Abstract: A minimally invasive endovascular device for treating a blocked or obstructed biological lumen, such as a blood vessel. The device is designed to fully or partially block the obstruction by depositing biological matter in or near the biological lumen. Certain embodiments of the present invention comprise two capture members that are configured to be placed on either side of the obstruction and enclose around the obstruction for removal. Embodiments of the present invention also provide methods for implementing an endovascular device according to aspects of the present invention.
INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 13/64988

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61M 29/00 (2014.01)
USPC - 606/200

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)
USPC: 606/200

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 604508
IPC: A61M 31/00 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase: Google Patents; Google
Search Terms Used: proximal, distal, trap%, filter%, snare%, net%, captur%, first, second, double, dual, two, multiple, cage%, material, thromb*, emboli*, clot%, protect%, remov*, filter*

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>
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<tbody>
<tr>
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<td>7-10, 14</td>
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<tr>
<td>Y</td>
<td>US 5,01 1,488 A (GINSBURG) 30 April 1991 (30.04.1991) fig 1, 2A, 2C, col 5, In 23-57, col 6, In 6-8</td>
<td>1, 3-5, 11, 13, 15-16, 18-22</td>
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</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
  "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
  "Z" document member of the same patent family

Date of the actual completion of the international search
15 April 2014 (15.04.2014)

Date of mailing of the international search report
02 MAY 2014

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. 571-273-3201

Authorized officer: Lee W. Young
PCT Helpdesk: 571-272-4300
PCT OSB: 571-272-7774

Form PCT/ISA/2.10 (second sheet) (July 2009)
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).

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 1-23, directed to a device to remove an obstruction in a lumen.

Group II: Claims 24-31 directed to a method for removing an obstruction in a lumen.

--- Continued on Supplemental Page ---

1. ☐ 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. 1-23

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.
Continuation of Box III: Observations where unity of invention is lacking.

The inventions listed as Groups I and II 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:

The invention of Group II includes the special technical feature of method for removing an obstruction in a lumen, the method comprising: positioning a distal end of the catheter distal to said obstruction; withdrawing said catheter to release the first capture member distal to said obstruction; positioning the distal end of the catheter proximal to said obstruction; withdrawing said catheter to release the second capture member proximal to said obstruction; enclosing said obstruction with said capture members by manipulating at least one of the first guide member or the second guide member to unite the capture members; and removing said captured obstruction by removing said united capture members from the lumen, not required in Group I.

The inventions of Groups I-II share the technical features of a device comprising a first capture member; a second capture member; each capture member comprises an open end and a tapered end, wherein said open end comprises a frame component coupled to a body component, said body component extending between said open end and said tapered end; a first guide member coupled to said first capture member at said open end and along at least a portion of said body component; a second guide member coupled to said second capture member at said open end and along at least a portion of said body component; wherein said first capture member and said second capture member are slidably coupled to each other, said slidable coupling comprises said first guide member disposed in said second guide member. Specifically, Groups I and II are related as an apparatus (Group I) and methods for using the apparatus (Group II). The apparatus is known in prior art as shown in US 2001/0044632 A1 to Daniel, et al. (hereinafter Daniel). Therefore, Groups I and II lack unity since the shared technical features do not represent a contribution over Daniel.

Regarding claim 1, Daniel discloses a device to remove an obstruction in a lumen comprising:
- a first capture member (352, fig 23C, 23D);
- each capture member comprises an open end and a tapered end (fig 23C, 23D), wherein said open end is defined by a frame component (354 - first capture member; 394 - second capture member, fig 23C) coupled to a body component (344 - first capture member; 392 - second capture member, fig 23C, said body component extending between said open end and said tapered end (fig 23C, 23D);
- a first guide member (346) coupled to said first capture member at said open end, wherein at least a portion of said body component is attached to the first guide member (fig 23A-23E);
- a second guide member (390) coupled to said second capture member at said open end (390 is coupled to frame 394 via 392), wherein at least a portion of said body component (392) is attached to the second guide member (390, fig 23A, para [0112][0113]); and wherein said first capture member and said second capture member are slidably coupled to each other, said slidable coupling comprises said first guide member (346) disposed in said second guide member (390, fig 23A, para [0113]).

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

Therefore, Groups I-II lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.