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Paper 35
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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FORD MOTOR COMPANY,
Petitioner,

v.

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

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Case IPR2015-00784
Patent 7,237,634 B2

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

MEDLEY, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
*Inter Partes* Review
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

## I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we dismiss the *inter partes* review with respect to claims 1 and 16, and determine that Petitioner

has shown by a preponderance of the evidence that claims 2, 3, 6–12, 17, 19, 23, 27, 30, and 66 of U.S. Patent No. 7,237,634 B2 are unpatentable.

### *A. Procedural History*

Petitioner, Ford Motor Company, filed a Petition requesting an *inter partes* review of claims 1–3, 5–12, 16, 17, 19, 23, 27, 30, and 66 of U.S. Patent No. 7,237,634 B2 (Ex. 1550, "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."). Upon consideration of the Petition and Preliminary Response, on October 29, 2015, we instituted an *inter partes* review of claims 1–3, 6–12, 16, 17, 19, 23, 27, 30, and 66, pursuant to 35 U.S.C. § 314. Paper 12 ("Dec.").

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 17 ("PO Resp.")) and Petitioner filed a Reply (Paper 25 ("Pet. Reply")).[1] An oral hearing was held on June 28, 2016, and a transcript of the hearing is included in the record (Paper 34 ("Tr.")).

### *B. 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, and subsequently entered final written decisions. *Ford*

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[1] In addition, Patent Owner filed a Motion for Observation on Cross-Examination (Paper 27) and Petitioner filed a Response to Motion for Observation on Cross-Examination (Paper 30), both of which have been considered.

*Motor Co. v. Paice LLC & The Abell Foundation, Inc.*, Case IPR2014-00904 (Papers 13 and 41), and *Ford Motor Co. v. Paice LLC & The Abell Foundation*, Inc., Case IPR2014-01416 (Papers 9 and 26). The '634 patent also is involved in the following *inter partes* review proceedings: IPR2015-00606, IPR2015-00722, IPR2015-00758, IPR2015-00785, IPR2015-00787, IPR2015-00790, IPR2015-00791, IPR2015-00799, IPR2015-00800, and IPR2015-00801.

*C. The '634 Patent (Ex. 1550)*

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. 1550, 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.

*D. Illustrative Claim*

Petitioner challenges independent claim 1 and dependent claims 2, 3, 6–12, 16, 17, 19, 23, 27, 30, and 66, which depend directly or indirectly from claim 1. Claim 1 is illustrative:

> 1. A hybrid vehicle, comprising:
>
> one or more wheels;
>
> an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;
>
> a first electric motor coupled to the engine;
>
> a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;
>
> a battery coupled to the first and second electric motors, operable to: provide current to the first and/or the second electric motors; and accept current from the first and second electric motors; and
>
> a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;
>
> wherein the controller is operable to operate the engine when torque required from the engine to propel the hybrid vehicle and/or to drive one or more of the first or the second motors to charge the battery is at least equal to a setpoint (SP) above which the torque produced by the engine is efficiently produced, and wherein the torque produced by the engine when operated at the SP is substantially less than the maximum torque output (MTO) of the engine.

Ex. 1550, 58:2–27.

*E. Grounds of Unpatentability*

We instituted an *inter partes* review of claims 1–3, 6–12, 16, 17, 19, 23, 27, 30, and 66 on the following grounds:

| Reference[s] | Basis | Challenged Claim(s) |
|---|---|---|
| Ibaraki '882 [2] and the general knowledge of a person of ordinary skill in the art ("POSA") | § 103 | 1–3, 12, 16, 17, 19, 27, 30, and 66 |
| Ibaraki '882, Frank,[3] and the general knowledge of a POSA | § 103 | 6–11 |
| Ibaraki '882, Jurgen,[4] Lateur,[5] and the general knowledge of a POSA | § 103 | 23 |

## II. ANALYSIS

### *A. Petitioner Estoppel*

On December 10, 2015, we rendered a final written decision of claims 1 and 16 of the '634 patent in IPR2014-00904. *Ford Motor Co. v. Paice LLC & The Abell Foundation*, Inc., Case IPR2014-00904 (PTAB December 10, 2015) (Paper 41). Patent Owner argues that, pursuant to 35 U.S.C. § 315(e)(1), Petitioner may not maintain its challenge of claims 1 and 16. PO Resp. 16–17. Petitioner responds that it was necessary for it to file multiple petitions to address the large number of dependent claims, and that in doing so, it was necessary to re-challenge claims 1 and 16. Pet. Reply 4.

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[2] U.S. Patent No. 5,789,882, issued Aug. 4, 1998 (Ex. 1552) ("Ibaraki '882").
[3] U.S. Patent No. 6,116,363, issued Sep. 12, 2000 (Ex. 1553) ("Frank").
[4] Ronald Jurgen, *Automotive Electronics Handbook*, 1995 (Ex. 1554) ("Jurgen").
[5] U.S. Patent No. 5,823,280, issued Oct. 20, 1998 (Ex. 1555) ("Lateur").

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