

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 December 2007 (27.12.2007)

PCT

(10) International Publication Number  
**WO 2007/149751 A3**

(51) International Patent Classification:  
A61B 6/03 (2006.01)

(21) International Application Number:

PCT/US2007/071101

(22) International Filing Date: 13 June 2007 (13.06.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/805,515 22 June 2006 (22.06.2006) US

(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS, N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(71) Applicant (for AE only): **U.S. PHILIPS CORPORATION** [US/US]; 1251 Avenue of the Americas, New York, New York 10020 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **RIBBING, Carolina** [SE/DE]; Gartenstr. 7, 52064 Aachen (DE). **VOGTMEIER, Gereon** [DE/DE]; Laurentiushang 37, 52072 Aachen (DE). **PROKSA, Roland** [DE/DE]; Roentgenstrasse 24-26, 22315 Hamburg (DE).

(74) Common Representative: **KONINKLIJKE PHILIPS ELECTRONICS, N.V.**; c/o Thomas M. Lundin, 595 Miner Road, Cleveland, Ohio 44143 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

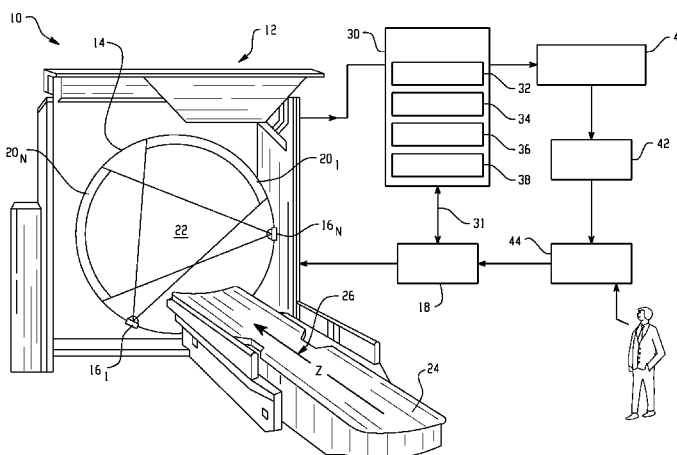
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT,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

**Declaration under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: MULTI-SOURCE ENCODED X-RAY IMAGING



(57) Abstract: A tomographic apparatus (10) includes at least two x-ray sources (16) that are concurrently driven with different switching patterns to generate uniquely encoded radiation. The tomographic apparatus (10) further includes at least two detectors (20) that each detect primary radiation emitted by its corresponding one of the at least two x-ray sources (16) and cross scatter radiation from at least one of the other at least two x-ray sources (16). Each of the at least two detectors (20) produces an aggregate signal representative of the detected primary and cross scatter radiation. The tomographic apparatus (10) further includes a decoupler (30) which, based on the different switching patterns, identifies at least one signal corresponding to at least one of the at least two x-ray sources (16) within the aggregate signal and associates the identified signal with its corresponding x-ray source (16).

WO 2007/149751 A3



---

**Published:**

— *with international search report*

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

21 February 2008

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/071101

## A. CLASSIFICATION OF SUBJECT MATTER

INV. A61B6/03

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)

A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	US 2007/253525 A1 (POPESCU STEFAN [DE]) 1 November 2007 (2007-11-01) paragraphs [0008] - [0011] paragraphs [0056] - [0077] figures 1-8	1-29
X	US 2003/128801 A1 (EISENBERG HARVEY C [US] ET AL) 10 July 2003 (2003-07-10) paragraphs [0103] - [0105] figures 3,21,22	1-29
X	US 2004/114710 A1 (OZAKI MASAHIRO [JP]) 17 June 2004 (2004-06-17)  paragraphs [0036] - [0056] figures 2-9	1-3,5-8, 10-15, 17-23, 25-29
	----- -/--	

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*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)
- \*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

- \*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
- \*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
- \*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.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

28 November 2007

Date of mailing of the international search report

06/12/2007

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Völlinger, Martin

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/071101

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/079232 A1 (GROH BURKHARD [DE] ET AL GROH BURKHARD [DE] ET AL) 29 April 2004 (2004-04-29) paragraphs [0017] - [0023] figures 1-3 -----	1-3, 5-7, 9-23, 25-29
Y	US 2004/213371 A1 (BRUDER HERBERT [DE] ET AL) 28 October 2004 (2004-10-28)  paragraphs [0047] - [0052] figures 2,3 -----	1-3, 5-7, 9-23, 25-29
A	US 2006/023832 A1 (EDIC PETER M [US] ET AL) 2 February 2006 (2006-02-02) paragraphs [0025], [0034] -----	1, 19

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/071101
---

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007253525 A1	01-11-2007	DE 102006019920 A1	15-11-2007
US 2003128801 A1	10-07-2003	AU 2003202929 A1 EP 1467654 A2 JP 2005514975 T WO 03058222 A2	24-07-2003 20-10-2004 26-05-2005 17-07-2003
US 2004114710 A1	17-06-2004	CN 1496712 A DE 60304786 T2 EP 1405598 A1 JP 2004121446 A	19-05-2004 03-05-2007 07-04-2004 22-04-2004
US 2004079232 A1	29-04-2004	DE 10232429 B3	22-01-2004
US 2004213371 A1	28-10-2004	DE 10302567 A1	12-08-2004
US 2006023832 A1	02-02-2006	NONE	