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- (71) **Applicant:** C.R. BARD, INC. [US/US]; 730 Central Avenue, Murray Hill, NJ 07974 (US).
- (72) **Inventors:** BUKHMAN, Vladislav; 419 First Street, East Northport, NY 11731 (US). MISENER, Anthony, Kent; 298 South 800 East, Bountiful, UT 84010 (US). VAS-SYLYEV, Valeriy; 73 Vladimirskaia Street, Apt. 26, Kiev, 01033 (UA). URRY, Robin, Scott; 1601 East 11245 South, Sandy, UT 84092 (US). TANNER, Brian, Steven; 1623 West 200 North, Layton, UT 84041 (US).
- (74) **Agent:** WIGHT, Todd, W.; Rutan & Tucker LLP, 611 Anton Boulevard, Suite 1400, Costa Mesa, CA 92626 (US).
- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

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**Declarations under Rule 4.17:**

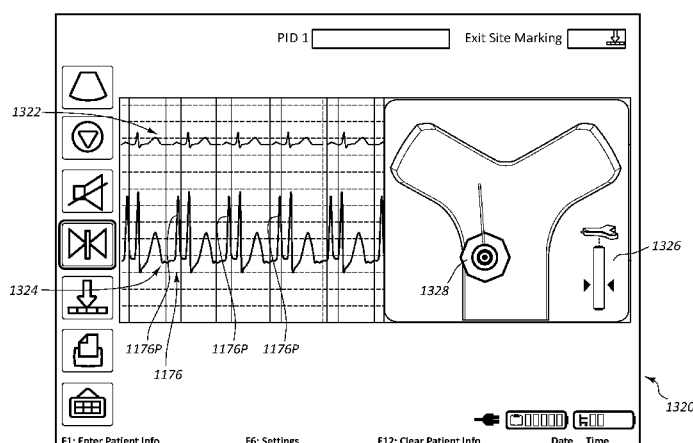
— of inventorship (Rule 4.17(iv))

**Published:**

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

- (88) **Date of publication of the international search report:**  
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(54) **Title:** SYSTEMS AND METHODS FOR GUIDANCE AND PLACEMENT OF AN INTRAVASCULAR DEVICE



(57) **Abstract:** A guidance and placement system and associated methods for assisting a clinician in the placement of a catheter or other medical device within the vasculature of a patient is disclosed. In one embodiment, a method for guiding a medical device to a desired location within a vasculature of a patient is also disclosed and comprises detecting an intravascular ECG signal of the patient and identifying a P-wave of a waveform of the intravascular ECG signal, wherein the P-wave varies according to proximity of the medical device to the desired location. The method further comprises determining whether the identified P-wave is elevated, determining a deflection value of the identified P-wave when the identified P-wave is elevated, and reporting information relating to a location of the medical device within the patient's vasculature at least partially according to the determined deflection value of the elevated P-wave.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2015/014795

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61B 5/0452, 5/06 (2015.01)

CPC - A61B 5/0452, 5/06 (2015.04)

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) - A61B 5/02, 5/04, 5/0402, 5/0452, 5/0456, 5/0472, 5/06 (2015.01)

CPC - A61B 5/0006, 5/04012, 5/0402, 5/0452, 5/0456, 5/0472, 5/06, 5/061, 5/6852, 19/5244, 2017/00044, 2019/5246 (2015.04)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC - 600/374, 424, 509, 516, 517, 521 (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase, Orbit, Google Patents, Google Scholar, Google.

Search terms used: ECG, P wave, amplitude, noise, frequency, deflection, increase, elevate, raise, maximum, threshold, guidance, location, catheter, heart, cardiac, atrial

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2013/0123597 A1 (BARD ACCESS SYSTEMS, INC) 16 May 2013 (16.05.2013) entire document	1-29
A	US 2010/0317981 A1 (GRUNWALD) 16 December 2010 (16.12.2010) entire document	1-29
A	US 2010/0036227 A1 (COX et al) 11 February 2010 (11.02.2010) entire document	1-29
A	US 2002/0016549 A1 (MEJIA) 07 February 2002 (07.02.2002) entire document	1-29
A, P	US 2014/0249505 A1 (BUKHMANN) 04 September 2014 (04.09.2014) entire document	1-29

☐ Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

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"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

11 April 2015

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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

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Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300

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