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(54) Title: SINGLE-USE DISPOSABLE STERILE ENVELOPE FOR SURGICAL OPTICS

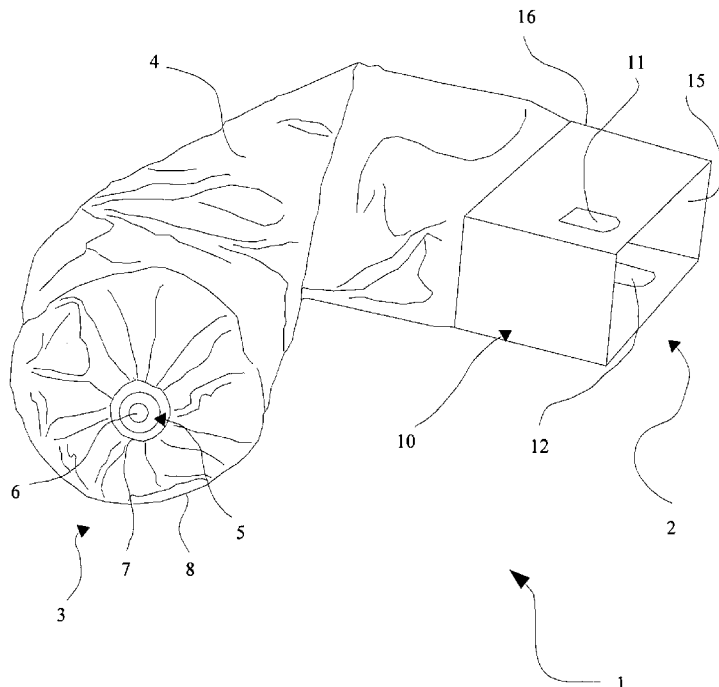


Fig. 1

(57) Abstract: The present invention relates to a single use, disposable, envelope device (1), comprising a flexible envelope having an openable proximal extremity (2) and a closed distal extremity (3), in which the closed distal extremity comprises a translucent, fluid impermeable, port means (5). Preferably the port means is adapted to distally receiving an optical or surgical tip or probe (20) and adapted to proximally engage an imaging equipment means (18). The device is particularly useful for laparoscopic and coelioscopic surgery where the imaging equipment needs to be protected from contamination, whilst at the same time allowing a perfect view of the area of the body being operated on.



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Single-Use Disposable Sterile Envelope Device for Surgical Optics

The present invention relates to single use, disposable devices adapted for use in surgery. Such single use, disposable devices are known generally in the surgical art, and have gained popularity with a variety of healthcare professionals and healthcare organisations, because they require little or no maintenance, and can be thrown away and the materials of which they are comprised recycled after use of the device. For this reason, many such devices are made of a plastics material, for example, polypropylene, polyethylene, of varying densities, i.e. high or low density, or many other plastics, such as high impact plastics, ABS, PVC, PET, polyurethanes, or their equally well known derivatives and modified polymers. Examples of such single-use, disposable medical devices are trocars, for instance, used in laparoscopic or coeliac surgery, or optical probes or tips, catheters, clamps, guides, surgical balloons, cauterising tips, and the like.

With regard to optically assisted surgery, one major problem that healthcare professionals encounter, for example when operating, is the fact that a truly sterile environment is almost impossible to maintain. This poses a further problem in that although typically only the interchangeable surgical heads and tips are fully sterilized, it would also be desirable to have the option of maintaining at least a sterile separation or barrier between the surgical head or tip and the camera or imaging head to which such tips may, as required or necessary, be connected. This is especially the case for equipment which is subject to manipulation by the surgeons and other healthcare professionals, and which is exposed to body fluids and the environment, and therefore potential contamination, with regard to the surrounding sterile operating environment. The risk of contamination means that such equipment, for example a camera head, and its cabling, must also be sterilized after the operation, which is a lengthy, and costly process, and further requires that the healthcare establishment have multiple sets of equipment, such as camera heads or mountings, all completely sterilized in order to be able to run a service normally and hygienically. Other optical assistance devices, such as ultrasound scan heads, often used for gynaecological and obstetric operations, also pose a problem with regard to

maintaining a sterile environment, and if such heads become unsterile, for whatever reason, they require a lengthy and awkward sterilisation process. In addition to the practical disadvantages of having to sterilize such equipment, the sterilisation process used causes destruction of the head over time, thereby shortening their useful
5 lifespan.

The present invention proposes to solve these problems, which are also long felt needs in the healthcare industry, especially for surgeons using imaging systems and optical instruments to assist them in their operations, by offering a single-use, disposable, sterile envelope device specifically adapted to protecting said
10 imaging systems and/or optical equipment, such as a camera head or mounting, and which is optionally attached to a scope, in particular, a coelioscope, laparoscope, arthroscope, hysteroscope, and uteroscope, or specifically adapted to directly protecting an imaging probe, such as an ultrasound probe or other digital imaging equipment. The envelope device of the present invention maintains the sterile field
15 around the imaging systems and/or optical equipment, preventing body fluids and possible contamination from projections or user operation from coming into contact with said imaging systems and/or optical equipment, thereby reducing the need for sterilisation, and consequently both increasing the lifespan and reducing the complexity of maintenance thereof.

As mentioned above, the envelope device of the invention is single use and disposable, thereby obviating the need for resterilisation. In addition, it is preferably made from a material that is sterilisable. More details of the envelope device of the present invention will be given hereafter.

One object of the present invention is therefore a single use, disposable,
25 envelope device, comprising :

- a flexible envelope means comprising an openable proximal extremity and a closed distal extremity ;
- whereby the closed distal extremity comprises a translucent, fluid or microorganism impermeable port means.

It is to be understood here and throughout the specification that the expression "fluid or microorganism impermeable" indicates that the material and other components of the envelope device of the present invention are impervious to

fluids under normal conditions of use, such as bodily fluids, or water, gases and other liquids, or even microorganisms, that may be found in the environment in which the device is used. The use of fluid or microorganism impermeable materials for the flexible envelope and other components of the device guarantees that the contents
5 inserted or contained within the device will remain protected compared to the outer surface of the device, which may come into contact with non-sterile areas and thus become contaminated.

In one preferred embodiment, the port means of the closed distal extremity is adapted to distally receiving an optical tip or optical probe and adapted
10 to proximally engaging a camera head means of a surgical optical instrument.

Preferably, the optical or surgical instrument is selected from the group consisting of a coelioscope, a laparoscope, a hysteroscope, a uteroscope, an arthroscope and the imaging system is any such system used in surgery or diagnosis, including an ultrasound probe or doppler system.

15 In yet another preferred embodiment, the mounting means of the imaging system which connects to the optical or surgical instrument is a grip twist lock socket or a bayonet socket, or spigot lock, or any other traditionally used locking mechanism. Especially preferred is the embodiment in which the mounting means is directly integrated into the imaging system.

20 Even more preferably, the translucent port is dimensioned to engage an inner diameter of the optical or surgical tip or probe. According to a particularly preferred embodiment, the translucent port can be affixed to the envelope by clipping the components of the port together to trap the envelope between them or, alternatively, is welded into the flexible envelope means, for example, by thermal
25 welding, or by polymer interaction welding, or gluing with an appropriate adhesive.

In yet more preferred embodiments, the translucent port comprises a translucent fluid or microorganism impermeable port plate, and a plate retainer means. The plate retainer means can also preferably comprise a base plate, an orifice located within the base plate, and flanges which project outwardly from the base
30 plate. The flanges of the plate retainer means preferably project outwardly at an inclination comprised between about 1% to about 5%, and even more preferably at 3%, from an axis perpendicular to the base plate. The thickness of the material of the

envelope at the port is preferably comprised between about 0.5/10 mm et 5/10 mm and more preferably is 2/10 mm, and in this way does not affect the focal point of the imaging equipment or the actual affixing of the surgical tip or probe to said imaging equipment. In turn, the thickness of the film impacts the thickness of the port, which does not in general exceed the depth of the frustoconic connector head of the probe, in other words, does not generally exceed 4 mm. The projecting flanges of the plate retainer means have, even more preferably, outermost extremities that define dimensions corresponding to those of the translucent impermeable port plate. In this way, it is most preferred that the port plate be located sealingly in the space defined by the projecting flanges and the orifice located in the base plate. The port plate in itself is made of translucent and of course preferably sterilisable material, so that light can pass through the plate unimpeded in both directions. It has been found that best results are obtained when the translucent port is comprised of a polymer, for example polycarbonate, although other suitable substitutes or equivalents know to the skilled person would also be sufficient, in other words any material that would enable non altering transmission of light through the system and maintaining the quality of the image adapted to the envisaged applications.

In another embodiment of the present invention, the flexible envelope means is substantially made of a thermoplastic material, or mixture thereof. Such thermoplastic materials are generally known to the skilled person in the art, since they must be deemed appropriate for use in a medical environment, and preferably sterilisable, for example using radiation, where appropriate, or ethylene oxide gas, or even ion bombardment. Accordingly, the flexible envelope means is preferably substantially made of a low density polyethylene polymer loaded with an ethylene vinyl acetate copolymer, and even more preferably of a low density polyethylene polymer loaded with 9% of an ethylene vinyl acetate copolymer. Such a thermoplastic material is available generally as a film or sheet. The sheet or film can be supplied as a blown or moulded sleeve or tube, without welding, or else can be welded contiguously in one or more places to form a generally sleeve like structure. Welding can be by polymer interaction, thermal welding, or simply by an appropriate adhesive.

Additionally, and preferably, the flexible envelope means further

comprises an envelope expansion means located proximally near to the distal extremity, i.e. in the vicinity of the distal extremity. Even more preferably, the envelope expansion means comprises folds of material, integrated into said flexible envelope means. There are two advantages to this, the first being that it causes the envelope to act like a sleeve when a camera head or imaging instrument is inserted therein, the folds deploying in correspondence to the length of the imaging equipment, for example, a camera head, and any associated cabling, and secondly, the location of the expansion means enables the user a degree of flexibility when inserting the mounting or imaging system, since the envelope unfolds easily. Most preferably, the folds are made of the same material as the flexible envelope, i.e. in a most preferred embodiment, from the same low density polyethylene loaded with EVA. The folds are oriented in a way that makes it possible to simply pull the flexible envelope along a substantially longitudinal axis of said envelope, in the manner that one would pull on a sock or stocking. To this end, the folds can be organised in the manner of an accordion.

As mentioned above, in one preferred embodiment, the envelope device comprises an openable proximal extremity. This proximal extremity preferably comprises a sterility ensuring closure means for sterile closure of said open proximal extremity before use of the device. Even more preferably, the openable proximal extremity further comprises envelope strengthening means. The envelope strengthening means preferably comprise, for example, a cardboard or rigid plastic sleeve attached to the flexible envelope. This sleeve can, for example, be inserted into the proximal extremity of the flexible envelope, and bond welded or adhere thereto by any of the techniques known to the skilled person. Alternatively, and preferably, the sleeve can be bonded to the outer surface of the flexible envelope. In still yet another preferred alternative, the sleeve can be bonded to the flexible envelope at one peripheral edge of the sleeve, preferably the distal edge, such that the flexible envelope appears as a bag with a reinforced strengthening rim made of cardboard or rigid plastic material.

The strengthening sleeve enables a user to squeeze each strengthened rim of the flexible envelope, thereby causing the envelope to open through the play of opposing forces pushing toward each other.

The device of the invention as outlined above is thus particularly useful for laparoscopic and coelioscopic surgery where the surgical optical equipment needs to be protected from contamination, whilst at the same time allowing a perfect view of the area of the body being operated on.

5 In another embodiment of the present invention, the device is particularly useful in imaging or scanning, whereby the optical or imaging equipment would be usefully represented by a scanning apparatus, such as an ultrasound scanning head of the type used in obstetric examination, or in any other kind of ultrasound imaging analysis of body parts. In such a case, the fluid or microorganism impermeable distal
10 port means preferably consists of an extension of the flexible envelope, in other words, the flexible envelope is simply extended and closed at its distal extremity, for example, by thermal welding or any other appropriate manufacturing method that ensures compatibility with the requirement for the envelope to be fluid or microorganism impermeable at that extremity.

15 In such an embodiment, the envelope device preferably further comprises a cannula guide means disposed towards to the distal extremity of said envelope on an outer surface thereof, in a substantially axial alignment to an optical axis of an optical instrument inserted within said flexible envelope. Most preferably, the cannula guide means are bonded to the exterior surface of the flexible envelope, although
20 other forms of art known methods of fastening the guide means to the envelope can be used as appropriate.

The cannula guide means are adapted in shape and size to accommodate a cannula, that can be used, for example, to carry out a puncture, or when used in surgical operations, to take samples of, or inject, objects into the area of surgery.
25 One useful example of this is in vitro fertilisation, where eggs may be taken, for fertilisation, or re-implanted once fertilised, as embryos, using well established techniques.

To this end, the cannula guide preferably comprises a longitudinal bore extending from a first, proximal end of the guide to a second, distal end of the guide.
30 The longitudinal bore most preferably has a substantially circular cross-section, although other cross-sections are possible to the extent that they are adapted to receiving a cannula or other implement intended for similar use.

Even more preferably, and advantageously, the distal extremity of the flexible envelope has a narrowed cross-section compared to the remainder of the envelope, such that the narrowed distal extremity of the flexible envelope substantially defines an optical axis. In this case, the narrowed cross-section essentially constrains the optical imaging system or equipment inserted in the envelope to adopt an axis that generally corresponds to the field of view that one wishes to obtain, and is therefore an aid for the surgeon or manipulator who as a consequence is more able to concentrate on the operations to be carried out rather than having to deal with optimal optical alignment of the imaging system.

The cannula guide can comprise at least one strap means, and preferably two strap means, adapted to surround and secure the flexible envelope around an optical instrument inserted therein. Preferably, the strap means comprise at least one length of adhesive tape, disposed substantially orthogonally to the longitudinal axis of said cannula guide. Here again, the strap means are designed to facilitate manipulation of the envelope device and optical imaging equipment inserted therein, by reducing independent movement, such as slippage, or rotation, of the former compared to the latter and vice-versa.

In still yet another preferred embodiment, an image enhancement media is located within the space defined by an interior of the flexible envelope at its proximal extremity. The image enhancing media can preferably be a contrast gel adapted to conveying ultrasound waves, but other media could be used instead, as would be well known to those skilled in the art.

The invention will now be described in detail whilst referring to examples thereof illustrated by the accompanying drawings, which are given purely for the purposes of assisting in understanding the inventive concepts of the invention.

Brief Description of the Figures

Figure 1 is a perspective view of a device according to the present invention ;

Figure 2 is a closer perspective view of how the distal extremity of the device engages with both an imaging equipment system and a surgical optical

instrument, such as a laparoscope ;

Figure 3 is a schematic plan of the envelope device of the present invention ;

Figure 4 is a schematic cross-section of the envelope device along the line
5 A-A, showing details of the envelope expansion means ;

Figure 5 is a schematic cross-section of the distal port, and the elements comprising it.

Figure 6 is a schematic perspective view of another preferred embodiment of the device of the present invention ;

10 Figure 7a is a schematic cross-section of the device along the line BB of Figure 6.

Figure 7b is a top perspective view of the cannula guide means illustrated in Figure 6.

15 Figure 1 shows a representation of a flexible envelope device , generally referenced by the numeral 1, according to the present invention. In this representation, the device 1 is shown semi-deployed, in that the envelope has been opened and left in such a way as to show what the device might look like just before
20 insertion of an optical or digital imaging system or equipment, for example keyhole surgery investigative camera equipment. The device 1 has an openable proximal extremity 2 and a closed distal extremity 3, both extremities being connected by an envelope body 4. The envelope body is made of a thermoplastic material, or mixture thereof, for example, polyethylene, a product that can be easily sterilised using ethylene oxide gas. In the present example, however, it is preferred to use a low
25 density polyethylene (LDPE) polymer loaded with an ethylene vinyl acetate copolymer, for example with about 9% of said ethylene vinyl acetate copolymer. Such a composition for the envelope body provides an ideal choice of flexibility and ease of use, and it also means that the envelope device can be recycled into its component materials after disposal. One way of constructing the envelope device 1 is to provide
30 a sleeve of LDPE that will represent the body 4, and a substantially circular distal end piece 7, which can, for example, be thermally welded to the sleeve body 4.

In addition, and as can be seen schematically from Figure 4, which is a cross sectional view along the line A-A of Figure 3, the envelope device 1 comprises an envelope expansion means 13 located proximally near to the distal extremity 3. The envelope expansion means 13 comprises folds of material 14, integrated into the body 4 or forming an extension thereof, which is connected to the distal end piece 7. Again such connections can be made by thermal welding of the LDPE materials making up each component. Alternatively, the folds 14 can be a continuation of the envelope material, simply folded over itself in a ladder or flip-flop arrangement a certain number of times, such that when deployed, the folds unfold along a substantially longitudinal axis of the envelope, as would a stocking or a sock that had been rutsched before being pulled onto a foot or a leg or in the manner of an accordion. In this way, the envelope can unfold over the optical or imaging equipment and any associated cabling by a simple pulling action from the proximal extremity of the envelope device.

Turning back to Figure 1 again, the openable proximal extremity 2 can further preferably comprise flexible envelope strengthening or reinforcing means 10. These flexible envelope strengthening means comprise a cardboard or rigid plastic sleeve 15 attached to the flexible envelope, the sleeve being provided with openings 11 used for gripping the sleeve and extending it over the cables of the camera head away from the sterile area. The sleeve 15 can have folds 16 enabling it to be folded down before or after use for storage or disposal.

Figure 1 shows the envelope device already opened at its proximal extremity 2, and at least partially opened along the envelope body 4, ready to receive optical imaging equipment, such as that usually found in a coelioscopic or laparoscopic camera system. The system is inserted into the envelope, as will be described hereinafter. An illustration of the insertion of a camera system 18 into the flexible envelope device is shown schematically in Figure 2. This drawing represents an incomplete view of the flexible envelope device, focussing instead on the fitting of the translucent port into the diameter of the locking means 19 provided for on the camera head 18, and the subsequent connection of an optical probe 20. Preferably, such a locking means is a grip twist lock 19.

The closed distal extremity 3 comprises a translucent impermeable port

means 5 adapted to distally receiving an optical or surgical tip or probe 20 and adapted to proximally engaging head means 18 of the optical or imaging equipment. The port means 5 has a translucent port 6 which is dimensioned to engage an inner diameter 21 of the optical tip 20 or optical probe, but which also fits within an interior volume of the camera head 18.

As can be seen from Figure 2 and Figure 5, the translucent port 6 is welded or bonded or clipped into the flexible envelope means 7. The translucent port 6 comprises a translucent impermeable port plate 22, and a plate retainer means 23. The plate retainer means 23 comprises a base plate 24, an orifice 25 located within the base plate 24, and flanges 26, 27 which project outwardly from the base plate 24. The flanges 26, 27 of the plate retainer means 23 project outwardly at an inclination comprised between about 1% to about 5%, and preferably 3%, from an axis 28, 28' perpendicular to the base plate 24. The projecting flanges 26, 27 of the plate retainer means 23 have outermost extremities 29, 30 that define dimensions corresponding to those of the translucent impermeable port plate 22. The port plate 22 is located sealingly in the space defined by the projecting flanges 26, 27 and the orifice 25 located in the base plate 24, the circumference of the orifice being in this example defined by a washer 31, for example made of polyethylene. The washer 31 is used as an aid to clipping the optical or surgical tip or probe 20, and provides a seat therefor when the latter is inserted or clipped onto the camera head 18. The translucent port 6 is thus dimensioned to engage an inner diameter 21 of the optical or surgical tip or probe 20. Although the translucent port is preferably comprised of polycarbonate, other transparent materials could be used, such as glass, methacrylates or other polymer or mineral crystalline materials that do not alter the optical pathways of reflected light entering via the probe and the optical lens system, or emitted light originating from the camera, or degrade the image quality.

Figure 6 shows an illustration of another preferred embodiment of the present invention, particularly adapted to obstetric and gynaecological operations, or any other surgical operation requiring simultaneous positioning and/or manipulation of a surgical optical equipment or imaging equipment, and a cannula, where an imaging system, such as an ultrasound device, can be inserted into the flexible envelope device. In this representation, the flexible envelope device is generally

represented by the reference numeral 111, and only the distal extremity 113 of the device is shown. The envelope body 114 is terminated in a closure 115, comprising a thermally welded seal 116 of two opposing surfaces of envelope material, thus rendering the envelope device impermeable to fluids and microorganisms at the distal extremity 113. As can be seen from the figure, the envelope body has a narrowing cross-section that extends towards the closure 115 and seal 116. The device also comprises cannula guide means 117, which comprise a cannula guide 118 per se, for example, made of a sterilisable polymer material, for example polycarbonate, extending substantially along the longitudinal axis of the envelope device 111, and a longitudinal bore 119 that extends from the proximal end 120 of the cannula guide 118 to the distal end thereof 121. In addition, the cannula guide means 117 also comprise strap means 122, which in turn comprises at least one length 123, 124 of adhesive tape, intended to enable the envelope body to be securely wrapped around the imaging or optical instrument once inserted into the envelope device, and thereby reduce any movement of one relative to the other.

Figures 7a and 7b show a cross-section of Figure 6 along the line B-B, and a top perspective view respectively of the cannula guide means, and giving more detail of the cannula guide 118 per se. As can be seen from Figure 7, the cannula guide 118 has a substantially circular bore 119, and comprises a longitudinal ridge 126, as well as two longitudinal flanges 127 and 128, whereby the ridge and flanges define the shape of the bore 119, in this case, a general circular shape, for example, in the case where the flanges extend inwardly toward each other, defining an inner gorge 131 substantially located beneath, but not connecting with, and extending parallel to, the bore 119. The flanges 127 and 128 are affixed to the envelope body 114, for example, by thermal welding or any appropriate form of bonding, and their lower surfaces 129, 130 have an arc or curvature substantially equivalent to that of the imaging equipment around which the flexible envelope device is placed, thereby ensuring correct placement of the cannula guide means on the flexible envelope device, substantially in alignment with an optical axis of the imaging equipment placed inside said envelope device.

Claims

- 1) Single use, disposable, envelope device, comprising :
- a flexible envelope means comprising an openable proximal extremity and a closed distal extremity ;
 - whereby the closed distal extremity comprises a translucent, fluid or microorganism impermeable port means.
- 2) Single use, disposable envelope device according to claim 1, wherein the port means of the closed distal extremity is adapted to distally receiving an optical or surgical tip or probe and adapted to proximally engaging an imaging equipment means.
- 3) Single use, disposable, envelope device according to claim 1, wherein the optical tip or probe is selected from the group consisting of a coelioscope, a laparoscope, an arthroscope, a uteroscope, a hysteroscope, and the imaging system is any such system used in surgery or diagnosis, including an ultrasound imaging system or a doppler system.
- 4) Single use, disposable, envelope device according to claim 1, wherein the mounting means of the imaging system is selected from the group consisting of a grip twist socket, a bayonet socket, and a spigot socket.
- 5) Single use, disposable, envelope device according to claim 1, wherein the translucent port is dimensioned to engage an inner diameter of the optical or surgical tip or probe.
- 6) Single use, disposable, envelope device according to claim 1, wherein the translucent port is welded, glued, or clipped, into the flexible envelope means.
- 7) Single use, disposable, envelope device according to claim 1, wherein the translucent port comprises a translucent impermeable port plate, and a plate retainer means.
- 8) Single use, disposable, envelope device according to claim 7, wherein the plate retainer means comprises a base plate, an orifice located within the base plate, and flanges which project outwardly from the base plate.

- 9) Single use, disposable, envelope device according to claim 6, wherein the flanges of the plate retainer means project outwardly at an inclination comprised between about 1% to about 5%, and preferably 3%, from an axis perpendicular to the base plate.
- 5 10) Single use, disposable, envelope device according to claim 8, wherein the projecting flanges of the plate retainer means have outermost extremities that define dimensions corresponding to those of the translucent impermeable port plate.
- 10 11) Single use, disposable, envelope device according to claim 7, wherein the port plate is located sealingly in the space defined by the projecting flanges and the orifice located in the base plate.
- 12) Single use, disposable, envelope device according to claim 1, wherein the translucent port is comprised of polymer, preferably carbonate.
- 15 13) Single use, disposable, envelope device according to claim 1, wherein the flexible envelope means is substantially made of a thermoplastic material, or mixture thereof.
- 14) Single use, disposable, envelope device according to claim 1, wherein the flexible envelope means is substantially made of a low density polyethylene polymer loaded with an ethylene vinyl acetate copolymer.
- 20 15) Single use, disposable, envelope device according to claim 1, wherein the flexible envelope means is substantially made of a low density polyethylene polymer loaded with 9% of an ethylene vinyl acetate copolymer.
- 25 16) Single use, disposable, envelope device according to claim 1, wherein the flexible envelope means further comprises an envelope expansion means located proximally near to the distal extremity.
- 17) Single use, disposable, envelope device according to claim 1, wherein the envelope expansion means comprises folds of material, integrated into said flexible envelope means.
- 30 18) Single use, disposable, envelope device according to claim 17, wherein the folds are made of the same material as the flexible envelope.
- 19) Single use, disposable, envelope device according to claim 1, wherein the

openable proximal extremity further comprises flexible envelope strengthening means.

- 5 20) Single use, disposable, envelope device according to claim 19, wherein the flexible envelope strengthening means comprise a sleeve attached to the flexible envelope.
- 10 21) Single use, disposable, envelope device according to claim 1, wherein the device further comprises a cannula guide means disposed towards to the distal extremity of said envelope on an outer surface thereof, in a substantially axial alignment to an optical axis of an optical instrument inserted within said flexible envelope.
- 22) Single use, disposable, envelope device according to claim 21, wherein the distal extremity of the flexible envelope has a narrowed cross-section compared to the remainder of the envelope.
- 15 23) Single use, disposable, envelope device according to claim 22, wherein the narrowed distal extremity of the flexible envelope substantially defines an optical axis.
- 20 24) Single use, disposable, envelope device according to claim 21, wherein the cannula guide comprises at least one strap means, preferably two strap means, adapted to surround and secure the flexible envelope around an imaging equipment means inserted therein.
- 25 25) Single use, disposable, envelope device according to claim 24, wherein the strap means comprise at least one length of adhesive tape, disposed substantially orthogonally to the longitudinal axis of said cannula guide.
- 26) Single use, disposable, envelope device according to claim 21, wherein the cannula guide comprises a longitudinal bore extending from a first, proximal end of the guide to a second, distal end of the guide.
- 30 27) Single use, disposable, envelope device according to claim 26, wherein the longitudinal bore has a substantially circular cross-section.
- 28) Single use, disposable, envelope device according to claim 21, wherein an image enhancement media is located within the space defined by an interior of the flexible envelope at its proximal extremity.

- 29) Single use, disposable, envelope device according to claim 38, wherein the image enhancing media is a gel adapted to conveying ultrasound waves.
- 30) Single use, disposable, envelope device according to claim 1, wherein the fluid impermeable distal port means consists of an extension of the flexible envelope.
- 31) Single use, disposable, envelope device according to claim 21, wherein the cannula guide means are bonded to the exterior surface of the flexible envelope.

1 / 5

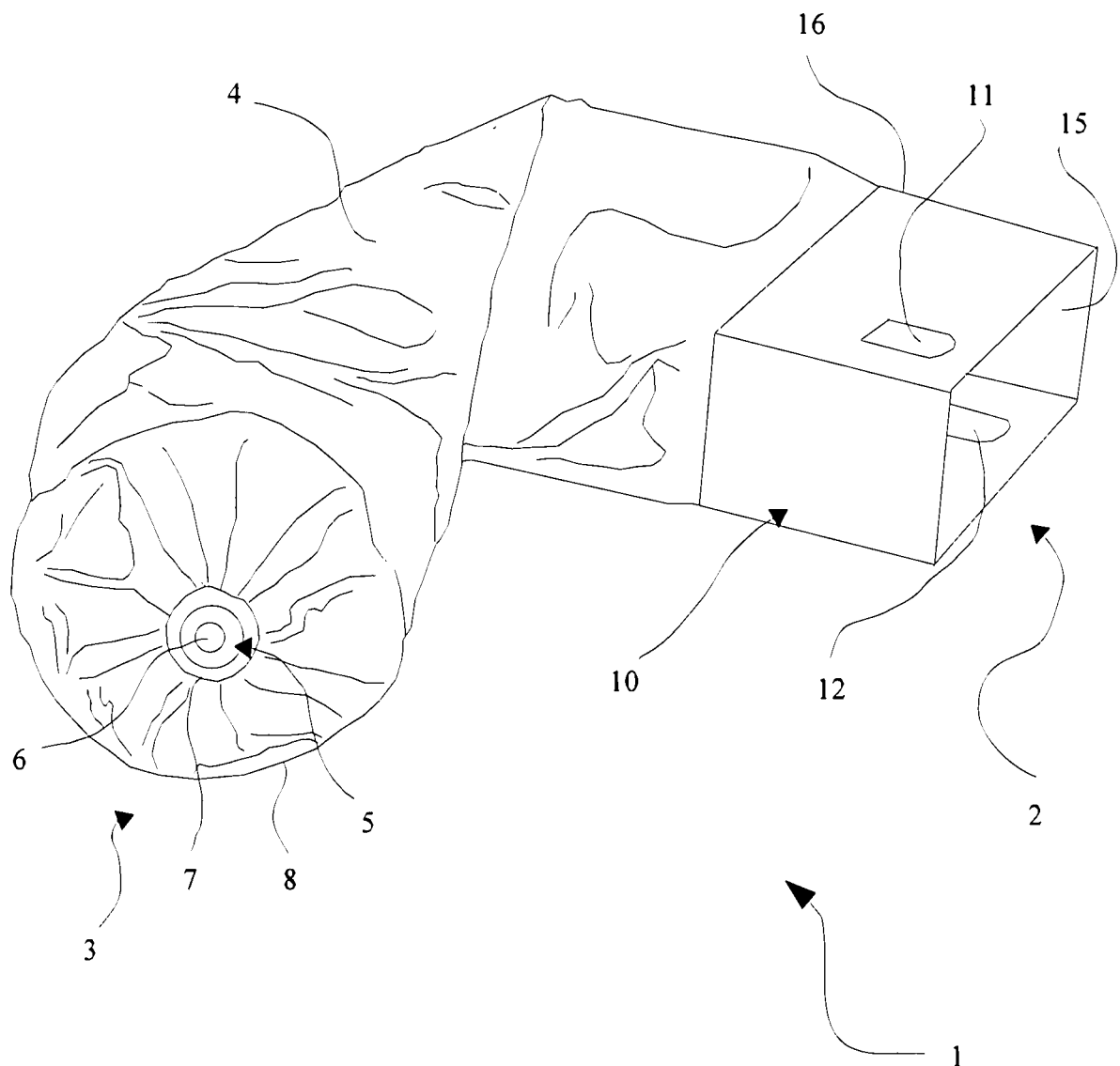


Fig. 1

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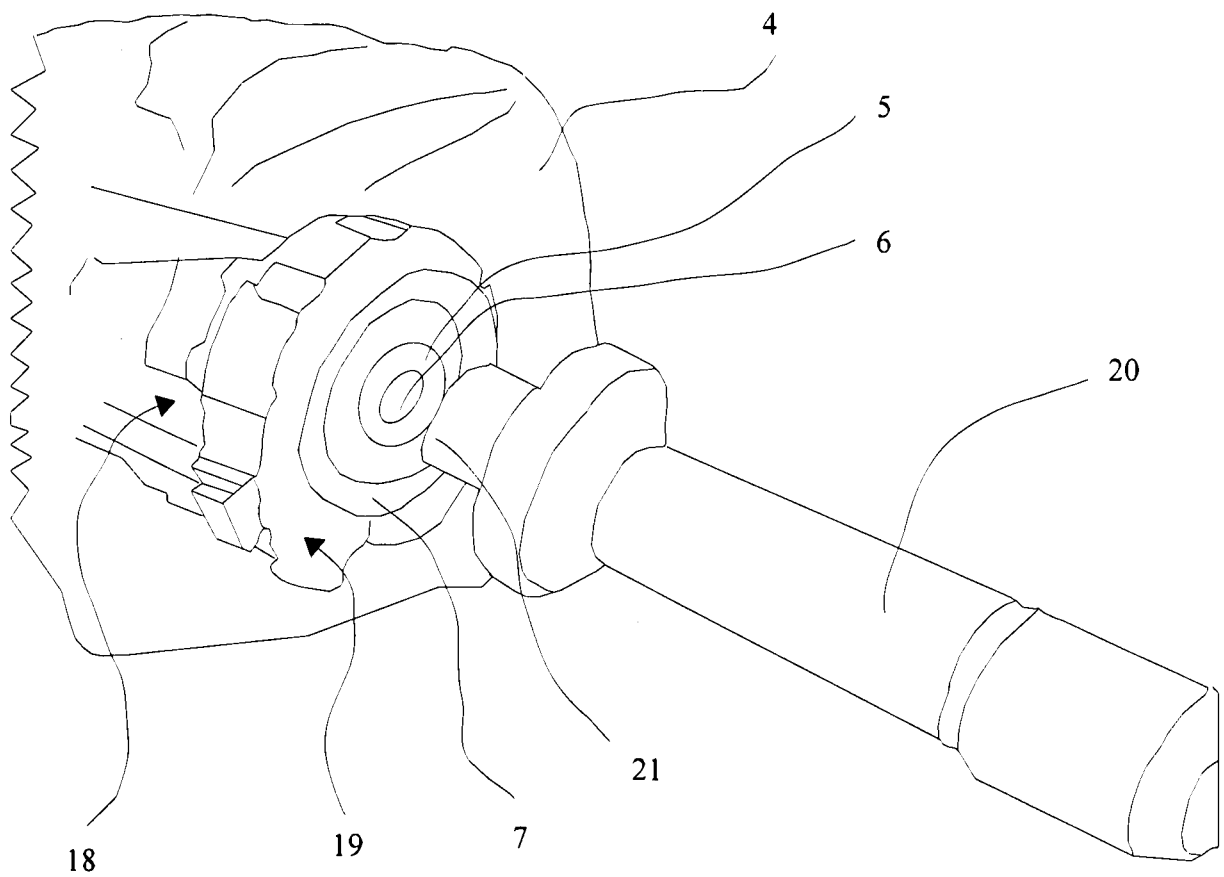


Fig. 2

3 / 5

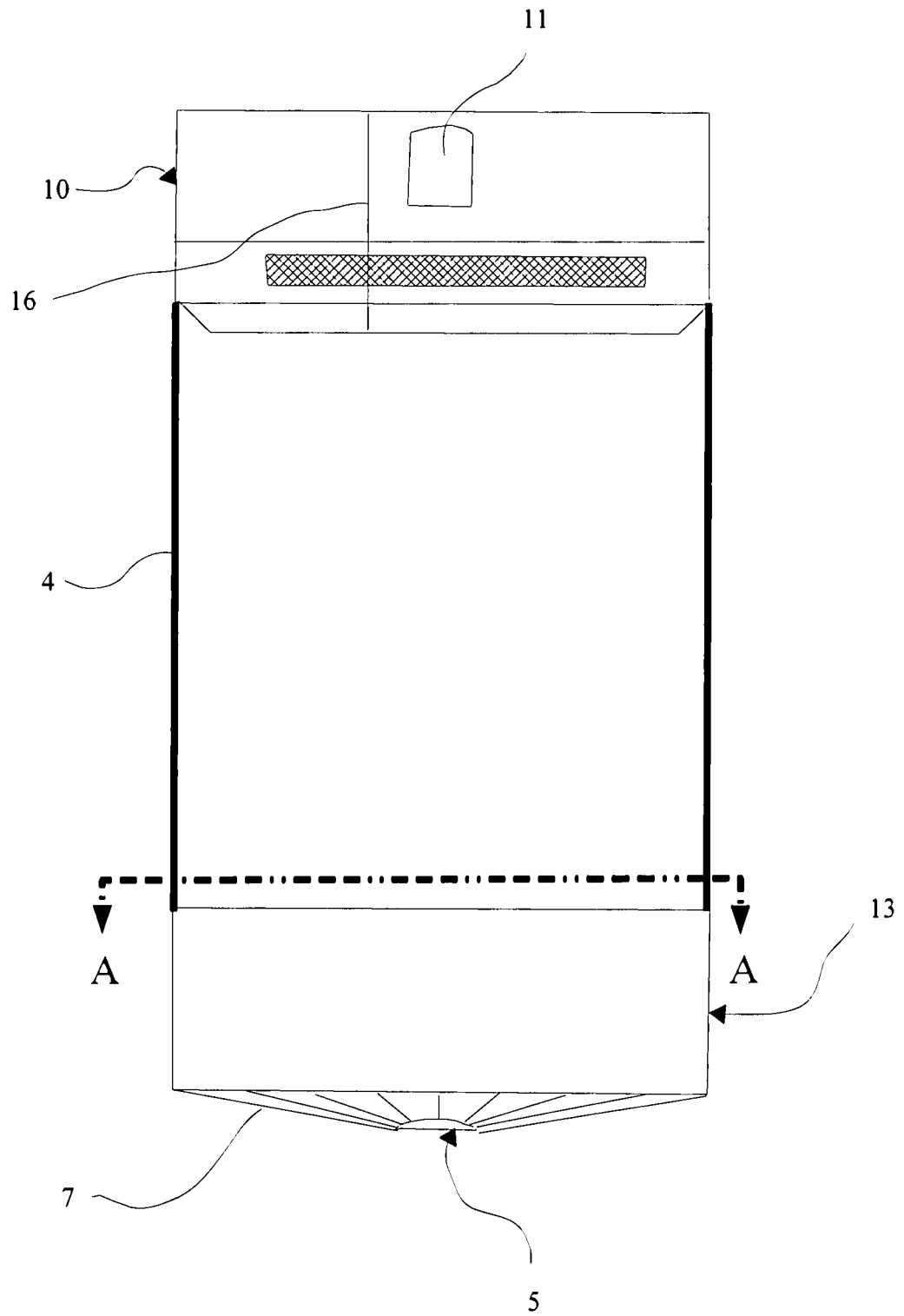


Fig. 3

4 / 5

Fig. 4

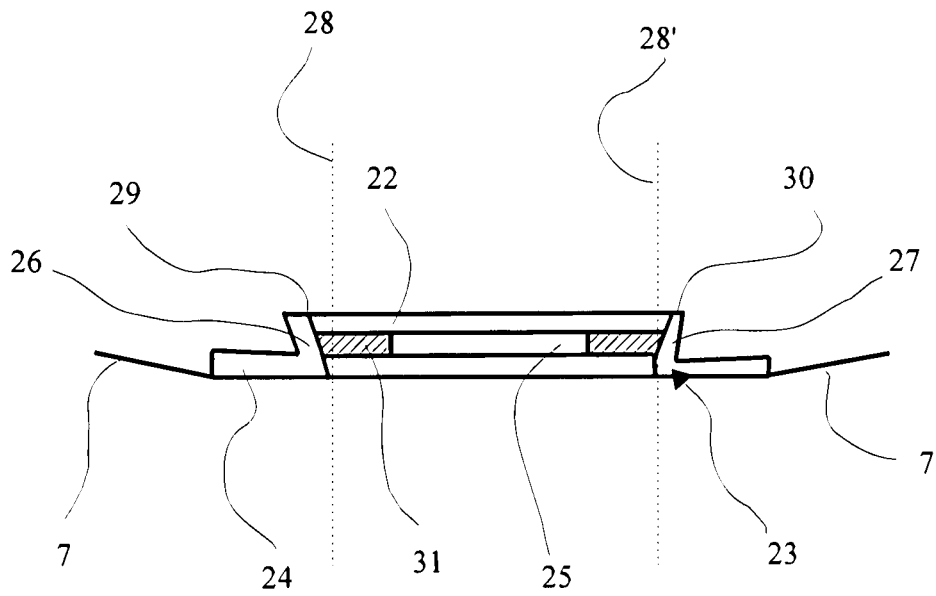
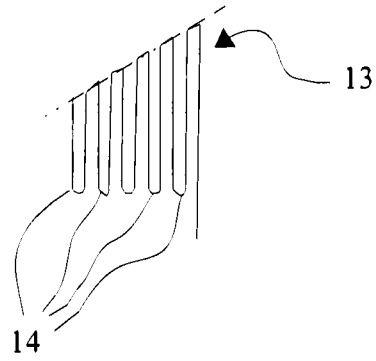


Fig. 5

5 / 5

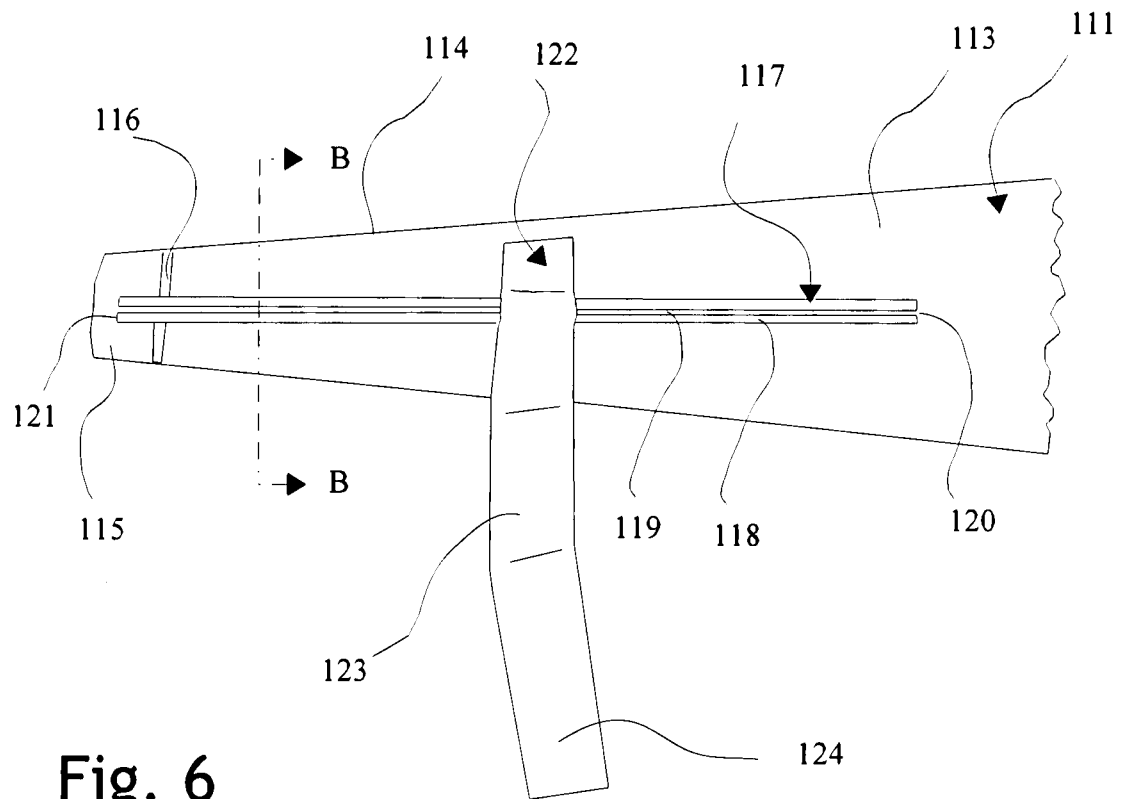


Fig. 6

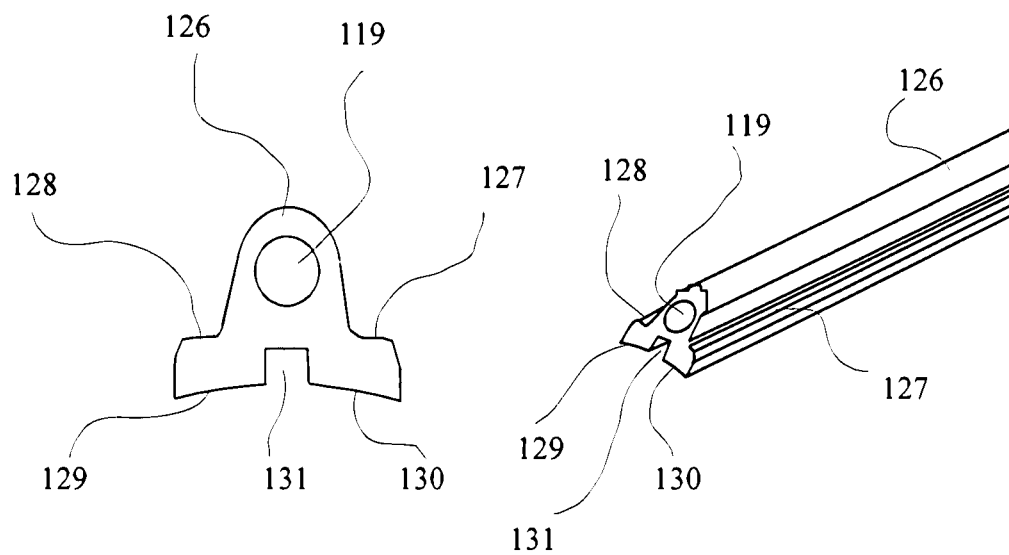


Fig. 7a

Fig. 7b

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2008/002517

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B1/00 A61B19/08

ADD. A61B19/10

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 A61K

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 792 045 A (ADAIR EDWIN L [US]) 11 August 1998 (1998-08-11)	1-18
Y	figures 2-9,13,15,17	19-31
Y	US 2004/127891 A1 (HUMBLE ROBIN CHARLES [GB] ET AL) 1 July 2004 (2004-07-01) figures 1-3	19-25, 28-31
Y	US 5 910 113 A (PRUTER RICK L [US]) 8 June 1999 (1999-06-08) column 4, lines 48-50	28,29
Y	US 5 676 159 A (NAVIS JOHN A [US]) 14 October 1997 (1997-10-14) abstract	28,29
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☒ 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 document but published on or after the international filing date

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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.

8 document member of the same patent family

Date of the actual completion of the international search

30 January 2009

Date of mailing of the international search report

17/02/2009

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INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2008/002517

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 902 275 A (DOBKIN WILLIAM R [US]) 11 May 1999 (1999-05-11) figures 1-3 column 2, lines 35-37, 62-65 -----	21, 26, 27, 31

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2008/002517

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5792045	A	11-08-1998	NONE	
US 2004127891	A1	01-07-2004	US 2008045793 A1	21-02-2008
US 5910113	A	08-06-1999	NONE	
US 5676159	A	14-10-1997	NONE	
US 5902275	A	11-05-1999	NONE	

专利名称(译)	一次性无菌外壳，用于外科光学		
公开(公告)号	EP2303095A1	公开(公告)日	2011-04-06
申请号	EP2008807168	申请日	2008-05-15
[标]申请(专利权)人(译)	VECTEC		
申请(专利权)人(译)	VECTEC		
当前申请(专利权)人(译)	VECTEC		
[标]发明人	DARPIANY FRANCIS		
发明人	D'ARPIANY, FRANCIS		
IPC分类号	A61B1/00 A61B19/08 A61B19/10 A61B46/23		
CPC分类号	A61B1/00142 A61B46/10 A61B2017/00477 A61B2017/00907		
外部链接	Espacenet		

摘要(译)

本发明涉及一次性使用的包封装置（1），其包括具有可打开的近端（2）和闭合的远端（3）的柔性封套，其中封闭的远端包括半透明的流体不可渗透的，port表示（5）。优选地，端口装置适于向远侧接收可操作的尖端或外科尖端或探针（20）并且适于近端接合成像设备装置（18）。该装置特别适用于成像设备需要的腹腔镜和眼科手术。保护免受污染，同时可以完美地观察正在操作的身体区域。