IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Patent Application of :		
Severinsky et al	:	Examiner: Shafi
Serial No.: 13/065,704	:	Group Art Unit: 3667
Filed: March 29, 2011	:	Att.Dkt:PAICE201.DIV.10
For: Hybrid Vehicles	:	

Hon. Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

AMENDMENT

Sir:

In response to the Office Action mailed December 1, 2011 setting a shortened statutory period for response to expire March 1, 2012, kindly amend the above-identified application as follows:

IN THE CLAIMS

1 - 16 (Cancelled)

17. (Currently amended) A method for controlling a hybrid vehicle, said vehicle comprising a battery, a controller, wheels, an internal combustion engine and at least one electric motor, wherein both the internal combustion engine and motor are capable of providing torque to the wheels of said vehicle, and wherein said engine has an inherent maximum rate of increase of output torque, said method comprising the steps of:

operating the internal combustion engine of the hybrid vehicle to provide torque to operate the vehicle;

operating said at least one electric motor to provide additional torque when the amount of torque provided by said engine is less than the amount of torque required to operate the vehicle; and

employing said controller to control the engine such that a rate of ~~change~~ increase of output torque ~~output~~ of the engine is limited to ~~no more than a predetermined value~~ less than said inherent maximum rate of increase of output torque, and wherein said step of controlling the engine such that the rate of increase of output torque of the engine is limited is performed such that combustion of fuel within the engine occurs at a substantially stoichiometric ratio.

18. (Cancelled)

19. (Currently amended) The method of claim [[18]] 17, wherein the amount of oxygen in an exhaust stream from said engine is monitored to ensure that combustion of fuel within the engine occurs at a ~~near~~substantially[[-]]stoichiometric ratio.

20. (Currently amended) The method of claim 17, wherein when it is desired to start said engine, said engine is rotated at at least 300 rpm, whereby the engine is heated, prior to supply of fuel for starting the engine.

21. (Currently amended) The method of claim [[17]] 20, wherein fuel and air are supplied to said engine at a fuel:air ratio of no more than 1.2 of the stoichiometric ratio for starting the engine.

22. (Previously presented) The method of claim 17, wherein said at least one electric motor produces torque at least equal to the engine's maximum torque output (MTO).

23. (Previously presented) The method of claim 17, comprising the further steps of:

operating said at least one electric motor to provide additional torque when the torque required to operate the vehicle is greater than the engine's instantaneous torque output (ITO), and

operating said electric motor as a generator to accept torque from said engine to charge said battery when the torque required to operate the vehicle is less than ITO.

24. (Previously presented) The method of claim 17, comprising the further steps of:

operating said internal combustion engine to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is between a setpoint SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above SP, and wherein SP is substantially less than MTO;

operating both the at least one electric motor and the engine to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is more than MTO; and

operating the at least one electric motor to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is less than SP.

25. (Previously presented) The method of claim 24, further comprising the step of operating the engine at torque output levels less than SP under abnormal and transient conditions.

26. (Previously presented) The method of claim 17, further comprising the step of:

operating the engine to charge the battery responsive to the state of charge of the battery, wherein the engine is operable to provide torque at least equal to SP to propel the hybrid vehicle, to drive the at least one electric motor to charge the battery, or both, wherein torque produced by the engine equal to the torque required to propel the vehicle (RL) is used to propel the hybrid vehicle, and torque produced by the engine in excess of RL is used to drive the at least one electric motor to charge the battery.

27. (Previously presented) The method of claim 17, wherein energy is supplied to the motor from the battery at a voltage of at least 500 volts under peak load conditions.

28. (Previously presented) The method of claim 17, wherein energy is supplied to the motor from the battery at no more than about 75 amperes under peak load conditions.

29. (Currently amended) A method for controlling a hybrid vehicle, said vehicle comprising a battery, a controller, wheels, an internal combustion engine and at least one electric motor, wherein both the internal combustion engine and motor are capable of providing torque to the wheels of said vehicle, <u>wherein said engine has an inherent maximum rate of increase of output torque,</u> said method comprising the steps of:

operating the internal combustion engine of the hybrid vehicle to provide torque to operate the vehicle;

operating said at least one electric motor to provide additional torque when the amount of torque being provided by said engine is less than the amount of torque required to operate the vehicle; and

employing said controller to control the engine such that a rate of ~~change~~ increase of output torque ~~output~~ of the engine is limited to ~~no more than a predetermined value~~ less than said inherent maximum rate of increase of output torque, and such that combustion of fuel within the engine occurs at a ~~near~~ substantially[[-]]stoichiometric ratio.

30. (Currently amended) The method of claim 29, wherein the amount of oxygen in an exhaust stream from said engine is monitored to ensure that combustion of fuel within the engine occurs at a ~~near~~ substantially[[-]]stoichiometric ratio.

31. (Currently amended) The method of claim 29, wherein when it is desired to start said engine, said engine is rotated at at least 300 rpm, whereby the engine is heated, prior to supply of fuel for starting the engine.

32. (Currently amended) The hybrid vehicle of claim [[29]] 31, wherein fuel and air are supplied to said engine at a fuel:air ratio of no more than 1.2 of the stoichiometric ratio for starting the engine.

33. (Previously presented) The method of claim 29, wherein said at least one electric motor produces torque at least equal to the engine's maximum torque output (MTO).

34. (Previously presented) The method of claim 29, comprising the further step of:

operating said electric motor as a generator to accept excess torque from said engine to charge said battery when the torque required to operate the vehicle is less than the engine's ITO.

35. (Previously presented) The method of claim 29, comprising the further steps of:

operating said internal combustion engine to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is between a setpoint SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above SP, and wherein SP is substantially less than MTO;

operating both the at least one electric motor and the engine to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is more than MTO; and

operating the at least one electric motor to provide torque to the hybrid vehicle when the torque required to operate the hybrid vehicle is less than SP.

36. (Previously presented) The method of claim 35, further comprising the step of operating the engine at torque output levels less than SP under abnormal and transient conditions.

37. (Previously presented) The method of claim 35, further comprising the step of:

operating the engine to charge the battery responsive to the state of charge of the battery, wherein the engine is operable to provide torque at least equal to SP to propel the hybrid vehicle, to drive the at least one electric motor to charge the battery, or both, wherein torque produced by the engine equal to the torque required to propel the vehicle (RL) is used to propel the hybrid vehicle, and torque produced by the engine in excess of RL is used to drive the at least one electric motor to charge the battery.

38. (Previously presented) The method of claim 29, wherein energy is supplied to the motor from the battery at a voltage of at least 500 volts under peak load conditions.

39. (Previously presented) The method of claim 29, wherein energy is supplied to the motor from the battery at a current of no more than about 75 amperes under peak load conditions.

40. (Previously presented) A method for controlling a hybrid vehicle, said vehicle comprising a battery, a controller, wheels, an internal combustion engine and at least one electric motor, wherein both the internal combustion engine and motor are capable of providing torque to the wheels of said vehicle, and wherein said engine has an inherent maximum rate of increase of output torque, comprising the steps of:

determining instantaneous road load (RL) required to propel the hybrid vehicle;

operating at least one electric motor to propel the hybrid vehicle when RL is less than a setpoint (SP);

operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when RL is between SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above SP, and wherein SP is substantially less than MTO;

operating both the at least one electric motor and the engine to propel the hybrid vehicle when RL is more than MTO; and

employing said controller to control ~~controlling~~ the engine such that a rate of ~~change~~ increase of output torque ~~output~~ of the engine is limited to less than said inherent maximum rate of increase of output torque, and, if the engine is incapable of supplying instantaneous torque required to propel the hybrid vehicle, supplying additional torque from the at least one electric motor, and wherein said step of controlling the engine such that the rate of change of output torque of the engine is limited is performed such that combustion of fuel within the engine occurs at a substantially stoichiometric ratio.

41. (Cancelled)

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