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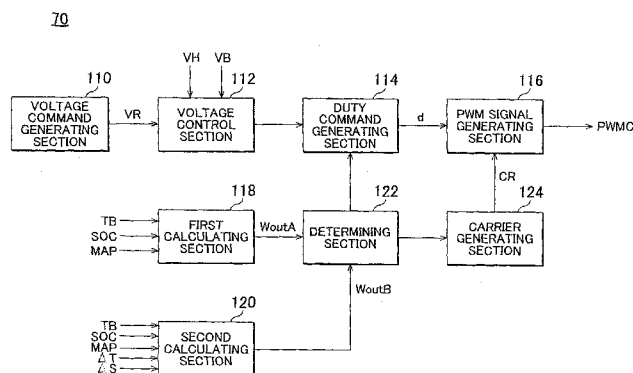
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(54) Title: SECONDARY BATTERY TEMPERATURE-INCREASING CONTROL APPARATUS, VEHICLE INCLUDING THE SAME, AND SECONDARY BATTERY TEMPERATURE-INCREASING CONTROL METHOD

FIG. 11



(57) Abstract: A first calculating section (118) calculates an allowable output power (WoutA) of the secondary battery before a ripple temperature increase operation for increasing the temperature of a secondary battery by causing a ripple current to flow in the secondary battery is performed, the allowable output power being determined in advance based on the temperature and a state of charge (SOC) of the secondary battery. A second calculating section (120) calculates the allowable output power (WoutB) achieved when the ripple temperature increase operation is performed. A determining section (122) determines whether to perform the ripple temperature increase operation so that when the allowable output power (WoutB) is equal to or greater than the allowable output power (WoutA), the ripple temperature increase operation is performed and, when the allowable output power (WoutB) is smaller than the allowable output power (WoutA), the ripple temperature increase operation is not performed.



**INTERNATIONAL SEARCH REPORT**

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**A. CLASSIFICATION OF SUBJECT MATTER**  
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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)  
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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)  
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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2009 142069 A (GS YUASA CORP) 25 June 2009 (2009-06-25) * abstract; figures 1,4 -----	1
A	DE 100 40 198 A1 (HONDA MOTOR CO LTD [JP]) 8 March 2001 (2001-03-08) * abstract; figure 2 -----	1
A	EP 1 286 459 A1 (TOYOTA MOTOR CO LTD [JP]; TOYODA CHUO KENKYUSHO KK [JP] TOYOTA MOTOR C) 26 February 2003 (2003-02-26) * abstract; figure 4 -----	1
A	US 6 271 648 B1 (MILLER JOHN MICHAEL [US]) 7 August 2001 (2001-08-07) * abstract; figure 5 -----	1

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2009142069	A	25-06-2009	NONE
-----			
DE 10040198	A1	08-03-2001	JP 3926514 B2 06-06-2007
			JP 2001057709 A 27-02-2001
			US 6408968 B1 25-06-2002
-----			
EP 1286459	A1	26-02-2003	CN 1436395 A 13-08-2003
			DE 60113832 T2 06-07-2006
			WO 02065628 A1 22-08-2002
			JP 3732828 B2 11-01-2006
			US 2003057914 A1 27-03-2003
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US 6271648	B1	07-08-2001	NONE
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