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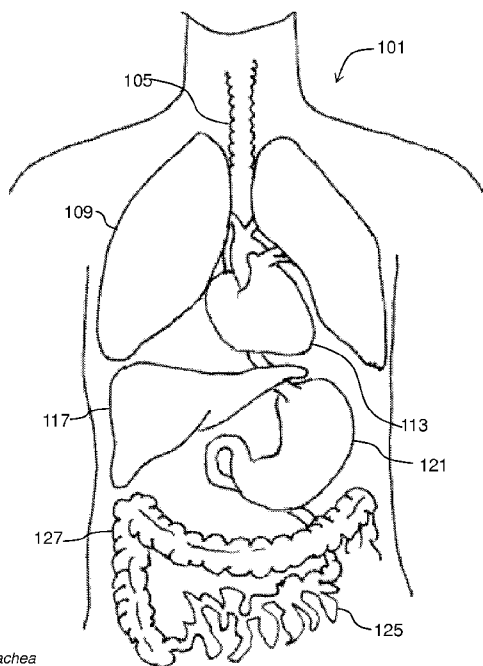
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[Continued on next page]

(54) Title: DEVICES AND METHODS FOR INTRAHEPATIC SHUNTS



105 trachea  
109 lung  
113 heart  
117 liver  
121 stomach  
125 small intestines  
127 large intestines

FIG. 1

(57) Abstract: The invention provides methods and devices for treating liver cirrhosis or portal hypertension by creating an intrahepatic shunt, or new passage, from a portal vein of a patient to a hepatic vein using a device with intravascular imaging capabilities and pressure sensing capabilities or positioning mechanisms. The integration of intravascular imaging aids in the precise placement of the shunt and pressure measurement may verify successful shunt creation. An apparatus may include a catheter with an extended body for insertion into a hepatic vein of a patient, an intravascular imaging device and a needle exit port on the distal portion of the extended body, and a needle disposed within a lumen in the catheter and configured to be pushed out of the exit port and extend away from a side of the extended body, in which the needle includes a pressure sensor.

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**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/IB2015/055302

A. CLASSIFICATION OF SUBJECT MATTER  
 INV. A61B17/06 A61F2/07 A61B17/11 A61B19/00 A61B17/00  
 ADD.  
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B. FIELDS SEARCHED  
 Minimum documentation searched (classification system followed by classification symbols)  
 A61B A61F  
 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.
Y	US 6 726 677 B1 (FLAHERTY J CHRISTOPHER [US] ET AL) 27 April 2004 (2004-04-27) figures 2, 13, 14 column 14, line 20 - line 37 column 17, line 54 - column 19, line 40 -----	11-20,22  21
Y	WO 99/48545 A1 (TRANSVASCULAR INC [US]) 30 September 1999 (1999-09-30) figures 1A-1E, 2 page 19, line 31 - page 20, line 13 page 21, line 15 - line 28 page 33, line 16 - line 20 ----- -/--	11-20,22

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search  24 November 2015	Date of mailing of the international search report  12/02/2016
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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  Etienne, Nicolas
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2015/055302

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 976 363 A2 (INTERVENTIONAL TECHNOLOGIES [US]) 2 February 2000 (2000-02-02) figures 1-3, 11 paragraph [0018] - paragraph [0022] paragraph [0036] -----	11,12, 14,20,21
A	WO 2006/027599 A1 (ADVOTEK MEDICAL DEVICES LTD [GB]; DICKINSON ROBERT JULIAN [GB]; PACEY) 16 March 2006 (2006-03-16) figures 1-4, 6 page 6, line 36 - page 11, line 30 page 12, line 13 - page 13, line 10 -----	11,15, 17,19-21

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2015/055302

## 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.: 1-10, 23-26  
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.:
  
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.:  
11-22

### 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**

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

1. claims: 11-22

Apparatus for creating an intrahepatic portosystemic shunt comprising a pressure sensor.

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2. claims: 27-31

Apparatus for creating an intrahepatic portosystemic shunt comprising two positioning balloons.

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

Continuation of Box II.1

Claims Nos.: 1-10, 23-26

Pursuant to Article 17(2)(a)(i) PCT, this Authority is not required to search the subject-matter of claims 1-10 and 23-26 since the methods of creating an intrahepatic portosystemic shunt as defined in these claims are methods for treatment of the human or animal body by surgery (Rule 39.1(iv) and Rule 43bis PCT). Indeed, the step of directing a catheter down a jugular vein and into a hepatic vein of a patient, recited in claims 1-10 and 23-26, is a surgical step.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2015/055302

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