

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 May 2008 (29.05.2008)

PCT

(10) International Publication Number
WO 2008/064367 A3

- (51) **International Patent Classification:**
G06T 11/00 (2006 01) *A61B 6/00* (2006 01)
- (21) **International Application Number:**
PCT/US2007/085510
- (22) **International Filing Date:**
26 November 2007 (26 11 2007)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
60/867,165 24 November 2006 (24 11 2006) US
- (71) **Applicants and**
- (72) **Inventors:** **CHIANG, Be-Shan S.** [US/US], 1203 E Deerfield Parkway, #101, Buffalo Grove, IL 60089 (US) **ZAMYATIN, Alexander A.** [RU/US], 1219 E Deerfield Parkway, #203, Buffalo Grove, IL 60089 (US) **NAKANISHI, Satoru** [JP/JP], 4-3-17-804 Higashishukugo, Utsunomiya-shi, Tochigi 321-0953 (JP) **SILVER, Michael D.** [US/US], 845 Appletree Court, Northbrook, IL 60062 (US)
- (74) **Agents:** **SACHAR, Surinder** et al , Oblon, Spivak, McClelland, Maier & Neustadt, P C , 1940 Duke Street, Alexandria, VA 22314 (US)

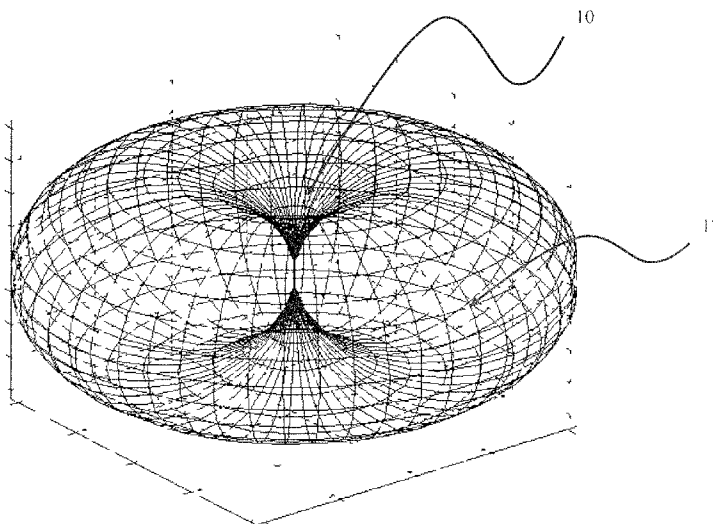
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, **BR**, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, **HR**, HU, **ID**, IL, IN, IS, **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)

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) **Title:** METHOD AND SYSTEM FOR TOMOGRAPHIC RECONSTRUCTION IN MEDICAL IMAGING USING THE CIRCLE AND LINE TRAJECTORY



(57) **Abstract:** A method of reconstructing a volume image of an object includes receiving circle projection data collected by a detector along a circular path with respect to the object, receiving line projection data collected by the detector along a linear path with respect to the object, producing a reconstructed circle path volume image of the object from the pre-processed circle projection data using a reconstruction algorithm that includes a ramp filter, producing a reconstructed line path volume image of the object from the pre-processed line projection data using a reconstruction algorithm that includes a Hubert filter, and combining the reconstructed circle path volume image and the reconstructed line path volume image to produce the volume image of the object. An apparatus and computer program product are also described.

WO 2008/064367 A3



(88) Date of publication of the international search report:
31 July 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US 07/85510

A CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06T 11/00; A61 B 6/00 (2008.04)
USPC - 378/4
 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)
 IPC(8) G06T 11/00, A61 B 6/00 (2008 04)
 USPC 378/4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 USPC 382/276 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 WEST/USPT JPGPB JEPAB JPAB JUSOCR, DialogWEB(Eng teening), Google
 Search terms rebinning reconstruction circular helical spiral line linear combination aggregation 2TTS FDK backprojection filter weighting cone fan beam xray grid coordinate axis

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 2006/0050842 A1 (WANG et al) 09 March 2006 (09 03 2006), fig 11, abstract, [0033]-[0038], [0079H0082], [0093], [0102], [01 11]-[01 14], [0130]	1-3, 6-19, 22-33 4, 5, 20, 21
Y	US 2003/0161443 A1 (XIAO et al) 28 August 2003 (28 08 2003), para [0108], [0224]	4, 20
Y	US 2006/0104407 A1 (ZAMYATIN et al) 18 May 2006 (18 05 2006), para [0032], [0033], [0085]	5, 21
A	US 6,330,298 B1 (TAM) 11 December 2001 (11 12 2001), col 9, ln 5-55	1, 17, 32
A	US 2004/0252806 A1 (TAGUCHI et al) 16 December 2004 (16 12 2004), abstract, para [0005], [0006]	1, 17, 32

D Further documents are listed in the continuation of Box C

* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance	"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 theoiy underlying the invention
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"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 07 June 2008 (07 06 2008)	Date of mailing of the international search report 17 JUN 2008
----------------------------------------------------------------------------------------	--------------------------------------------------------------------------

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 571-273-3201	Authorized officer Lee W Young PCT Helpd βsk 571-272-4300 PCT OSP 571 272-7774
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------