



- (51) **International Patent Classification:**
H01M 8/04 (2006.01) G01F 15/06 (2006.01)
C01B 3/06 (2006.01)
- (21) **International Application Number:**
PCT/GB2015/050370
- (22) **International Filing Date:**
11 February 2015 (11.02.2015)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
1402442.6 12 February 2014 (12.02.2014) GB
- (71) **Applicant: INTELLIGENT ENERGY LIMITED**
[GB/GB]; Charnwood Building, Holywell Park, Ashby Road, Loughborough LE11 3GB (GB).
- (72) **Inventor: EDGAR, David;** Intelligent Energy Limited, Charnwood Building, Holywell Park, Ashby Road, Loughborough LE11 3GB (GB).
- (74) **Agent: LINCOLN, Ben James;** Potter Clarkson LLP, The Belgrave Centre, Talbot Street, Nottingham, Nottinghamshire NG1 5GG (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, BN, 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, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, 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, KM, 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:**
15 October 2015

(54) **Title:** FUEL SOURCE, FUEL CELL SYSTEM AND ASSOCIATED METHOD

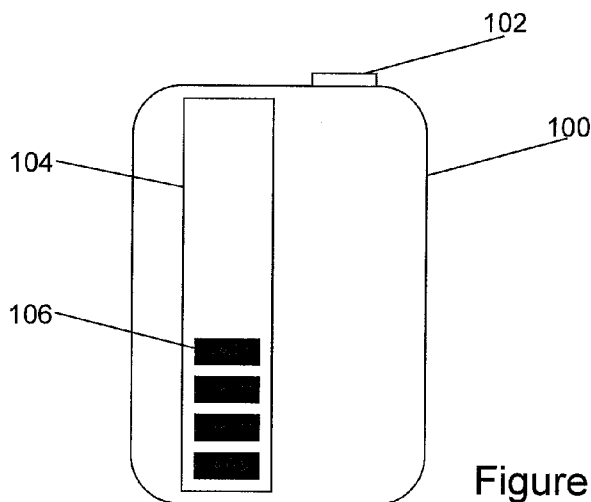


Figure 1

(57) **Abstract:** A fuel source (100), a fluid gauge adapter (300), a fuel cell system (200) and an associated method. The fuel source (100) has a gauge (104) comprising an electronic multi-stable display (106). The fuel cell system (200) and method relate to receiving fuel from the fuel source (100), determining (212) a fuel consumption of the fuel cell system (200), calculating (214) a substance level of the fuel source in accordance with the fuel consumption and updating (216) an electronic multi-stable display of the fluid gauge of the fuel source in accordance with the substance level.



INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2015/050370

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01M8/04 C01B3/06 G01F15/06
 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)
 H01M C01B G01F F17C

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	US 2012/226451 A1 (BACOT PATRICK [FR] ET AL) 6 September 2012 (2012-09-06)	1-3,19
Y	paragraphs [0001] - [0003], [0006] -	5,6,8-11
A	[0017], [0021] - [0027]	4
Y	US 2013/162439 A1 (SCHUMACHER MARK S [US]) 27 June 2013 (2013-06-27)	5,6,8-11
	paragraphs [0010], [0011]	
X	JP 2010 105252 A (BROTHER IND LTD) 13 May 2010 (2010-05-13)	16-18
	paragraph [0046]	
X	US 2006/019135 A1 (CURELLO ANDREW J [US] ET AL) 26 January 2006 (2006-01-26)	20
Y	paragraphs [0068], [0090]	5,6,8-11
A		7

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 application or patent 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

"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

"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

Date of the actual completion of the international search	Date of mailing of the international search report
6 May 2015	27/08/2015

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 Raimondi, Fabio
--	---

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2015/050370

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.:

1-11, 16-20

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: 1-11, 16-20

Substance storage vessel having a gauge comprising an electronic multi-stable display and a read-back unit configured to determine a substance level in the vessel by measurement of a property of the display.

2. claims: 12-15

Fluid gauge adapter comprising a fluid property measuring device in a flow path of the adapter and a controller adapted to calculate a fluid level in accordance with the fluid property and to display the calculated fluid level in an electronic multi-stable device.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2015/050370

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2012226451	A1	06-09-2012	CN 102597720 A	18-07-2012
			EP 2499470 A1	19-09-2012
			FR 2952432 A1	13-05-2011
			JP 2013510327 A	21-03-2013
			US 2012226451 A1	06-09-2012
			WO 2011058258 A1	19-05-2011

US 2013162439	A1	27-06-2013	AU 2012358287 A1	17-07-2014
			CA 2859984 A1	27-06-2013
			CN 103282752 A	04-09-2013
			EP 2795267 A1	29-10-2014
			JP 2015504156 A	05-02-2015
			US 2013162439 A1	27-06-2013
			WO 2013096790 A1	27-06-2013

JP 2010105252	A	13-05-2010	NONE	

US 2006019135	A1	26-01-2006	AR 054604 A1	27-06-2007
			AU 2006278708 A1	15-02-2007
			BR PI0614720 A2	04-12-2012
			CA 2616709 A1	15-02-2007
			CN 101390246 A	18-03-2009
			EP 1915794 A2	30-04-2008
			ES 2428317 T3	07-11-2013
			JP 2009506482 A	12-02-2009
			KR 20080033317 A	16-04-2008
			MY 142323 A	15-11-2010
			US 2006019135 A1	26-01-2006
			US 2008231836 A1	25-09-2008
			WO 2007019106 A2	15-02-2007
			ZA 200800745 A	26-08-2009
