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[Continued on next page]

(54) Title: AUTOMATIC CALIBRATION FOR DEVICE WITH CONTROLLED MOTION RANGE AND VARIABLE APERTURE COLLIMATOR

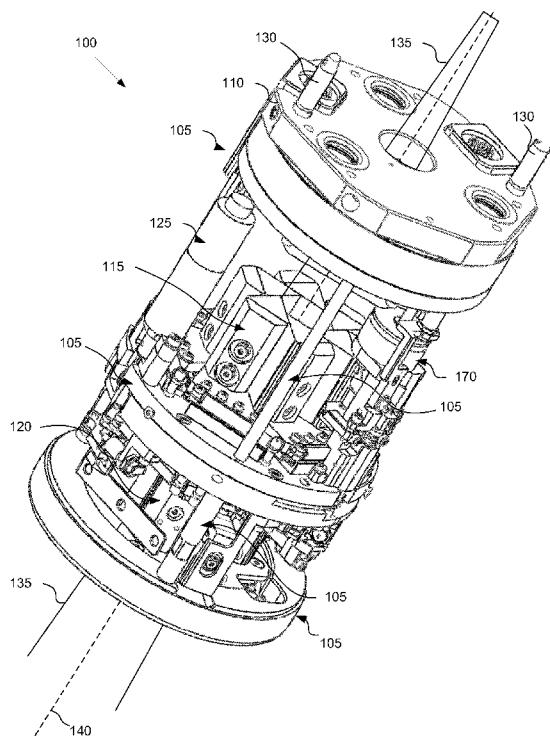


Figure 1A

(57) Abstract: An apparatus includes a portion that moves along a guided path and a displacement gauge that outputs readings based on the portion's position on the guided path. The apparatus additionally includes an intermediate limit switch that is activated in response to the portion being moved to an intermediate position on the guided path. The apparatus also includes a processing device configured to calibrate the apparatus based on a first reading corresponding to a first position on the guided path and a second reading corresponding to a second position on the guided path. The processing device verifies the calibration based on a third reading corresponding to the intermediate position. The apparatus may be a variable aperture collimator.





OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/024016

A. CLASSIFICATION OF SUBJECT MATTER
INV. G21K1/04 G01D5/244 G05B19/401 A61N5/10
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)
G01D G05B G21K A61N

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009/001296 A1 (KUDUVALLI GOPINATH R [US]) 1 January 2009 (2009-01-01) paragraphs [0040], [0050] - [0053]; figure 6	1
X	----- "INTERMEDIATE SENSOR", IBM TECHNICAL DISCLOSURE BULLETIN, INTERNATIONAL BUSINESS MACHINES CORP. (THORNWOOD), US, vol. 36, no. 11, 1 November 1993 (1993-11-01), page 647/648, XP000424979, ISSN: 0018-8689	1,3,4,7, 8
Y	the whole document	2,10
Y	----- US 6 136 274 A (NOVA MICHAEL P [US] ET AL) 24 October 2000 (2000-10-24) column 67, lines 55-61; figure 47 ----- -/--	2

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 29 May 2012	Date of mailing of the international search report 19/09/2012
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

International application No.
PCT/US2012/024016

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.:

1-4, 7, 8, 10-12, 14, 15

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.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/024016

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 4 912 468 A (RUST GREGORY J [US]) 27 March 1990 (1990-03-27) column 3, lines 20-29; figure 2 -----	10
X	US 2005/137751 A1 (COX DAMON K [US] ET AL) 23 June 2005 (2005-06-23)	1-4,7,8, 11,12, 14,15
A	paragraphs [0035], [0042] - [0046], [0055] - [0072], [0077] - [0104], [0111] - [0114]; figures 1,3,4, 5A-5C,10-12 -----	10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2012/024016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009001296 A1	01-01-2009	US 2009001296 A1 WO 2009005558 A1	01-01-2009 08-01-2009

US 6136274 A	24-10-2000	AU 6247998 A EP 0959985 A2 US 6136274 A US 6306975 B1 WO 9831732 A2	07-08-1998 01-12-1999 24-10-2000 23-10-2001 23-07-1998

US 4912468 A	27-03-1990	NONE	

US 2005137751 A1	23-06-2005	CN 1638021 A KR 20050054859 A US 2005137751 A1	13-07-2005 10-06-2005 23-06-2005

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-4, 7, 8, 10-12, 14, 15

dedicated to an apparatus wherein the calibration based on a first and second limit switch as defined e.g. in present claim 2

2. claims: 5, 6

dedicated to an apparatus with a carriage with the plurality of rises as defined in said present claim 5

3. claims: 9, 13, 22-28

dedicated to an apparatus with the intermediate limit switch being a variable aperture collimator as defined e.g. in claim 9

4. claims: 16-21

dedicated to a variable aperture collimator with the construction of the brake as defined in present claim 16
