

(19)



(11)

EP 3 556 284 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
25.12.2019 Bulletin 2019/52

(51) Int Cl.:
A61B 5/042 ^(2006.01) **A61B 5/044** ^(2006.01)
A61B 5/046 ^(2006.01) **A61B 5/06** ^(2006.01)
A61B 34/20 ^(2016.01) **A61B 5/00** ^(2006.01)

(43) Date of publication A2:
23.10.2019 Bulletin 2019/43

(21) Application number: **19170337.0**

(22) Date of filing: **18.04.2019**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Ablacon Inc.**
Wheat Ridge, CO 80033 (US)

(72) Inventor: **RUPPERSBERG, Peter**
1807 Blonay (CH)

(74) Representative: **Betten & Resch**
Patent- und Rechtsanwälte PartGmbB
Maximiliansplatz 14
80333 München (DE)

(30) Priority: **18.04.2018 US 201862659513 P**

(54) **SYSTEMS, DEVICES, COMPONENTS AND METHODS FOR DETECTING THE LOCATIONS OF SOURCES OF CARDIAC RHYTHM DISORDERS IN A PATIENT'S HEART AND CLASSIFYING SAME**

(57) Disclosed are various examples and embodiments of systems, devices, components and methods configured to detect a location of a source of at least one cardiac rhythm disorder in a patient's heart, such as atrial fibrillation, and to classify same. Velocity vector maps reveal the location of the source of the at least one cardiac rhythm disorder in the patient's heart, which may be, by way of example, an active rotor in the patient's myocardium and atrium. The resulting velocity vector map may be further processed and/or analyzed to classify the na-

ture of the patient's cardiac rhythm disorder, e.g., as Type A, B or C atrial fibrillation. The resulting cardiac rhythm classification then can be used to determine the optimal, most efficacious and/or most economic treatment or surgical procedure that should be provided to the individual patient. A simple and computationally efficient intra-cardiac catheter-based navigation system is also described. Also described and disclosed are various intra-cardiac catheter-based navigation systems.

EP 3 556 284 A3



EUROPEAN SEARCH REPORT

Application Number
EP 19 17 0337

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2017/065198 A1 (RUPPERSBERG PETER [CH]) 9 March 2017 (2017-03-09) * abstract; claims 2-11 * * paragraphs [0124] - [0125], [0135] * -----	1-14	INV. A61B5/042 A61B5/044 A61B5/046 A61B5/06 A61B34/20 A61B5/00
X	US 2015/216438 A1 (BOKAN RYAN [US] ET AL) 6 August 2015 (2015-08-06) * abstract; figure 15 * * paragraphs [0062] - [0068], [0113] * * the whole document * -----	1-14	
L	EP 3 375 365 A2 (ABLA CON INC [US]) 19 September 2018 (2018-09-19) * claims 1-13 * * the whole document *	1-14	
A	B. BELLMANN ET AL: "P329Electrographic flow mapping - A new technology for identification of atrial fibrillation drivers", EUROPACE, vol. 19, no. suppl 3, 1 June 2017 (2017-06-01), pages iii54-iii55, XP055613748, GB ISSN: 1099-5129, DOI: 10.1093/ehjci/eux141.056 * Section P329 * -----	1-14	TECHNICAL FIELDS SEARCHED (IPC) A61B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 August 2019	Examiner Furlan, Stéphane
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)



Application Number

EP 19 17 0337

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-14

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 19 17 0337

5
10
15
20
25
30
35
40
45
50
55

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-14

Classification of atrial fibrillation

2. claim: 15

System for determining the position of the distal end of a catheter

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 17 0337

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-08-2019

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2017065198 A1	09-03-2017	EP 3346914 A1	18-07-2018
		EP 3346915 A1	18-07-2018
		US 2017065198 A1	09-03-2017
		US 2018020916 A1	25-01-2018
		US 2019090746 A1	28-03-2019
		US 2019125186 A1	02-05-2019
		US 2019142271 A1	16-05-2019
		WO 2017041892 A1	16-03-2017
		WO 2017042623 A1	16-03-2017
US 2015216438 A1	06-08-2015	CN 106061374 A	26-10-2016
		EP 3102102 A1	14-12-2016
		US 2015216438 A1	06-08-2015
		US 2018042507 A1	15-02-2018
		WO 2015120064 A1	13-08-2015
EP 3375365 A2	19-09-2018	NONE	

专利名称(译)	患者心律失常来源的系统，装置，组件和方法及其分类		
公开(公告)号	EP3556284A3	公开(公告)日	2019-12-25
申请号	EP2019170337	申请日	2019-04-18
[标]申请(专利权)人(译)	ablacon公司		
申请(专利权)人(译)	ablacon Inc.		
当前申请(专利权)人(译)	ablacon Inc.		
[标]发明人	RUPPERSBERG PETER		
发明人	RUPPERSBERG, PETER		
IPC分类号	A61B5/042 A61B5/044 A61B5/046 A61B5/06 A61B34/20 A61B5/00		
CPC分类号	A61B5/0422 A61B5/044 A61B5/046 A61B5/065 A61B5/7203 A61B2017/00243 A61B2034/2051 A61B2034/2053 A61B2090/374 A61B2090/376 A61B2090/3762 A61B2090/378 A61B2090/3966 A61B2560/0223 A61B34/20		
代理机构(译)	贝滕 & RESCH		
审查员(译)	他stÉphane		
优先权	62/659513 2018-04-18 US		
其他公开文献	EP3556284A2		
外部链接	Espacenet		

摘要(译)

公开了系统，设备，部件和方法的各种示例和实施例，其被配置为检测患者心脏中的至少一种心律失常的源（例如心房纤颤）的位置并将其分类。速度矢量图揭示了患者心脏中至少一种心律失常的来源，例如，它可能是患者心肌和心房中的活动转子。所得的速度矢量图可以进一步处理和/或分析，以将患者的心律失常的性质分类，例如，分类为A，B或C型心房颤动。然后，可以将所得的心律分类用于确定应提供给各个患者的最佳，最有效和/或最经济的治疗或手术程序。还描述了一种简单且计算有效的基于心脏内导管的导航系统。还描述和公开了各种基于心脏内导管的导航系统。

DOCUMENTS CONSIDERED TO BE RELEVANT		Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2017/065198 A1 (RUPPERSBERG PETER [CH]) 9 March 2017 (2017-03-09) * abstract; claims 2-11 * * paragraphs [0124] - [0125], [0135] *	1-14	INV A61B5/042 A61B5/044 A61B5/046 A61B5/06 A61B34/20 A61B5/00
X	US 2015/216438 A1 (BOKAN RYAN [US] ET AL) 6 August 2015 (2015-08-06) * abstract; figure 15 * * paragraphs [0062] - [0068], [0113] * * the whole document *	1-14	
L	EP 3 378 365 A2 (ARLACON INC [US]) 19 September 2018 (2018-09-19) * claims 1-13 * * the whole document *	1-14	
A	B. BELLMANN ET AL: "P329Electrographic flow mapping - A new technology for identification of atrial fibrillation drivers". EUROPEAN JOURNAL OF CARDIOVASCULAR MEDICINE, vol. 19, no. suppl 3, 1 June 2017 (2017-06-01), pages 11154-11155, XP055613748, GB ISSN: 1099-5129, DOI: 10.1093/ehjci/ehx141.056 * Section P329 * -----	1-14	TECHNICAL FIELDS SEARCHED (IPC) A61B
-The present search report has been drawn up for all claims			
The Hague		Furian, Stéphane	
☒ particularly relevant if taken alone ☒ particularly relevant if considered with another document of the same category ☐ technological background ☐ intermediate document ☐ intermediate document		1. theory or principle underlying the invention 2. prior art documents disclosed on, or 3. other the filing date 4. document used to the application 5. document used to the application 6. number of the same patent family, corresponding document	