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- (71) Applicant: **MEDTRONIC INC.** [US/US]; LC 340, 710 Medtronic Parkway, Minneapolis, MN 55432 (US).
- (72) Inventor: **THOMPSON, David, L.**; 14171 Alder Street Northwest, Andover, MN 55304 (US).
- (74) Agents: **SOLDNER, Michael, C.** et al.; 710 Medtronic Parkway NE, Minneapolis, MN 55432-5601 (US).
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(54) Title: IMPROVED SYSTEM AND METHOD OF POSITIONING IMPLANTABLE MEDICAL DEVICES

(57) Abstract: A device and method for deploying a lead in tortuous pathways such as the left ventricle or the coronary sinus vasculature. A catheter having fiber optics is inserted into the vasculature of a patient with the aid of a guide wire or equivalent. The fiber optics transmits infrared light to an optical head at the distal end of the catheter. Light reflecting from the vasculature system is collected and transmitted through the optical fibers to an infrared camera for imaging. Alternatively, an active pixel sensor is positioned distally on the lead for collecting and transmitting the image to a display device located external to the patient. Proper selection of the wavelength of infrared illumination allows objects to be imaged through bodily opaque fluid. Another embodiment enables viewing of a cardiac lead for extraction by a laser. Yet another embodiment enables proper positioning of an ablation catheter before energization.



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INTERNATIONAL SEARCH REPORT

PCT/US 02/36331

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B1/00 A61B18/14 A61B17/22

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 7 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 practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 46123 A (IMPERIAL COLLEGE ;KITNEY RICHARD IAN (GB); DOWDY CLIFF (US)) 22 October 1998 (1998-10-22) page 1, line 1-28 page 3, line 6 -page 5, line 5 page 9, line 10-19 ---	1-12
X	US 6 178 346 B1 (HANLIN H JOHN ET AL) 23 January 2001 (2001-01-23) cited in the application column 6, line 21-63 column 7, line 56 -column 9, line 39 column 28, line 1-44; figure 11A ---	1-12
A	US 6 190 353 B1 (GARIBOTTO JOHN THOMAS ET AL) 20 February 2001 (2001-02-20) column 15, line 57 -column 16, line 37 column 24, line 1-48; figure 5A -----	1-12

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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 document but published on or after the international filing date
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- "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

17 July 2003

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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, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pohjamo, T

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Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.: 13-15
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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 fee, this Authority did not invite payment of any additional fee.
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.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9846123	A	22-10-1998	AU 6930998 A 11-11-1998
		EP 0987980 A1 29-03-2000	
		WO 9846123 A1 22-10-1998	

US 6178346	B1	23-01-2001	AU 1450800 A 15-05-2000
		EP 1123041 A1 16-08-2001	
		WO 0024310 A1 04-05-2000	

US 6190353	B1	20-02-2001	AU 1275997 A 11-05-1998
		AU 733332 B2 10-05-2001	
		AU 1847297 A 22-08-1997	
		AU 723785 B2 07-09-2000	
		AU 1847397 A 22-08-1997	
		CA 2244079 A1 07-08-1997	
		CA 2244080 A1 07-08-1997	
		CN 1218414 A 02-06-1999	
		CN 1216929 A 19-05-1999	
		EP 0879068 A1 25-11-1998	
		EP 0932426 A1 04-08-1999	
		JP 2000504594 T 18-04-2000	
		JP 2000505316 T 09-05-2000	
		US 6283951 B1 04-09-2001	
		WO 9816161 A1 23-04-1998	
		WO 9727893 A1 07-08-1997	
		WO 9727898 A1 07-08-1997	
		US 2002123698 A1 05-09-2002	
		US 6379319 B1 30-04-2002	
		US 6375615 B1 23-04-2002	
		US 2002002349 A1 03-01-2002	
		US 6302875 B1 16-10-2001	
		US 2002029079 A1 07-03-2002	
		US 2001047165 A1 29-11-2001	
		US 6432127 B1 13-08-2002	
		US 2002062146 A1 23-05-2002	
		AU 726713 B2 16-11-2000	
		AU 7431696 A 30-04-1997	
		AU 729466 B2 01-02-2001	
		AU 7595396 A 30-04-1997	
		CA 2234361 A1 17-04-1997	
		CA 2234389 A1 17-04-1997	
		EP 1166721 A2 02-01-2002	
		EP 1317908 A2 11-06-2003	
		EP 0954248 A1 10-11-1999	
		EP 0955933 A1 17-11-1999	
		EP 0910298 A1 28-04-1999	
		JP 11513577 T 24-11-1999	
		JP 11514269 T 07-12-1999	
		WO 9713471 A1 17-04-1997	
		WO 9713463 A1 17-04-1997	
		US 6068638 A 30-05-2000	
		US 6159225 A 12-12-2000	
		US 6283983 B1 04-09-2001	
		US 6231587 B1 15-05-2001	
		AU 733341 B2 10-05-2001	
		AU 1847197 A 22-08-1997	
