



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
04.02.2004 Bulletin 2004/06

(51) Int Cl.⁷: **A61B 8/06**

(43) Date of publication A2:
16.08.2001 Bulletin 2001/33

(21) Application number: **01102689.5**

(22) Date of filing: **07.02.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
 Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
 • **Okada, Takashi**
Mitaka-shi, Tokyo, 181-8622 (JP)
 • **Harada, Akimitsu**
Mitaka-shi, Tokyo, 181-8622 (JP)

(30) Priority: **10.02.2000 JP 2000032856**
25.04.2000 JP 2000123615

(74) Representative: **Heim, Hans-Karl, Dipl.-Ing. et al**
Weber & Heim
Patentanwälte
Irmgardstrasse 3
81479 München (DE)

(71) Applicant: **ALOKA CO., LTD.**
Mitaka-shi Tokyo 181-8622 (JP)

(54) **Ultrasonic diagnostic apparatus**

(57) To accurately measure wave intensity as an evaluation value using an ultrasonic diagnostic apparatus, a measurement line is set in a tomogram and anterior and posterior walls of a blood vessel are tracked on the measurement line, so that a change waveform concerning a blood vessel diameter is prepared. A tracking gate S is set on the measurement line, so that a blood velocity change waveform is prepared based on echo data concerning a part within the tracking gate S, the

change waveform indicating averaged blood velocity. Wave intensity is calculated based on the blood vessel diameter change waveform and the blood velocity change waveform. Prior to the calculation of wave intensity, the blood vessel diameter change waveform is calibrated based on the maximum and minimum blood pressure values into a blood pressure waveform. A beam for Doppler measurement may be set intersecting with the displacement measurement beam.

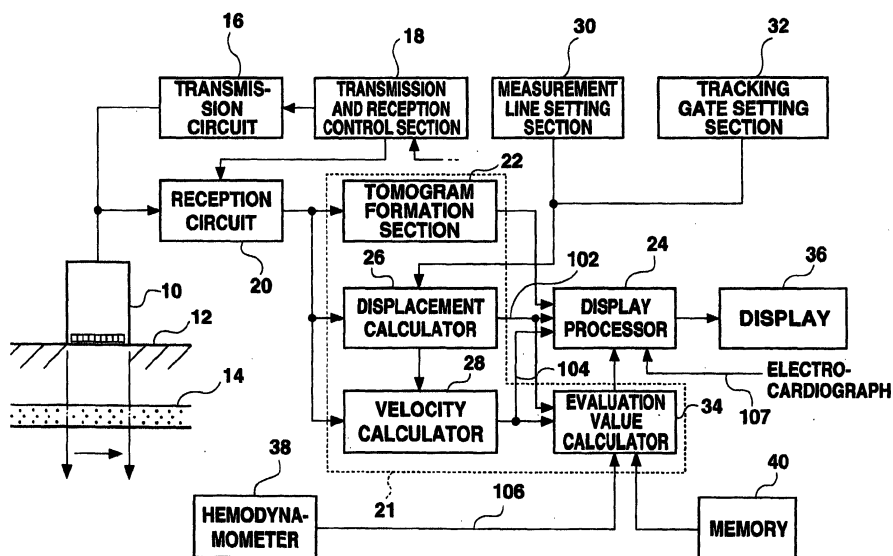


Fig. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 10 2689

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	EP 0 842 638 A (ATL ULTRASOUND INC) 20 May 1998 (1998-05-20)	1,7-10	A61B8/06
A	* column 2, line 40 - column 8, line 19; figures *	2-6,11, 12,16, 19,24	

X	US 5 682 896 A (SCHEIB JOHN P ET AL) 4 November 1997 (1997-11-04)	1,7,10	
A	* column 2, line 38 - column 5, line 29; figures *	12,16, 19,24	
	* column 10, line 50 - column 11, line 21 *		

X	US 4 630 612 A (UCHIDA ROKUROH ET AL) 23 December 1986 (1986-12-23)	1	
A	* column 4, line 23 - column 12, line 29; figures *	12,16, 19,22	

A	US 5 107 840 A (BONNEFOUS ODILE) 28 April 1992 (1992-04-28)	16-21	TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A	US 4 476 874 A (TAENZER JON C ET AL) 16 October 1984 (1984-10-16)	1-23	
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X	US 5 450 850 A (IINUMA KAZUHIRO) 19 September 1995 (1995-09-19)	1,7-9, 12-14, 19-21	
A	* column 4, line 16 - column 14, line 34; figures *	2-6,22, 23	

A	US 5 555 886 A (WENG LEE ET AL) 17 September 1996 (1996-09-17)	24	
	* column 6, line 12 - column 8, line 3; figures *		

The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
MUNICH		5 December 2003	Ruff, C
CATEGORY OF CITED DOCUMENTS			
<p>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</p>			
<p>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</p>			
<p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03 82 (P04C01)



European Patent
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Application Number

EP 01 10 2689

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims 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 the first ten claims.

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 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 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 European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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LACK OF UNITY OF INVENTION
SHEET B

Application Number

EP 01 10 2689

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: 1-23

Ultrasonic diagnostic apparatus
for measuring the displacement of a blood vessel wall and
for measuring the the blood velocity and for calculating an
evaluation value based on the measured data.

1.1. Claims: 1-11

Ultrasonic diagnostic apparatus for measuring the
displacement of a blood vessel wall and the blood
velocity and for calculation of an evaluation value
based on the measured data

1.2. Claims: 12-15

Ultrasonic diagnostic apparatus having a blood
pressure calculator

1.3. Claims: 16-18

Ultrasonic apparatus having a blood pressure
calculator, a calculator for the time differential of
blood pressure, a calculator for time differential of
blood velocity and a calculator for wave intensity

1.4. Claims: 19-21

Ultrasonic apparatus having a blood vessel wall
specifying circuit and a calculator for the blood
vessel diameter and having a blood pressure calculator

1.5. Claim : 22

Ultrasonic diagnostic apparatus having a blood
velocity calculator and multi curves-display device

1.6. Claim : 23

Ultrasonic diagnostic apparatus having a tomogram- and
"multi curves"-display device

2. Claims: 24-35

Ultrasonic apparatus with
- first beam direction setting circuit
- displacement measuring circuit

Please note that all inventions mentioned under item 1, although not



European Patent
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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 01 10 2689

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:

necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

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

EP 01 10 2689

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.

05-12-2003

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专利名称(译)	超声诊断设备		
公开(公告)号	EP1123687A3	公开(公告)日	2004-02-04
申请号	EP2001102689	申请日	2001-02-07
[标]申请(专利权)人(译)	日立阿洛卡医疗株式会社		
申请(专利权)人(译)	ALOKA CO. , LTD.		
当前申请(专利权)人(译)	日立ALOKA MEDICAL. , LTD.		
[标]发明人	OKADA TAKASHI HARADA AKIMITSU		
发明人	OKADA, TAKASHI HARADA, AKIMITSU		
IPC分类号	A61B8/06		
CPC分类号	A61B8/0858 A61B5/1075 A61B8/06 A61B8/13		
优先权	2000123615 2000-04-25 JP 2000032856 2000-02-10 JP		
其他公开文献	EP1123687A2		
外部链接	Espacenet		

摘要(译)

为了使用超声波诊断装置精确地测量作为评估值的波强度，在断层图像中设置测量线，并且在测量线上跟踪血管的前壁和后壁，使得关于血管直径的变化波形是准备。在测量线上设置跟踪门S，从而基于关于跟踪门S内的部分的回波数据准备血液速度变化波形，该变化波形表示平均血液速度。基于血管直径变化波形和血流速度变化波形计算波强度。在计算波强度之前，基于最大和最小血压值将血管直径变化波形校准为血压波形。可以设置用于多普勒测量的光束与位移测量光束相交。

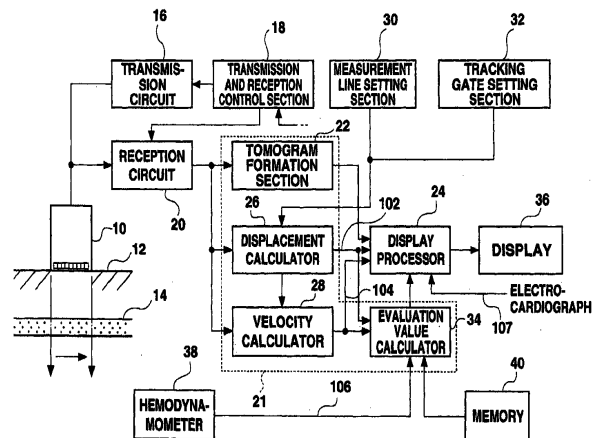


Fig. 1