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Paper 11
Entered: November 20, 2014

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 IPR2014-00852
Patent 7,455,134 B2

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

MEDLEY, *Administrative Patent Judge*.

DECISION
Denying 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 1–3, 5, 6, 19, 27, 40, and 58 of U.S. Patent No. 7,455,134 B2 (Ex. 1101, "the '134 patent"). Paper 2 ("Pet."). Patent

Owner, Paice LLC & The Abell Foundation, Inc., filed a Preliminary Response in both unredacted and redacted form. Papers 7 and 8 ("Prelim. Resp.").[1] Patent Owner also filed a Motion to Seal. Paper 9 ("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."

Upon consideration of the Petition and the Preliminary Response, we conclude that there is not a reasonable likelihood that Petitioner would prevail in challenging any of claims 1–3, 5, 6, 19, 27, 40, and 58 as unpatentable. Accordingly, pursuant to 35 U.S.C. § 314(a), we do not authorize an *inter partes* review to be instituted.

A. Related Proceedings

The '134 patent is involved in *Paice, LLC v. Ford Motor Company*, No. 1-14-cv-00492, filed on February 19, 2014, in the United States District Court for the District of Maryland. Pet. 1. Petitioner filed an earlier Petition for *inter partes* review of the '134 patent, but we did not institute trial. *Ford Motor Company v. Paice LLC & The Abell Foundation*, Inc., Case IPR2014-00568 (PTAB Sept. 8, 2014) (Paper 12).

[1] Citations are to the redacted version of the Patent Owner Preliminary Response (Paper 8, "Prelim. Resp."). Patent Owner marked Paper 8 for "Parties and Board Only." The paper will be made publicly available in due course.

B. The '134 Patent (Ex. 1101)

The '134 patent describes a hybrid vehicle with an internal combustion engine, a traction motor, a starter motor, and a battery bank, all controlled by a microprocessor. Ex. 1101, Abs. Figure 4, reproduced below, shows a block diagram of a hybrid vehicle. *Id*. at Fig. 4.

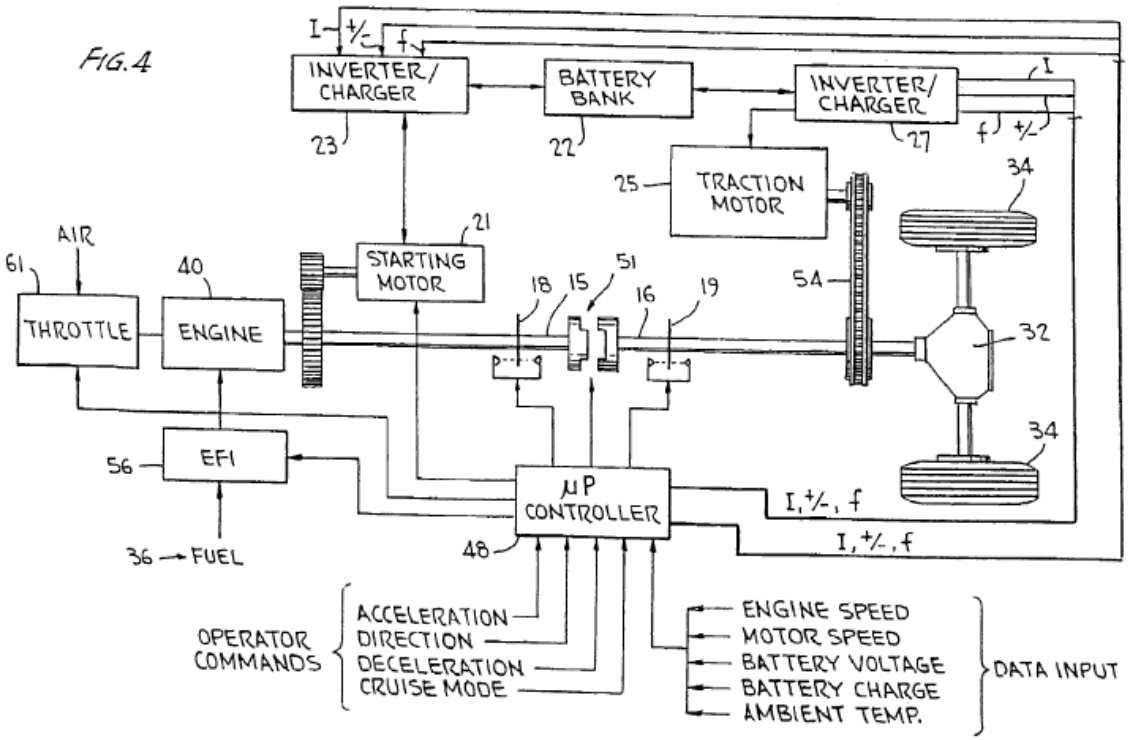

Figure 4 illustrates a block diagram of a hybrid vehicle.

The hybrid vehicle includes two wheels 34 operable to propel the vehicle, traction motor 25, starting motor 21, and engine 40 coupled to starting motor 21. *Id.* Inverter/charger 27 is coupled to traction motor 25 and inverter/charger 23 is coupled to starting motor 21. *Id*. Battery bank 22 is coupled to inverter/charger 23, as well as inverter/charger 27. Controller 48 controls the operation of engine 40 and motors 21 and 25. *Id*. The components of the vehicle "are to be sized so that the ratio between

battery voltage under load to peak current is at least about 2.5, and preferably is at least 3.5 to 4:1." *Id*. at 50:5–9.

C. Claims

Petitioner challenges independent claim 1 and dependent claims 2, 3, 5, 6, 19, 27, and 40, which depend directly from claim 1. Petitioner also challenges independent claim 58. Claim 1 reads:

> 1. A hybrid vehicle, comprising:
>
> at least two wheels, operable to receive power to propel said hybrid vehicle;
>
> a first alternating current (AC) electric motor, operable to provide power to said at least two wheels to propel said hybrid vehicle;
>
> a second AC electric motor;
>
> an engine coupled to said second electric motor, operable to provide power to said at least two wheels to propel the hybrid vehicle, and/or to said second electric motor to drive the second electric motor to generate electric power;
>
> a first alternating current-direct current (AC-DC) converter having an AC side coupled to said first electric motor, operable to accept AC or DC current and convert the current to DC or AC current respectively;
>
> a second AC-DC converter coupled to said second electric motor, at least operable to accept AC current and convert the current to DC;
>
> an electrical storage device coupled to a DC side of said AC-DC converters, wherein the electrical storage device is operable to store DC energy received from said AC-DC converters and provide DC energy to at least said first AC-DC converter for providing power to at least said first electric motor; and
>
> a controller, operable to start and stop the engine to minimize fuel consumption;
>
> wherein a ratio of maximum DC voltage on the DC side of at least said first AC-DC converter coupled to said first electric motor to current supplied from said electrical storage

> device to at least said first AC-DC converter, when maximum current is so supplied, is at least 2.5.

Id. at 56:43–57:7.

D. Asserted Grounds of Unpatentability

Petitioner contends that claims 1–3, 5, 6, 19, 27, 40, and 58 of the '134 patent are unpatentable under 35 U.S.C. §§ 102 and 103 based on the following specific grounds:

Reference[s]	**Basis**	**Challenged Claim[s]**
Ehsani[2] and Ehsani NPL[3]	§ 103	1–3, 5, and 6
Ehsani, Ehsani NPL, and Vittone[4]	§ 103	40
Ehsani	§ 103	58
Kawakatsu[5] and Ehsani	§ 103	1–3, 5, 6, 19, and 58
Kawakatsu, Ehsani, and Yamaguchi[6]	§ 103	27

II. ANALYSIS

A. Claim Construction

As a step in our analysis for determining whether to institute a review, we determine the meaning of the claims for purposes of this decision. In an

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[2] U.S. Patent No. 5,586,613, issued Dec. 24, 1996 (Ex. 1103) ("Ehsani").
[3] Yimin Gao et al., *The Energy Flow Management and Battery Energy Capacity Determination for the Drive Train and Electrically Peaking Hybrid Vehicle*, SAE 972647 (1997) (Ex. 1106) ("Ehsani NPL").
[4] Oreste Vittone et al., *Fiat Conceptual Approach to Hybrid Car Design*, 12th International Electric Vehicle Symposium (1994) (Ex. 1107) ("Vittone").
[5] U.S. Patent No. 4,335,429, issued June 15, 1982 (Ex. 1104) ("Kawakatsu").
[6] U.S. Patent No. 5,865,263, filed Feb. 23, 1996, issued Feb. 2, 1999 (Ex. 1105) ("Yamaguchi").

inter partes review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning, as understood by a person of ordinary skill in the art, in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). For purposes of this decision, we only need to construe the term "maximum DC voltage."

"maximum DC voltage"

Patent Owner argues that the "maximum DC voltage" recited in independent claims 1 and 58 refers to a voltage under load, and not a nominal voltage (i.e., a voltage not under load), citing to examples in the '134 patent. Prelim. Resp. 18–19. Although Petitioner does not construe the "maximum DC voltage" limitation, Petitioner's declarant, Dr. Jeffrey L. Stein, agrees with this construction. In particular, Dr. Stein opines that "[a]s it is used in the claims and the specification of the '134 patent, the maximum DC voltage refers to a maximum DC voltage under load" and that the maximum DC voltage "when maximum current is so supplied" refers to the maximum DC voltage under peak electrical load. Ex. 1102 ¶ 181. We agree that the plain language of the claims of a "maximum DC voltage . . . when maximum current is so supplied" means a voltage under load and excludes a nominal voltage (a voltage not under load).

B. All Grounds of Obviousness Based in Part on Ehsani

Petitioner contends that all challenged claims 1–3, 5, 6, 19, 27, 40, and 58 are unpatentable under 35 U.S.C. § 103 based on various combinations of prior art. In each of the proposed challenges, Petitioner relies on Ehsani to teach the "wherein" limitation of independent claims 1 and 58. Pet. 24–25, 41, 48–49, 56. In particular, claim 1 recites "wherein a ratio of maximum DC voltage . . . to current supplied from said electrical storage device to at least said first AC-DC converter, when maximum current is so supplied, is at least 2.5." Claim 58 recites nearly an identical limitation. Ex. 1101, 64:12–16. The limitation in all of the challenged claims requires a maximum DC voltage to current supplied to be at least 2.5. For the reasons discussed below, Petitioner has not made a sufficient showing that Ehsani teaches a maximum DC voltage to current supplied to be at least 2.5, or that that ratio would have been obvious to a person of ordinary skill in the art.

1. Ehsani

Ehsani describes an electrically peaking hybrid system and method of generating hybrid electric-combustion power. Ex. 1103, 1:13–16. Figure 5, reproduced below, shows a block diagram of a hybrid vehicle. *Id*. at Fig. 5.

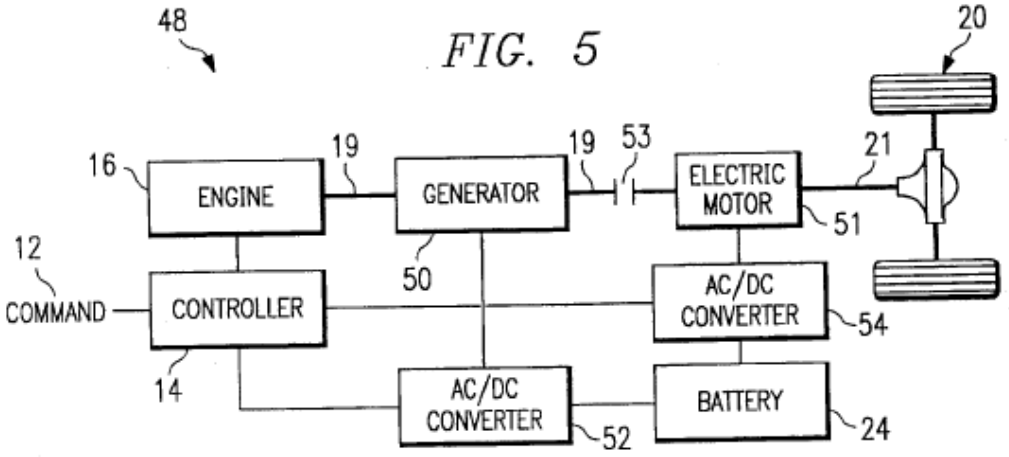

Figure 5 illustrates a block diagram of a hybrid vehicle.

The hybrid vehicle includes two wheels 20, operable to propel the vehicle, electric motor 51, generator 50, engine 16 coupled to generator 50. *Id.* AC/DC converter 54 is coupled to electric motor 51 and AC/DC converter 52 is coupled to generator 50. *Id.* Battery 24 is coupled to AC/DC converter 52, as well as AC/DC converter 54. Controller 14 controls the operation of engine 16, converter 22, and battery 24. *Id*. at 7:1–2.

2. Analysis

Petitioner contends that Ehsani describes an embodiment within the scope of the "at least 2.5" ratio range recited in claims 1 and 58. Although Petitioner asserts that Ehsani describes, in general, operating the AC electric machines at a high voltage and relatively low current, citing to column six, lines 57–67 (Pet. 17), Petitioner acknowledges that Ehsani does not describe any specific numeric ratio of a maximum DC voltage to current supplied. *Id.* at 25. Nonetheless, Petitioner relies on the Declaration of Dr. Stein to demonstrate that Ehsani describes parameters that a person of ordinary skill

in the art would have recognized would lead to two different ratios of DC voltage to current supplied. *Id.* at 24–26; Ex. 1102 ¶¶ 182, 197.

The first ratio of 10:1 is calculated by Dr. Stein using parameters found in Ehsani of a nominal voltage of 700V divided by a maximum current of 70A. Ex. 1102 ¶ 182. As discussed in the claim construction section, a "maximum DC voltage . . . when maximum current is so supplied" means a voltage under load and excludes a nominal voltage (a voltage not under load). Accordingly, the first ratio has not been shown to be an embodiment within the scope of the at least 2.5 ratio range.[7]

The second ratio of 8.82:1 is calculated by Dr. Stein using parameters found in the '134 patent. Pet. 25; Ex. 1102 ¶¶ 183–197. Ehsani describes that battery 24 is a lead-acid battery. Ex. 1103, 5:16–17. Dr. Stein testifies that the maximum voltage drop of the Ehsani 700 volt lead-acid battery bank under peak load conditions would be approximately 70 volts, resulting in a DC bus voltage under load no less than approximately 630 volts when a maximum current of about 70 amperes is being supplied. Ex. 1102 ¶ 184. To determine the internal resistance of the Ehsani battery, and, thus, the voltage drop, Dr. Stein looks to the vehicle parameters used in the '134 patent. *Id.* ¶¶ 185–197. Dr. Stein concludes that under the maximum current condition, the ratio of the maximum DC voltage to current is 8.82:1. *Id.* ¶ 199.

[7] Dr. Stein opines that "[a] case can be made that the DC bus voltage refers to a voltage under load" but does not explain how that case can be made. Ex. 1102 ¶ 182. Petitioner has not shown that the DC bus voltage described in Ehsani refers to a voltage under load.

Patent Owner argues that Dr. Stein's calculation of DC maximum voltage to current supplied of 8.82:1, based on parameters found in the disclosure of the'134 patent, as opposed to parameters found in Ehsani, is improper. Prelim. Resp. 20–32. We agree with Patent Owner that the information contained in the '134 patent has not been shown by Petitioner to be information that would have been known by a person of ordinary skill in the art, as opposed to information known only to the inventors of the '134 patent. Even Petitioner recognizes that the design parameters described in the '134 patent, used by Dr. Stein to arrive at the 8.82:1 ratio, dictate the claimed ratio, which is described as the "further improvements" of the '134 patent. Pet. 25; Ex. 1101, 49:10–57. As such, Petitioner has not shown that the information Dr. Stein relies on from the '134 patent to arrive at an embodiment within the scope of the claim was known to anyone other than the inventors of the '134 patent. Petitioner, therefore, has failed to establish that Ehsani discloses the claimed ratio. Petitioner does not provide a rationale as to why the claimed ratio would have otherwise been obvious.

For these reasons, we conclude that there is not a reasonable likelihood that Petitioner would prevail in challenging any of claims 1–3, 5, 6, 19, 27, 40, and 58 as unpatentable.

C. Patent Owner Motion to Seal

Patent Owner moves to seal the unredacted Patent Owner Preliminary Response (Paper 7) and Exhibit 2101. Paper 9. In rendering our decision not to institute trial, we found it unnecessary to rely on the information Patent Owner seeks to maintain as sealed. For these reasons, we expunge the unredacted version of the Patent Owner Preliminary Response and Exhibit 2101. Patent Owner's motion to seal is *dismissed* as moot.

III. CONCLUSION

For the foregoing reasons, we conclude that there is not a reasonable likelihood that Petitioner would prevail in challenging claims 1–3, 5, 6, 19, 27, 40, and 58 of the '134 patent as unpatentable. In rendering our decision, we found it unnecessary to rely on documents Patent Owner seeks to maintain as sealed, and, therefore, we expunge from the record the sealed documents and dismiss Patent Owner's motion to seal.

IV. ORDER

Upon consideration of the record before us, it is

ORDERED that the Petition is *denied* and no trial is instituted;

FURTHER ORDERED that Patent Owner's motion to seal is *dismissed*; and

FURTHER ORDERED that Patent Owner's unredacted preliminary response (Paper 7) and Exhibit 2101 be expunged from the record.

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