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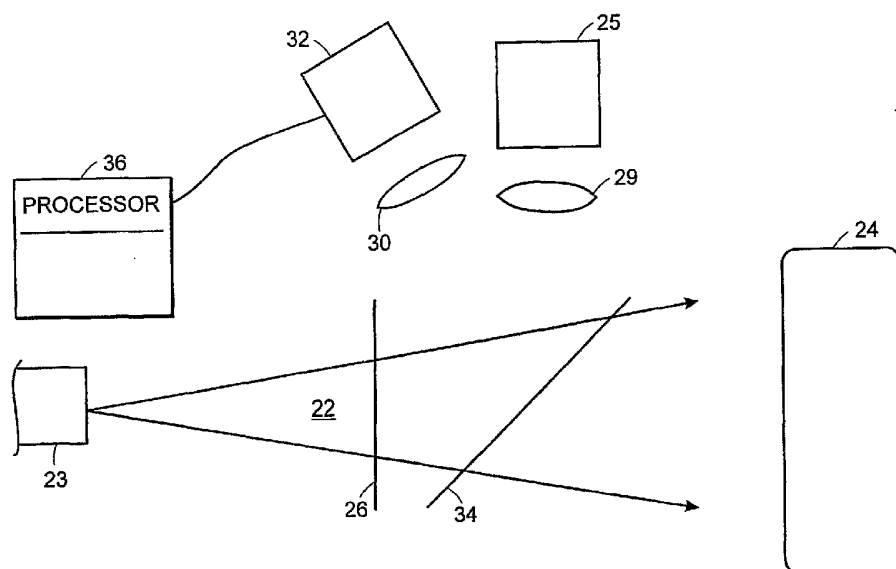
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HIGH RESOLUTION PROTON BEAM MONITOR



(57) Abstract: A method and apparatus for monitoring a scanning beam of penetrating radiation (22), such as a scanning proton beam used to irradiate tissue (24). The position of the beam is tracked in real time by interposing a scintillator film (26) between a source (23) and an object of irradiation. An imaging detector, in optical communication with the scintillator, provides an output that is indicative of the position of the radiation and its variation with time. The accumulated dose over a scan may also be monitored.

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/023747

A. CLASSIFICATION OF SUBJECT MATTER
G01T1/02 G01T1/29

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 practical, search terms used)

EPO-Internal, WPI Data, INSPEC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SCHULTZ L J ET AL: "A narrow-gap ion chamber for beam motion correction in proton radiography experiments" 11 August 2003 (2003-08-11), NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH, SECTION - A: ACCELERATORS, SPECTROMETERS, DETECTORS AND ASSOCIATED EQUIPMENT, ELSEVIER, AMSTERDAM, NL, PAGE(S) 220-226 , XP004442403 ISSN: 0168-9002 the whole document ----- -/--	1,2,4,7, 10-13

☒ 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

9 December 2005

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2005/023747

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>KWIATKOWSKI K ET AL: "Development of multi-frame detector for ultra-fast radiography with 800 MeV protons" 15 October 2000 (2000-10-15), NUCLEAR SCIENCE SYMPOSIUM CONFERENCE RECORD, 2000 IEEE LYON, FRANCE 15-20 OCT. 2000, PISCATAWAY, NJ, USA, IEEE, US, PAGE(S) 6-129 , XP010556528 ISBN: 0-7803-6503-8 The entire document -----</p>	1,10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/023747

Box 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 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 fee, this Authority did not invite payment of any additional fee.
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.:

see annex

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ 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: 1,2,3,4,6,7,10,11,12,13

A radiation detector with a substrat for supporting a thin scintillator.

2. claim: 5

A radiation detector in which the scintillator is an inorganic phosphor like P11,P46 and Gadox:Pr

3. claim: 8

A dosimetric sensor.
