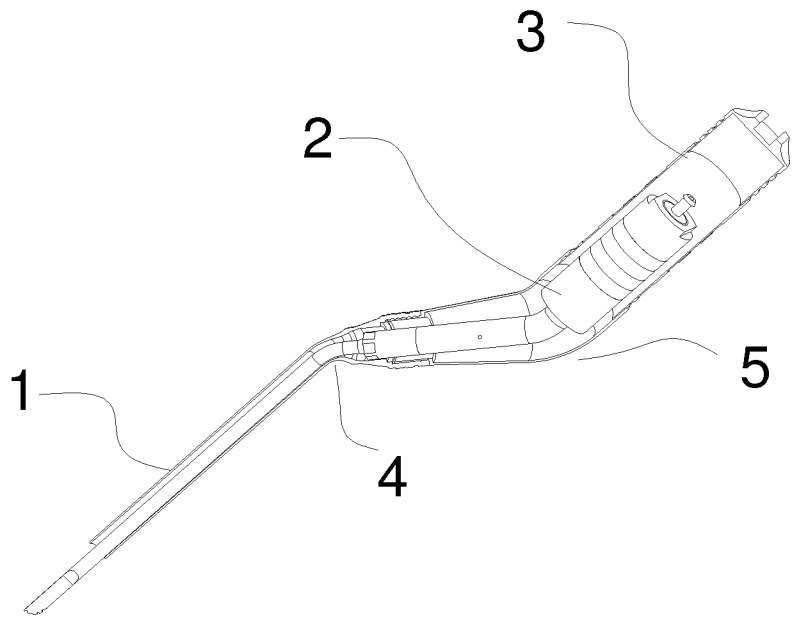

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/092569

A. CLASSIFICATION OF SUBJECT MATTER

A61B 17/32 (2006.01) i

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)

A61B 17/-

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)

CNKI, CNPAT, WPI, EPODOC: 江苏水木天蓬科技有限公司, 罗卓荆, 曹群, 战松涛, 超声, 手术刀, 超声刀, 刀柄, 弯折, 弯曲, 反 s 方向, 换能器, 转换器, ultrasonic, ultrasound, transducer, scalpel, bistoury, knife, handle, bend, double, curve

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 206183335 U (JIANGSU SHUIMU CANOPY TECHNOLOGY CO., LTD.) 24 May 2017 (24.05.2017), claims 1-10	1-10
Y	CN 205198132 U (ANJIN MEDICAL TECHNOLOGY BEIJING CO., LTD.) 04 May 2016 (04.05.2016), description, paragraphs [0029]-[0059], and figures 1-6	1-10
Y	CN 2852965 Y (YU, Jinhui) 03 January 2007 (03.01.2007), description, page 1, the last paragraph, and figure 1	1-10
A	CN 102665577 A (LASZLO CSILY et al.) 12 September 2012 (12.09.2012), entire document	1-10
A	CN 204814077 U (LAN, Qing) 02 December 2015 (02.12.2015), entire document	1-10
A	WO 2014123874 A1 (STRYKER CORPORATION) 14 August 2014 (14.08.2014), entire document	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 September 2017	29 September 2017
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer XING, Minghao Telephone No. (86-10) 62413449

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/092569

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 206183335 U	24 May 2017	None	
CN 205198132 U	04 May 2016	None	
CN 2852965 Y	03 January 2007	None	
CN 102665577 A	12 September 2012	EP 2473119 B1	01 April 2015
		HU 0900538 A2	28 April 2011
		CA 2772954 A1	10 March 2011
		WO 2011027183 A2	10 March 2011
		EP 2473119 A2	11 July 2012
		US 2012232339 A1	13 September 2012
		AU 2010290955 A1	19 April 2012
		CN 102665577 B	25 November 2015
		HU 229773 B1	30 June 2014
CN 204814077 U	02 December 2015	None	
WO 2014123874 A1	14 August 2014	None	

Form PCT/ISA /210 (patent family annex) (July 2009)

专利名称(译)	超声刀手柄		
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申请号	EP2017838505	申请日	2017-07-12
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[标]发明人	ZHAN SONGTAO CAO QUN		
发明人	LUO, ZHUOJING ZHAN, SONGTAO CAO, QUN		
IPC分类号	A61B17/32		
代理机构(译)	DAUB，THOMAS		
优先权	201620845590.2 2016-08-08 CN		
外部链接	Espacenet		

摘要(译)

本发明公开了一种超声手术刀手柄，包括刀头安装部分（1），连接到刀头安装部分（1）后端的换能器安装部分（2），以及连接到后部的手持部分（3）换能器安装部分（2）的一端。超声手术刀手柄具有两个弯曲结构，包括前弯曲部分（4）和后弯曲部分（5），前弯曲部分（4）和后弯曲部分（5）具有相反的弯曲方向。本发明的超声刀手柄结构简单，制作方便，操作灵活，应用广泛。当在操作中使用本发明的超声刀时，操作者保持超声手术刀的位置改变，从而移除可能阻挡手术视野外的视线的抓握部分，从而医生的手术视图是更清楚，特别是在需要精细观察的微创手术领域中，本发明的超声刀手柄可以发挥其优点。本发明的超声手术刀手柄具有更广泛的应用范围，更短的手术时间，更高的手术安全性和更少的患者痛苦。

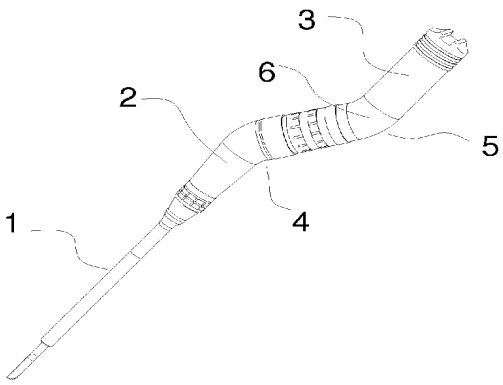

Fig. 1