



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**15.09.2004 Bulletin 2004/38**

(51) Int Cl.7: **A61B 5/00**

(43) Date of publication A2:  
**17.09.2003 Bulletin 2003/38**

(21) Application number: **03251571.0**

(22) Date of filing: **14.03.2003**

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

- **Jeon, Kye-jin**  
**Suwon-City, Kyungki-do (KR)**
- **Lee, Jong-young**  
**Kiheung-eub, Yongin-city, Kyungki-do (KR)**
- **Park, Kun-kook**  
**Kiheung-eub, Yongin-city, Kyungki-do (KR)**
- **Kim, Su-jin**  
**Suseong-gu, Daejeon (KR)**
- **Jwa, Hoon-jong**  
**Gangbuk-gu, Seoul (KR)**

(30) Priority: **16.03.2002 KR 2002014277**

(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**  
**Suwon-City, Kyungki-do (KR)**

(74) Representative: **Greene, Simon Kenneth**  
**Elkington and Fife LLP,**  
**Prospect House,**  
**8 Pembroke Road**  
**Sevenoaks, Kent TN13 1XR (GB)**

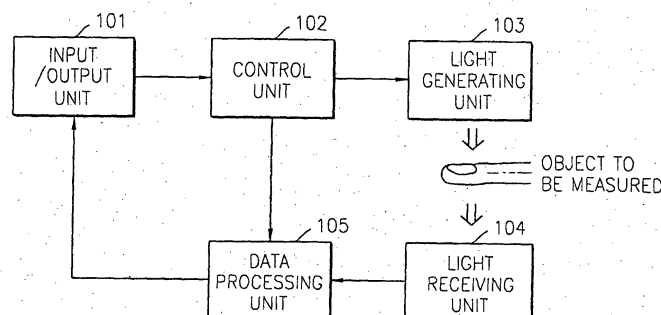
(72) Inventors:  
 • **Yoon, Gil-won**  
**Seongdong-gu, Seoul (KR)**  
 • **Kim, Hong-sig, 180 Geumgok-dong**  
**Bundang-gu, Seongnam-City, Kyungki-do (KR)**

(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





European Patent Office

EUROPEAN SEARCH REPORT

Application Number  
EP 03 25 1571

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	US 5 800 348 A (KAESTLE SIEGFRIED) 1 September 1998 (1998-09-01)	1-3, 8-10,15, 16	A61B5/00
Y	* column 11, line 17 - column 12, line 53; figure 6 *	4,11	
X	US 6 067 462 A (DIAB MOHAMED K ET AL) 23 May 2000 (2000-05-23)	1-3, 8-10,15, 16	
Y	* column 6, line 60 - column 8, line 5 * * column 8, line 61 - column 12, line 24 * * figure 3 *	4,11	
Y	----- JEON KYE JIN; KIM SU-JIN; PARK KUN KOOK; KIM JONG-WON; YOON GILWON: "Noninvasive total hemoglobin measurement" JOURNAL OF BIOMEDICAL OPTICS, ISSN 1083-3668, vol. 7, no. 1, - January 2002 (2002-01) pages 45-50, XP002265172 United States * 2 Theory *	4,11	
A	----- US 5 499 627 A (HARRIS DAVID H ET AL) 19 March 1996 (1996-03-19)  * column 5, line 8 - column 9, line 13 * -----	1-3, 8-10,15, 16	TECHNICAL FIELDS SEARCHED (Int.Cl.7)  A61B
-The present search report has been drawn up for all claims			
Place of search <b>The Hague</b>		Date of completion of the search <b>29 April 2004</b>	Examiner <b>Lommel, A</b>
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)



**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:

1-3, 8-10, 15, 16 and 4, 11



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, 8-10, 15, 16 and 4, 11

Diagnosis method and apparatus for determining hemoglobin concentration and oxygen saturation  
---

2. claims: 1-3, 8-10, 15, 16 and 5, 12

Diagnosis method and apparatus for determining pulse rate  
---

3. claims: 1-3, 8-10, 15, 16 and 6, 13

Diagnosis method and apparatus for determining respiration rate  
---

4. claims: 1-3, 8-10, 15, 16 and 7, 14

Diagnosis method and apparatus for determining degree of aging of blood vessels  
---

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

EP 03 25 1571

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.

29-04-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5800348 A	01-09-1998	EP 0760223 A1	05-03-1997
		EP 0761159 A2	12-03-1997
		DE 69604464 D1	04-11-1999
		DE 69604464 T2	20-01-2000
		JP 9103425 A	22-04-1997
-----			
US 6067462 A	23-05-2000	US 6002952 A	14-12-1999
		US 6699194 B1	02-03-2004
		AU 7109298 A	11-11-1998
		WO 9846126 A1	22-10-1998
-----			
US 5499627 A	19-03-1996	US 5372136 A	13-12-1994
		US 6246894 B1	12-06-2001
		US 6266546 B1	24-07-2001
		US 5803908 A	08-09-1998
		US 2004116817 A1	17-06-2004
		US 2001003793 A1	14-06-2001
		US 2001020122 A1	06-09-2001
		US 2002038079 A1	28-03-2002
		US 5351686 A	04-10-1994
		US 5456253 A	10-10-1995
-----			

EPO FORM P0459

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

专利名称(译)	使用光的诊断方法和设备		
公开(公告)号	<a href="#">EP1344488A3</a>	公开(公告)日	2004-09-15
申请号	EP2003251571	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.		
[标]发明人	YOON GIL WON KIM HONG SIG 180 GEUMGOK DONG JEON KYE JIN LEE JONG YOUN PARK KUN KOOK KIM SU JIN JWA HOON JONG		
发明人	YOON, GIL-WON KIM, HONG-SIG, 180 GEUMGOK-DONG JEON, KYE-JIN LEE, JONG-YOUN PARK, KUN-KOOK KIM, SU-JIN JWA, HOON-JONG		
IPC分类号	A61B5/0245 A61B5/00 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	EP1344488A2		
外部链接	<a href="#">Espacenet</a>		

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。

FIG. 1

