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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TETSUYA AOKI

Appeal 2019-005029
Application 14/001,373
Technology Center 1700

Before JAMES C. HOUSEL, N. WHITNEY WILSON, and MONTÉ T. SQUIRE, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Examiner's September 6, 2018 decision finally rejecting claims 12–18, 20–22, and 25–35, which constitute all the claims pending in this application ("Final Act."). We have jurisdiction over the appeal under 35 U.S.C. § 6(b). An oral hearing was held on May 21, 2020. A transcript of that hearing will be part of the record.

We reverse.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies NISSAN Motor Co., LTD, as the real party in interest (Appeal Br. 1).

CLAIMED SUBJECT MATTER

Appellant's disclosure relates to a fuel cell system for generating power by supplying a reaction gas to a fuel cell (Abstract). The system includes a wet state detection unit configured to detect a wet state of the electrolyte membrane of the fuel cell (*id.*). The wet state is a measurement of the moisture content of the electrolytic membrane (Spec. ¶ 45). The system further includes a steady time target wet state setting unit configured to set a steady time target wet state of the electrolyte membrane during a steady operation of the fuel cell system, and a transient time target wet state setting unit configured to set a transient time target wet state so that the wet state of the electrolyte membrane gradually changes from a wet state detected before a transient operation starts to the steady time target wet state during the transient operation in which the operating condition of the fuel cell system changes (Spec. ¶ 5). The controller sets the transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output, in essence throttling back the change (Spec. ¶¶78–89). Details of the claimed invention are set forth in representative claim 12, which is reproduced below from the Claims Appendix to the Appeal Brief (*emphasis added*):

> 12. A fuel cell system for generating power by supplying a reaction gas to a fuel cell, comprising:
>
> a wet state detection unit configured to detect a wet state of an electrolyte membrane of the fuel cell, wherein the wet state of the electrolyte membrane corresponds to a degree of moisture in the electrolyte membrane;

an accelerator stroke sensor configured to detect an accelerator operation amount based on a depression of an accelerator pedal;

a controller; and

a device configured to adjust a flow rate of a reaction gas;

wherein the controller is programmed to:

set a target output of the fuel cell based on the accelerator operation amount detected by the accelerator stroke sensor;

set a steady time target wet state of the electrolyte membrane during a steady operation of the fuel cell based on an operating condition and the target output of the fuel cell;

set a next target output of the fuel cell when the accelerator operation amount detected by the accelerator stroke sensor is changed;

set a transient time target wet state of the electrolyte membrane during a transient operation based on the next target output, the transient operation being an operation state in which an actual output of the fuel cell is changing from the target output to the next target output;

set the flow rate of the reaction gas based on the steady time target wet state or the transient time target wet state; and

set the transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output, and

wherein the wet state detection unit includes an internal resistance detector configured to detect an internal resistance of the fuel cell and detects the wet state of the electrolyte membrane based on the internal resistance of the fuel cell detected by the internal resistance detector from a correlation between the wet state of the electrolyte membrane of the fuel cell and the internal resistance of the fuel cell.

REJECTIONS

1. Claims 12–18, 20–22, and 25–35 are rejected under 35 U.S.C. § 102(b) as anticipated by Matsumoto.[2]

2. Claims 12–18, 20–22, and 25–35 are rejected under 35 U.S.C. § 103(a) as unpatentable over Sinha.[3]

DISCUSSION

We decide this appeal based on reasons common to each of the claims. Accordingly, we focus our discussion on the rejection of claim 12 as anticipated by Matsumoto (Rejection 1) and as obvious over Sinha (Rejection 2).

Rejection 1. "A prior art reference anticipates a patent claim under 35 U.S.C. § 102(b) if it discloses every claim limitation." *In re Montgomery*, 677 F.3d 1375, 1379 (Fed. Cir. 2012) (citing *Verizon Servs. Corp. v. Cox Fibernet Va., Inc.*, 602 F.3d 1325, 1336–37 (Fed. Cir. 2010)). In this instance, with regards to claim 12, Appellant argues, *inter alia*, that Matsumoto does not disclose: "wherein the controller is programmed to...set the transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according

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[2] Matsumoto et al., WO 2010/053027 A1, published May, 14, 2010. We refer, as do the Examiner and Appellant, to the US counterpart: US 9,246,182 B2, issued January 26, 2016.
[3] Sinha et al., US 2006/0263653 A1, published November 23, 2006.

to a change rate of the output from the target output to the next target output," as recited in claim 12 (Appeal Br. 16–17).

The Examiner finds that this limitation is taught by Matsumoto as follows: "Matsumoto teaches limiting the target generated current such that the rate of change in the target generated current does not exceed the limit value calculated by the current change rate limit value calculating unit 35 (abstract)" (Final Act. 4). However, as explained by Appellant (Appeal Br. 17), while Matsumoto does disclose calculating limit values for the rate of upward or downward changes in the target generated *current*, Matsumoto does not disclose limiting the rate of change of the wet state (or the water clogging, which is the term used by Matsumoto).

Therefore, Matsumoto does not disclose a controller programmed to set transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output. The Examiner does not dispute this, stating only that the claims recite that the transient time target wet state is based on the next target output (Ans. 14). However, the claims plainly recite controlling of the rate of change of the transient time target wet state, which is not addressed at all by Matsumoto.

Accordingly, we determine that the preponderance of the evidence of record does not support the Examiner's finding of anticipation, and we reverse the rejection.

Rejection 2. As was the case with Rejection 1 and Matsumoto, Appellant argues that Sinha fails to teach or suggest "wherein the controller is programmed to...set the transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output," as recited in claim 12 (Appeal Br. 40–44). Appellant argues that while Sinha does reference a rate of change of hydration, Sinha does not disclose making that rate of change smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output (Appeal Br. 43–44).

Appellant's argument is persuasive.

Sinha describes a fuel cell system which alters the operating parameters of the fuel cell "based on the state of hydration, the rate of change of the state of hydration, and a desired operational range for the state of hydration" (Sinha, Abstract). The Examiner finds that Sinha teaches that over-drying or over-flooding of the fuel stack leads to loss of performance, as does cycling between those states (Final Act. 5–6). The Examiner further finds that Sinha discloses that the desired operating conditions for the fuel cell system (described as the operating condition space or OCS) "defines the steady state normal operating boundary that results in best performance and durability" of the fuel cell, and that "transient operations" often results in stack conditions outside the OCS (Final Act. 5). The Examiner also finds that Sinha teaches that the state of hydration is controlled in order to keep the system within the OCS (Final Act. 6–7).

The Examiner finds that:

> Claim 12 recites a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next

> target output. See discussion of Sinha above. See [0022-0023] and [0049].

(Final Act. 8). However, the portions of Sinha cited by the Examiner do not explain how Sinha's system uses a change rate of the output from the target output to the next target output in order to adjust the rate of change of the transient time target wet state, much less that the rate of change of the transient time target wet state is smaller than it would otherwise be based on the change rate of the output.

It is well established that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *cited with approval in KSR Int'l Co. v. Teleflex, Inc.,* 550 U.S. 398, 418 (2007). In this instance, Appellant has demonstrated that the preponderance of the evidence of record does not support a determination that Sinha teaches or suggests "wherein the controller is programmed to...set the transient time target wet state such that a rate of change of the transient time target wet state is smaller than a rate of change of a wet state according to a change rate of the output from the target output to the next target output."

Accordingly, we reverse the obviousness rejections over Sinha.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	References(s)/Basis	Affirmed	Reversed
12–18, 20–22, 25–35	102(b)	Matsumoto		12–18, 20–22, 25–35
12–18, 20–22, 25–35	103(a)	Sinha		12–18, 20–22, 25–35
Overall Outcome				12–18, 20–22, 25–35

REVERSED