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- (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, BR, BW, BY, BZ, CA, CH, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW**
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[Continued on next page]

(54) **Title:** APPARATUS TO TREAT AND PREVENT ATRIAL TACHYARRHYTHMIAS

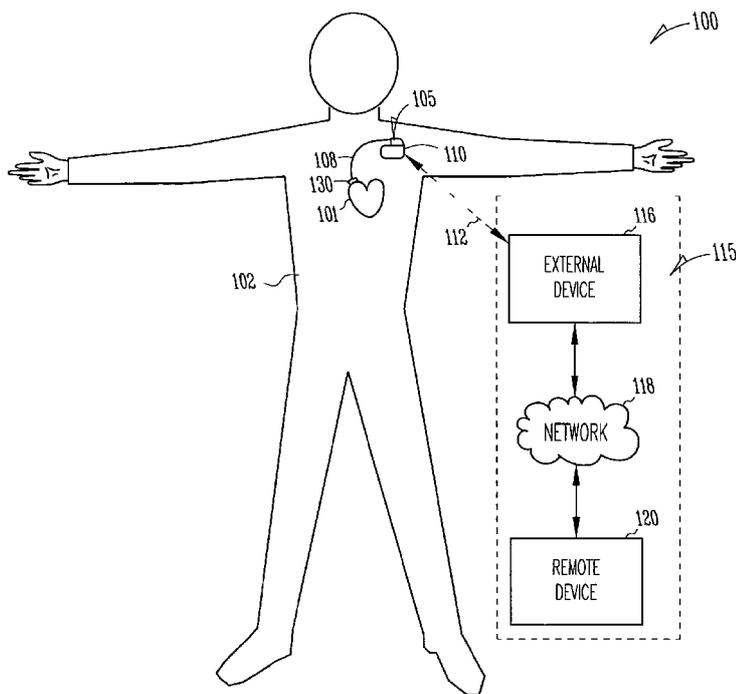


fig 1

(57) **Abstract:** The invention provides a cardiac rhythm management system which includes a tachyarrhythmia detection and classification circuit programmed to detect and classify a tachyarrhythmia, a biologic therapy delivery device configured to deliver or regulate an expression cassette suitable for terminating or preventing atrial fibrillation (AF), and a control circuit coupled to the tachyarrhythmia detection and classification circuit and the biologic therapy delivery device. Also provided is an implantable medical device for use in a body having a cardiovascular system, which includes an implantable device body including at least a cardiovascular portion configured to be in the cardiovascular system, and an expression cassette incorporated into the cardiovascular portion of the implantable device body, the expression cassette selected to express a gene product that terminates or prevents AF. Further provided are methods which employ particular expression cassettes to prevent, inhibit or treat AF.

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ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,
NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/009898

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61K47/48 A61N1/362

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)

A61K 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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 2007/190028 A1 (QU JIHONG [US] ET AL) 16 August 2007 (2007-08-16)	1-3
Y	paragraphs [0010] - [0016], [0076], [0109], [0123], [0135], [0144]; figures 2-4,7	4-9
X	US 2005/192637 A1 (GIROUARD STEVEN D [US] ET AL) 1 September 2005 (2005-09-01)	1-3
Y	paragraphs [0010] - [0012], [0063], [0150]; figures 1,2	4-9
Y	US 2006/134071 A1 (ROSS JEFFREY [US] ET AL) 22 June 2006 (2006-06-22)	4-9
	paragraphs [0007], [0008], [0036], [0040], [0058], [0100], [0132], [0139], [0182] - [0186]; figures 3,10	

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
- 'X1' 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
- '*F' document member of the same patent family

Date of the actual completion of the international search

25 February 2009

Date of mailing of the international search report

24/03/2009

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/009898

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 10-30
because they relate to subject matter not required to be searched by this Authority, namely

Due to the steps of delivering an effective amount of a regulatory signal to a mammal, and administering to a mammal an expression cassette respectively, independent claims 10 and 11 respectively relate to a method for treatment of the human or animal body by therapy and by surgery (Rule 39.1(iv) PCT).
- 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 **D** 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 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

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: 1-3

Cardiac rhythm management system with triggering of delivery or regulation of an expression cassette in response to atrial fibrillation

2. claims: 4-9

Implantable medical device with expression cassette in cardiovascular portion of device

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2008/009898

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007190028	A1	16-08-2007	EP 1984513 A1 29-10-2008
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