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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: IMAGE-GUIDED INTRAVASCULAR THERAPY CATHETERS

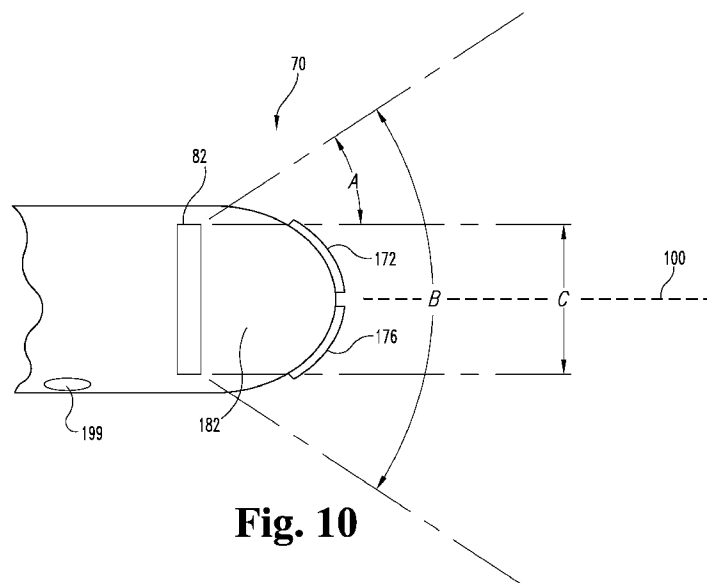


Fig. 10

(57) Abstract: An intravascular ultrasound catheter having an imaging array and ablation electrodes is provided. The imaging array and ablation electrodes are forward facing and the catheter can be used to ablate plaque in partially or totally occluded blood vessels under real time ultrasound visualization. The ablation electrodes are integrated into the distal face of the catheter and allow ultrasound to pass through them, which provides the ability to achieve highly accurate real time visualization of the tissue undergoing treatment.

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INTERNATIONAL SEARCH REPORT

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PCT/US2008/071006**A. CLASSIFICATION OF SUBJECT MATTER***A61B 8/12(2006.01)i, A61M 25/00(2006.01)i*

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: A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and Applications for Utility models since 1975

Japanese Utility models and Applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal) "ultrasound", "imaging", "RF", "transducer"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 006066096 A(Smith; Stephen W.,Light; Edward D. et al.) May 23, 2000 See abstract and claims 1-10	14,17-20 1-13,15,16,21-35
A	WO 99/12489 A2(ZIKORUS, Arthur, W., PARKER, Mark, P. et al.) Mar. 18, 1999 See abstract and pages 3-10	1-35
A	KR 10-2006-0112244 A(ALTMANN ANDRES CLAUDIO, GOVARI ASSAF) Oct. 31, 2006 See abstract and claims 1-13	1-35

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

* Special categories of cited documents:

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6066096 A	23.05.2000	US 6530888	11.03.2003
		US 6572551	03.06.2003
		US 2002-0013529 A1	31.01.2002
		US 6066096 A	23.05.2000
		US 6530888 B2	11.03.2003
		US 6572551 B1	03.06.2003
WO 99-12489 A2	18.03.1999	AU 1998-94845 B2	29.03.1999
		AU 740000 B2	25.10.2001
		AU 9484598 A	29.03.1999
		BR 9814738 A	10.10.2000
		CA 2303021 A1	18.03.1999
		CA 2303021 C	30.05.2006
		CA 2303021 A1	18.03.1999
		CA 2303021 C	18.03.1999
		CN 1154447 C	23.06.2004
		CN 1278711 A	03.01.2001
		CN 1278711	03.01.2001
		EP 1035796 A2	20.09.2000
		IL 135008 D0	20.05.2001
		JP 2001-515752	25.09.2001
		KR 10-2001-0030589	16.04.2001
		NO 20001267 A	09.05.2000
		RU 2207822 C2	10.07.2003
		US 6165172	26.12.2000
		US 6179832	30.01.2001
		US 6200312	13.03.2001
		US 6258084	10.07.2001
		US 6398780	04.06.2002
		US 6401719	11.06.2002
		US 6689126	10.02.2004
		US 6752803	22.06.2004
		US 6769433	03.08.2004
		US 7041098	09.05.2006
		US 7396355	08.07.2008
		US 7406970	05.08.2008
		US 2001-016739 A1	23.08.2001
		US 6165172 A	26.12.2000
		US 6179832 B1	30.01.2001
		US 6200312 B1	13.03.2001
		US 6237606 B1	29.05.2001
		US 6258084 B1	10.07.2001
		US 6398780 B1	04.06.2002
		US 6401719 B1	11.06.2002
		US 6682526 B1	27.01.2004
		US 6689126 B1	10.02.2004
		US 6752803 B2	22.06.2004
		US 6769433 B2	03.08.2004
		US 6969388 B2	29.11.2005
		US 7041098 B2	09.05.2006
		WO 99-12489 A3	17.06.1999

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2008/071006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2006-0112244 A	31. 10. 2006	AU 2006-201646 A1	09. 11. 2006
		CA 2544026 A1	26. 10. 2006
		EP 1717601 A2	02. 11. 2006
		EP 1717601 A3	27. 02. 2008
		JP 2006-305361	09. 11. 2006
		KR 20060112244 A	31. 10. 2006