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(54) Title: SYSTEM AND METHODS FOR CULTIVATING BIOMASS AND CONCENTRATING NUTRIENTS

(57) Abstract: Vessels that include magnetic field sources for concentrating nutrients useful for growing microorganisms are provided. Systems for growing the microorganisms include modules with various functions, such as a bioharvester module and a magneto-concentrator module. Methods for growing biomass with the aid of magnetic fields sources used to concentrate nutrients are also provided.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/041766**A. CLASSIFICATION OF SUBJECT MATTER****C12M 1/42(2006.01)i, C12M 3/00(2006.01)1, CIOG 3/00(2006.01)1, CIOL 1/02(2006.01)1, C12P 7/00(2006.01)1**

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)

C12M 1/42; C12M 1/00; C12M 1/24; C12N 5/06; C02F 1/48; C12M 1/36; C12M 1/02; C12P 1/00; C12M 1/04; B01J 19/12

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: Magnetic field source, concentrating, nutrient, microorganism, vessel, biomass.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	wo 2010-141559 A2 (COASTAL WATERS BIOTECHNOLOGY GROUP, LLC) 09 December 2010 See paragraph [0060] , [0065] -[0069] , [0087] , and [0106] ; claims 1-2 , 4-6 , 13 , and 19 .	1-4 , 11-12
A		5-10 , 13-38
A	US 2009-0130704 A1 (GYURE, D. C.) 21 May 2009 See paragraph [0072] and claims 1, 2, 4, 5, and 36 .	1-38
A	US 2010-0102004 A1 (HOLLAND, H. w.) 29 April 2010 See paragraphs [0024]-[0026] ; claim 1.	1-38
A	US 2009-0035856 A1 (GALLIHER, P. M et al.) 05 February 2009 See claims 1 and 15 .	1-38
A	US 6670169 B1 (SCHOB, R. et al.) 30 December 2003 See claims 1, 3, and 4 .	1-38

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

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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
W02010- 141559 A2	09 . 12 . 20 10	EP 2438 150 A2 Wo 20 10- 141559 A3	11.04 ,2012 21.04 ,2011
US2009-0 130704 A1	21 .05 .2009	AU 2004-229070 A1	02 .06 ,2005
US20 10-0 102004 A1	29 .04 .20 10	US 2003-0160000 A1 US 2004-01 12408 A1 US 2005-016 1405 A1 US 2008-0264869 A1 us 20 10-010 1958 A1 us 20 10-0102003 A1 us 6706 196 B2 us 6852235 B2 us 7407589 B2 us 80435 11 B2 us 80483 13 B2 us 8066886 B2	28.08 ,2003 17 .06 ,2004 28 .07 ,2005 30 . 10 ,2008 29 .04 ,2010 29 .04 ,2010 16 .03 ,2004 08 .02 ,2005 05 .08 ,2008 25 . 10 ,2011 01 . 11 ,2011 29 . 11 ,2011
US2009-0035856 A1	05 .02 .2009	EP 2020433 A2 EP 2020433 A3 JP 2009-072 182 A	04. 02 ,2009 05 . 10 ,2011 09 .04 ,2009
US6670 169 B1	30 . 12 .2003	EP 10870 10 A2 EP 10870 10 A3 EP 10870 10 B1 EP 2284253 A1 EP 2284253 B1 EP 2290049 A1 EP 2290049 B1 EP 2290050 A1	28.03 ,2001 18 .02 ,2004 09 . 11 ,2011 16 .02 ,2011 27 .06 ,2012 02 .03 ,2011 15 .08 ,2012 02 .03 ,2011