



(51) International Patent Classification:

B63B 21/50 (2006.01) **F03B 17/06** (2006.01)
E02B 9/08 (2006.01) **F03B 13/26** (2006.01)
B63B 21/26 (2006.01)

(21) International Application Number:

PCT/GB20 12/05 1071

(22) International Filing Date:

14 May 2012 (14.05.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

110805 1.2 13 May 2011 (13.05.2011) GB

(71) Applicant (for all designated States except US): **SUSTAINABLE MARINE TECHNOLOGIES LTD** [GB/GB]; Unit 6, 31 Blenheim Gardens, London Greater London SW2 5EU (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **HAYMAN, Jason** [GB/GB]; c/o Sustainable Marine Technologies Ltd., Unit 6, 31 Blenheim Gardens, London Greater London SW2 5EU (GB).

(74) Agent: **KAVANAGH, Benjamin**; 120, Holborn, London, Greater London, EC1N 2SQ (GB).

(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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

13 June 2013

(54) Title: A FLOWING- WATER DRIVEABLE TURBINE ASSEMBLY

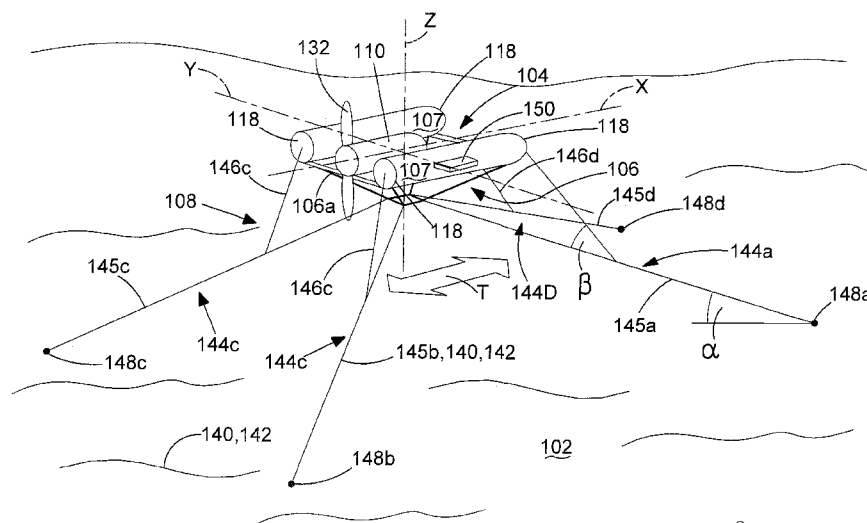


FIG. 8

(57) Abstract: A flowing-water driveable turbine assembly (104) for location in river or sea areas with unidirectional and bidirectional water flows. The turbine assembly comprises a turbine support (106) with positive buoyancy in water. The turbine support (106) is arranged to be anchored by an anchoring system (108) to a water bed. The turbine assembly comprises at least one turbine (110). The positive buoyancy of the turbine assembly in water has an upward force to constrain the turbine support 106 and the at least one turbine (110) to a position of floating equilibrium against a downward force of the anchoring system (108). The turbine assembly may have variable buoyancy, a duct around each turbine for directing water through the turbine to generate power from water flow, and a winch or winches for submerging the turbine assembly or parts thereof.

WO 2012/156717 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051071

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B63B21/50 E02B9/08 B63B21/26 F03B17/06 F03B13/26
 ADD.
 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)
 B63B F03B

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 practicable, search terms used)
 EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 162 618 A2 (AQUANTIS L L C [US] AQUANTIS INC [US]) 17 March 2010 (2010-03-17) paragraphs [0001] , [0016] , [0017] , [0018] , [0019] , [0052] - [0054] , [0060] , [0047] , [0048] figures 1-5 ,9-14 -----	1-7 , 9-22 , 36-62 , 111-114, 117
X	CN 101 592 117 A (JIANGUO LIN [CN]) 2 December 2009 (2009-12-02) the whole document -----	1-5 , 7-22 , 112-114, 117

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	"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
"E" earlier application or patent but published on or after the international filing date	"X" 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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 31 January 2013	Date of mailing of the international search report 15/04/2013
--	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lux, Ralph
--	--------------------------------------

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/051071

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.:
because they relate to subject matter not required to be searched by this Authority, namely:

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. 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 all searchable 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. :

see additional sheet(s)

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: 1-22, 36-62, 111-114, 117

A submersible turbine assembly to be anchored and an appropriate anchoring system comprising three anchoring cables moored in the sea bed, each of the anchoring cable bifurcates and is attached to two respective attachment points at the turbine assembly.

2. claims: 23-35, 118

An anchoring cable comprising a helical protrusion.

3. claims: 63-65, 71-101, 115, 116

A turbine assembly having an anchored turbine support and a plurality of turbine modules secured to the turbine support.

4. claims: 66-70, 102-110

An anchored turbine assembly wherein each turbine is mounted in a respective duct with a flared annular section tapering inwardly towards the duct.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051071

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP 2162618	A2	17-03-2010	EP 2162618 A2	17-03-2010
			JP 2010531956 A	30-09-2010
			US 2010181774 A1	22-07-2010
			WO 2009004420 A2	08-01-2009

CN 101592117	A	02-12-2009	NONE	
