

SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application Number
EP 15 74 3308

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 6 019 727 A (KOGER JAMES D [US] ET AL) 1 February 2000 (2000-02-01) * abstract * * column 1, line 13 - column 2, line 59 * * column 4, line 20 - column 6, line 67 * * figures 1A-1C, 2, 3A-3F,4 *	1-3	INV. A61B8/12 H01L41/337 B06B1/06 ADD. A61B8/08 A61B8/00
Y	US 2007/182290 A1 (GUO HONGKAI [US] ET AL) 9 August 2007 (2007-08-09) * abstract * * paragraph [0008] - paragraph [0010] * * figure 1 *	1-3	
A	US 6 124 664 A (MAMAYEK DON S [US] ET AL) 26 September 2000 (2000-09-26) * abstract * * column 2, line 55 - column 5, line 24 * * figures 1-6 *	1-3	
A	US 2009/171216 A1 (SADAKA ALAIN [US]) 2 July 2009 (2009-07-02) * the whole document *	1-3	TECHNICAL FIELDS SEARCHED (IPC)
X	US 6 186 952 B1 (WHITE DAVID A [US] ET AL) 13 February 2001 (2001-02-13) * abstract * * column 4, line 15 - column 6, line 60 * * figures 2-4 *	4,5,10, 11 6,14	A61B B06B H01L
X	US 2005/085730 A1 (FLESCH AIME [FR] ET AL) 21 April 2005 (2005-04-21) * the whole document *	4,5,7,8 12,15	
X	US 5 546 948 A (HAMM MARK A ET AL) 20 August 1996 (1996-08-20) * abstract * * column 9, line 56 - column 10, line 44 * * figure 2a *	4,5	
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The supplementary search report has been based on the last set of claims valid and available at the start of the search.			
Place of search Munich		Date of completion of the search 12 February 2018	Examiner Artikis, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C04)

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 5 406 951 A (TEN HOFF HARM [NL] ET AL) 18 April 1995 (1995-04-18) * the whole document *	4-6,10, 11,14	
A	US 6 162 178 A (GARCIA RIZZA A [US] ET AL) 19 December 2000 (2000-12-19) * abstract * * column 1, line 11 - column 6, line 5 * * figures 5-7 *	4-6,10, 11,14	
			TECHNICAL FIELDS SEARCHED (IPC)
The supplementary search report has been based on the last set of claims valid and available at the start of the search.			
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EPO FORM 1503 03.82 (P04C04)

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present (supplementary) European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present (supplementary) European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present (supplementary) European search report has been drawn up for those parts of the European patent application which relate to the first mentioned in the claims, namely claims:

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-3

A method for producing an ultrasonic transducer, comprising: forming a piezoelectric material lapped according to a preset thickness; depositing a conductive material on a lapped surface of the piezoelectric material; casting a front surface and a rear surface of the piezoelectric material having the deposited conductive material to respectively form a matching layer and a backing layer and lapping according to a preset thickness; and dicing the bulk material with a stack of the matching layer, the piezoelectric material and the backing layer along a stack direction to produce single elements which are less than or equal to a threshold size for intravascular ultrasound (IVUS).

2. claims: 4-15

An ultrasonic transducer structure comprising: a tube for insertion into a blood vessel for IVUS; an ultrasonic transducer of a single element consisting of a stack of a matching layer, a piezoelectric material and a backing layer, and installed at an end of the tube to obtain an ultrasonic image; and a support positioned between one side wall of the tube and the ultrasonic transducer to form an angle at which the ultrasonic transducer is oriented, and to adjust the angle to make an ultrasonic radiation angle of the ultrasonic transducer different from an insertion angle of the tube.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-02-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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12-02-2018

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专利名称(译)	生产血管内超声换能器的方法及其结构		
公开(公告)号	EP3089479A4	公开(公告)日	2018-03-28
申请号	EP2015743308	申请日	2015-01-28
申请(专利权)人(译)	西江大学研究基金会		
当前申请(专利权)人(译)	西江大学研究基金会		
[标]发明人	CHANG JIN HO SONG TAI KYONG YOO YANG MO LEE JUNSU		
发明人	CHANG, JIN HO SONG, TAI-KYONG YOO, YANG MO LEE, JUNSU		
IPC分类号	H04R17/00 A61B8/12 A61B8/00 A61B8/08 B06B1/06 H01L41/337		
CPC分类号	H01L41/083 A61B8/0891 A61B8/12 A61B8/4483 B06B1/0648 H01L41/27 H01L41/337 H01L41/35		
优先权	1020140011682 2014-01-29 KR 1020140011683 2014-01-29 KR		
其他公开文献	EP3089479A1 EP3089479B1		
外部链接	Espacenet		

摘要(译)

本发明涉及一种用于制造血管内超声换能器的方法及其结构，该超声换能器的制造方法通过以下方式制造单个元件：形成根据预先设定的厚度研磨的压电元件；将导电材料沉积在压电元件的搭接表面上；通过铸造已经沉积有导电材料的压电元件的前表面和后表面来形成匹配层和后表面层；根据预先设定的厚度进行研磨；以及沿着堆叠方向切割作为匹配层，压电元件和背面层的叠层的大块材料，使得元件的尺寸小于血管内超声（IVUS）的临界尺寸。

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3	The supplementary search report is based on the text as filed at the time of the search.			
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