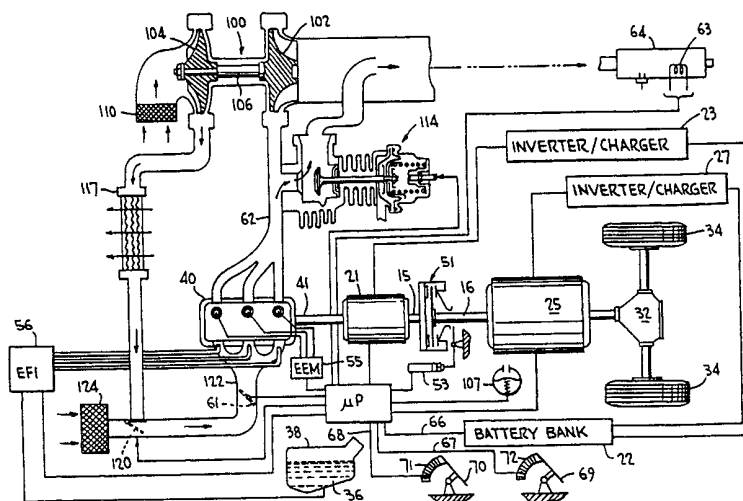




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US99/18844 (22) International Filing Date: 10 September 1999 (10.09.99)</p> <p>(30) Priority Data: 60/100,095 14 September 1998 (14.09.98) US 60/122,296 1 March 1999 (01.03.99) US 09/264,817 9 March 1999 (09.03.99) US</p> <p>(71) Applicant: PAICE CORPORATION [US/US]; Suite 315, 8605 Cameron Street, Silver Spring, MD 20910 (US).</p> <p>(72) Inventors: SEVERINSKY, Alex, J.; 4707 Foxhall Crescent, Washington, DC 20007 (US). LOUCKES, Theodore; 10398 Appomattox, Holly, MI 48442 (US).</p> <p>(74) Agent: DE ANGELI, Michael; Suite 330, 1901 Research Boulevard, Rockville, MD 28050 (US).</p>		<p>(81) Designated States: AU, BR, CA, CN, CZ, IL, JP, KR, LV, MX, PL, UA, Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 8 June 2000 (08.06.00)</p>

(54) Title: HYBRID VEHICLES



(57) Abstract

A hybrid vehicle comprising an internal combustion engine (40) controllably coupled to road wheels (34) of the vehicle by a clutch (51), a traction motor (25) coupled to road wheels of said vehicle, a starting motor (21) coupled to the engine (40), both motors being operable as generators, a battery bank (22) for providing electrical energy to and accepting energy from said motors, and a microprocessor (48) for controlling these components is operated in different modes, depending on the vehicle's instantaneous torque requirements, the state of charge of the battery bank, and other operating parameters. The mode of operation is selected by the microprocessor in response to a control strategy resulting in improved fuel economy and reduced emission. The engine may be fitted with a turbocharger (100) operated in response to a control signal for extended high-load operation.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/18844

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :B60K 6/00; B60L 11/12
US CL :180/65.2; 290/17

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)

U.S. : 180/65.2, 65.3, 65.4, 65.6, 65.8, 265; 60/716, 1718, 706, 711; 290/17, 40R, 40C; 322/16

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---, P Y	US 5,934,395 A (KOIDE et al) 10 August 1999, figures 2, 5, 8, 10.	1, 21 ----- 2-6, 10-19, 22-24, 29-34, 36, 37, 40, 51, 52
X --- Y	US 5,343,970 A (SEVERINSKY) 06 September 1994, figure 3.	39 ---- 2-6, 10-14, 40-43, 45-50
X ---, P Y	US 5,927,417 A (BRUNNER et al.) 27 July 1999, figures 1,2; col. 5, lines 33-58.	44 ---- 15-20, 33, 36, 45- 50, 52

Further documents are listed in the continuation of Box C. See patent family annex.

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International application No.
PCT/US99/18844

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 5,697,466 A (MOROTO et al.) 16 December 1997, figures 1, 4, 10.	4-6, 10-14, 18, 19, 22-24, 29-34, 36. 46-48, 51, 52
Y, E	US 5,986,376 A (WERSON) 16 November 1999, col. 4, lines 64-67.	41
A, E	US 5,969,624 A (SAKAI et al) 19 October 1999.	1-52
A, E	US 6,018,198 A (TSUZUKI et al) 25 January 2000.	1-52
A, P	US 5,845,731 A (BUGLIONE et al) 08 December 1998.	1-52
A	US 5,767,637 A (LANSBERRY) 16 June 1998.	1-52
A	US 5,495,906 A (FURUTANI) 05 March 1996.	1-52
A, P	US 5,842,534 A (FRANK) 01 December 1998.	1-52
A, P	US 5,823,280 A (LATEUR et al) 20 October 1998.	1-52