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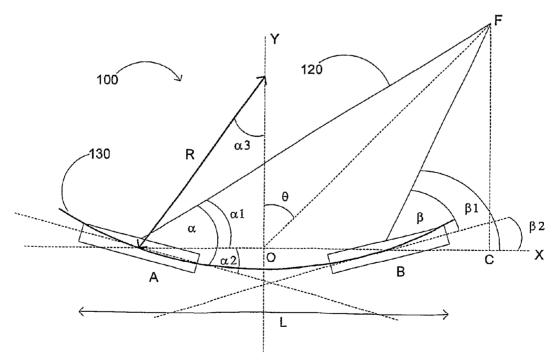
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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

[Continued on next page]

(54) Title: CONCAVE PHASED ARRAY IMAGING CATHETER



(57) Abstract: The present invention generally relates to medical devices, and more particularly to an improved intravascular device. In one embodiment, an intravascular device includes a catheter having proximal and distal portions, and a phased array of imaging elements, having edge elements each having angles of emission, located in the distal portion of the catheter, wherein the phased array is concaved having a radius of curvature such that when the phased array is steered in a maximal azimuthal direction, the angles of emission of the edge elements are substantially similar.



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Documenta	tion searched other than minimum documentation to the extent that	such documents are included in the fields so	earched						
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EPO-In	ternal								
с. росим	ENTS CONSIDERED TO BE RELEVANT								
Category*	Citation of document, with indication, where appropriate, of the re	elevant passages	Relevant to claim No.						
Х	US 2004/068191 A1 (SEWARD JAMES [US] ET AL) 8 April 2004 (2004-0		1-3, 5-11, 13-16						
	page 1, paragraphs 6,7 page 3, paragraph 46 - page 4, p 53								
	figures 1-3								
Х	WO 01/45550 A2 (THERUS CORP [US] 28 June 2001 (2001-06-28))	1-3, 5-11, 13-16						
	page 3, line 18 - line 30 page 4, line 8 - line 20 page 8, line 18 - page 10, line figures 4,6,7A,7B	21	13 10						
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X Furt	ther documents are listed in the continuation of Box C.	See patent family annex.							
* Special of	categories of cited documents:	"T" later document published after the inte	ernational filing date						
consid	ent defining the general state of the art which is not dered to be of particular relevance	or priority date and not in conflict with cited to understand the principle or the invention							
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other "P" docum	means ent published prior to the international filling date but	ments, such combination being obvious in the art.	us to a person skilled						
	han the priority date claimed actual completion of the international search	*&" document member of the same patent family Date of mailing of the international search report							
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/025770

0/0		PCT/US2006/025770		
C(Continua	tion). DOCUMENTS CONSIDERED TO BE RELEVANT			
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
Α	US 5 415 175 A (HANAFY AMIN M [US] ET AL) 16 May 1995 (1995-05-16)	1-3, 5-11, 13-16		
	column 14, line 63 - column 15, line 15 figures 14,15 			
A	US 5 522 393 A (PHILLIPS PATRICK J [US] ET AL) 4 June 1996 (1996-06-04)	1-3, 5-11, 13-16		
	column 10, line 56 - column 11, line 3 figure 20d			
Α	US 6 485 413 B1 (BOPPART STEPHEN A [US] ET AL) 26 November 2002 (2002-11-26) column 9, line 27 - line 65 column 34, line 27 - column 35, line 30 figure 23a	4,12		
A	XIE H ET AL: "Endoscopic optical coherence tomographic imaging with a CMOS-MEMS micromirror" SENSORS AND ACTUATORS A, ELSEVIER SEQUOIA S.A., LAUSANNE, CH, vol. 103, no. 1-2, 15 January 2003 (2003-01-15), pages 237-241, XP004400406 ISSN: 0924-4247 the whole document	4,12		
A	WO 00/19908 A (BOSTON SCIENT LTD [BB]) 13 April 2000 (2000-04-13) page 3, line 11 - line 17	5-7, 13-15		
A	POMPEI F JOSEPH ET AL: "Phased array element shapes for suppressing grating lobes" JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA, AIP / ACOUSTICAL SOCIETY OF AMERICA, MELVILLE, NY, US, vol. 111, no. 5, May 2002 (2002-05), pages 2040-2048, XP012002867 ISSN: 0001-4966 page 2040, left-hand column	7,15		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2006/025770

Patent doci			Publication date		Patent family member(s)		Publication date
US 20040	68191 A	\1	08-04-2004	US WO	2002058873 9308738		16-05-2002 13-05-1993
				US	6306096	-	23-10-2001
				US	5325860		05-07-1994
				US 	5345940	A 	13-09-1994
WO 01455	50 A	12	28-06-2001	AU	2598201	Α	03-07-2001
				CA	2394892		28-06-2001
				EP	1241994		25-09-2002
				JP	2004512856		30-04-2004
				US	2006235300		19-10-2006
				US	2001031922		18-10-2001
				US	2005096542	A1	05-05-2005
US 54151	75 A	1	16-05-1995	US	5582177	Α	10-12-1996
US 55223	93 A	1	04-06-1996	NONE	· —		
US 64854	13 B	31	26-11-2002	NONE	, u, u, u, u		
WO 00199	08 A	\	13-04-2000	CA	2340233	A1	13-04-2000
				EP	1117333	A1	25-07-2001
				JP	2002526145	Ţ	20-08-2002
				US	6168564		02-01-2001