

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

PAICE LLC & THE ABELL FOUNDATION, INC.,
Patent Owner.

Case IPR2015-00787
Patent 7,237,634 B2

Before SALLY C. MEDLEY, KALYAN K. DESHPANDE, and
CARL M. DeFRANCO, *Administrative Patent Judges*.

MEDLEY, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner, Ford Motor Company, filed a Petition requesting an *inter partes* review of claims 33, 34, 35, 38, 53, 54, 215, 238, 241, 252–256, 259, 261, 262, 267, 281, 282, 285, 287, and 288 of U.S. Patent No. 7,237,634 B2 (Ex. 1750, “the ’634 patent”). Paper 1 (“Pet.”). Patent Owner, Paice LLC &

The Abell Foundation, Inc., filed a Preliminary Response in both unredacted and redacted forms. Papers 9, 10 (“Prelim. Resp.”).¹ Patent Owner also filed a Motion to Seal. Paper 11 (“Mot. to Seal.”). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless . . . the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons that follow, we institute an *inter partes* review of claims 215, 238, 241, 252–256, 259, 261, 262, 267, 281, 282, 285, 287, and 288 of the ’634 patent. We do not institute an *inter partes* review of claims 33, 34, 35, 38, 53, and 54 of the ’634 patent.

A. Related Proceedings

The ’634 patent is involved in *Paice LLC v. Ford Motor Co.*, No. 1-14-cv-00492, filed on February 19, 2014, in the United States District Court for the District of Maryland. Pet. 2. Petitioner twice filed an earlier Petition for *inter partes* review of the ’634 patent, and we instituted trial in both proceedings. *Ford Motor Co. v. Paice LLC & The Abell Foundation, Inc.*, Case IPR2014-00904 (PTAB Dec. 11, 2014) (Paper 13), and *Ford Motor Co. v. Paice LLC & The Abell Foundation, Inc.*, Case IPR2014-01416 (PTAB Mar. 12, 2015) (Paper 9). Petitioner filed eleven additional petitions, including the instant Petition, challenging various claims of the ’634 patent.²

¹ Citations are to the redacted version of Patent Owner’s Preliminary Response (Paper 10, “Prelim. Resp.”).

² See IPR2015-00606 (Paper 10, Appendix), for a complete listing of the eleven cases.

B. The '634 Patent (Ex. 1750)

The '634 patent describes a hybrid vehicle with an internal combustion engine, at least one electric motor, and a battery bank, all controlled by a microprocessor that directs torque transfer between the engine, the motor, and the drive wheels of the vehicle. Ex. 1750, 17:17–56, Fig. 4. The microprocessor compares the vehicle's torque requirements and the engine's torque output against a predefined setpoint and uses the results of the comparison to control the vehicle's mode of operation, e.g., straight-electric, engine-only, or hybrid. *Id.* at 40:16–49. The microprocessor utilizes a hybrid control strategy that operates the engine only in a range of high fuel efficiency, which occurs when the instantaneous torque required to drive the vehicle, or road load (RL), reaches a setpoint (SP) of approximately 30% of the engine's maximum torque output (MTO). *Id.* at 20:61–67; *see also id.* at 13:64–65 (“the engine is never operated at less than 30% of MTO, and is thus never operated inefficiently”). Operating the engine in a range above the setpoint but substantially less than the maximum torque output maximizes fuel efficiency and reduces pollutant emissions of the vehicle. *Id.* at 15:55–58.

C. Claims

Petitioner challenges independent claim 33 and dependent claims 34, 35, 38, 53, and 54, which depend directly from claim 33. Petitioner also challenges independent claim 215 and directly dependent claim 238. Petitioner also challenges independent claim 241 and dependent claims 252–256, 259, 261, and 262, which depend directly from claim 241. Petitioner also challenges independent claim 267 and dependent claims 281, 282, 285,

287, and 288, which depend directly from claim 267. Claims 33 and 241 are illustrative:

33. A method for controlling a hybrid vehicle, comprising:
determining instantaneous road load (RL) required to propel the hybrid vehicle responsive to an operator command;
operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP);
operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO;
operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO; and
monitoring patterns of vehicle operation over time and varying the SP accordingly.

Ex. 1750, 60:58–61:8.

241. A method for controlling a hybrid vehicle, comprising:
determining instantaneous road load (RL) required to propel the hybrid vehicle responsive to an operator command;
operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP);
operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO; and
operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO;

controlling said engine such that combustion of fuel within the engine occurs substantially at a stoichiometric ratio, wherein said controlling the engine comprises limiting a rate of change of torque output of the engine; 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.

Id. at 81:33–58.

Independent claim 215 is similar in scope to claim 33 except it does not include the “monitoring patterns of vehicle operation over time and varying the SP accordingly” language. Instead, that claim adds “regeneratively charging a battery of the hybrid vehicle when instantaneous torque output of the engine $>$ the RL, when RL is negative, and/or when braking is initiated by an operator of the hybrid vehicle.” *Id.* at 79:10–32.

Independent claim 267 is similar in scope to claim 33 except it does not include the “monitoring patterns of vehicle operation over time and varying the SP accordingly” language. Instead, that claim adds “rotating the engine before starting the engine such that its cylinders are heated by compression of air therein.” *Id.* at 84:10–11.

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