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(54) Title: METHOD AND APPARATUS FOR CONTROLLING THE POWER SUPPLY FROM AN ELECTRIC VEHICLE TO A DWELLING OR TO AN AC POWER DISTRIBUTION NETWORK

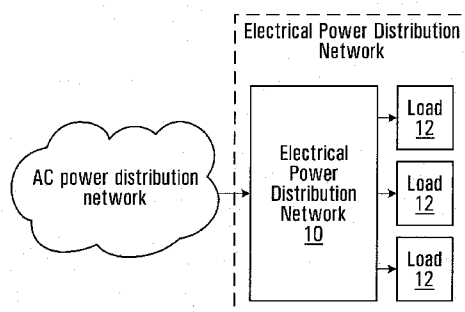


FIG. 1

(57) Abstract: A method for managing the operation of an AC power distribution network to which connect a plurality of electric vehicles, at random times and at random locations to receive electrical energy for charging. The AC power distribution network is characterized by a dynamic state of balance between power generation and load, and it has an operating reserve which is a supplemental power generation capacity available to the AC power distribution network. The method includes the step of forecasting a power-supply contribution that would be available to the AC power distribution network from the electric vehicles connected to the AC power distribution network in the event the AC power distribution network experiences a state of imbalance resulting from a power-generation deficit. The method further includes adjusting the magnitude of the operating reserve on the basis of the forecasting.

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INTERNATIONAL SEARCH REPORT

International application No PCT/IB2014/002094

A. CLASSIFICATION OF SUBJECT MATTER INV. H02J3/32 B60L11/18 H02J3/14 G06Q30/00 ADD. H02J3/00				
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) H02J B60L				
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, PAJ, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 2013/110260 A1 (CARPINTERI CARMELO A [US] ET AL) 2 May 2013 (2013-05-02) paragraph [0036] -----	1-26		
A	US 2011/204720 A1 (RUIZ JOHN ISMAEL [US] ET AL) 25 August 2011 (2011-08-25) paragraph [0006] -----	1-26		
A	US 2011/084664 A1 (WHITE CHRISTOPHER A [US] ET AL) 14 April 2011 (2011-04-14) paragraph [0005] -----	1-26		
X	US 2013/173075 A1 (MITSUMOTO KENJI [JP] ET AL) 4 July 2013 (2013-07-04) -----	32, 34		
Y	paragraphs [0074] - [0077], [0102] - [0107]; figure 17 -----	33		
-/--				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> <td style="width: 50%; border: none; vertical-align: top;"> "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 </td> </tr> </table>			"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
"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			
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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 Ramcke, Ties			

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2014/002094

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/323396 A1 (SHELTON JOHN CHRISTOPHER [US] ET AL) 20 December 2012 (2012-12-20) paragraph [0019] -----	33

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2014/002094

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.:
1-26, 32-34

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-26

- a. monitoring connection events, a connection event occurring when a mobile electrical storage device connects to the AC power distribution network for receiving electrical energy;
- b. computing on the basis of the monitored connection events an estimate of the electrical energy that would be available for injection in the AC power distribution network when the AC power distribution network is in a state of imbalance resulting from a power generation deficit.

2. claims: 27-31

- a. detecting connections of electrical vehicles to the AC power distribution network through which electricity is supplied to the electrical vehicles for recharging;
- b. identifying for the electric vehicles at the detected connections, user accounts;
- c. computing a credit for the individual electric vehicles at the detected connections for the supply of electricity to the AC power distribution network occurring when the AC power distribution network is in a state of imbalance;
- d. posting the credits to the respective user account.

3. claims: 32-34

- a. forecasting a degree of load receding that would arise in the event the AC power distribution network falls in a state of imbalance as a result of a power generation deficit;
- b. adjusting the magnitude of the operating reserve at least in part on the basis of the forecasting.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/IB2014/002094

Patent document cited in search report	A1	Publication date	Patent family member(s)	Publication date
US 2013110260	A1	02-05-2013	CA 2787638 A1 US 2013110260 A1	26-04-2013 02-05-2013

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