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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte J. WARD MACARTHUR, SACHINDRA K. DASH, and RAVI K. BHASKAR

Appeal 2017-001392
Application 13/324,853
Technology Center 1700

Before CHUNG K. PAK, N. WHITNEY WILSON, and MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

Appellants[2] appeal the Examiner's decision to finally reject claims 1–20, which constitute all the claims pending in this application. 35 U.S.C. § 134(a). We have jurisdiction under 35 U.S.C. § 6(b).

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[1] In our Decision, we refer to the Specification filed December 13, 2011 ("Spec."); Final Office Action dated September 24, 2015 ("Final Act."); Appeal Brief dated February 29, 2016 ("App. Br."); Examiner's Answer to the Appeal Brief dated October 7, 2016 ("Ans."); and Reply Brief dated November 2, 2016 ("Reply Br.").

[2] Appellants identify Honeywell International Inc. as the real party in interest. App. Br. 2.

For the reasons set forth below, we AFFIRM-IN-PART and enter a NEW GROUND OF REJECTION.

The Claimed Invention

Appellants' disclosure relates to a method and apparatus for pH control treatment plants and other systems. Spec. ¶ 2. The claimed method includes obtaining a nonlinear model that represents a pH of a material in a process to be controlled. *Id.* ¶ 6; Abstract.

Claims 1 and 8 are illustrative of the claimed subject matter on appeal and are reproduced below from the Claims Appendix to the Appeal Brief:

1. A method comprising:

obtaining, by at least one computer processing device, a nonlinear model that represents a pH of a material in a process to be controlled, the model generated using an orthonormal bases function that captures dynamics of the process and an ordinal spline bases function that captures static nonlinearities of the process; and

performing, by the at least one computer processing device, non-linear model predictive control of the process using the model;

wherein performing the non-linear model predictive control comprises:

receiving sensor measurements identifying the pH of the material from a pH sensor;

predicting, using the model, how changes to at least one manipulated variable associated with the process affect the pH of the material; and

generating, using the sensor measurements, one or more control signals configured to modify the at least one manipulated variable in order to keep the pH of the material at a setpoint or within a specific range of the setpoint by controlling at least one actuator in the process.

App. Br. 22 (Claim App'x) (key disputed claim language italicized and bolded).

> 8. An apparatus comprising:
>
> ***at least one memory configured to store a nonlinear model that represents a pH of a material in a process to be controlled***, the model associated with an orthonormal bases function that captures dynamics of the process and an ordinal spline bases function that captures static nonlinearities of the process; and
>
> ***at least one computer processing device configured to perform non-linear model predictive control of the process using the model***, wherein the at least one computer processing device is configured to perform the non-linear model predictive control by:
>
> receiving sensor measurements identifying the pH of the material from a pH sensor;
>
> ***predicting, using the model, how changes to at least one manipulated variable associated with the process affect the pH of the material***; and
>
> ***generating, using the sensor measurements, one or more control signals configured to modify the at least one manipulated variable*** in order to keep the pH of the material at a setpoint or within a specific range of the setpoint by controlling at least one actuator in the process.

App. Br. 24 (Claims App'x) (key disputed claim language italicized and bolded).

The Rejections

On appeal, the Examiner maintains the following rejections:

1. Claims 1–7 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter ("Rejection 1"). Ans. 3; Final Act. 2.

2. Claims 1–20 are rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA, the applicant regards as the invention ("Rejection 2"). Ans. 6; Final Act. 5.

OPINION

Rejection 1

Claims 1–7

Appellants argue claims 1–7 as a group. We select claim 1 as representative of this group and claims 2–7 stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner determines that Appellants' claimed invention is unpatentable under 35 U.S.C. § 101 because it is directed to non-statutory subject matter. Ans. 3–5, 8–9. In particular, the Examiner determines that the claims are drawn to the abstract concept of comparing new and stored information and using rules to identify options and the recited steps do not amount to significantly more than the concept. *Id.* at 9 (citing *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014)).

Appellants argue that the Examiner's rejection should be reversed because the Examiner erred in concluding that the claims are directed to non-statutory subject matter. App. Br. 11. In particular, Appellants argue that: (1) the Examiner applies the incorrect test for subject matter eligibility (*id.* at 11); (2) claim 1 is not directed to any judicial exception (*id.* at 12); (3) claim 1 is tied to another statutory class, i.e., a machine that includes a computer processing device (*id.* at 13); and (4) claim 1 transforms the

underlying subject matter by generating one or more control signals to control at least one actuator in a process in order to control the pH of a material (*id.* at 14).

We do not find Appellants' arguments persuasive of reversible error in the Examiner's rejection.

35 U.S.C. § 101 provides that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title," but "[l]aws of nature, natural phenomena, and abstract ideas are not patentable." *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013) (internal quotation marks and citation omitted).

The Supreme Court's decision in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101. According to *Alice* step one, "[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice*, 134 S. Ct. at 2355.

Step two of the *Alice* framework is "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.'" *Id.* at 2355 (alteration in original) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1294 (2012)).

In applying step two, we must determine whether there are any "additional features" in the claims that constitute an "inventive concept,"

Alice, 134 S. Ct. at 2357, and whether those "additional features" amount to more than merely "well-understood, routine, conventional activity" *Mayo*, 132 S. Ct. at 1298.

Beginning with the first step, we look at claim 1 to determine whether it is directed to an abstract idea. Claim 1 recites a method comprising the following steps: (1) "obtaining, by at least one computer processing device, a nonlinear model that represents a pH of a material in a process to be controlled"; (2) "performing, by the at least one computer processing device, non-linear model predictive control of the process using the model"; (3) "predicting, using the model, how changes to at least one manipulated variable associated with the process affect the pH of the material"; and (4) "generating, using the sensor measurements, one or more control signals configured to modify the at least one manipulated variable." App. Br. 22 (Claims App'x).

Based on the language of the claim and the Specification, we determine that claim 1 is, at its core, directed to the abstract idea of collecting, analyzing, and mathematically manipulating data using a law of nature (a nonlinear model). *See Intellectual Ventures I LLC v. Capital One Financial Corporation*, 850 F.3d 1332, 1340 (Fed. Cir. 2017) (holding claims ineligible under § 101 where the "concept related to the collection, display, and manipulation of data"); *Elec. Power Grp. v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (holding that "collecting information, analyzing it, and displaying certain results of the collection and analysis" are "a familiar class of claims 'directed to' a patent-ineligible concept").

The fact that the data being collected and processed relates to a nonlinear mathematical model (a law of nature) that represents a pH of a

material in a process to be controlled, as opposed to some business method, and the claimed method may be implemented using a computer does not render the claim patent-eligible or the underlying idea any less abstract. *See Alice*, 134 S. Ct. at 2358 ("the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention").

Unlike the claims found non-abstract in prior cases, Appellants' claimed invention is directed to data collection, analysis, and manipulation and does not recite an improvement to a particular computer technology. *See, e.g., McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) (finding claims not abstract because they "focused on a specific asserted improvement in computer animation").

Moreover, as the Examiner finds (Ans. 3–4), the steps of claim 1 could conceivably be performed using mental steps, pen, and paper (e.g., performing calculations based on a nonlinear mathematical model). *See Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1318 (Fed. Cir. 2016) (claims directed to an abstract idea, where "with the exception of generic computer-implemented steps, there is nothing in the claims themselves that foreclose them from being performed by a human, mentally or with pen and paper.").

Turning to the second step of *Alice*, we find claim 1 does not contain an inventive concept sufficient to "'transform the nature of the claim' into a patent-eligible application." *Alice*, 134 S. Ct. at 2355.

We determine that each of the steps of claim 1, considered both individually and as an ordered combination, is conventional, and does not amount to significantly more than the implementation of the abstract idea of collecting, analyzing, and mathematically manipulating data. *See Alice*, 134

S. Ct. 2357 (finding "conventional steps" insufficient to supply an "inventive concept").

In particular, we find that the steps of "obtaining . . . a nonlinear model that represents a pH of a material in a process"; "using the model" to predict "how changes . . . associated with the process affect the pH of the material"; and "generating, using sensor measurements, . . . control signals" are nothing more than routine and conventional techniques known and applied in the field of process control. *See, e.g.*, Spec. ¶¶ 4, 37–38, 44, 144. Pre- or post-solution activities that are "purely 'conventional or obvious,'…'can[not] transform an unpatentable principle into a patentable process.'" *Mayo Collaborative Services*, 132 S. Ct. at 1298–99 (*citing Parker v. Flook,* 437 U.S. 584, 589–90 (1978)). Similar to *Mayo*, the steps in this case are nothing more than an instruction to gather data for the applicable law of nature (a nonlinear model that represents a pH of a material) and apply the law of nature to conventional post solution activities.

Thus, we are persuaded that claim 1 is directed to an abstract idea involving a law of nature and fails to recite an inventive concept sufficient to transform the abstract idea into patent-eligible subject matter.

Accordingly, we affirm the Examiner's rejection of claims 1–7 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

<u>*Claim 8*</u>

Although claim 8 is directed to an "apparatus," which includes a memory and a computer processing device, the claim recites limitations nearly identical to claim 1. *Compare* claim 8 (App. Br. 24) *with* claim 1 (App. Br. 22).

In particular, like claim 1, claim 8 recites at least one computer processing device configured to (1) "perform non-linear model predictive control of the process using the model"; (2) "predicting, using the model, how changes to at least one manipulated variable associated with the process affect the pH of the material"; and (3) "generating, using the sensor measurements, one or more control signals configured to modify the at least one manipulated variable." App. Br. 24 (Claim App'x). Similar to the "obtaining" a nonlinear model step of claim 1, claim 8 also recites "at least one memory configured to store a nonlinear model that represents a pH of a material in a process to be controlled." *Id.* at 24.

For principally the same reasons discussed above with respect to claim 1, we determine that claim 8 is likewise directed to the abstract idea of collecting, analyzing, and mathematically manipulating data using a law of nature and does not contain an inventive concept sufficient to transform the nature of the claim into a patent-eligible application. *Alice*, 134 S. Ct. at 2355; *see also Intellectual Ventures I*, 838 F.3d at 1340 (holding that method, systems, and apparatus claims of a patent "ineligible under § 101 for reciting similar data manipulation steps").

The fact that claim 8 recites "at least one memory configured to store a nonlinear model" and "at least one computer processing device configured to perform nonlinear model predictive control," without more, does not render the claim patent-eligible. *See Alice*, 134 S. Ct. at 2358. Indeed, these elements are nothing more than generic computer components and do not supply an inventive concept. *See Alice*, 134 S. Ct. at 2359.

Moreover, as previously discussed above regarding claim 1, considering the "using the model," "predicting," and "generating"

limitations of claim 8 as an ordered combination, we find that they amount to nothing significantly more than an apparatus for implementing the abstract idea of collecting, analyzing, and mathematically manipulating data using generic computer technology. *Id.* at 2359–60.

Claims 9–20

Because claims 9–20 recite and/or are based upon principally the same limitations as claims 1 and 8, we determine that claims 9–20 are likewise directed to the abstract idea of collecting, analyzing, and mathematically manipulating data and fail to recite an inventive concept sufficient to transform the abstract idea into patent- eligible subject matter. *Alice*, 134 S. Ct. at 2355; *see also Intellectual Ventures I*, 838 F.3d at 1340.

Accordingly, for principally the same reasons previously discussed above in affirming the Examiner's § 101 rejection of claims 1–7 (Rejection 1) and claim 8, we also reject claims 9–20 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Rejection 2

Because claims 1–20, which constitute all the claims pending in this Appeal, have already been determined to be directed to non-statutory subject matter under 35 U.S.C. § 101, we exercise our discretion and decline to reach the merits of the Examiner's remaining rejection of claims 1–20 under 35 U.S.C. § 112 for indefiniteness (Rejection 2). *In re Basell Poliolefine*, 547 F.3d 1371, 1379 (Fed. Cir. 2008) ("Having concluded that the Board properly affirmed the rejection of claims 1-52 of the '687 patent based on obviousness-type double patenting in view of the '987 patent, we need not address the remaining issues raised by Basell regarding the §§102(b) and

103(a) rejections, as well as the additional double patenting rejections."); *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421 (Fed. Cir. 1984) (ITC having decided a dispositive issue, there was no need for the Commission to decide other issues decided by the presiding officer).

DECISION

In view of the foregoing, we affirm the Examiner's rejection of claims 1–7 under 35 U.S.C. § 101 as being directed to non-statutory subject matter (Rejection 1) and enter a New Ground of Rejection against claims 8–20 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

We also designate our affirmance of the rejection of claims 1–7 under 35 U.S.C. § 101 as containing a New Ground of Rejection because our reasons for affirmance contain additional fact findings not discussed by the Examiner.

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter

> reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. . . .
>
> (2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same Record.

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

AFFIRMED-IN-PART AND NEW GROUND OF REJECTION ENTERED PURSUANT TO 37 C.F.R. § 41.50(b)