

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number
WO 2012/045056 A3

(43) International Publication Date
5 April 2012 (05.04.2012)

W I P O | P C T

(51) International Patent Classification:

B60W 10/08 (2006.01) B60P 3/20 (2006.01)
B60K 16/00 (2006.01)

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.

(21) International Application Number:

PCT/US201 1/054474

(22) International Filing Date:

1 October 2011 (01.10.2011)

(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, MD, 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).

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/389,093 1 October 2010 (01.10.2010) US
61/484,805 11 May 2011 (11.05.2011) US
61/526,763 24 August 2011 (24.08.2011) US

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:

5 July 2012

(54) Title: REFRIGERATION SYSTEM

100

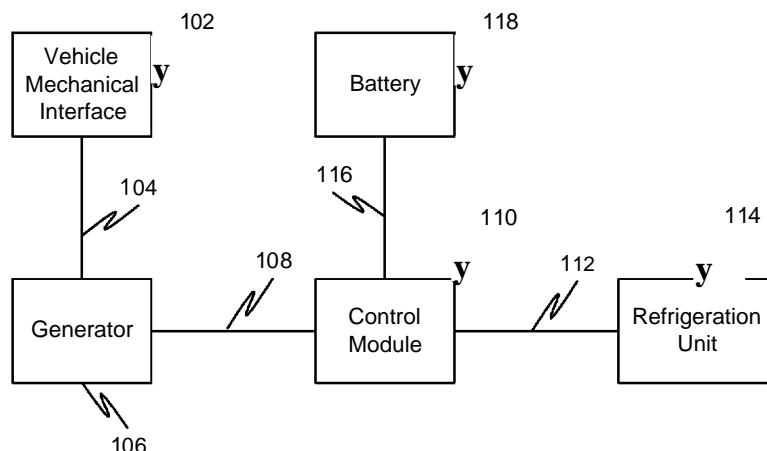


Fig. 1

(57) **Abstract:** A refrigeration system can include an electrical generator coupled to a mechanical interface, the mechanical interface configured to transfer mechanical energy from a vehicle to the electrical generator, and a control module connected to the electrical generator via electrical wiring. The refrigeration system can also include an electrically-driven refrigeration unit coupled to the control module, and a battery coupled to the control module via electrical wiring. The control module can be adapted to provide electrical power to the refrigeration unit from the electrical generator or the battery and is further adapted to charge the battery with electrical energy not needed for operating the refrigeration unit.

WO2012/045056 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/054474

A. CLASSIFICATION OF SUBJECT MATTER

B60W 10/08(2006.01)i, B60K 16/00(2006.01)I, B60P 3/20(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)

B60W 10/08; H02K 15/00; B60K 6/02; H02J 15/00; B60K 1/00; B60P 3/20; G05D 23/00; B60W 40/06

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 modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: refrigeration system, generator, control module, battery, gear, mechanical energy, electrical energy

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008-079002 A1 (NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWETENSCHAPPE LIJK ONDERZOEK TN0 et al.) 03 July 2008 See abstract, pages 6, 7, 23 and 26, and fig. 5	1-14, 20
A	US 2009-0024256 A1 (DANIEL THOMAS ADAMS et al.) 22 January 2009 See paragraphs [0013]-[0017] and fig.1	1-25
A	US 05667029 A (EDWARD F. URBAN et al.) 16 September 1997 See column 5 lines 44-49, column 7 lines 10-25 and figs.1 and 7	1-25
A	US 2010-0044129 A1 (KYLE RONALD) 25 February 2010 See abstract and fig.1.	1-25

 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 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
26 APRIL 2012 (26.04.2012)Date of mailing of the international search report
04 MAY 2012 (04.05.2012)Name and mailing address of the ISA/KR
 Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsa-ro,
Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140Authorized officer
Kim Sung Soo
Telephone No. 82-42-481-3401

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/054474**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:

Claims 1-19 are directed to a refrigeration system comprising an electrical generator coupled to a mechanical interface, the mechanical interface configured to transfer mechanical energy to electrical energy. Claims 21-23 are directed to a power generating system. Claims 24-25 are directed to a kinetic energy convertor system.

Since the above mentioned groups of claims do not share any of the technical features identified, a technically special relationship between the inventions does not exist.

Accordingly the claims do not relate to one invention or to a single inventive concept, a priori.

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 fee, this Authority did not invite payment of any additional fee.
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.:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/054474

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
Wo 2008-079002 A1	03,07,2008	CN 10 1605673 A EP 1935712 A1 EP 2 12 1381 A1 JP 2010-513137 A KR 10-2009-0092837 A US 2010-0305794 A1	16.12.2009 25.06.2008 25.11.2009 30.04.2010 01.09.2009 02.12.2010
us 2009-0024256 A1	22,01,2009	US 7890218 B2	15.02.2011
us 05667029 A	16,09,1997	AU 1996-59601 B2 CA 2222531 C EP 0828623 A1 EP 0828623 B1 JP 11-506406 A Wo 96-38313 A1	29.06.2000 30.01.2007 02.09.1998 10.05.2000 08.06.1999 05.12.1996
us 2010-0044129 A1	25,02,2010	CN 10 1272924 A EP 1926623 A2 US 2006-0030450 A1 US 2006-0046894 A1 wo 2007-040629 A2 wo 2007-040629 A3	24.09.2008 04.06.2008 09.02.2006 02.03.2006 12.04.2007 12.04.2007