



- (51) International Patent Classification: *G21C 13/024* (2006.01)
- (21) International Application Number: PCT/US2013/025042
- (22) International Filing Date: 7 February 2013 (07.02.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:

61/625,387	17 April 2012 (17.04.2012)	US
13/668,740	5 November 2012 (05.11.2012)	US
- (71) Applicant: **BABCOCK & WILCOX MPOWER, INC.** [US/US]; 11525 N. Community House Road, Suite 600, Charlotte, NC 28277 (US).
- (72) Inventors: **WHITTEN, Andrew, C**; 25 Lasalle Ct., Apt. 302, Lynchburg, VA 24502 (US). **EDWARDS, Michael, J**; 1315 Somerset Drive, Forest, VA 24551 (US).
- (74) Agent: **SEYMOUR, Michael, J**; Babcock & Wilcox Nuclear Energy, Inc., 20 S. Van Buren Avenue (bvcb2k), Barberton, OH 44203 (US).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, 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, PA, 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.
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

[Continued on next page]

(54) Title: INCORE INSTRUMENTATION CABLE ROUTING AND SUPPORT ELEMENT FOR PRESSURIZED WATER REACTOR

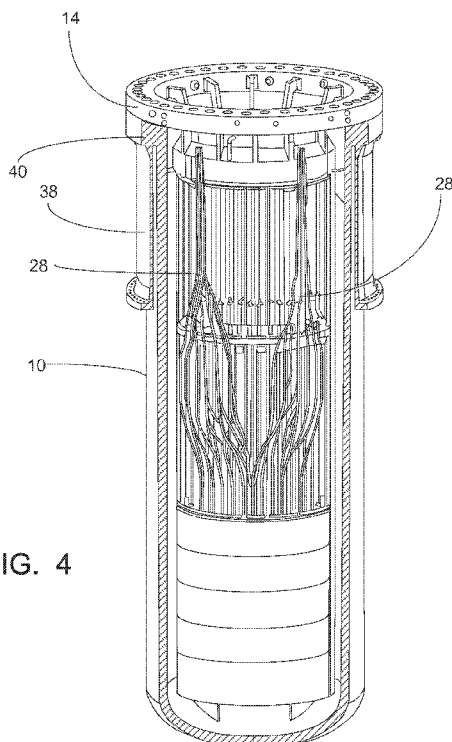


FIG. 4

(57) Abstract: A nuclear reactor comprises a pressure vessel, a nuclear reactor core comprising fissile material disposed in the pressure vessel, and a core basket disposed in the pressure vessel and containing the nuclear reactor core. An incore instrument is disposed in a guide tube of the nuclear reactor core. The incore instrument has a cable extending out of the bottom of the nuclear reactor core and making a 180° turn. A bottom support element is attached to the bottom of the core basket and defines or includes a routing tube that routes the cable of the incore instrument through the 180° turn. In some embodiments, the pressure vessel includes upper and lower vessel portions, the nuclear reactor core and core basket are disposed in the lower vessel portion, and the vessel penetration is through the lower vessel portion or through a mid-flange connecting the upper and lower vessel portions.





TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

3 January 2014

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2013/025042

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - G21C 13/024 (2013.01) USPC - 376/461 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) -G21C 13/00, G21C 13/024, G21C 17/00, G21C 19/20 (2013.01) USPC -376/229, 376/245, 376/249, 376/258, 376/259, 376/406, 376/461, 376/462, 376/463 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched CPC - G21C 13/00, G21C 13/024, G21C 17/00, G21C 19/207 (2013.01) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Orbit, Google Patents, Google		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/0169839 A1 (MATTESON) 11 September 2003 (11.09.2003) entire document	18
---		---
Y		1-17, 19-26
Y	US 2010/0284507 A1 (UDA et al) 11 November 2010 (11.11.2010) entire document	1-17, 24-26
Y	US 3,821,079 A (JABSEN) 28 June 1974 (28.06.1974) entire document	2-6, 19-23
Y	US 2012/0076254 A1 (MALLOY et al) 29 March 2012 (29.03.2012) entire document	10-17
Y	US 2010/0316177 A1 (STAMBAUGH et al) 16 December 2010 (16.12.2010) entire document	13, 17
Y	US 4,426,352 A (BYBEE et al) 17 January 1984 (17.01.1984) entire document	24-26
Y	US 7,289,590 B2 (JOLY et al) 30 October 2007 (30.10.2007) entire document	24-26
Y	US 2011/0002432 A1 (HEIBEL et al) 06 January 2011 (06.01.2011) entire document	26
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 21 October 2013		Date of mailing of the international search report 13 NOV 2013
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: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774