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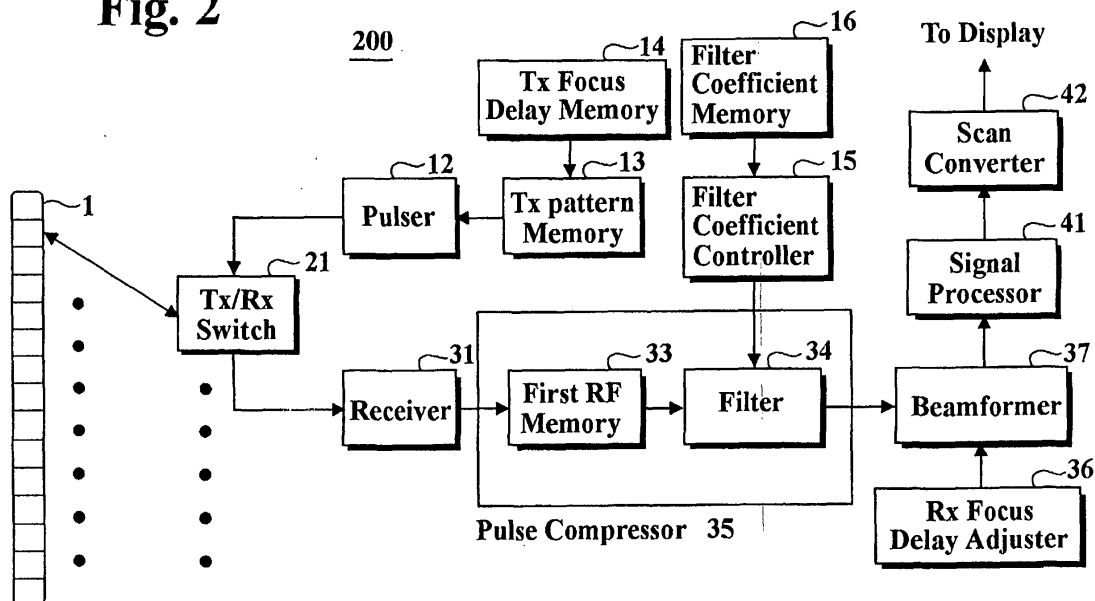
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(54) **Ultrasound imaging method and apparatus based on pulse compression technique using a spread spectrum signal**

(57) An ultrasound imaging method forms an image of an object using signals reflected from the object after transmitting an ultrasound pulse to the object. In the method, at a first step, a predetermined first spread spectrum signal is converted to the ultrasound signal at one or more transducers and the ultrasound signal is

transmitted to the object. At a second step, pulse compression is performed on a reflected signal of the ultrasound signal reflected from the object to form a pulse compressed signal. And the pulse compressed signal is processed to produce a receive-focused signal and the image of the object from the receive-focused signal is generated.

Fig. 2





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EUROPEAN SEARCH REPORT

Application Number
EP 01 11 4401

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P,X	YANG-MO YOO, WOO-YOUL LEE, TAI-KYONG SONG: "Correlator design using genetic algorithms for medical imaging" PROC. IC-AI 2000 SYMPOSIUM, LAS VEGAS, 26 - 29 June 2000, pages 1149-1152, XP009029306 * the whole document *	1-16	G01S15/89 G01S7/52 G06F17/50
X Y A	US 5 964 706 A (CHIAO RICHARD Y ET AL) 12 October 1999 (1999-10-12) * abstract; figures 1,3-5 * * column 1, line 7-17 * * column 2, line 66 - column 3, line 34 * * column 3, line 58 - column 5, line 25 * * column 5, line 35-47 * * column 5, line 63 - column 6, line 67 * --- ---	1-5,8,9, 11-15 6,7,16 10	
X Y	US 6 010 456 A (RHYNE THEODORE L) 4 January 2000 (2000-01-04) * abstract; figures 2-7 * * column 2, line 39 - column 3, line 26 * * column 5, line 1 - column 8, line 61 * --- -/--	1,2,5,9, 11,13,15 6-8,14, 16	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G01S G06F
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 15 April 2004	Examiner Reuss, 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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European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 11 4401

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	SCHAFFER J D ET AL: "DESIGNING MULTIPLIERLESS DIGITAL FILTERS USING GENETIC ALGORITHMS" PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON GENETIC ALGORITHMS. UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN, JULY 17 - 21, 1993, SAN MATEO, MORGAN KAUFMANN, US, vol. CONF. 5, 17 July 1993 (1993-07-17), pages 439-444, XP000449249	10	
Y	* the whole document *	6-8,14,16	
X	GENTILI P ET AL: "Efficient genetic algorithm design for power-of-two FIR filters" ACOUSTICS, SPEECH, AND SIGNAL PROCESSING, 1995. ICASSP-95., 1995 INTERNATIONAL CONFERENCE ON DETROIT, MI, USA 9-12 MAY 1995, NEW YORK, NY, USA, IEEE, US, 9 May 1995 (1995-05-09), pages 1268-1271, XP010151542 ISBN: 0-7803-2431-5	10	
Y	* the whole document *	6-8,14,16	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search MUNICH		Date of completion of the search 15 April 2004	Examiner Reuss, 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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Application Number
EP 01 11 4401

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	LEE A ET AL: "Digital filter design using genetic algorithm" ADVANCES IN DIGITAL FILTERING AND SIGNAL PROCESSING, 1998 IEEE SYMPOSIUM ON VICTORIA, BC, CANADA 5-6 JUNE 1998, NEW YORK, NY, USA, IEEE, US, 5 June 1998 (1998-06-05), pages 34-38, XP010289015 ISBN: 0-7803-4957-1	10	
Y	* the whole document *	6-8,14,16	
A	US 4 848 354 A (ANGELSEN BJORN A J ET AL) 4 18 July 1989 (1989-07-18) * figure 15A * * column 12, line 48-59 * * column 13, line 53 - column 14, line 15 * -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search MUNICH		Date of completion of the search 15 April 2004	Examiner Reuss, 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			

EPO FORM 1503 03 82 (P04C01)

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

EP 01 11 4401

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
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15-04-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5964706 A	12-10-1999	DE 19909699 A1	23-09-1999
		IL 128867 A	01-12-2002
		JP 11309145 A	09-11-1999

US 6010456 A	04-01-2000	NONE	

US 4848354 A	18-07-1989	NO 831718 A	14-11-1984
		DE 3417660 A1	22-11-1984
		FR 2545715 A1	16-11-1984
		GB 2142142 A ,B	09-01-1985
		IT 1174091 B	01-07-1987
		JP 1887966 C	22-11-1994
		JP 6013028 B	23-02-1994
		JP 60034434 A	22-02-1985

专利名称(译)	基于使用扩频信号的脉冲压缩技术的超声成像方法和装置		
公开(公告)号	EP1164385A3	公开(公告)日	2004-06-02
申请号	EP2001114401	申请日	2001-06-15
申请(专利权)人(译)	MEDISON CO. , LTD.		
当前申请(专利权)人(译)	MEDISON CO. , LTD.		
[标]发明人	SONG TAI KYONG YOO YANG MO		
发明人	SONG, TAI KYONG YOO, YANG MO		
IPC分类号	G01N29/44 A61B8/00 G01S15/89 H03H17/06 G01S7/52 G06F17/50		
CPC分类号	G01S15/8954		
优先权	1020000033417 2000-06-17 KR		
其他公开文献	EP1164385A2 EP1164385B1		
外部链接	Espacenet		

摘要(译)

超声成像方法使用在向对象发射超声脉冲之后从对象反射的信号来形成对象的图像。在该方法中，在第一步骤，在一个或多个换能器处将预定的第一扩展频谱信号转换为超声信号，并且将超声信号发送到对象。在第二步骤，对从对象反射的超声信号的反射信号执行脉冲压缩，以形成脉冲压缩信号。并且脉冲压缩信号被处理以产生接收聚焦信号，并且从接收聚焦信号产生对象的图像。

