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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte WILLIAM PAUL PERKINS, MING LANG KUANG, and
SHUNSUKE OKUBO

Appeal 2015-002875¹
Application 13/346,841²
Technology Center 3600

Before BIBHU R. MOHANTY, KENNETH G. SCHOPFER, and
TARA L. HUTCHINGS, *Administrative Patent Judges*.

HUTCHINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner’s final rejection of claims 1, 3–9, 11–16, and 18–20. We have jurisdiction under 35 U.S.C. § 6(b).

¹ Our decision references Appellants’ Appeal Brief (“App. Br.,” filed Sept. 29, 2014) and Reply Brief (“Reply Br.,” filed Dec. 5, 2014), and the Examiner’s Answer (“Ans.,” mailed Nov. 26, 2014) and Final Office Action (“Final Act.,” mailed Sept. 3, 2013).

² Appellants identify Ford Global Technologies, LLC., as the real party in interest. App. Br. 2.

We REVERSE.

CLAIMED INVENTION

Appellants' claimed invention "relates to path-dependent control of plug-in hybrid electric vehicles." Spec. ¶ 1.

Claims 1, 9, and 16 are the independent claims on appeal. Claim 1, reproduced below, is illustrative:

1. A method comprising:
operating an engine of a vehicle below peak efficiency while the engine is capable of operating at peak efficiency to output from the engine, while a battery of the vehicle is supplying power in response to a demanded power, only the difference in power between (i) the demanded power and (ii) the power which the battery can deliver, when the demanded power exceeds the power which the battery can deliver.

REJECTION

Claims 1, 3–9, 11–16, and 18–20 are rejected under 35 U.S.C. § 103(a) as unpatentable over Fleming (US 2011/0190968 A1, pub. Aug. 4, 2011), Sugimoto (US 2012/0046814 A1, pub. Feb. 23, 2012), and Lasson (US 6,500,089 B2, iss. Dec. 31, 2002).

ANALYSIS

We are persuaded by Appellants' argument that the Examiner erred in rejecting claims 1, 9, and 16 under 35 U.S.C. § 103(a) at least because the combination of Fleming, Sugimoto, and Lasson fails to disclose or suggest

operating an engine of a vehicle below peak efficiency while the engine is capable of operating at peak efficiency to output from the engine, while a battery of the vehicle is supplying power in response to a demanded power, only the difference in power between (i) the demanded power and (ii) the power which

the battery can deliver, when the demanded power exceeds the power which the battery can deliver,
as recited in claim 1, and similarly recited in claims 9 and 16. App. Br. 5–7;
see also Reply Br. 2–5.

In rejecting claims 1, 9, and 16, the Examiner relies on Fleming as disclosing

operating an engine of the vehicle below peak efficiency while the engine is capable of operating at peak efficiency to output from the engine only the difference in power between the demanded power and the power which the battery can deliver when the demanded power exceeds the power which the battery can deliver.

Final Act. 3 (citing Fleming ¶¶ 27–29). We disagree that Fleming discloses operating an engine in this manner.

Fleming is directed to a more efficient operation of plug-in electric vehicles. Fleming ¶ 2. As shown with reference to Figure 1 of Fleming, automobile 100 includes energy conversion units 102, 132 connected to energy storage unit 104. *Id.* ¶ 24, Fig. 1. Energy storage unit 104 receives energy from one or more of energy conversion units 102 and stores the energy. *Id.* The stored energy then can be used to power electronic devices 122 within automobile 100 and/or move automobile 100. *Id.* In particular, the energy conversion unit 102 and/or energy storage unit 104 can operate in various modes, such as a charge depletion mode or a charge sustaining mode. *Id.* ¶ 25. In the charge depletion mode, energy conversion unit 102 does not provide energy to energy storage unit 104, thereby depleting the state of charge (“SOC”) of energy unit 104. *Id.* ¶¶ 25–26.

At paragraphs 27–29, Fleming describes examples of moving an automobile 100 that draws 15 kW of energy in the charge depletion mode

and charge sustaining unit, respectively. In the charge depleting mode, 15 kW of energy is drawn from energy storage unit 104 to move the car, and no energy is generated by the operation of the engine and/or generator. *Id.* ¶ 27. In contrast, in the charge sustaining mode, the engine and generator maintain the SOC of the energy storage unit 104 within a predetermined range. *Id.* ¶ 29. Thus, the engine and generator may generate only the 15 kW necessary to move automobile 100 or they may generate 21 kW to increase the SOC by an additional 6 kW.

Although the Examiner is correct that Fleming at paragraph 29 describes that the vehicle engine may operate below peak efficiency in the charge sustaining mode (*see* Ans. 4), the battery is not supplying *any* power while in this mode, as required by the claim language. Conversely, in the charge depleting mode described at paragraph 27 of Fleming, the engine is not operating, as required by the claim language. In other words, contrary to the Examiner's finding (*see* Final Act. 3), Fleming does not describe or suggest affecting engine operation based on battery power while the battery is supplying power, as required by the language recited in claim 1, and similarly recited in claims 9 and 16.

The Examiner acknowledges that Fleming does not describe outputting from the engine, while the battery is supplying power in response to the demanded power, only the difference in power between the demanded power and the power which the battery can deliver with the demanded power exceeds the power which the battery can deliver.

Final Act. 3. And the Examiner relies on Sugimoto to disclose “outputting from the engine, while the battery is supplying power in response to the demanded power, the difference in power.” *Id.* (citing Sugimoto ¶ 61). We

have reviewed the cited portion of Sugimoto. Yet we fail to see anything that adequately supports this finding.

Sugimoto describes a plug-in hybrid vehicle equipped with an electronic control unit (“ECU”). Sugimoto ¶ 26. A selection switch connected to the ECU enables a user to select between a charge depleting (“CD”) mode and a charge sustain (“CS”) mode. *Id.* ¶ 37. In the CS mode, conservation of the vehicle’s battery electric power is prioritized. *Id.* ¶ 54. In contrast, in the CD mode, consumption of the battery’s electric power is prioritized. *Id.* ¶ 53. Because driving of the engine is not permitted in the CD mode, Sugimoto describes at paragraph 61 restricting engine start if the user’s demands exceeds the available battery power. We fail to see how, and the Examiner does not adequately explain how, Sugimoto’s description regarding restricting a start of an engine in the CD mode discloses or suggests the Examiner’s finding that Sugimoto teaches “outputting from the engine . . . the difference in power” (Final Act. 3), particularly where Sugimoto’s engine does not operate during the CD mode.

In the Answer, the Examiner maintains that Sugimoto is only relied on for its description of outputting from the engine when the demanded power exceeds the power that the battery can deliver. Ans. 4–5. At paragraph 64, Sugimoto describes that if the SOC falls below a threshold value during the CD mode, then the mode changes to the CS mode and remains in the CS mode during the trip even if the SOC rises to the threshold value. However, Sugimoto’s description of outputting power from the engine when the SOC falls below a threshold value nonetheless fails to account for the operation being “below peak efficiency” and for “only the difference in power

between a demanded power and the power which the battery can deliver while the battery is supplying power,” as required by the claims.

In view of the foregoing, we do not sustain the Examiner’s rejection of claims 1, 9, and 16 under 35 U.S.C. § 103(a). For the same reasons, we also do not sustain the Examiner’s rejection of dependent claims 3–8, 11–15, and 18–20. *Cf. In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (“dependent claims are nonobvious if the independent claims from which they depend are nonobvious.”).

DECISION

The Examiner’s rejection of claims 1, 3–9, 11–16, and 18–20 under 35 U.S.C. § 103(a) is reversed.

REVERSED