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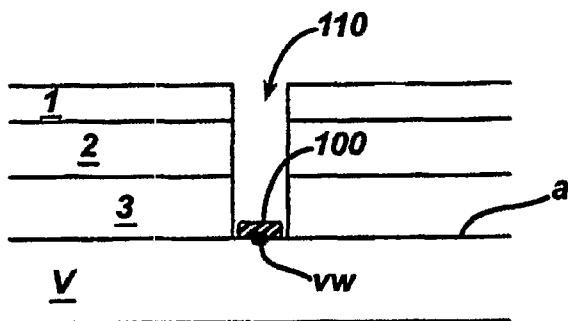
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(54) Title: SYSTEMS AND METHODS FOR CLOSING A VESSEL WOUND



(57) Abstract: Vessel wound closure systems and method for sealing a puncture wound in a target vessel, such as those puncture wounds that occur from interventional procedures. The vessel wound closure system comprises at least a biocompatible, viscoelastic, self-sealing septum material injected onto the adventitia of the target vessel prior to performance of an interventional procedure. The prior injected septum material remains and seals the puncture wound of the target vessel even after various components associated with accessing the target vessel and the performance of the interventional procedure are removed from the target vessel and the puncture wound.

WO 2007/075364 A3

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2006/047799

## A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B17/00

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 A61L A61M

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, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/063129 A (ACCESSCLOSURE INC [US]; KHOSRAVI FARHAD [US]; BAGAOISAN CELSO J [US];) 14 July 2005 (2005-07-14)	1, 2, 15, 21, 22
Y	figures 1-2D, 3, 4A-5B, 8A-8B, 9C-11E  page 3, lines 1-10 page 19, line 20 - page 29, line 13 page 31, lines 19-24 page 36, line 7 - page 37, line 12 page 40, lines 16-20 -----	4, 5, 16-18, 20, 21
Y	US 5 213 576 A (ABIUSO CHRISTOPHER L [US] ET AL) 25 May 1993 (1993-05-25) column 1, line 24 - column 2, line 20 ----- -/--	4, 5, 16-18

☒ 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
- \*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

17 April 2007

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07/08/2007

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## INTERNATIONAL SEARCH REPORT

International application No

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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 6 050 986 A (HEKTNER THOMAS R [US]) 18 April 2000 (2000-04-18) figure 7 column 7, lines 39-48 -----	4,5, 16-18
Y	US 6 033 427 A (LEE BENJAMIN I [US]) 7 March 2000 (2000-03-07) figures 2-10 column 1, lines 9-13 column 8, lines 24-60 column 9, lines 26-53 -----	20,21
A	US 6 899 889 B1 (HNOJEWYJ OLEXANDER [US] ET AL) 31 May 2005 (2005-05-31)  column 3, lines 7-12 column 6, lines 49,50 column 8, line 14 column 9, lines 38-41 column 10, line 51 - column 11, line 18 -----	1,2,4,5, 15-18, 20-22

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

Continuation of Box II.1

Claims Nos.: 3,6,19,27-38

Claims 27-38: these claims are related to a method of sealing an opening made in a target vessel during a percutaneous interventional procedure. This subject-matter is considered to be covered by the provisions of Rule 39.1(iv) PCT (methods for treatment of the human or animal body by surgery). Consequently, the subject-matter of these claims was not searched (Article 17 (2)(a)(i) PCT).

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Continuation of Box II.2

Claims Nos.: 3,6,19

Claims 3, 6, 19: the expression "at least 800-900% deformation properties" used in claim 3 is obscure and does not allow the scope of the claim to be ascertained. In claims 6, 19 the use of a balloon for containing the self-sealing material is suggested, the balloon membrane comprising intestine. However, the description does not provide clear support and disclosure in the sense of Article 6 and 5 PCT for such a feature: it is indeed unclear to the skilled person where this piece of intestine should be taken from (from the patient's body / from an animal, from a living / dead body) and how it should be prepared in order to be used as a balloon membrane. The non-compliance with the substantive provisions is to such an extent that no meaningful search of claims 3, 6, 19 could be carried out at all (Article 17 (2)(a)(ii) PCT).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2006/047799

### Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 3, 6, 19, 27-38  
because they relate to subject matter not required to be searched by this Authority, namely:  
see FURTHER INFORMATION sheet PCT/ISA/210
2. ☒ Claims Nos.: 3, 6, 19  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful international Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
see annex

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-2,4-5,15-18,20-22

a vessel wound closure system comprising a self-sealing, biodegradable, viscoelastic septum material suitable for being disposed onto the adventitia of a vessel prior an intraveinuous intervention within said vessel, said self-sealing material ensuring a tight sealing of the puncture after withdrawal of the intervention instruments from the vessel,  
wherein the self-sealing material is contained in a porous balloon from which it can seep,  
so that it can be slowly delivered in a non-damaging manner without forcefully impinging the neighboring tissues.

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2. claims: 1-3,7-8,23-26

a vessel wound closure system comprising a self-sealing, biodegradable, viscoelastic septum material suitable for being disposed onto the adventitia of a vessel prior an intraveinuous intervention within said vessel, said self-sealing material ensuring a tight sealing of the puncture after withdrawal of the intervention instruments from the vessel,  
wherein the self-sealing material is delivered in a preformed state, incorporating a hemostatic valve and being suitable for being adhesively secured onto the adventitia, so that the risk that some material flows into the vessel is prevented, thereby avoiding any risk of thrombosis.

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3. claims: 1,9-14

a vessel wound closure system comprising a self-sealing, biodegradable, viscoelastic septum material suitable for being disposed onto the adventitia of a vessel prior an intraveinuous intervention within said vessel, said self-sealing material ensuring a tight sealing of the puncture after withdrawal of the intervention instruments from the vessel,  
wherein the self-sealing material is delivered by means of a stepped needle having a smaller diametered distal portion to be inserted into the target vessel and a larger diametered portion proximal thereof which abuts the outer wall of the vessel during needle insertion,  
so that the target vessel can be efficiently and accurately located and the material properly disposed without need of a guidewire configuration.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/047799

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2005063129	A	14-07-2005	CA 2545547 A1 EP 1703845 A2 JP 2007516790 T US 2007060950 A1	14-07-2005 27-09-2006 28-06-2007 15-03-2007
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