

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 IPR2015-00795  
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 1–5, 14, 16, 19, 20, and 22 of U.S. Patent No. 7,104,347 B2 (Ex. 1301, “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 2. Thus, we authorize institution of an *inter partes* review of claims 1, 3–5, 14, 16, 19, 20, and 22 of the ’347 patent and we do not institute review of claim 2.

### 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, IPR2015-00794, and IPR2015-00792. *Id.* at 1–2; Paper 5, 3.

*B. The '347 Patent (Ex. 1301)*

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. 1301, 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 1–5, 14, 16, 19, 20, and 22 of the '347 patent. Pet. 4–60. Claim 1 is illustrative of the claims at issue and is reproduced below:

1. A hybrid vehicle, comprising:
  - an internal combustion engine controllably coupled to road wheels of said vehicle;
  - a first electric motor connected to said engine and [sic] operable to start the engine responsive to a control signal;
  - a second electric motor connected to road wheels of said vehicle, and operable as a motor, to apply torque to said wheels to propel said vehicle, and as a generator, for accepting torque from at least said wheels for generating current;
  - a battery, for providing current to said motors and accepting charging current from at least said second motor; and
  - a controller for controlling the flow of electrical and mechanical power between said engine, first and second motors, and wheels, wherein said controller starts and operates said engine when torque require to be produced by said engine to propel the vehicle and/or to drive either one or both said electric motor(s) to charge said battery is at least equal to a setpoint (SP) above which said engine torque is efficiently

produced, 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. 1301, 58:13–37.

*D. The Alleged Grounds of Unpatentability*

The information presented in the Petition sets forth proposed grounds of unpatentability of claims 1–5, 14, 16, 19, 20, and 22 of the '347 patent under 35 U.S.C. § 103(a) as follows (*see* Pet. 7–60):<sup>2 3</sup>

References	Claims Challenged
Ibaraki '882 <sup>4</sup> and Koide <sup>5</sup>	1, 2, and 5
Ibaraki '882, Koide, and Frank <sup>6</sup>	3 and 4
Ibaraki '882, Koide, and Kawakatsu <sup>7</sup>	16
Ibaraki '882, Koide, and Vittone <sup>8</sup>	20
Ibaraki '882, Koide, and Yamaguchi <sup>9</sup>	19

<sup>2</sup> Petitioner supports its challenge with the Declaration of Dr. Gregory W. Davis. Ex. 1308.

<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. 1303) (“Ibaraki '882”).

<sup>5</sup> U.S. Patent No. 5,934,395, issued Aug. 10, 1999 (Ex. 1317) (“Koide”).

<sup>6</sup> U.S. Patent No. 6,116,363, issued Sept. 12, 2000 (Ex. 1318) (“Frank”).

<sup>7</sup> U.S. Patent No. 4,335,429, issued June 15, 1982 (Ex. 1305) (“Kawakatsu”).

<sup>8</sup> Oreste Vittone, *Fiat Conceptual Approach to Hybrid Cars Design*, 12TH INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM (1994) (Ex. 1320) (“Vittone”).

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