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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
23 October 2014 (23.10.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/172501 A3

(51) International Patent Classification:
A61F 2/06 (2013.01)

(21) International Application Number:
PCT/US2014/034429

(22) International Filing Date:
16 April 2014 (16.04.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/812,523 16 April 2013 (16.04.2013) US

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(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, BN, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
22 January 2015

WO 2014/172501 A3

(54) Title: ENDOVASCULAR DOCKING APPARATUS AND METHOD

(57) Abstract: Exemplary embodiments of apparatuses and methods of providing an endovascular'dock within a blood vessel are provided. An apparatus for vascular surgery can be provided, having an external tubular graft capable of expansion and configured to be placed within a sheath in an unexpended state, a first tubular structure provided internally within the external tubular graft and configured for placement of a graft therein, and a second tubular structure provided internally within the external tubular graft and configured for placement of a graft therein. Stent grafts can be provided along each tubular structure to a corresponding blood vessel such that blood flow is provided to the blood vessel from the apparatus within the stent grafts to each blood vessel, blocking the blood flow directly from the aneurysm.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 14/34429

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61F 2/06 (2014.01)
CPC - A61F 2/91
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)
CPC: A61F 2/91 IPC(8): A61F 2/06 (2014.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 623/1.16, 1.15, 1.27 CPC: A61F 2/06, 2/07 (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: stent%, graft%, dock*, hub, bifurcat*, attach*, connect*, coupl*, cap, nose cone, aperture, lumen, channel, opening, hole, guidewire, guide wire, manifold

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/0075722 A1 (CHUTER) 07 April 2005 (07.04.2005) fig 1, 2, 3, para [0009], [0021]-[0022], [0026]	1-5, 7-8, 21, 25
Y		22
Y	US 2005/0049667 A1 (ARBEFEUILLE et al) 03 March 2005 (03.03.2005) fig 13, 63, para [0169], [0174], [0208]	22

☐ 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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 November 2014 (06.11.2014)	04 DEC 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 OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.
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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 species of the generic invention 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 1-5, 7-8, 21-22, 25 directed to stent features.
Group II: Claims 1-2, 6, 9-10, 21-22, 25 directed to tubular structure features.
Group III: Claims 1-2, 21-25 directed to catheter features.
Group IV: Claims 11-14 directed to methods of providing an apparatus for vascular surgery.
Group V: Claims 15-20 directed to methods of performing vascular surgery.

Claims 1-2, 21-22 and 25 are generic to groups I-III.

----Continued on Supplemental Page----

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.:
1-5, 7-8, 21-22, 25

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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 14/34429

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

The inventions listed as Groups I-V 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 special technical feature of each species (Groups I-III) is provided in the group descriptions above. None of these special technical features are common to the other species, nor do they correspond to a special technical feature in the other species.

Group IV includes the special technical feature of a method of providing an apparatus for vascular surgery, comprising:
providing an external tubular stent graft having a tubular wall and configured to be placed within a sheath in an unexpanded state;
providing a first tubular structure within the external tubular stent graft and having a tubular wall attached to the tubular wall of the external tubular stent graft, and configured for placement of a graft therein; and
providing a second tubular structure within the external tubular stent graft and having a tubular wall attached to the tubular wall of the external tubular stent graft, and configured for placement of a graft therein, not required by Groups I-III and V.

Group V includes the special technical feature of a method of performing vascular surgery, comprising:
providing an endovascular dock within a sheath, the endovascular dock comprising:
an external tubular stent graft having a tubular wall;
a first tubular structure provided within the tubular wall of the external tubular stent graft; and
a second tubular structure provided within the tubular wall of the external tubular stent graft;
retracting the sheath to dock the endovascular dock within a wall of a first blood vessel;
providing a first stent graft having a first end within the first tubular structure and a second end within a wall of a second blood vessel such that blood flow is substantially restricted to within the first stent graft between the first stent graft and the second blood vessel; and
providing a second stent graft having a first end within the second tubular structure and a second end within a wall of a third blood vessel to provide blood flow between the second stent graft and the third blood vessel such that blood flow is substantially restricted to within the second stent graft between the second stent graft and the third blood vessel, not required by Groups I-IV.

COMMON TECHNICAL FEATURES

Groups I-V share the technical features of claim 1. Groups I-III are species of generic independents claim 1 and 21. Groups I-V are related as an apparatus (Groups I-III) and methods in conjunction with the apparatus (Groups IV-V). The apparatus is known in prior art as shown in US 2005/0075722 A1 (CHUTER).

Regarding claim 1, Chuter discloses an apparatus for vascular surgery, comprising:
an external tubular graft (40, fig 3) capable of expansion and configured to be placed within a sheath in an unexpanded state (para [0022]);
a first tubular structure (52, fig 3) provided internally within the external tubular graft and configured for placement of a graft therein (16, fig 1, para [0021]-[0022]); and
a second tubular structure (50, fig 3) provided internally within the external tubular graft and configured for placement of a graft therein (14, fig 1, para [0021]-[0022]).

Regarding claim 21, Chuter discloses a system for providing an endovascular dock within a blood vessel, comprising:
an endovascular dock having an external tubular stent graft (40, fig 3);
a first tubular structure (52, fig 3) provided internally within the external tubular stent graft and configured for placement of a first graft therein (16, fig 1, para [0021]-[0022]);
a second tubular structure (50, fig 3) provided internally within the external tubular stent graft and configured for placement of a second graft therein (14, fig 1, para [0021]-[0022]);
a sheath (delivery catheter) for housing the endovascular dock within the sheath (para [0022]); and
and US 4,655,771 A (WALLSTEN), incorporated by reference at para [0021], teaches a top portion (32) connected to a distal end of the sheath via 39, fig 6, col 6, ln 35-58);
wherein the endovascular dock is configured to be placed within a distal end of the sheath in a non-expanded state and is configured to expand when the sheath is retracted from the top portion (intended use, device capable of intended use, see para [0021]-[0022] which discloses the dock being self-expanding.

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-V lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.