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(54) Title: CONVENTIONAL IMAGING WITH AN IMAGING SYSTEM HAVING PHOTON COUNTING DETECTORS

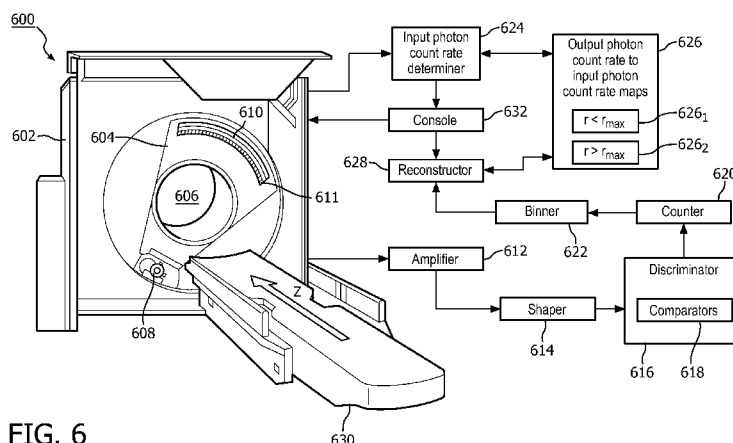


FIG. 6

(57) **Abstract:** An imaging system (600) includes a radiation source (608) that emits polychromatic radiation that traverses an examination region and a detector array (610) located opposite the radiation source, across the examination region, which includes a paralyzable photon counting detector pixel (611) that detects photons of the radiation that traverse the examination region and illuminate the detector pixel and that generates a signal indicative of each detected photon. An output photon count rate to input photon count rate map (626) includes at least one map which maps multiple input photon count rates of the detector pixel to a single output photon count rate of the detector pixel, and an input photon count rate determiner (624) identifies one input photon count rate of the multiple input photon count rates of the map as a correct input photon count rate for the detector pixel. A reconstructor that reconstructs the signal based on the identified input photon count rate.

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2013/052354

A. CLASSIFICATION OF SUBJECT MATTER

INV. G01T1/17
ADD.

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)

G01T

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 practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2007/262251 A1 (BALAN ADI [IL]) 15 November 2007 (2007-11-15) paragraphs [0057], [0061]; figures 2, 3, 4a -----	1-4,7, 15-17 5,6
A	US 2008/260094 A1 (CARMI RAZ [IL]) 23 October 2008 (2008-10-23) paragraphs [0026], [0041] - paragraphs [0046], [0057], [0063] -----	1,15
A	US 2009/039273 A1 (TKACZYK JOHN ERIC [US] ET AL) 12 February 2009 (2009-02-12) paragraph [0043] - paragraph [0049]; figures 6, 7 -----	5,6

☐ 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 application or patent 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

17 October 2013

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10/01/2014

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2013/052354

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-6, 15-17

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 15-17

An imaging system which uses a timer to determine the amount of time that the pulses exceed the pulse identifying threshold for each integration period to determine a correction due to possible pile-up

2. claim: 7

An imaging system which uses a comparator to determine the number of times that the pulses exceed the pulse pile-up threshold to determine a correction due to possible pile-up

3. claims: 8-11, 18

An imaging system which uses 2 differently sized pixels to determine a correction due to possible pile-up

4. claims: 12, 13, 19

An imaging system which uses 2 differently shaping times to determine a correction due to possible pile-up

5. claims: 14, 20

An imaging system which uses 2 different fluxes to determine a correction due to possible pile-up

6. claims: 21, 22

An imaging system which bins detected photons in different energy bins, and uses the distribution to determine a correction due to possible pile-up

7. claim: 23

An imaging system which determines the input count rate for each point on a sinogram

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2013/052354

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007262251 A1	15-11-2007	NONE	

US 2008260094 A1	23-10-2008	CN 101297221 A	29-10-2008
		EP 1943545 A2	16-07-2008
		JP 2009513220 A	02-04-2009
		US 2008260094 A1	23-10-2008
		WO 2007049168 A2	03-05-2007

US 2009039273 A1	12-02-2009	NONE	
