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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL J. HARRISON

Appeal 2020-000221
Application 15/001,534
Technology Center 2800

Before JEFFREY B. ROBERTSON, JEFFREY R. SNAY, and
LILAN REN, *Administrative Patent Judges*.

ROBERTSON, *Administrative Patent Judge*.

DECISION ON APPEAL¹

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant² appeals from the Examiner’s decision to reject claims 1, 3–15, and 17–20. Appeal Br. 6. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

¹ This Decision includes citations to the following documents: Specification filed January 20, 2016 (“Spec.”); Final Office Action mailed October 18, 2018 (“Final Act.”); Appeal Brief filed April 15, 2019 (“Appeal Br.”); Examiner’s Answer mailed August 6, 2019 (“Ans.”); and Reply Brief filed October 7, 2019 (“Reply Br.”).

² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies Enphase Energy, Inc. as the real party in interest. Appeal Br. 3.

CLAIMED SUBJECT MATTER

Appellant states the invention relates to power conversion and more particularly, a power converter having reactive power control. Spec. ¶ 2. Claim 1, reproduced below, is illustrative of the claimed subject matter (Appeal Br., Claims Appendix 9):

1. Apparatus for controlling reactive power comprising:

a bidirectional power converter comprising a switched mode cycloconverter for generating AC power having a desired amount of a reactive power component, wherein the bidirectional power converter generates the desired amount of the reactive power component as determined by a reactive power control schedule.

Independent claims 8 and 15, directed to a method and a system, respectively, also stand rejected, and similarly recite a switched mode cycloconverter and a reactive power control schedule. *Id.* at 10–11.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Harrison	US 2009/0323380 A1	December 31, 2009
Varma et al. hereinafter “Varma”	US 2012/0205981 A1	August 16, 2012

REJECTION

The Examiner rejected claims 1, 3–15, and 17–20 under 35 U.S.C. § 103 as unpatentable over Varma and Harrison. Final Act. 2–4.

OPINION

Appellant does not present separate arguments with respect to the claims on appeal. *See* Appeal Br. 6–7. Thus, we select claim 1 as representative for disposition of this rejection. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner's Rejection

In rejecting claim 1 as unpatentable over Varma and Harrison, the Examiner found Varma discloses an apparatus for controlling reactive power comprising a bidirectional power converter including switch nodes for generating AC power having a desired amount of a reactive power component. Final Act. 2. The Examiner found Varma discloses the bidirectional power converter generates the desired amount of reactive power component as determined by a reactive power control schedule. *Id.* The Examiner found Varma does not disclose a cycloconverter as recited in claim 1. *Id.* The Examiner found Harrison discloses an apparatus for controlling reactive power including a three-phase converter, which is a cycloconverter. *Id.* at 3.

The Examiner determined it would have been obvious to have employed a cycloconverter as disclosed in Harrison for the converter of Varma for the purpose of providing high conversion efficiency, lower power component count, low rated power components, no large inductors or storage components, and low harmonic distortion. *Id.*, citing Harrison ¶ 7.

Appellant's contentions

Appellant contends Varma discloses operating solar farm inverters and wind farm inverters at certain time periods, but such operation is

different from generating reactive power (Volt-Amps reactive (VAr), *see* Spec. ¶ 32) according to a schedule. Appeal Br. 6. Appellant also argues there is no reason to modify Varma’s system using Harrison’s cycloconverter because the improvements identified in Harrison “are with respect to conventional two-stage power converters, single-stage AC-DC switch mode power supplies, hard-switched full-bridge cycloconverters, resonant switching full-bridge cycloconverters, and series resonant converters employing full resonant switching,” where Varma’s disclosed inverter is not any of these. *Id.* at 7, citing Harrison, ¶¶ 1–6.

Issue

Did the Appellant demonstrate reversible error in the Examiner’s determination that the apparatus for controlling reactive power recited in claim 1 would have been obvious over Varma and Harrison?

Discussion

We are not persuaded by Appellant’s arguments. In particular, we are not persuaded by Appellant’s contention that Varma’s disclosure of being operable to provide reactive power during a certain time period is different from generating reactive power based on a schedule.

Varma discloses a distributed power generation system, which uses solar farm inverters and wind turbine generator inverters as Flexible Alternating Current Transmission Systems (FACTS) controller-static synchronous compensator (STATCOM). Varma ¶ 1. Varma discloses reactive power control in daytime and nighttime as found by the Examiner. *Id.* ¶¶ 147–148, 181–184; Final Act. 2. As the Examiner explains in the

Answer, a schedule is a “plan for carrying out a process or procedure, giving lists of intended events and times.”³ Ans. 5. The control between day and night disclosed in Varma constitutes such a plan. Although the terms “nighttime” and “day time” are broad, we nevertheless consider these disclosures to be intended events and times. Indeed, “day time” is defined as “[t]he *time* of the day between sunrise and sunset.”⁴ As a result, we agree that the control operations disclosed in Varma constitute a “reactive power control schedule” recited in claim 1.

We are also not persuaded by Appellant’s argument that the Specification’s disclosure of a particular embodiment where “time of day” may be obtained from a real time clock function in order to argue the Examiner’s position is not consistent with the broadest reasonable interpretation of the claims. Reply Br. 2. The Specification describes “the time of day (*e.g.*, from a ‘real time clock’ function residing within the controller 500.” Spec. ¶ 34. Thus, although the Specification describes one example of a way to determine “time of day,” such a disclosure is not sufficient to rise to the level of a definition as argued by Appellant.⁵

³ See <https://www.lexico.com/en/definition/schedule>: “A plan for carrying out a process or procedure, giving lists of intended events and times,” accessed on October 6, 2020.

⁴ <https://www.lexico.com/en/definition/daytime> accessed on October 6, 2020.

⁵ Although Appellant did not separately argue claims 3, 10, and 17 in the Appeal Brief, and thus arguments with respect to these claims may be considered new (*see* 37 C.F.R. 41.41(b)(2)), Appellant’s further arguments regarding the “list of reactive power amounts” and “corresponding time of day” recited in these claims in the Reply Brief (Reply Brief 2) would also not be persuasive in view of our discussion and the breadth of the claims.

We are also unpersuaded by Appellant’s argument that one of ordinary skill in the art would not have modified Varma’s system using Harrison’s cycloconverter absent improper hindsight. Appeal Br. 7; Reply Br. 2–3. Appellant’s argument appears to be that Harrison’s cycloconverter would not be applicable to Varma’s inverter, because Harrison allegedly discloses only specific converters over which the cycloconverter Harrison discloses would be an improvement. However, Harrison’s disclosure is not so limited. Indeed, Harrison discloses the converter disclosed therein “may find application in a wide range of applications” and “can be used to perform the function of DC to three-phase AC converter (inverter).” Harrison ¶¶ 1, 102; *see also* ¶¶ 103–104. Thus, we agree with the Examiner that simply because Harrison discloses specific examples of converters, such disclosures do not limit the applicability of Harrison’s teachings to Varma. *See* Ans. 7–8.

Moreover, Appellant’s position that the Examiner has not provided sufficient reasoning as to why replacing Varma’s inverter with Harrison’s cycloconverter would result in the improvements disclosed in Harrison (Reply Br. 3) is also not persuasive. The Examiner’s rationale for combining Varma and Harrison is “to use the teachings of a cycloconverter for the converter of [Varma] for the purpose of a cycloconverter being able to provide high conversion efficiency, low power component count, low rated power components, no large inductors or storage components, and low harmonic distortion.” Final Act. 3, citing Harrison, ¶ 7. As the Examiner further explains, “[a] converter is a device that is used to change electrical energy form [sic, from] one form to another such as DC to AC voltages or currents. A cycloconverter is a specific type of converter that converts AC

power to one frequency into AC power of an adjustable but lower frequency without any direct current, or DC, stage inbetween.” Ans. 7. Appellant focuses on whether the overall advantages in Harrison would be an improvement over the converter in Varma without addressing the entirety of the Examiner’s reasoning. *See id.* at 7–8.

Thus, Appellant has not provided sufficient arguments to demonstrate reversible error on the part of the Examiner.

Accordingly, we affirm the Examiner’s rejection of claim 1, 3–15, and 17–20.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–15, 17–20	103	Varma, Harrison	1, 3–15, 17–20	

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED