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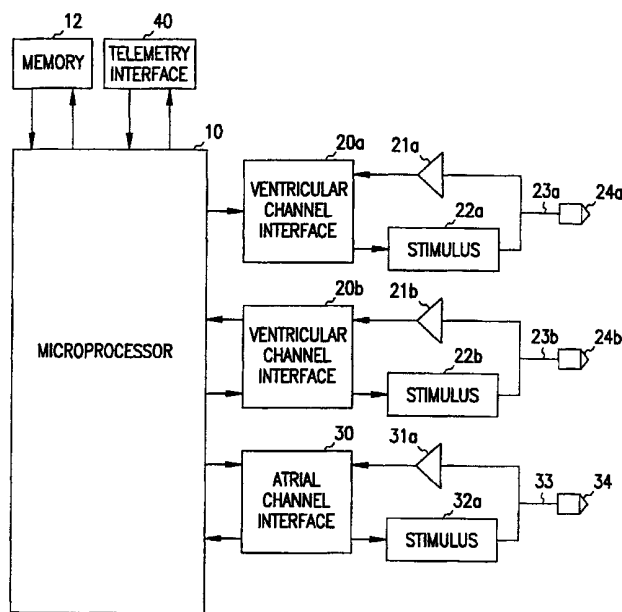
(43) International Publication Date  
18 October 2001 (18.10.2001)

PCT

(10) International Publication Number  
WO 01/76689 A3

- (51) International Patent Classification<sup>7</sup>: A61N 1/362
- (21) International Application Number: PCT/US01/40415
- (22) International Filing Date: 30 March 2001 (30.03.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
09/544,363 6 April 2000 (06.04.2000) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM,  
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,  
LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,  
MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL,  
TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF,  
CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report
- (88) Date of publication of the international search report:  
11 April 2002
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: SYSTEM FOR SPATIALLY AND TEMPORALLY DISTRIBUTING CARDIAC STIMULATION



(57) Abstract: A cardiac electro-stimulatory device and method for operating same in which stimulation pulses are distributed among a plurality of electrodes fixed at different sites of the myocardium in order to reduce myocardial hypertrophy brought about by repeated pacing at a single site and/or increase myocardial contractility. In order to spatially and temporally distribute the stimulation, the pulses are delivered through a switchable pulse output configuration during a single cardiac cycle, with each configuration comprising one or more electrodes fixed to different sites in the myocardium.

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# INTERNATIONAL SEARCH REPORT

International Application No

PCI/US 01/40415

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 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)

IPC 7 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	WO 00 09206 A (MEDTRONIC INC) 24 February 2000 (2000-02-24) the whole document ---	1-3,9,12
X	EP 0 522 693 A (TELECTRONICS NV) 13 January 1993 (1993-01-13) the whole document ---	1-3,9,12
X	US 4 549 548 A (WITTKAMPF FREDERIK H M ET AL) 29 October 1985 (1985-10-29) the whole document ---	1-3,6
X	US 5 792 203 A (SCHROEPPPEL EDWARD A) 11 August 1998 (1998-08-11) cited in the application the whole document -----	1-3

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

11 October 2001

Date of mailing of the international search report

19/10/2001

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/40415

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0009206	A	24-02-2000	EP 1105188 A1 13-06-2001
			WO 0009206 A1 24-02-2000
			US 6185459 B1 06-02-2001
EP 0522693	A	13-01-1993	US 5209229 A 11-05-1993
			DE 69226738 D1 01-10-1998
			DE 69226738 T2 15-04-1999
			DE 522693 T1 08-07-1993
			EP 0522693 A1 13-01-1993
			JP 5137801 A 01-06-1993
US 4549548	A	29-10-1985	NONE
US 5792203	A	11-08-1998	EP 1021221 A1 26-07-2000
			WO 9908747 A1 25-02-1999