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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT ROESNER and SAID FAROUK SAID EL-BARBARI

Appeal 2018-004210
Application 12/778,309
Technology Center 2800

Before JEFFREY T. SMITH, CHRISTOPHER C. KENNEDY, and JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] request our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 63–71. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

Appellants' invention generally relates to a system for monitoring the health of a photovoltaic plant based on a calculated power curve for the plant. Spec. ¶ 1. Claim 63 illustrates the subject matter on appeal and is reproduced below:

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[1] Appellants identify the General Electric Company as the real party in interest. Appeal Brief filed September 21, 2017 ("App. Br."), 3.

63. A photovoltaic (PV) plant comprising:

one or more solar panels;

one or more irradiation sensors for measuring irradiance data with respect to the one or more solar panels;

one or more solar panel temperature sensors for measuring solar panel temperature data with respect to the one or more solar panels;

one or more power converters for receiving DC power from the one or more solar panels and delivering AC power to a power grid; and

a health monitoring system including a data processing unit for determining normalized irradiation data in response to an algorithmic software based on the irradiance data and the solar panel temperature data with respect to the one or more solar panels,

obtaining power signals at one or more locations of the PV plant, generating an estimated power curve representing an output of the power signals as a function of an input of the normalized irradiation data, and

comparing the estimated power curve to historical, theoretical, or simulated power curves to detect degradation of the PV plant in a desired time frame.

App. Br. 16 (Claims Appendix) (spacing and indentations added).

The Examiner sets forth the following rejections in the Final Office Action entered May 2, 2017 ("Final Act."), and maintains the rejections in the Examiner's Answer entered January 12, 2018 ("Ans."):

I. Claims 63–71 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter that the applicants regard as the invention;

II. Claims 63–71 under 35 U.S.C. § 101 as directed to non-statutory subject matter; and

III. Claims 63–71 under 35 U.S.C. § 102(e) as anticipated by Herzig et al. (US 2010/0318297 Al, published December 16, 2010) (hereinafter "Herzig").

DISCUSSION

Upon consideration of the evidence relied upon in this appeal and each of Appellants' timely contentions, we reverse the Examiner's rejection of claim 63–71 under 35 U.S.C. § 112, second paragraph for the reasons set forth in the Appeal Brief and below, and affirm the Examiner's rejection of claims 63–71 under 35 U.S.C. § 101, and the Examiner's rejection of claims 63–71 under 35 U.S.C. § 102(e), for the reasons set forth in the Final Office Action, the Answer, and below.

We review appealed rejections for reversible error based on the arguments and evidence Appellants provide for each ground of rejection Appellants contest. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential), *cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that even if the examiner had failed to make a prima facie case, "it has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections").

Rejection I

The Examiner determines that the recitation in claim 63 of "a health monitoring system including a data processing unit for determining normalized irradiation data in response to an algorithmic software based on the irradiance data and the solar panel temperature data with respect to the one or more solar panels" invokes 35 U.S.C. § 112, sixth paragraph. Final Act. 2. The Examiner finds that Appellants' Specification "fails to clearly

link or associate the disclosed structure, material, or acts to the claimed function such that one of ordinary skill in the art would recognize what structure, material, or acts perform the claimed function." *Id.*

Appellants argue that Figure 1 of their application and the description provided in paragraphs 19, 21, and 22 of their Specification "clearly links the data processing unit of the health monitoring unit 20 to the determination of normalized irradiation data in response to an algorithmic software based on the irradiance data and the solar panel temperature data with respect to the one or more solar panels." App. Br. 8–9.

We note initially that because Appellants do not dispute the Examiner's determination that the recitation in claim 63 of "a health monitoring system including a data processing unit for determining normalized irradiation data in response to an algorithmic software based on the irradiance data and the solar panel temperature data with respect to the one or more solar panels" invokes 35 U.S.C. § 112, sixth paragraph, we do not address the merits of the Examiner's determination. Consequently, for the purposes of this appeal, we limit our analysis to addressing only whether the Specification describes corresponding structure, materials, or acts for performing the function of determining normalized irradiation data. *In re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) ("[I]f one employs means-plus-function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant . . . . If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112.").

The Specification indicates that Appellants' system analyzes the power generation process associated with a PV plant to map the PV plant electrical power output to normalized irradiation data. Spec. ¶ 22. The Specification explains that the operating conditions of the PV plant, including the measured irradiation and solar panel temperature, are used to calculate normalized irradiation data, and "[a]lgorithmic software analyzes the normalized PV plant input and the electrical output power to realize a power curve providing electrical output as a function of the normalized input." *Id.*

Figure 1 illustrates an embodiment of Appellants' system and shows photovoltaic plant 10 that includes power curve measurement and health monitoring system 20. *Id.* ¶ 13; Fig. 1. The Specification explains that "photovoltaic power curve measurement system 20 is directed by algorithmic software that may be integrated therein to determine normalized irradiation data based on measured solar panel 21 temperatures at one or more locations, measured solar panel 21 irradiation, time of day, and plant 10 geographic location." *Id.* ¶ 16. The Specification indicates that "[p]ower curve measurement system monitor 20 then generates an estimated power curve map of corresponding photovoltaic plant 10 electrical output power as a function of the normalized irradiation data." *Id.* The Specification indicates that power curve measurement system 20 may include "a data processing unit such as a CPU or a DSP, among others, in combination with any number of suitable memory units, including without limitation, RAM, ROM, EEPROM, and so forth." *Id.* ¶ 19. The Specification further indicates that "[t]hose skilled in the relevant art will readily appreciate that

substantially any type of algorithm, e.g. neuro, genetic, fuzzy, and so on, can be employed." *Id.* ¶ 21.

The Examiner does not address these disclosures in Appellants' Specification, and thus does not explain why these disclosures do not "link or associate the disclosed structure, material, or acts to the claimed function such that one of ordinary skill in the art would recognize what structure, material, or acts perform the claimed function." Ans. 3–4. Consequently, the Examiner does not establish that Appellants' Specification fails to describe corresponding structure, materials, or acts for performing the function recited in claim 63 of determining normalized irradiation data.

We accordingly do not sustain the Examiner's rejection of claims 63–71 under 35 U.S.C. § 112, second paragraph.

Rejection II

Appellants argue claims 63–71 as a group on the basis of claim 63, to which we accordingly limit our discussion.[2] App. Br. 10–13; 37 C.F.R. § 41.37(c)(1)(iv).

In *Alice Corp. v. CLS Bank International*, 134 S. Ct. 2347 (2014), the Court identified a two-step framework for determining whether claimed subject matter is judicially excepted from patent eligibility under § 101. In the first step, "[w]e must . . . determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice*, 134

[2] We do not consider the arguments that Appellants present for the first time at pages 2–4 of their Reply Brief because Appellants do not show good cause for doing so. 37 C.F.R. § 41.37(c)(1)(iv); 37 C.F.R. § 41.41(b)(2) (arguments raised for the first time in the Reply Brief that could have been raised in the Appeal Brief will not be considered by the Board unless good cause is shown).

S. Ct. at 2355. The second step involves "a search for an 'inventive concept'—*i.e.*, an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself,'" and is more than "well-understood, routine, conventional activit[y]." *Alice*, 134 S. Ct. at 2355, 2359 (first alteration in original) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73 (2012)).

The Examiner applies *Alice*'s two-step framework in rejecting claim 63 under 35 U.S.C. § 101. Final Act. 3–5. In the first step, the Examiner determines that the following features of claim 63 are directed to an abstract idea:

> determining normalized irradiation data in response to an algorithmic software based on measured or obtained irradiance and temperature data with respect to the one or more solar panels, generating an estimated power curve representing an output of the power signals as a function of an input of the normalized irradiation data, and comparing the estimated power curve to historical, theoretical, or simulated power curves to detect degradation of the PV plant in a desired time frame.

Final Act. 3–4 (emphasis omitted).

For the second step of the *Alice* framework, the Examiner determines that the additional elements recited in claim 63 do not amount to significantly more than the judicial exception (the abstract idea). Final Act. 4. Specifically, the Examiner determines that irradiation sensors for measuring solar panel irradiance data, temperature sensors for measuring solar panel temperature data, and obtaining power signals at one or more locations of the PV plant "is mere data gathering recited at a high level of generality." *Id.* The Examiner also determines that a data processing unit and solar panels with power converters "are generic or conventional

equipment." *Id.* (emphasis omitted). The Examiner determines that claim 63, therefore, does not include limitations that qualify as significantly more than the judicial exception. *Id.*

The Examiner concludes that the elements of the photovoltaic plant of claim 63 involve use of mathematical relationships to analyze irradiance and temperature sensor data to build an estimated power curve, and compare the data with a database to identify a degradation, which is analogous to other concepts that have been identified by the Federal Circuit as abstract, such as collecting information, analyzing it, and displaying certain results of the collection and analysis. *Id.* (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016)).

Appellants argue that claim 63 is not directed to an abstract idea because it is directed to a system for providing reliable and accurate real time measurements of overall photovoltaic plant performance, and is not directed to a method as in *Bilski v. Kappos*, 561 U.S. 593 (2010). App. Br. 12. Appellants contend that the system of claim 63 is not an abstract idea within the meaning of *Alice* "because it is not a long-prevalent and fundamental practice, no matter how widespread, in comparison to the abstract ideas of risk-hedging and intermediated settlement relied upon the Court in *Alice*, which have been in widespread use for many centuries throughout the world." *Id.* Appellants assert that "the Examiner's alleged 'abstract idea' is not related to commerce or finance, and therefore is not an 'abstract idea' according to *Alice*." *Id.*

We note initially that the Court in *Bilski* did not hold that systems claims cannot be directed to an abstract idea. *Bilski*, 561 U.S. at 609–613. Similarly, the Court in *Alice* did not hold that only claims directed to

commerce, finance, and long-prevalent and fundamental practices, can be directed to abstract ideas. *Alice*, 134 S. Ct. at 2354–2357.

We next apply the first step of the *Alice* framework. Claim 63 recites determining normalized irradiation data using algorithmic software based on measured solar panel irradiance and temperature, generating an estimated power curve from power signals obtained at one or more locations of the PV plant as a function of the normalized irradiation data, and comparing the estimated power curve to historical, theoretical, or simulated power curves to detect degradation of the PV plant in a desired time frame. These steps, taken individually, are directed to the abstract idea of manipulating or analyzing data or information (solar panel irradiance, solar panel temperature, and power signals obtained from the PV plant) to generate additional data or information (normalized irradiation data, an estimated power curve, and comparative power curve information). Merely combining these steps as recited in claim 1 fails to render the combination any less abstract. *See Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) ("Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible."); *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1093 (Fed. Cir. 2016) (abstract ideas include collecting information and analyzing that information "by steps people go through in their minds, or by mathematical algorithms"); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1146–47 (Fed. Cir. 2016) ("[W]e continue to 'treat[ ] analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, as essentially mental processes within the abstract-idea category.'" (second

alteration in original) (citation omitted)); *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1340–41 (Fed. Cir. 2017) (organizing, displaying, and manipulating data is an abstract idea).

For the second step of the *Alice* framework, measuring solar panel irradiance data with irradiation sensors, measuring solar panel temperature data with temperature sensors, and obtaining power signals at one or more locations of the PV plant, constitutes mere data gathering using conventional equipment. And the solar panels, one or more power converters, and a data processing unit recited in claim 63 are generic or conventional equipment, as the Examiner correctly finds.

Thus, claim 63 is directed to data gathering using conventional equipment, and carrying out computations on the gathered data to generate new data or information—corresponding to a mathematical algorithm. The features of claim 63, considered individually and as an ordered combination, therefore, do not constitute an inventive concept that transforms the abstract idea into a patent-eligible application of the abstract idea. *See, e.g.*, *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715–16 (Fed. Cir. 2014) (holding the claims insufficient to supply an inventive concept because they did not "do significantly more than simply describe [the] abstract method," but rather are simply "conventional steps, specified at a high level of generality" (quoting *Alice*, 134 S. Ct. at 2357)); *In re Bilski*, 545 F.3d 943, 963 (Fed. Cir. 2008) (en banc) (characterizing data gathering steps as insignificant extra-solution activity).

Appellants argue that even if claim 63 may be interpreted as an abstract idea under *Alice*, the claim does not preempt all possible uses of the abstract idea and does not preempt or monopolize "the whole technical field

for detecting a degradation in a PV plant." App. Br. 12. Appellants assert that claim 63 "specifies that the system is performed in a specific, ordered way that leaves other ordered ways available to the public." *Id.*

Although claim 63 is directed to a specific system for detecting degradation of a photovoltaic plant by conducting a sequence of particular steps as Appellants assert, claim 63 is nonetheless directed to manipulating or analyzing data or information to generate additional data or information (discussed above), and therefore constitutes a procedure for solving a mathematical problem—referred to by the courts as an "algorithm"—corresponding to an abstract idea. *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972) ("A procedure for solving a given type of mathematical problem is known as an 'algorithm.'"). Accordingly, contrary to Appellants' arguments, a patent to claim 63 would preempt use of the algorithm itself, rather than a patent-eligible application of the algorithm, and claim 63 is therefore ineligible for patenting. *Parker v. Flook*, 437 U.S. 584, 595 (1978) ("[I]f a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory." (citation omitted)).

Therefore, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection of claims 63–71 under 35 U.S.C. § 101, which we accordingly sustain.

Rejection III

Appellants argue claims 63–71 as a group on the basis of claim 63, to which we accordingly limit our discussion. App. Br. 13–15; 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Herzig discloses all of the elements of claim 63. Final Act. 5–6. Appellants argue that Herzig does not disclose one or more solar panel temperature sensors for measuring solar panel temperature data for one or more solar panels. App. Br. 14. Appellants contend that Herzig discloses obtaining temperature measurements from a third party internet weather feed source or from a temperature probe, "which is most likely a measurement of the ambient air temperature, not the temperature of the solar panel itself." App. Br. 14; Reply Br. 4. Appellants assert that because Herzig does not measure solar panel temperature, Herzig does not determine a normalized irradiation data in response to an algorithmic software based on the irradiance data and the solar panel temperature data for one or more solar panels. App. Br. 14–15.

As the Examiner correctly finds, however, Herzig discloses a photovoltaic solar panel array (also referred to as a solar photovoltaic system), and explains that the solar panels in the photovoltaic array convert irradiance to electric energy at a rate dependent on temperature and irradiance. Herzig ¶¶ 28, 63, 68; Fig. 3. Herzig discloses obtaining the "PV array temperature" using a temperature probe. *Id.* ¶¶ 64, 68. One of ordinary skill in the art would understand that Herzig's temperature probe for measuring PV array temperature corresponds to a solar panel temperature sensor for measuring solar panel temperature data, as recited in claim 63.[3] Appellants' arguments are therefore unpersuasive of reversible

[3] One of ordinary skill in the art would understand that a "PV panel" is a collection of single solar cells connected together, and a "PV array" is a number of individual PV panels electrically connected together. *See, e.g.*, Photovoltaic Array (Nov. 1, 2018), http://www.alternative-energy-tutorials.com/solar-power/pv-array.html.

error in the Examiner's rejection of claim 63 under 35 U.S.C. § 102(e), and we accordingly sustain the Examiner's rejection of claims 63–71 as anticipated by Herzig. *Jung*, 637 F.3d at 1365.

DECISION

We affirm the Examiner's rejection of claims 63–71 under 35 U.S.C. § 101, and the Examiner's rejection of claims 63–71 under 35 U.S.C. § 102(e). We reverse the Examiner's rejection of claim 63–71 under 35 U.S.C. § 112, second paragraph.

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

AFFIRMED