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(71) Applicant (for all designated States except US): **NEWTON SCIENTIFIC, INC.** [US/US]; 255 Bent Street, Cambridge, MA 02141 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KLINKOWSTEIN, Robert, E.** [US/US]; 7 Red Coach Lane, Winchester, MA 01890 (US). **SHEFER, Ruth, E.** [US/US]; 218 Beethoven Avenue, Newton, MA 02468 (US).

(74) Agents: **HILTON, William, E.** et al.; Gauthier & Connors LLP, 225 Franklin Street, Suite 2300, Boston, MA 02110 (US).

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(54) Title: COMPACT HIGH VOLTAGE X-RAY SOURCE SYSTEM AND METHOD FOR X-RAY INSPECTION APPLICATIONS

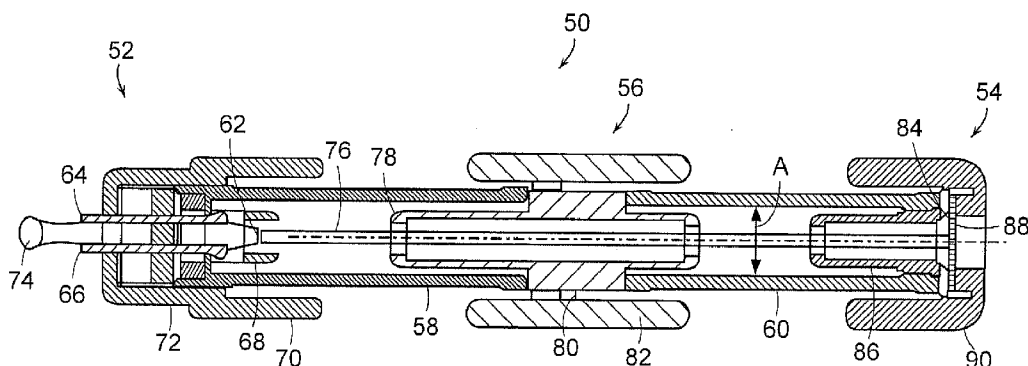


FIG. 2

(57) Abstract: An x-ray system is disclosed that includes a bipolar x-ray tube (50). The bipolar x-ray tube includes two insulators (58, 60) that are separated by an intermediate electrode (56) in an embodiment, wherein each insulator forms a portion of an outer wall of a vacuum envelope of the bipolar x-ray tube surrounding at least a portion of a path (76) of an electron beam within the vacuum envelope. In further embodiments, the bipolar x-ray tube includes a first electrode (54) at a positive high voltage potential with respect to a reference potential, a second electrode (56) at a negative high voltage potential with respect to the reference potential, and an x-ray transmissive window (88) that is at the positive high voltage potential.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. H01J35/00 H05G1/10 H05G1/06

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)

H01J H05G

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.
X	US 2 871 402 A (JOSEPH LEMPERT) 27 January 1959 (1959-01-27)	1-5, 7-10
Y	column 2, line 9 - column 5, line 69; figures 1-9 in particular also columns 2, 11. 26-50	31, 32, 34, 35
X	US 2007/121788 A1 (MILDNER MARK J [CH] ET AL) 31 May 2007 (2007-05-31)	1-10
A	paragraphs [0008], [0013], [0032] - [0035]; figures 4-10	31, 32, 34, 35
Y	EP 0 488 991 A (XI TECH INC [US] XI TEC INC [US]) 3 June 1992 (1992-06-03)	31-35
	column 9, line 52 - column 10, line 28	
Y	EP 0 924 742 A (PICKER INT INC [US] MARCONI MEDICAL SYS INC [US]) 23 June 1999 (1999-06-23)	33
	paragraphs [0013], [0014], [0020]	



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

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Name and mailing address of the ISA/

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

Authorized officer

Krauss, Jan

INTERNATIONAL SEARCH REPORT

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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 allsearchable 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 reportcovers 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.:

1-10, 31-35

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: 1-10,31-35

dedicated to a bipolar x-ray tube with an x-ray transmissive window that includes an x-ray producing target as defined in claim 3 and a similar method

2. claims: 11-22

dedicated an x-ray systems with particular insulation arrangements as defined in independent claims 11 and 19

3. claims: 23-30

dedicated to an x-ray system with a passive cooling system as defined in independent claim 23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/069195

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