(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 March 2012 (01.03.2012)

PCT

(10) International Publication Number
WO 2012/026809 A2

(51) International Patent Classification:
A61B 17/00 (2006.01)

(21) International Application Number:
PCT/NL2011/050570

(22) International Filing Date:
21 August 2011 (21.08.2011)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:
1038192 22 August 2010 (22.08.2010) NL
2005359 16 September 2010 (16.09.2010) NL

(72) Inventor; and
(71) Applicant : **JANSEN, Anton** [NL/NL]; Boekenrood-eweg 4, NL- 2111 HM Heemstede (NL).

(74) Agent: **VISSER-LUIRINK, Gesina**; Postbus 76068, NL-1070 EB Amsterdam (NL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: DEVICE FOR REMOVING TISSUE

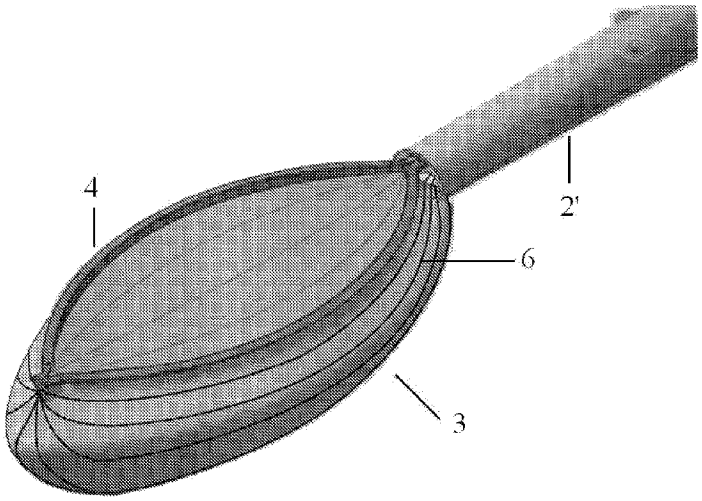

Fig. 4

(57) Abstract: Described is a device for removing tissue by means of laparoscopy or thoracoscopy, consisting of an operating part (1) and an optionally partially open hollow tube (2, 2') with guide for operating a removing part, wherein the removing part has the form of a zeppelin (3) with one or more ribs. The removing part is provided on the upper side with longitudinal connecting elements (4). Further described is an application of such a device in a surgical treatment, wherein using the operating part the removing part with the form of a zeppelin (3) is opened out, the removed tissue is collected in the expanded bag and the removing part with tissue is pulled optionally at least partially into the open part of the hollow tube, wherein the connecting elements (4) of the removing part are brought together, snapped or zipped closed.

WO 2012/026809 A2

Device for removing tissue

The invention relates to a device for removing tissue by means of laparoscopy or thoracoscopy and to application thereof during a surgical treatment.

When laparoscopic and thoracoscopic surgery is performed, use is frequently made of an extraction apparatus, an endo-removal apparatus such as for instance the endobag®, which generally consists of an operating part with handle, a tubular guide with trocar and a removing part. The organ or parts thereof to be removed is collected in this removing part, which is formed for instance by a plastic bag, wherein the spread of malignant or infected cells is prevented. This is described for instance in the American patent document US 5,480,404. The American patent document US 5,215,521 describes a removing part which can be moved out of and into the tubular guide using pneumatic means. Operation thereof requires the application of a pressure/vacuum system. The greatest drawback of these endo-removal apparatuses is that the tissue which is extracted cannot be easily transported along other tissue. An opening must further be made in the thorax or abdominal wall for the organ or parts thereof to be removed, this opening being kept as small as possible in order to minimize the scarring to be left, and thereby facilitate the extraction. Some organs are also removed via a hollow organ which can be accessed from outside the body, such as stomach, rectum and vagina, wherein it is also important that the tissue to be extracted has the smallest possible volume.

The European patent EP 959775 describes the use in the endo-removal apparatus of wires of spring steel inside the plastic bag parallel to the axis to enable cutting of the tissue into portions or compressing thereof. There is however a great risk of leakage of possibly malignant tissue fluid here.

The invention has for its object to design an endo-removal apparatus, wherein the form of the tissue to be removed automatically takes up a position such that the cross-sectional diameter is as small as possible, and to thereby facilitate the extraction. This implies that the axis of the tissue to be removed must run as parallel as possible to the tubular guide. In this latter position the plastic bag slides easily along the organs and the opening to be made in the stomach or abdominal wall is as small as possible. The

endo-removal part must further be both watertight and airtight and resistant to damage during the extraction of the tissue to be removed.

The present invention has for its object to provide a device of the type stated in the preamble, comprising an operating part with handle (1) and an optionally partially open hollow tube with guide (2) for operating a removing part, wherein the removing part has the form of a zeppelin (3) with one or more ribs. This zeppelin form as parallel as possible to the hollow tube is advantageous as it takes up little space in the transport of removed tissue along other tissue such as organs, and can be easily pulled at least partially under or into the tubular guide. The removing part can preferably be closed in airtight and watertight manner so as to prevent leakage of possibly malignant tissue. The removing part with the form of a zeppelin (3) is more preferably provided for this purpose on the upper side with longitudinal connecting elements (4). The connecting elements (4) are particularly of plastic or metal, and more particularly the one connecting element is provided with for instance thickened portions and the other connecting element with corresponding recesses, and these elements are preferably suitable for closing in accordance with a snap or zip principle.

In the removing part of the device according to the invention one or more ribs preferably run in a more or less oval shape in the longitudinal direction (6) of the zeppelin (3), and these ribs more preferably run on into the optionally partially open, hollow tubular guide (2, 2').

The removing part with the form of a zeppelin (3) of the device according to the invention is preferably provided with a curved support (5) in order to facilitate pulling of this removing part into the hollow tube. The curved support can optionally have a lazy S-shape. The removing part with the form of a zeppelin (3) is preferably provided with a venting reservoir (9) with the purpose of preventing possibly imminent overpressure inside the removing part.

The handle of the operating part (1) is particularly connected to one or more of the ribs which run on into the optionally partially open, hollow tube (2), wherein the ribs can be pulled in during use in order to make the diameter of the zeppelin with the extracted tissue as small as possible. The handle is more particularly connected to a closing mechanism of the connecting elements (4). When the handle is also connected

to one or more ribs, during use the removing part can advantageously be closed in combination with a narrowing of the space between the ribs.

According to a first preferred embodiment of the invention, the hollow tube (2) is partially open on the underside on the side of the removing part and is provided on the side of the removing part with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

According to a second preferred embodiment of the invention, the hollow tube (2) is closed, in which tube a rod (8) is situated on the side of the removing part and provided with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

Separately of the form of the removing part, the use of a hollow tube which is optionally partially open on the underside in the transport of removed tissue is also new and particularly advantageous. Another aspect of the invention is therefore formed by the device for removing tissue by means of laparoscopy or thoracoscopy, comprising an operating part with handle (1) and a hollow tube (2) with guide for operating a removing part, wherein a part of the hollow tube (2) is optionally partially open on the underside on the side of the removing part, and is provided on the same side with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

Another aspect of the invention is formed by applying the first preferred embodiment of the invention in a surgical treatment, wherein using the operating part the removing part with the form of a zeppelin (3) is opened out, the removed tissue is collected in the expanded removing part and the removing part with tissue is pulled at least partially into the open part of the hollow tube, wherein the connecting elements (4) of the removing part are brought together, snapped or zipped closed.

Yet another aspect of the invention is formed by applying the second preferred embodiment of the invention in a surgical treatment, wherein using the operating part the removing part with the zeppelin form (3) is opened out and the rod (8) is pushed out, the removed tissue is collected in the expanded removing part, and the removing part with tissue is pulled at least partially into the rod (8), wherein the connecting elements (4) of the removing part are brought together, snapped or zipped closed.

The ribs in the removing part (3) are preferably of plastic or light metal.

The connecting elements (4) preferably consist of plastic or metal flanges with a resilient action. They have a bias which ensures that they move apart as soon as they are pushed out of the tubular guide (2). When retracted they are pressed together in the tubular guide and they close the removing part (3). By means of being zipped or snapped shut the flanges can be closed with a closing mechanism so that separation of the flanges during extraction can be prevented. The flanges can be provided for this purpose at the outer end with a thickened portion and a recess therebehind with a configuration such that, after closing of the zeppelin, this closure is anchored and fully closed so that no further separation can take place. Other configurations for closure of the flanges with toothing are also possible. The two connecting elements (4) such as flanges can also be identical and be brought together in the hollow tube or in the rod present in the hollow tube. The material of which the zeppelin-like removing part according to the invention consists is not critical, but must be watertight and airtight; in the first instance flexible material such as plastic or other flexible synthetic materials is suitable.

When applying the partially open, hollow tube or half-open tube of the first embodiment of the invention it is also possible and advantageous to close the removing part by sliding this half-open tube over the connecting elements (4). The zeppelin-like configuration of the removing part with an oval shape in the horizontal plane and a lazy S-shape in the vertical plane makes extending of the removing part in the tube possible during closing.

The rod (8) of the second embodiment of the invention must have a form such that it fits in the hollow tube and is provided with an additional tubular open space, generally forming part of the open space of the hollow tube. The opening of the open space of the rod has a shape suitable for receiving both connecting elements (4) of the removing part.

In both embodiments of the invention it is recommended to retract the removing part into the tubular guide by pulling on the ribs. This can for instance be realized by arranging an instrument which is connected to the ribs and can pull on them, such as for instance a turn-buckle, on the outer end of the hollow tube, whereby the removing part can be retracted into the rod or partially open hollow tube.

In the present patent application the form of a zeppelin with ribs is understood to mean slightly more than the lower half of a zeppelin as known as airship and as shown in figures 1-5 and 9. This configuration of the removing part can also be designated in the open position as the form of a scoop or convex spoon, which can also be advantageously obtained when a plurality of ribs run more or less ovally in the longitudinal direction (6) of the zeppelin form (3) of the removing part or, in other words, more or less parallel to the connecting elements, which ribs have a bias and take the form of a scoop or spoon when the removing part is opened out, see particularly figure 4. With the S-shaped or lazy S-shaped support (5) this rib is indicated in the form as shown in figure 1, wherein the S-shape is visible on the long side of the zeppelin.

The zeppelin with ribs can also be envisaged as a cage with flexible bars in which the tissue for removal is safely packaged and transported either into the hollow tubular guide partially open on the underside or into the closed hollow tubular guide.

The terms tubular guide and tube with guide are used as synonyms in the present patent application. In the present patent application a partially open hollow tube is understood to mean a hollow tube which, at least during use, has on the underside an open part situated on the side of the removing part. An optionally partially open hollow tube is also understood to include the possibility of a closed hollow tube.

In this patent application tissue is understood to mean human or animal material or fluids, such as organs or blood and other bodily fluids. The tubular guide as part of the device according to the invention can also comprise a trocar.

The present invention is further elucidated with reference to the following drawings of the device for removing tissue according to the invention.

Figure 1 is an oblique front view of a part of the device with hollow tube with guide (2) for operating the removing part in the form of a zeppelin (3) with one or more ribs, connecting elements (4) and an S-shaped support (5).

Figure 2a is a front view of the first preferred embodiment of the invention comprising an operating part (1) with a hollow tube (2) which is partially open (2') on the underside on the side of the zeppelin-like removing part (3).

Figure 2b is a front view of the first preferred embodiment of the invention, comprising an operating part (1) with a hollow tube (2) which is partially open (2') on

the underside on the side of the zeppelin-like removing part (3), wherein this partially open part of the hollow tube has been pushed over the removing part (4).

Figure 3 is an enlarged view of the removing part of figure 2b in the form of a zeppelin with ribs (3), closed connecting elements (4) and an S-shaped support (5), wherein the open part of the hollow tube (2') has been pushed over the removing part (4).

Figure 4 is an oblique front view of the first preferred embodiment of the invention in the form of a zeppelin with spoon-like ribs (3) running more or less parallel to the connecting elements (4) and running on into the hollow tube (2').

Figure 5 is an oblique front view of the second preferred embodiment of the invention with a hollow tube (2) which is also closed on the underside, in which tube is situated a rod (8) which is provided on the side of the removing part with an opening (7) in a form suitable for receiving both connecting elements (4) of the zeppelin-like removing part (3).

Figure 6 is a front view of a part of the device according to the invention with a hollow tube (2) which is also closed on the underside and provided with an opening (7).

Figure 7 shows a cross-section of a zeppelin-like removing part (3) of the device according to the invention with connecting elements (4) in open position.

Figure 8 shows a cross-section of a zeppelin-like removing part (3) of the device according to the invention with connecting elements (4) in closed position in opening (7) of the hollow tube (2) optionally open on the underside.

Figure 9 is an oblique front view of the removing part with the form of a zeppelin provided with a venting reservoir (9).

The figures are for the most part schematic and not drawn to scale. Corresponding parts are designated in the figures with the same reference numerals.

Figure 1 shows an oblique detail front view of the removing part in the form of a zeppelin (3) with one or more ribs, connecting elements (4) and an S-shaped support (5). The ribs and S-shaped support impart shape and support to the removing part and facilitate the possible partial retraction of the removing part into the tube. Figures 2a and 2b show two positions of the first embodiment of the device according to the

invention, wherein the tubular guide (2) comprises a part (2') which is open on the underside and which, once the tissue to be removed has been received in the zeppelin-like removing part (3), is pushed over this removing part as shown in figure 2b. The opening on the underside of the part (2') of the hollow tube which is partially open tapers if necessary in order to realize the most efficient possible closure of the removing part.

The part (2') of figure 2b is shown enlarged in figure 3. The ribs on the rear side of the removing part are preferably already situated partially in the tubular guide (2) of the first embodiment or in the rod (8) of the second embodiment of the invention, whereby as the tube is pushed further forward the ribs are forced to move further inward. Also due to the curved form of supporting ribs the removing part will be urged partially or wholly upward in the tube or rod, and the bag will be compressed on the underside in the tube or rod.

Figure 4 shows the removing part in the expanded form in a further preferred embodiment of the first embodiment of the device according to the invention, i.e. in zeppelin form with ribs (3) in the longitudinal direction more or less parallel to the connecting elements and the open part of the hollow tube (2') into which the ribs run. An embodiment with a removing part with the same form of ribs, but then applied in the second embodiment of the invention with a closed hollow tube, otherwise also forms part of the present invention.

Figure 5 shows the tubular guide (2) and the removing part (3) of the second embodiment of the device according to the invention, wherein present in the hollow tubular guide is a rod (8) which, once the tissue to be removed has been received in the zeppelin-like removing part (3), can be pushed over this removing part. The rod (8) comprises for this purpose an opening (7) with a form suitable for receiving the connecting elements (4). When this rod is pushed over the connecting elements (4), they are for instance snapped or zipped together, whereby the removing part (3) is closed.

Figure 6 shows such an opening (7) in a form suitable for collecting or receiving the two connecting elements (4) of a removing part as shown for instance in figure 5.

Figures 7 and 8 show respectively the open and closed form of the removing part (3) of the device according to the invention. Able to serve as connecting elements (4) are for instance flanges of plastic which in closed position of the removing part are

received in the opening (7) of suitable form. Figure 9 shows the removing part with the form of a zeppelin provided with an example of a venting reservoir (9) with the purpose of preventing imminent overpressure inside the removing part. The venting reservoir preferably protrudes from the removing part into the tubular guide, from which it can be operated.

It will be apparent to the person with ordinary skill in the art that the present invention provides a new endo-removal apparatus in different embodiments which provides a great advantage relative to the existing endo-removal apparatuses, i.e. much safer removal and transport of tissue by means of laparoscopy or thoracoscopy than is possible with the heretofore known endo-removal apparatuses.

Although the invention is elucidated above on the basis of different embodiments and applications, it will be apparent that the invention is by no means limited thereto. On the contrary, many more variations are possible for a person with ordinary skill in the art within the scope of the invention.

Claims

1. Device for removing tissue by means of laparoscopy or thoracoscopy, comprising an operating part with handle (1) and an optionally partially open hollow tube (2) with guide for operating a removing part, wherein the removing part has the form of a zeppelin (3) with one or more ribs.

2. Device as claimed in claim 1, wherein the removing part can be closed in airtight and watertight manner.

3. Device as claimed in claim 2, wherein the removing part with the form of a zeppelin (3) is provided on the upper side with longitudinal connecting elements (4).

4. Device as claimed in claim 3, wherein the connecting elements (4) are of plastic or metal.

5. Device as claimed in claim 4, wherein the one connecting element is provided with thickened portions and the other connecting element with corresponding recesses.

6. Device as claimed in one or more of the claims 1-5, wherein one or more ribs run in a more or less oval shape in the longitudinal direction (6) of the zeppelin (3).

7. Device as claimed in one or more of the claims 1-6, wherein the removing part with the form of a zeppelin (3) is provided with a curved support (5).

8. Device as claimed in one or more of the claims 1-7, wherein the removing part with the form of a zeppelin (3) is provided with a venting reservoir (9).

9. Device as claimed in one or more of the claims 1-8, wherein the handle of the operating part (1) is connected to one or more of the ribs which run on into the optionally partially open, hollow tube (2).

10. Device as claimed in claims 1-9, wherein the handle is connected to a closing mechanism of the connecting elements (4).

11. Device as claimed in one or more of the claims 1-10, wherein a part of the hollow tube (2) on the side of the removing part is partially open on the underside and provided on the same side with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

12. Device as claimed in one or more of the claims 1-10, wherein the hollow tube (2) is closed, in which tube a rod (8) is situated on the side of the removing part and provided with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

13. Device for removing tissue by means of laparoscopy or thoracoscopy, comprising an operating part with handle (1) and a hollow tube (2) with guide for operating a removing part, wherein a part of the hollow tube (2) on the side of the removing part is optionally partially or wholly open on the underside and provided on the same side with an opening (7) in a form suitable for receiving both connecting elements (4) of the removing part.

14. Application of a device as claimed in claim 11 in a surgical treatment, wherein using the operating part the removing part with the form of a zeppelin (3) is opened out, the removed tissue is collected in the expanded removing part and the removing part with tissue is pulled at least partially into the open part of the hollow tube, wherein the connecting elements (4) of the removing part are brought together, snapped or zipped closed.

15. Application of a device as claimed in claim 12 in a surgical treatment, wherein using the operating part the removing part with the zeppelin form (3) is opened out and the rod (8) is pushed out, the removed tissue is collected in the expanded removing part, and the removing part with tissue is pulled at least partially into the rod (8), wherein the

connecting elements (4) of the removing part are brought together, snapped or zipped closed.

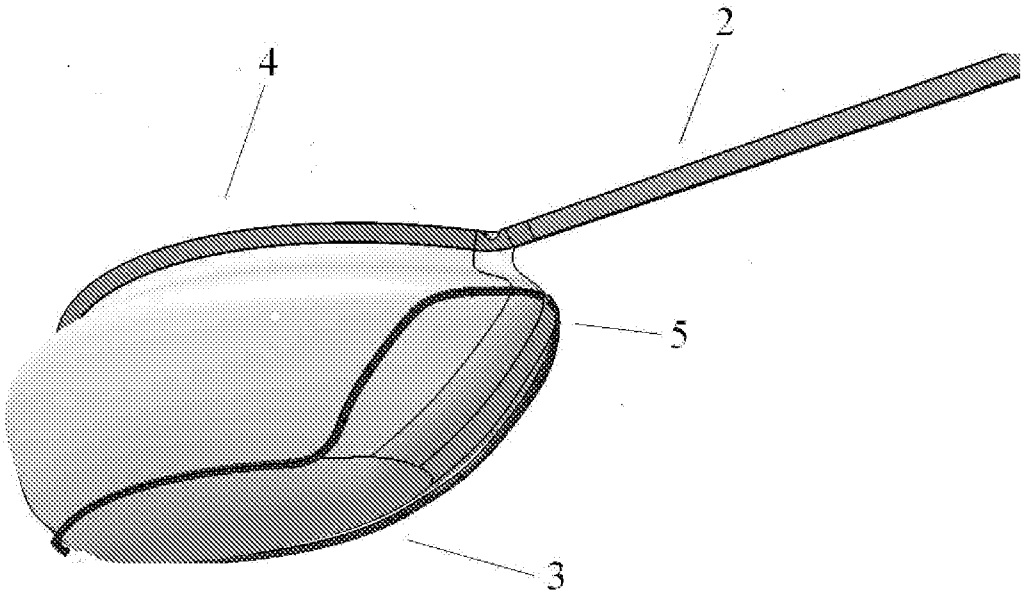

Fig. 1

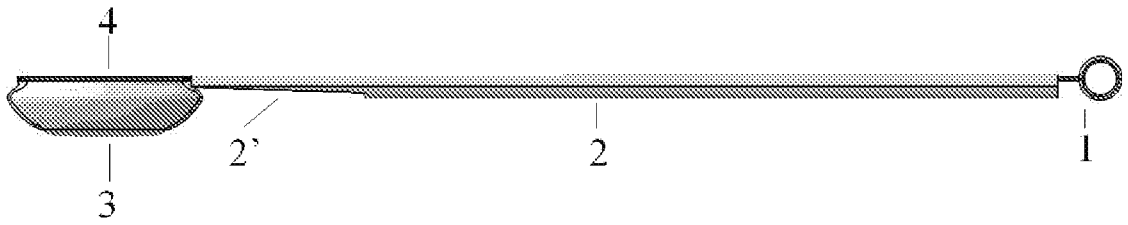

Fig. 2a

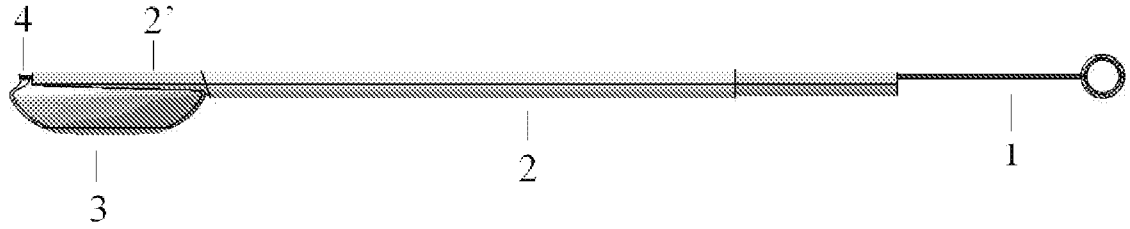

Fig. 2b

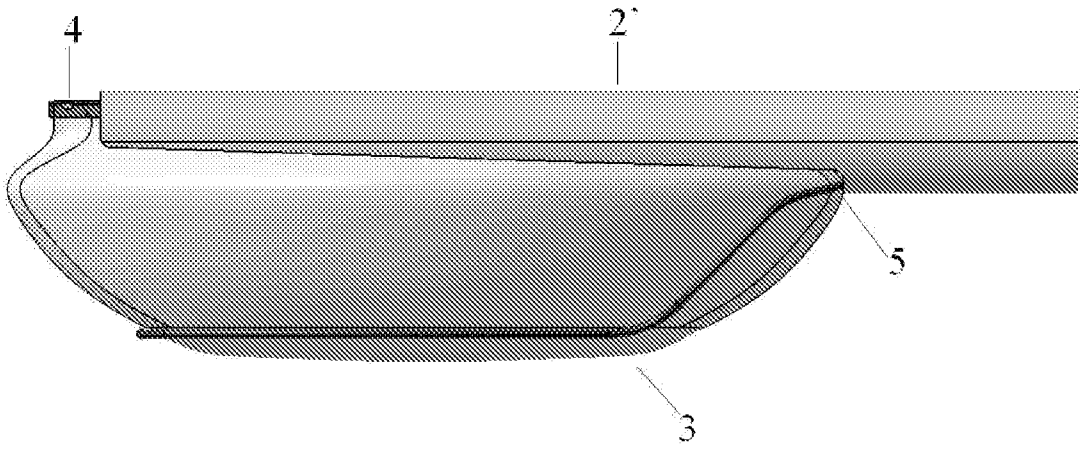

Fig. 3

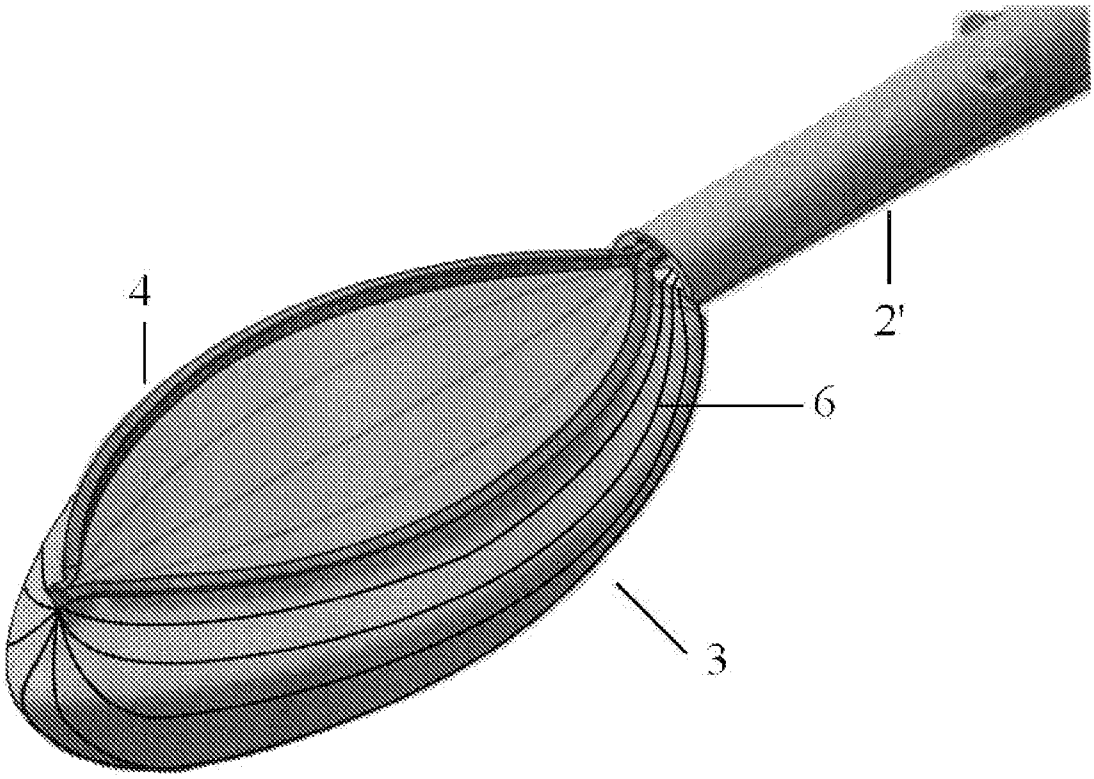

Fig. 4

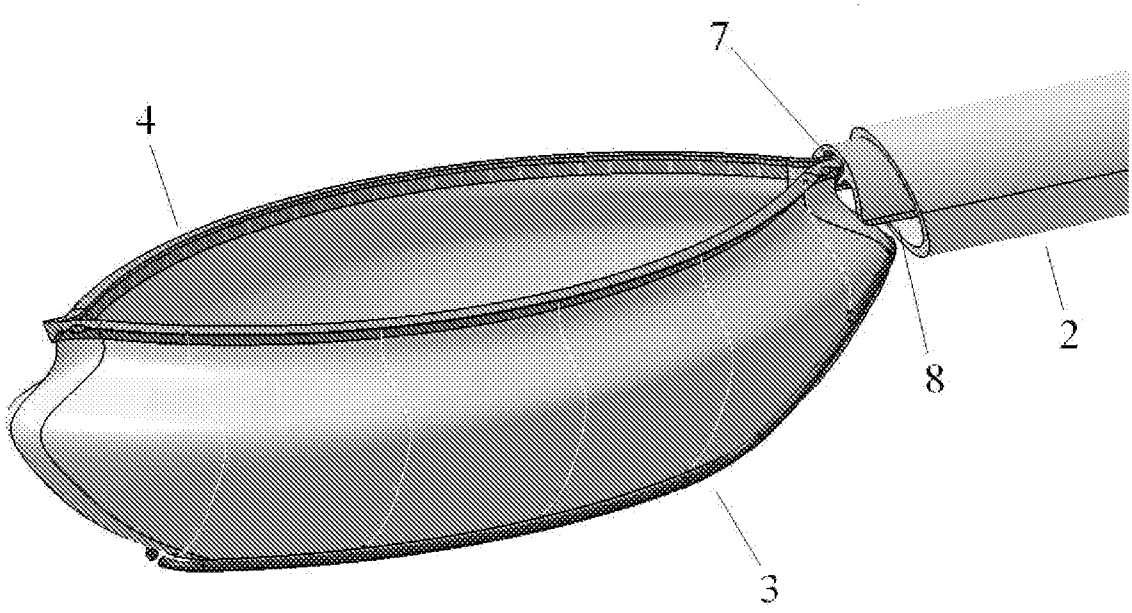

Fig. 5

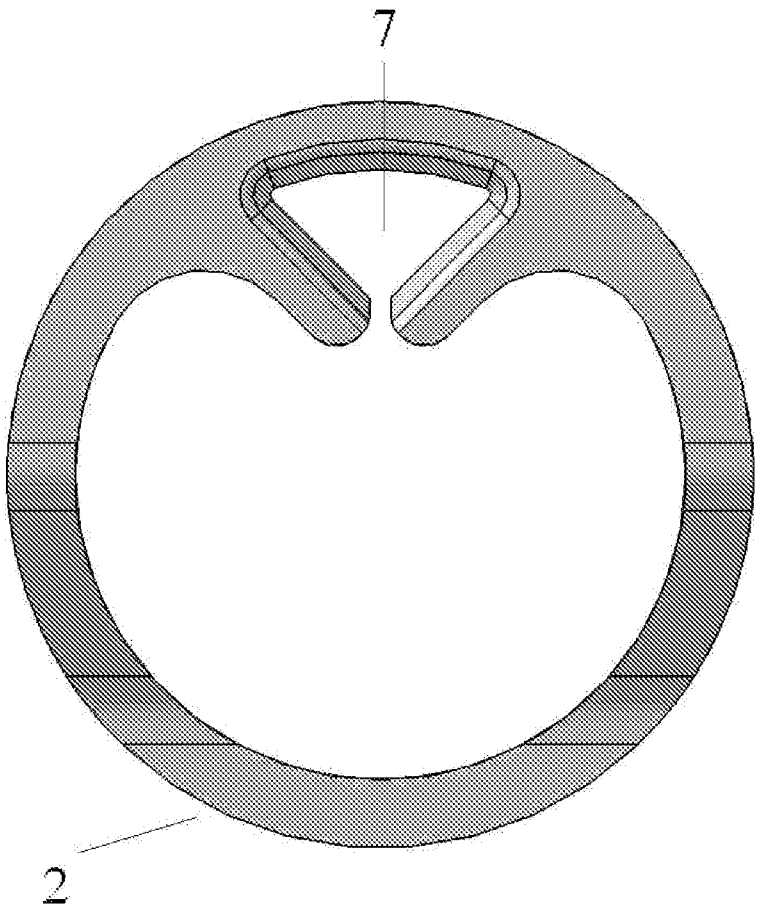

Fig. 6

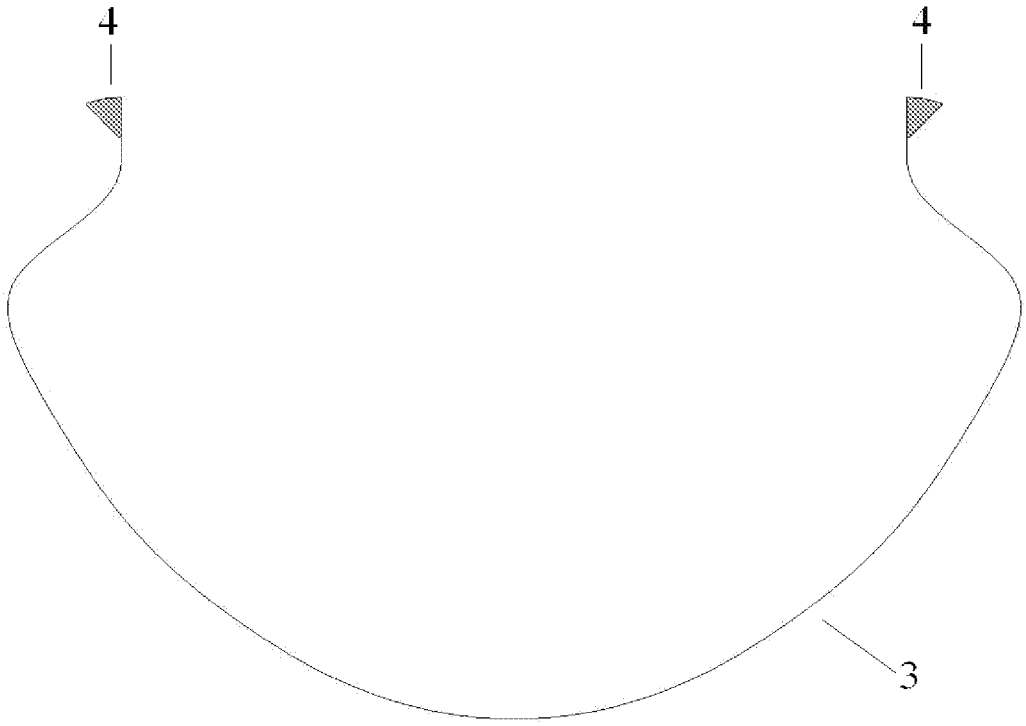

Fig. 7

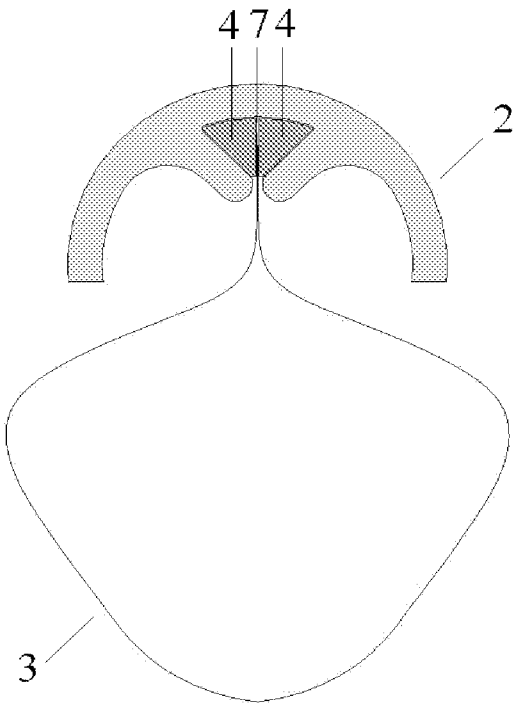

Fig. 8

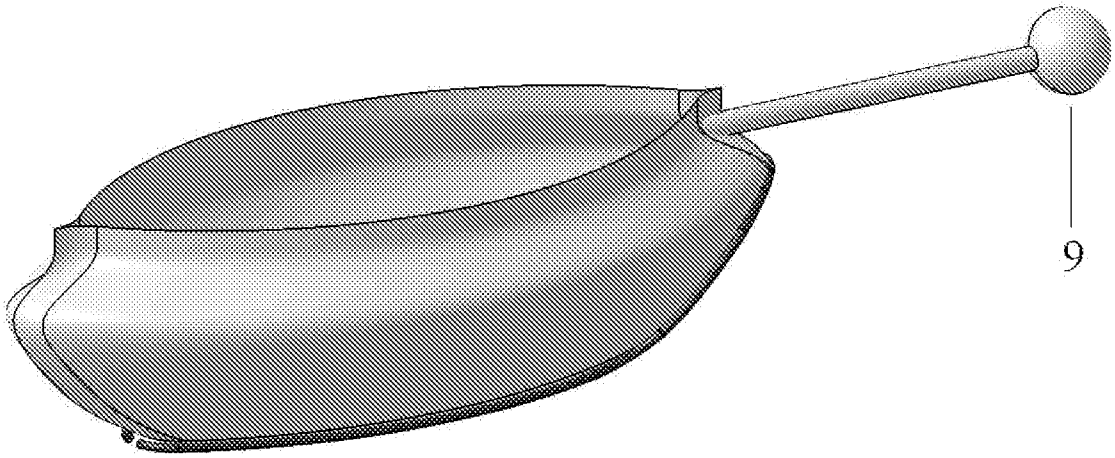

Fig. 9

专利名称(译)	用于移除组织的装置		
公开(公告)号	EP2605709A2	公开(公告)日	2013-06-26
申请号	EP2011763788	申请日	2011-08-21
[标]申请(专利权)人(译)	严实ANTON		
申请(专利权)人(译)	严实，ANTON		
当前申请(专利权)人(译)	严实，ANTON		
[标]发明人	JANSEN ANTON		
发明人	JANSEN, ANTON		
IPC分类号	A61B17/00		
CPC分类号	A61B17/00234 A61B2017/00287 A61B17/221		
代理机构(译)	VISSER-LUIRINK，GESINA		
优先权	2005359 2010-09-16 NL 1038192 2010-08-22 NL		
外部链接	Espacenet		

摘要(译)

描述了一种用于通过腹腔镜检查或胸腔镜检查来移除组织的装置，其包括操作部分（1）和可选地部分打开的中空管（2,2'），其具有用于操作移除部件的引导件，其中移除部件具有形式。齐柏林飞艇（3）的一个或多个肋骨。移除部分在上侧设置有纵向连接元件（4）。进一步描述了这种装置在外科手术治疗中的应用，其中使用手术部分打开具有齐柏林飞艇（3）形式的移除部分，将移除的组织收集在扩张袋中并且用组织收集移除部分可任选地至少部分地拉入中空管的开口部分，其中移除部分的连接元件（4）被放在一起，折断或拉链封闭。