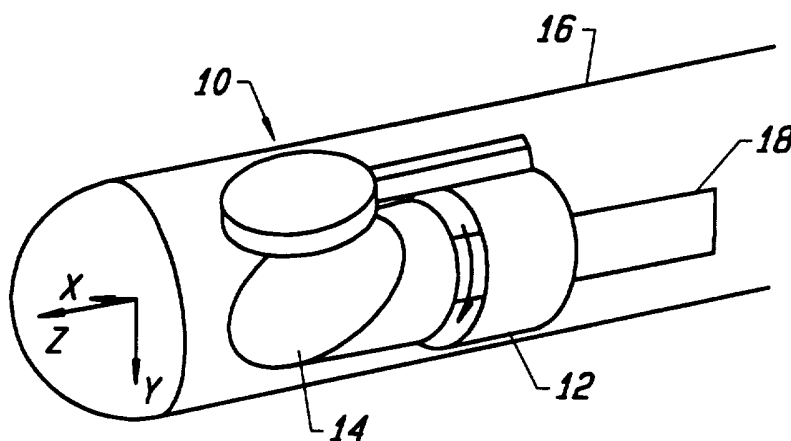




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification⁶ : A61B 8/12</p>	<p>A3</p>	<p>(11) International Publication Number: WO 96/09791 (43) International Publication Date: 4 April 1996 (04.04.96)</p>
<p>(21) International Application Number: PCT/US95/11656 (22) International Filing Date: 15 September 1995 (15.09.95) (30) Priority Data: 08/309,540 19 September 1994 (19.09.94) US (71) Applicant: THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY [US/US]; Stanford, CA 94305 (US). (72) Inventors: LIANG, David, H.; 970 Altschul Avenue, Menlo Park, CA 94025 (US). HU, Bob, S.; 2113 Camino a Los Cerros, Menlo Park, CA 94025 (US). (74) Agents: WOODWARD, Henry, K. et al.; Townsend and Townsend and Crew, Steuart Street Tower, 20th floor, One Market Plaza, San Francisco, CA 94105 (US).</p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 18 July 1996 (18.07.96)</p>

(54) Title: FORWARD VIEWING ULTRASONIC IMAGING CATHETER



(57) Abstract

A simple forward viewing ultrasound catheter includes one or more transducers (10), and an ultrasound mirror (14) supported by a bearing (12) in a sealed end of a catheter (16) with a drive cable (18) imparting relative motion to the transducer (10) and mirror (14). The mirror directs ultrasound waves forward of the catheter. An optical fiber can be provided to direct a laser beam for ablation of atheroma while under the guidance of simultaneous intravascular ultrasound.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgystan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/11656

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A61B 8/12
US CL :128/662.060

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)

U.S. : 128/660.1, 660.030, 662.060; 600/103, 109, 160; 606/159

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,313,950 (ISHIKAWA ET AL.) 24 May 1994, see column 6 lines 12-27.	1-4, 6-19
Y	US, A, 5,313,949 (YOCK) 24 May 1994, see column 6 lines 26-34, and column 10 lines 1-10	1-4, 6-19
Y	WO, A, 92/16140 (WINSTON) 01 October 1992, see page 13 line 36 to page 14 line 10.	1-4, 6-19
Y	JP, A, 4-9149 (MOCHIZUKI) 13 January 1992, see Abstract.	1-4, 6-19
Y	GB, A, 2 263 974 (DICKINSON) 11 August 1993, see page 6 lines 5-23.	8, 12-19

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	*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
A document defining the general state of the art which is not considered to be part of particular relevance	*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
E earlier document published on or after the international filing date	*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
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)	*G*	document member of the same patent family
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		

Date of the actual completion of the international search

06 MARCH 1996

Date of mailing of the international search report

21 MAY 1996

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Authorized officer
Frank Jaworski
FRANK JAWORSKI

Facsimile No. (703) 305-3230

Telephone No. (703) 308-3061