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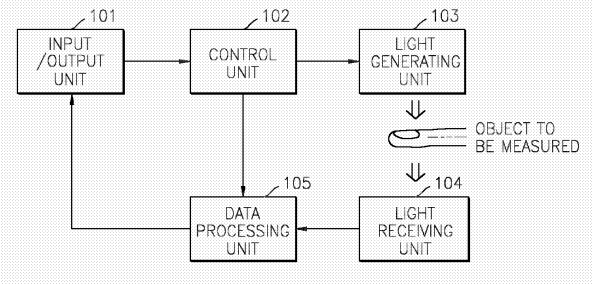
(54) Diagnostic method and apparatus using light

(57) A diagnosis method and apparatus for measuring blood hemoglobin concentration, oxygen saturation, pulse rate, respiration rate, and degree of aging of blood vessels using light are provided. The diagnosis apparatus using light includes: an input/output unit which receives a command for measurement from a user and provides information on the result of a measurement to the user; a control unit which receives the command for measurement from the input/output unit and generates a control signal; a light generating unit which generates at least two light beams for measurement according to the control signal; a light receiving unit which receives the light beams transmitted through an object that is subject to measurement and converts the received light beams into electrical signals; and a data processing unit which processes the electrical signals received from the light receiving unit and outputs information on the result of a predetermined measurement. Multiple parameters, including hemoglobin concentration, oxygen saturation, pulse rate, respiration rate, and degree of aging of blood vessels, can be noninvasively measured using the diagnosis apparatus.

FIG. 1



EP 1 834 577 A3

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PARTIAL EUROPEAN SEARCH REPORT

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 07 11 0389

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 5 800 348 A (KAESTLE SIEGFRIED [DE]) 1 September 1998 (1998-09-01) * column 11, line 17 - column 12, line 53; figure 6 *	1-4	INV. A61B5/00
Y	US 5 273 036 A (KRONBERG HARALD [DE] ET AL) 28 December 1993 (1993-12-28) * column 4, line 35 - column 5, line 2; figure 9 *	1-4	
Y	TAKAZAWA K ET AL: "Assessment of vasoactive agents and vascular aging by the second derivative of photoplethysmogram waveform." HYPERTENSION AUG 1998, vol. 32, no. 2, August 1998 (1998-08), pages 365-370, XP002446272 ISSN: 0194-911X * the whole document *	1	
	-/--		TECHNICAL FIELDS SEARCHED (IPC) A61B

INCOMPLETE SEARCH

The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.

Claims searched completely :

Claims searched incompletely :

Claims not searched :

Reason for the limitation of the search:

see sheet C

Place of search	Date of completion of the search	Examiner
The Hague	9 August 2007	Lommel, André

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 (P04C07)

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PARTIAL EUROPEAN SEARCH REPORT

Application Number
EP 07 11 0389

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	JEON KYE JIN ET AL: "Noninvasive total hemoglobin measurement" JOURNAL OF BIOMEDICAL OPTICS, SPIE, BELLINGHAM, WA, US, vol. 7, no. 1, January 2002 (2002-01), pages 45-50, XP002265172 ISSN: 1083-3668 * 2 Theory *	2	
Y	WO 00/21438 A1 (UNIV FLORIDA [US]) 20 April 2000 (2000-04-20) * page 3, line 23 - page 4, line 8 * * page 6, line 3 - page 8, line 17 *	3,4	
Y	NAKAJIMA K ET AL: "Monitoring of heart and respiratory rates by photoplethysmography using a digital filtering technique." MEDICAL ENGINEERING & PHYSICS JUL 1996, vol. 18, no. 5, July 1996 (1996-07), pages 365-372, XP002446273 ISSN: 1350-4533 * the whole document *	3,4	TECHNICAL FIELDS SEARCHED (IPC)

EPO FORM 1503 03.82 (P04C10) 2

European Patent Office

INCOMPLETE SEARCH
SHEET C

Application Number
EP 07 11 0389

Claim(s) searched completely:
1-4

Claim(s) not searched:
5-9

Reason for the limitation of the search (non-patentable invention(s)):

Claims 5-8:
Article 52 (4) EPC - Diagnostic method practised on the human or animal body

Claim 9:
Article 84 EPC - Claim 9 relates back to method claims falling under Article 52(4) EPC

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 11 0389

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.

09-08-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5800348 A	01-09-1998	NONE	
US 5273036 A	28-12-1993	NONE	
WO 0021438 A1	20-04-2000	AU 1118500 A	01-05-2000

专利名称(译)	使用光的诊断方法和设备		
公开(公告)号	EP1834577A3	公开(公告)日	2007-10-03
申请号	EP2007110389	申请日	2003-03-14
[标]申请(专利权)人(译)	三星电子株式会社		
申请(专利权)人(译)	SAMSUNG ELECTRONICS CO.，LTD.		
当前申请(专利权)人(译)	SAMSUNG ELECTRONICS CO.，LTD.		
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IPC分类号	A61B5/00 A61B5/0245 A61B5/02 A61B5/0205 A61B5/024 A61B5/08 A61B5/145 A61B5/1455 G01N21/31		
CPC分类号	A61B5/02007 A61B5/02416 A61B5/0816 A61B5/14551 A61B5/7239 G01N21/31		
优先权	1020020014277 2002-03-16 KR		
其他公开文献	EP1834577A2		
外部链接	Espacenet		

摘要(译)

提供了一种使用光测量血液血红蛋白浓度，氧饱和度，脉搏率，呼吸速率和血管老化程度的诊断方法和装置。使用光的诊断装置包括：输入/输出单元，其接收来自用户的测量命令，并向用户提供关于测量结果的信息;控制单元，从输入/输出单元接收测量命令并产生控制信号;光产生单元，根据控制信号产生至少两个用于测量的光束;光接收单元，接收通过待测量物体传输的光束，并将接收到的光束转换成电信号;数据处理单元处理从光接收单元接收的电信号，并输出关于预定测量结果的信息。可以使用诊断设备非侵入性地测量多个参数，包括血红蛋白浓度，氧饱和度，脉搏率，呼吸速率和血管老化程度。