

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 and THE ABELL FOUNDATION, INC.,  
Patent Owner.

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Case IPR2015-00794  
Patent 7,104,347 B2

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

DESHPANDE, *Administrative Patent Judge*.

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

## I. INTRODUCTION

Ford Motor Company (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 23–30, 32, and 39–41 of U.S. Patent No. 7,104,347 B2 (Ex. 1401, “the ’347 patent”). Paper 1 (“Pet.”). Paice LLC and The Abell Foundation, Inc. (collectively, “Patent Owner”) filed a Preliminary Response in both unredacted and redacted forms. Papers 9, 10 (“Prelim. Resp.”).<sup>1</sup> Patent Owner also filed a Motion to Seal. Paper 11 (“Motion to Seal”). We have jurisdiction under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” After considering the Petition, the Preliminary Response, and associated evidence, we conclude that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing unpatentability of all the challenged claims, except claim 24. Thus, we authorize institution of an *inter partes* review of claims 23, 25–30, 32, and 39–41 of the ’347 patent and we do not institute *inter partes* review of claim 24 of the ’347 patent.

### A. Related Proceedings

Petitioner indicates that the ’347 patent is the subject of *Paice, LLC and The Abell Foundation, Inc. v. Ford Motor Company*, Case No. 1-14-cv-00492 and *Paice LLC and The Abell Foundation, Inc. v. Hyundai Motor America et. al.*, Case No. 1:2012-cv-00499. Pet. 1; Paper 5, 2. Petitioner also indicates that the ’347 patent is the subject of IPR2014-00571, IPR2014-00579, and IPR2014-00884. *Id.*; Paper 5, 3. Petitioner further

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

indicates that patents related to the '347 patent are the subject matter of IPR2014-00570, IPR2014-01415, IPR2014-00568, IPR2014-00852, IPR2014-00875, IPR2014-00904, IPR2014-01416, IPR2015-00606, IPR2015-00767, IPR2015-00722, IPR2015-00758, IPR2015-00784, IPR2015-00785, IPR2015-00791, IPR2015-00787, IPR2015-00790, IPR2015-00795, and IPR2015-00792. *Id.* at 1–2; Paper 5, 3.

*B. The '347 Patent (Ex. 1401)*

The '347 patent describes a hybrid vehicle with an internal combustion engine, two electric motors (a starter motor and a traction motor), and a battery bank, all controlled by a microprocessor that directs the transfer of torque from the engine and traction motor to the drive wheels of the vehicle. Ex. 1401, 17:5–45, Fig. 4. The microprocessor features a control strategy that runs the engine only under conditions of high efficiency, typically when the vehicle's instantaneous torque requirements (i.e., the amount of torque required to propel the vehicle, or "road load") is at least equal to 30% of the engine's maximum torque output ("MTO") capability. *Id.* at 20:52–60, 35:5–14; *see also id.* at 13:47–61 ("the engine is never operated at less than 30% of MTO, and is thus never operated inefficiently").

Running the engine only when it is efficient to do so leads to improved fuel economy and reduced emissions. *Id.* at 13:47–52. To achieve such efficiency, the hybrid vehicle includes various operating modes that depend on the vehicle's torque requirements, the battery's state of charge, and other operating parameters. *Id.* at 19:53–55. For example, the hybrid vehicle may operate in: (1) an all-electric mode, where only the traction motor provides the torque to propel the vehicle and operation of the engine

would be inefficient (i.e., stop-and-go city driving); (2) an engine-only mode, where only the engine provides the torque to propel the vehicle and the engine would run at an efficient level (i.e., highway cruising); (3) a dual-operation mode, where the traction motor provides additional torque to propel the vehicle beyond that already provided by the engine and the torque required to propel the vehicle exceeds the maximum torque output of the engine (i.e., while accelerating, passing, and climbing hills); and (4) a battery recharge mode where the engine operates a generator to recharge the battery while the traction motor drives the vehicle. *Id.* at 35:66–36:58, 37:26–38:55.

*C. Illustrative Claim*

Petitioner challenges claims 23–30, 32, and 39–41 of the '347 patent. Pet. 4–60. Claim 23 is illustrative of the claims at issue and is reproduced below:

23. A method of control of a hybrid vehicle, said vehicle comprising an internal combustion engine capable of efficiently producing torque at loads between a lower level SP and a maximum torque output MTO, a battery, and one or more electric motors being capable of providing output torque responsive to supplied current, and of generating electrical current responsive to applied torque, said engine being controllably connected to wheels of said vehicle for applying propulsive torque thereto and to said at least one motor for applying torque thereto, said method comprising the steps of:  
determining the instantaneous torque RL required to propel said vehicle responsive to an operator command;  
monitoring the state of charge of said battery;  
employing said at least one electric motor to propel said vehicle when the torque RL required to do so is less than said lower level SP;

employing said engine to propel said vehicle when the torque RL required to do so is between said lower level SP and MTO;

employing both said at least one electric motor and said engine to propel said vehicle when the torque RL required to do so is more than MTO; and

employing said engine to propel said vehicle when the torque RL required to do so is less than said lower level SP and using the torque between RL and SP to drive said at least one electric motor to charge said battery when the state of charge of said battery indicates the desirability of doing so; and

wherein the torque produced by said engine when operated at said setpoint (SP) is substantially less than the maximum torque output (MTO) of said engine.

Ex. 1001, 60:22–54.

#### *D. The Alleged Grounds of Unpatentability*

The information presented in the Petition sets forth proposed grounds of unpatentability of claims 23–30, 32, and 39–41 of the '347 patent under 35 U.S.C. § 103(a) as follows (*see* Pet. 6–60):<sup>23</sup>

<b>References</b>	<b>Claims Challenged</b>
Ibaraki '882 <sup>4</sup>	23, 24, 28, 30, and 32
Ibaraki '882 and Admitted Prior Art (“APA”) <sup>5</sup>	29

<sup>2</sup> Petitioner supports its challenge with the Declaration of Dr. Gregory W. Davis. Ex. 1408.

<sup>3</sup> Although Petitioner adds the general knowledge of one with ordinary skill in the art to the express statement of each alleged ground of unpatentability (Pet. 3–4), that is not necessary. Obviousness is determined from the perspective of one with ordinary skill in the art. We leave out the express inclusion of the general knowledge of one with ordinary skill.

<sup>4</sup> U.S. Patent No. 5,789,882, issued Aug. 4, 1998 (Ex. 1403)(“Ibaraki '882”).

<sup>5</sup> Petitioner relies on Figures 1 and 2 of the '347 patent, reproduced from the '970 patent, and the Masding/Bumby disclosures from the '634 patent

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