Title: ANEURYSM TREATMENT DEVICE AND METHOD

Abstract: An intravascular device for treating a cerebral aneurysm, the device comprising an externally controllable expandable member, the expandable member comprising a plurality of wires that define walls of the expandable member; wherein in a relaxed state of the expandable member the walls comprise at least a first wall portion in which openings defined between the wires are small enough to prevent coils positioned within the aneurysm from exiting the aneurysm, the first wall portion comprising an axial length at least as long as a neck of the aneurysm; and at least a second wall portion in which openings defined between the wires are large enough to allow blood flow through; the second wall portion axially aligned relative to the first wall portion. In some embodiments, openings of the first wall portion are small enough to reduce radial blood flow to and/or from the aneurysm.

Declarations under Rule 4.17:
— of inventorship (Rule 4.17(iv))

Published:
— with international search report (Art. 21(3))
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61F 2/82 (2015.01)
CPC - A61F 2002/823

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)

IPC (8) A61 F 2/82 (2015.01)
CPC: A61F 2002/823

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched:

IPC (8) A61 F 2/90, A61B 17/12, A61F 2/06, A61B 17/00 (2015.01); CPC: A61B 17/12002, A61F 2/90, A61 F 2/82
USPC: 606/1 94, 623/1 .15

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase; Google (Web, Scholar, Patents);

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2014/0128901 A1 (KANG et al.); 8 May 2014 (08.05.2014); entire document, especially Figs. 4, 5, 24A, and 24B, and paras. [0054], [0058], [0076], [0116], [0121], [0150], and [0151].</td>
<td>1-6, 10, 11, 17, 18</td>
</tr>
<tr>
<td>Y</td>
<td>US 2003/0220683 A1 (MINASIAN et al.); 27 November 2003 (27.11.2003); entire document, especially Fig. 1.</td>
<td>7, 8, 12-14</td>
</tr>
<tr>
<td>A</td>
<td>US 2011/0213403 A1 (ABOYTES); 1 September 2011 (01.09.2011); entire document, especially Figs. 2A-C; paras. [0078]-[0080]</td>
<td>9, 15, 16</td>
</tr>
<tr>
<td>Y</td>
<td>US 6,454,795 B1 (CHUTER); 24 September 2002 (24.09.2002); entire document, especially col. 3, lines 41-55.</td>
<td>7, 8</td>
</tr>
<tr>
<td>A</td>
<td>US 8,562,867 D2 (COX); 22 October 2013 (22.10.2013); utility document.</td>
<td>15, 16</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

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

* Special categories of cited documents:

"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

"S" document member of the same patent family

Date of the actual completion of the international search: 18 November 2015 (18.11.2015)

Date of mailing of the international search report: 08 FEB 2016

Name and mailing address of the ISA/US:

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer: Lee W. Young

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)
INTERNATIONAL SEARCH REPORT

Box No. 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.: because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claims Nos.: 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:

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 No. 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:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-18, directed to an intravascular device for treating a cerebral aneurysm.
Group II: Claims 19-29 directed to an intravascular device for treating a cerebral aneurysm.
Group III: Claims 30-48 directed to an intravascular device for treating a cerebral aneurysm.
Group IV: Claims 49 and 50 directed to a kit for treating a cerebral aneurysm.

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 additional fees, this Authority did not invite payment of additional fees.
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.:

Remark on Protest

□ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
□ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
□ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (January 2015)
**INTERNATIONAL SEARCH REPORT**

**Group V:** Claim 50 directed to an intravascular device.

**Group VI:** Claim 51 directed to an intravascular device for treating a cerebral aneurysm.

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

**SPECIAL TECHNICAL FEATURES**

The invention of Group I includes the special technical features of at least a first wall portion, and at least a second wall portion, not required by the claims of Group II-VI.

The invention of Group II includes the special technical feature of an inner wire cage comprised within an outer wire cage, not required by the claims of Groups I and III-VI.

The invention of Group IV includes the special technical feature of a tubular body shaped and sized for fitting within a cerebral blood vessel, and plastically deformable members interwoven with plastically deformable members, not required by groups I, II, and IV-VI.

The invention of Group V includes the special technical features of a delivery system comprising at least one outer tube shaped and sized for introducing an expandable member into a cerebral blood vessel and a plurality of expandable members of various relaxed diameters, each expandable member comprising a wire mesh defining at least one wall portion, not required by groups I-III, V, and VI.

The invention of Group V includes the special technical feature of a first axial segment and a second axial segment, said first axial segment comprising a cross sectional diameter larger than a cross sectional diameter of said second axial segment; and a pushpull cable extending longitudinally within a lumen of an expandable member, not required by groups I-IV, and VI.

The invention of Group VI includes the special technical feature of at least one dense wall portion having openings that are smaller than one or more other wall portions of said expandable member, not required by groups I-V.

**COMMON TECHNICAL FEATURES**

Groups I-III, V, and VI share the common technical features of an intravascular device comprising an expandable member. However, this shared technical feature does not represent a contribution over prior art as being anticipated by US 2008/0045995 A1 to Guterman, et al. (hereinafter "Guterman"), which discloses an intravascular device (aneurysm buttressing arrangement, Fig. 1) comprising an expandable member (buttress scaffold 10 is expandable, Fig. 1 and para. [0023]).

Groups I, V, and VI share the common technical features of an intravascular device comprising an expandable member, and a plurality of wires that define walls of said expandable member. However, this shared technical feature does not represent a contribution over prior art as being anticipated by Guterman, which discloses an intravascular device (aneurysm buttressing arrangement, Fig. 1) comprising an expandable member (buttress scaffold 10 is expandable, Fig. 1 and para. [0023]), and a plurality of wires that define walls of said expandable member (buttress scaffold 10 is made of a mesh 40 of braided wire 24, an arrangement helically wound wires 42, or doulfuliulatulat lhereuf, Flv. 1 no 4, or paiati. [0039]).

As the common technical features were known in the art at the time of the invention, these cannot be considered special technical feature that would otherwise unify the groups.

Therefore, Groups I-VI lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.
search terms: cerebral intracranial aneurysm wire mesh stent obstruct blood flow opening saccular restrict ratio modular neck cage small large pore hole opening push pull cable self expand cause device intravascular coil prevent cover reduce placement flow-diverter occlusion first second wall portion segment pair multiple multi double triple strand overlap join deploy expand tubing catheter outer inner cup