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(54) Title: LYMPHATIC ANASTOMOSIS DEVICES

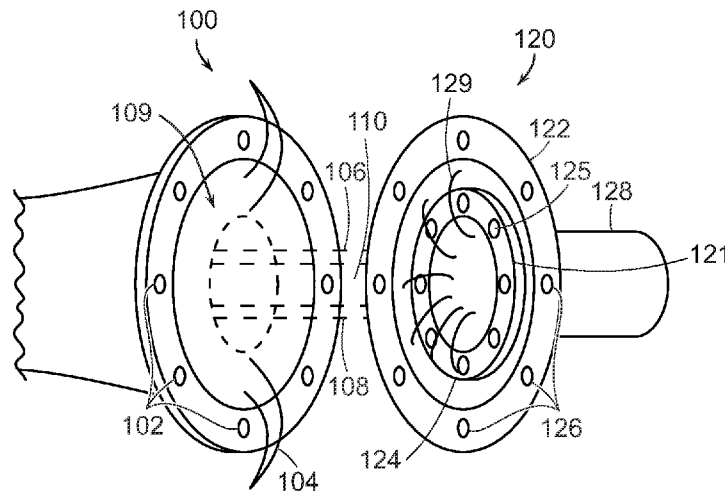


FIG. 1

(57) Abstract: Preferred embodiments relate to devices for performing a lymphovenous bypass procedure. A first ring is secured to tissue connected to at least one lymphatic channel of a patient and a second ring is attached to a vein of the patient. An end of the lymphatic channel that extends through the first ring is inserted into an open end of the vein and the rings are connected together to establish fluid flow from the lymphatic channel into the vein.



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INTERNATIONAL SEARCH REPORT

International application No PCT/US2020/038806

A. CLASSIFICATION OF SUBJECT MATTER INV. A61B17/11 ADD.				
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				
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 practicable, 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.		
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Y A	paragraph [0002] - paragraph [0003] paragraph [0031] - paragraph [0039] figures 1-3 -----	17-19 5,13, 31-33		
X	US 6 569 173 B1 (BLATTER DUANE D [US] ET AL) 27 May 2003 (2003-05-27)	1-5, 9-11, 13-16, 24,28, 29,31-33		
A	figures 1-3 column 18 - column 22 ----- -/--	6,8		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> See patent family annex.</td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> 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 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			
19 January 2021	25/01/2021			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lüddemann, Tobias			

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2020/038806

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 2005/149075 A1 (BORGHI ENZO [IT] ET AL) 7 July 2005 (2005-07-07)	1-6, 8-11, 14-16, 24,28-30
A	figures 1-4 paragraph [0019] - paragraph [0024] paragraph [0040] - paragraph [0045]	13,31-33
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	-/--	

INTERNATIONAL SEARCH REPORT

International application No PCT/US2020/038806

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	TOM J. M. VAN MULKEN ET AL: "First-in-human robotic supermicrosurgery using a dedicated microsurgical robot for treating breast cancer-related lymphedema: a randomized pilot trial", NATURE COMMUNICATIONS, vol. 11, no. 1, 11 February 2020 (2020-02-11), XP055763532, DOI: 10.1038/s41467-019-14188-w page 1 - page 6	17-19
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2020/038806

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.: **40-60**
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.:
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:

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 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.:
1-11, 13-19, 24, 29-33, 38, 39

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 40-60

Claims 40-60 relate to subject-matter considered by this Authority to be covered by the provisions of Rule 39.1(iv) PCT as they relate to surgical methods (see claim 40 specifying "inserting a lymphatic channel coupling device into a surgical opening of a patient"). Therefore, these claims have not been searched.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-6, 8-11, 13-16, 24, 28-33

Initially searched inventions

1.1. claims: 1-6, 8-11, 13-16, 24, 29-33

the device according to claim 1, comprising the additional features of pins on the first coupling element to be received by pin receiving regions of the second coupling element, solving the technical problem of facilitating connection of both coupling elements without the need for a further connector element

1.2. claim: 28

the device according to claim 1, comprising the additional features that the device comprises a therapeutic agent on a surface thereof, solving the technical problem of facilitating long-term implantability and acceptance of the device by the patient's body

2. claims: 7, 38, 39

the device according to claim 1, comprising the additional features of a first cone that connects to the first coupling element and a second cone that to the second coupling element, solving the technical problem of facilitating positioning of lymphatic vessels in the lumen of a vein (fig.2A)

3. claims: 12, 20-23, 25-27

the device according to claim 1, comprising the additional features that the device comprises a radiopaque material or comprises a sensor to measure flow, solving the technical problem of facilitating verification of proper positioning of the device during and/or after the procedure (fig.9 p.24 l.10)

4. claims: 17-19

the device according to claim 1, comprising the additional features that the device comprises a first or second tissue holding device or a robotic device for connecting the coupling elements, solving the technical problem of facilitating manipulation and implantation of the device in a minimal invasive procedure (fig.7,8 p.23 l.13ff.)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

5. claims: 34-37

the device according to claim 1, comprising the additional features that the device comprises a valve to constrict fluid flow in a vein, solving the technical problem of reducing venous pressure on the anastomosis junction wherein the reduced pressure aids in establishing flow of lymph fluid which tends to increase over time (fig.10 p.24 1.14ff.)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2020/038806

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