



(51) International Patent Classification:

B60L 11/18 (2006.01) B60L 15/20 (2006.01)  
B60L 11/12 (2006.01) H01M 10/44 (2006.01)

(21) International Application Number:

PCT/US2009/048366

(22) International Filing Date:

24 June 2009 (24.06.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/179,199 24 July 2008 (24.07.2008) US

(71) Applicant (for all designated States except US): GENERAL ELECTRIC COMPANY [US/US]; 1 River Road, Schenectady, NY 12345 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SALASOO, Lembit [AU/US]; 2280 Berkley Avenue, Schenectady, NY 12309 (US). KING, Robert, Dean [US/US]; 196 Wemple Road, Schenectady, NY 12306 (US). IACOVANGELO, Charles [US/US]; 39 Loughberry Lake Road, Saratoga Springs, NY 12866 (US). DAUM, Wolfgang [US/US]; 5228 Annendale Drive, Erie, PA 16506 (US).

(74) Agents: KRAMER, John, A. et al.; General Electric Company, Global Patent Operation, P.O. Box 861, 2 Corporate Drive, Suite 648, Shelton, CT 06484 (US).

(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, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (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, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))

[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR EXTENDING LIFE OF A VEHICLE ENERGY STORAGE DEVICE

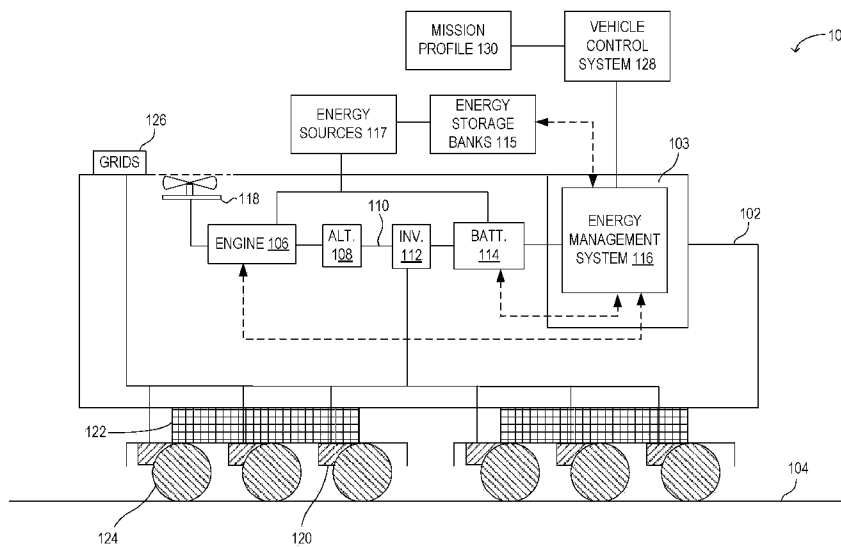


FIG. 1

(57) Abstract: Methods and systems are provided for controlling a power transfer rate in to and/or out of a vehicle energy storage device to affect a current state of charge of the energy storage device. The vehicle may be on a mission comprising a plurality of future power transfer opportunities. In one example, the method comprises adjusting the power transfer rate based on an estimated duration of a future power transfer opportunity. Further, the method may include, if the estimated duration of the future power transfer opportunity is different from a predetermined threshold, changing the power transfer rate at the future power transfer opportunity. The method allows the operating life of the energy storage device to be extended.

WO 2010/011458 A3

**(88)** Date of publication of the international search report:  
6 October 2011

**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2009/048366

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. B60L11/18      B60L11/12      B60L15/20      H01M10/44  
 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)  
 B60L H01M

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 practical, search terms used)  
 EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2005/274553 A1 (SALMAN MUTASIM A [US] ET AL) 15 December 2005 (2005-12-15) paragraphs [0008], [0015], [0019], [0020], [0024], [0028], [0032], [0039]; figures 1-3 -----	1-26
Y	US 6 470 983 B1 (AMANO MASAHIKO [JP] ET AL) 29 October 2002 (2002-10-29) column 7, lines 1-9; figures 1-10 -----	1-26
Y	JP 2001 314004 A (HITACHI LTD) 9 November 2001 (2001-11-09) abstract; figures 1,4 -----	1-26
Y	US 2002/174798 A1 (KUMAR AJITH KUTTANNAIR [US]) 28 November 2002 (2002-11-28) paragraphs [0057], [0073], [0082]; figures 2-12 -----	1-26
	-/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>
--	--

Date of the actual completion of the international search  31 May 2011	Date of mailing of the international search report  21/06/2011
--	--

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  Kanelis, Konstantin
--	---

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2009/048366

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2008/016129 A1 (TOYOTA MOTOR CO LTD [JP]; NISHI YUJI [JP]; YAMAUCHI TOMOKAZU [JP]) 7 February 2008 (2008-02-07) figures 1-19 -----	11-17
Y	EP 0 814 556 A2 (FORD GLOBAL TECH INC [US]) 29 December 1997 (1997-12-29) column 1, lines 17-44; figures 1-4 -----	18,19

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2009/048366
---

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005274553 A1	15-12-2005	WO 2006001949 A2	05-01-2006
US 6470983 B1	29-10-2002	JP 3395708 B2 JP 2000310131 A	14-04-2003 07-11-2000
JP 2001314004 A	09-11-2001	JP 3610879 B2	19-01-2005
US 2002174798 A1	28-11-2002	US 2003150352 A1	14-08-2003
WO 2008016129 A1	07-02-2008	CN 101496255 A EP 2048763 A1 JP 4265629 B2 JP 2008042960 A US 2010000809 A1	29-07-2009 15-04-2009 20-05-2009 21-02-2008 07-01-2010
EP 0814556 A2	29-12-1997	DE 69735080 T2 JP 10066270 A US 5764027 A	09-11-2006 06-03-1998 09-06-1998