

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 March 2004 (04.03.2004)

PCT

(10) International Publication Number
WO 2004/017821 A3

(51) International Patent Classification⁷: **A61B 8/12**

Drive, Avon Lake, OH 44012 (US). **NAIR, Anuja**; 2616 Mayfield Road, Apt. #3, Cleveland Heights, OH 44106 (US).

(21) International Application Number:
PCT/US2003/026492

(74) Agent: **KAPPOS, John**; O'MELVENY & MYERS LLP, 114 Pacifica, Suite 100, Irvine, CA 92618 (US).

(22) International Filing Date: 25 August 2003 (25.08.2003)

(25) Filing Language: English

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(26) Publication Language: English

(30) Priority Data:
60/406,183 26 August 2002 (26.08.2002) US
60/406,254 26 August 2002 (26.08.2002) US
60/406,184 26 August 2002 (26.08.2002) US
60/406,185 26 August 2002 (26.08.2002) US
60/406,234 26 August 2002 (26.08.2002) US

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

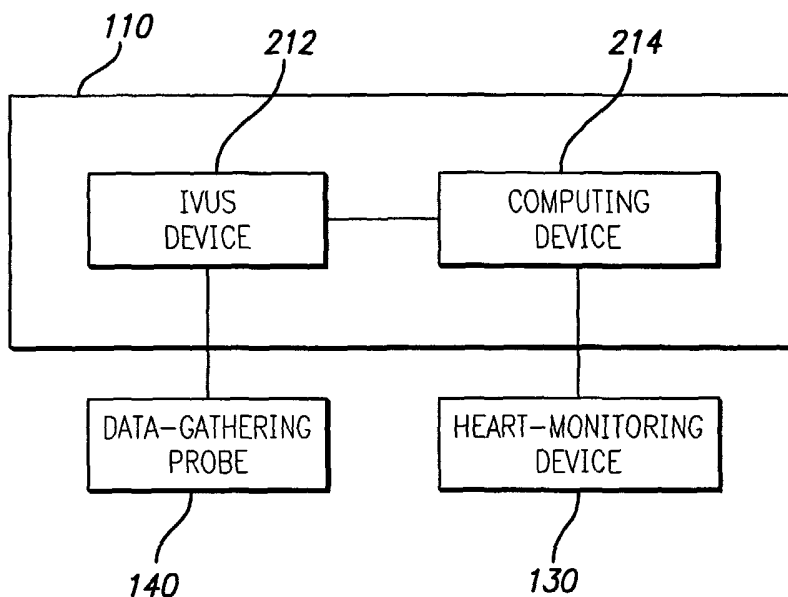
(71) Applicant: **THE CLEVELAND CLINIC FOUNDATION** [US/US]; 9500 Euclid Avenue, Cleveland, OH 44195 (US).

(72) Inventors: **KUBAN, Barry, D.**; 427 Moorewood Avenue, Avon Lake, OH 44012 (US). **KLINGENSMITH, Jon, D.**; 16211 Van Aken Blvd. #107, Shaker Heights, OH 44120 (US). **VINCE, D., Geoffrey**; 300 Williamsburg

Published:
— with international search report

[Continued on next page]

(54) Title: SYSTEM AND METHOD OF ACQUIRING BLOOD-VESSEL DATA



(57) Abstract: A system and method is provided for substantially synchronizing the acquisition of blood-vessel data to an identifiable portion of heartbeat data. Specifically, a data-gathering device is adapted to acquire heartbeat data and blood-vessel data from a heart-monitoring device and a data-gathering probe, respectively. In a preferred embodiment of the present invention, the blood-vessel data is acquired during a cyclical portion of the heartbeat data. By identifying a cyclical (or commonly reoccurring) portion of the heartbeat data and acquiring blood-vessel data during this cyclical portion (or during an interval that substantially corresponds thereto), the blood vessel can be analyzed as if it were standing still -- i.e., not expanding and relaxing. In one embodiment of the present invention,

the heart-monitoring device (130) includes an EKG device, the data-gathering device (110) includes an intra-vascular ultrasound (IVUS) device (212) and a computing device (214), and the data-gathering probe (140) includes at least one transducer. In another embodiment of the present invention, the data-gathering system further includes a retraction device (120) adapted to move the data-gathering probe through a blood vessel at a substantially steady speed.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

21 May 2004

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/26492

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61B 08/12

US CL : 600/467

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 600/462 - 467, 513; 128/916; 606/159,169-171

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X/Y	US 6152878 A (NACHTOMY et al) 28 November 2000, Abstract, col. 1 lines 17-30, col. 6 lines 22-49, col. 9 lines 1 - 8	1-10/11-41
Y	US 6148095 A (PRAUSE et al) 14 November 2000, see entire document	11 - 41

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

14 March 2004 (14.03.2004)

Date of mailing of the international search report

09 APR 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Marvin Latéef

Telephone No. 703-308-0858

INTERNATIONAL SEARCH REPORT

PCT/US03/26492

Continuation of B. FIELDS SEARCHED Item 3:

EAST

search terms: IVUS, ultrasound, heart or cardiac, EKG, ECG, Electrocardio\$6, elektrocardio\$6, pullback,