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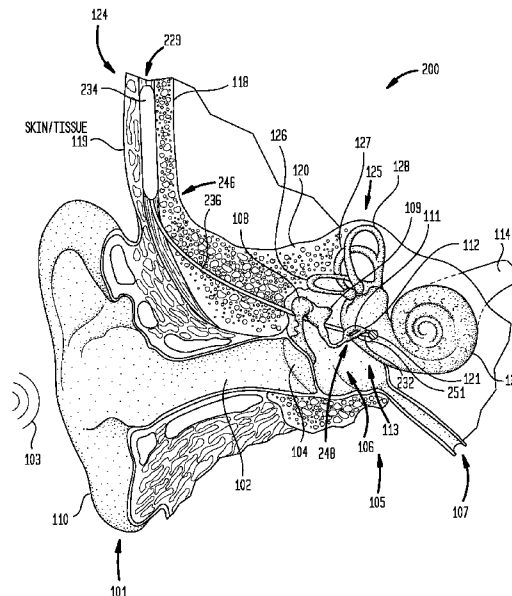
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(54) Title: CLINICAL-BASED AUTOMATED DELIVERY OF TREATMENT SUBSTANCES TO THE INNER EAR

FIG. 2A



(57) Abstract: Presented herein are techniques for clinical-based automated control of the delivery of treatment substances to at least one inner ear of a recipient of an implantable medical device. More specifically, in-vivo biomarkers are analyzed to determine a biological state/status of one or more physiological elements of the inner ear. Subsequent delivery of one or more treatment substances to the inner ear of the recipient are controlled based on the determined biological state of the one or more physiological elements of the inner ear.



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A. CLASSIFICATION OF SUBJECT MATTER

A61M 5/142(2006.01)i, A61M 31/00(2006.01)i, A61B 5/00(2006.01)i, A61N 1/36(2006.01)i, A61N 1/05(2006.01)i

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)

A61M 5/142; A61B 5/00; A61B 5/0205; A61B 6/00; A61M 31/00; A61M 5/172; A61N 1/30; A61N 1/36; A61N 2/02; A61N 1/05

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: substance delivery system, sensor, biomarker, control signal, reservoir, pump, substance-eluting portion, stimulator, notification

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012-0296176 A1 (HERBST, E.) 22 November 2012 See paragraphs [0003]-[0091], [0115]-[0178]; claims 1-18.	1-38
Y	US 8197461 B1 (ARENBERG, I. K. et al.) 12 June 2012 See column 24, line 26 - column 28, line 49; claims 1-26; figures 6, 7.	1-38
Y	US 2006-0047318 A1 (PASTORE, J. M. et al.) 02 March 2006 See paragraphs [0026], [0035]; claims 1-49.	8, 16, 32
A	US 2017-0173262 A1 (VELTZ, F. P.) 22 June 2017 See the whole document.	1-38
A	US 2010-0198281 A1 (CHANG, C.Y. J. et al.) 05 August 2010 See the whole document.	1-38

 Further documents are listed in the continuation of Box C. See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

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"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012-0296176 A1	22/11/2012	AU 1999-23507 A1 US 10061483 B2 US 2001-0021868 A1 US 2002-0143365 A1 US 2004-0059388 A1 US 2005-0216062 A1 US 2006-0089751 A1 US 2011-0224502 A1 US 2011-0230857 A1 US 2011-0248318 A1 US 2012-0204132 A1 US 2015-0277680 A1 US 2016-0157775 A1 US 6021347 A US 6029090 A US 6684106 B2 US 6708066 B2 US 7526334 B2 US 7937683 B1 US 8365122 B2 US 8595672 B2 US 9199076 B2 WO 01-41865 A1 WO 2010-065678 A1 WO 99-37359 A1	09/08/1999 28/08/2018 13/09/2001 03/10/2002 25/03/2004 29/09/2005 27/04/2006 15/09/2011 22/09/2011 13/10/2011 09/08/2012 01/10/2015 09/06/2016 01/02/2000 22/02/2000 27/01/2004 16/03/2004 28/04/2009 03/05/2011 29/01/2013 26/11/2013 01/12/2015 14/06/2001 10/06/2010 29/07/1999
US 8197461 B1	12/06/2012	AU 2000-021646 B2 AU 2000-21646 A1 CA 2350838 A1 EP 1133269 A1 EP 1133269 B1 EP 1767175 A1 US 6685697 B1 WO 00-33775 A1	12/06/2003 26/06/2000 15/06/2000 19/09/2001 14/02/2007 28/03/2007 03/02/2004 15/06/2000
US 2006-0047318 A1	02/03/2006	US 7621906 B2	24/11/2009
US 2017-0173262 A1	22/06/2017	None	
US 2010-0198281 A1	05/08/2010	None	