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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LALITHA VENKATARAMANAN,
TAREK M. HABASHY, FRED K. GRUBER, and
DENISE E. FREED

Appeal 2017-009877
Application 13/333,232
Technology Center 2800

Before JEFFERY T. SMITH, JAMES C. HOUSEL, 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 1–19 and 21–29. We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

We AFFIRM.

STATEMENT OF THE CASE

Appellants claim a method of characterizing a subterranean formation. App. Br. 2–3. Claim 1 illustrates the subject matter on appeal and is reproduced below:

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[1] Appellants identify Schlumberger Technology Corporation as the real party in interest. Appeal Brief filed February 3, 2017 ("App. Br."), 2.

> 1. A method of characterizing a subterranean formation, comprising:
>
> performing a nuclear magnetic resonance (NMR) measurement on the subterranean formation using an NMR apparatus to obtain NMR data in a measurement-domain, wherein the NMR apparatus performs the NMR measurement on the subterranean formation by applying a NMR pulse sequence to the subterranean formation;
>
> calculating an answer product for a desired area within a distribution-domain by computing an integral transform for the desired area on the NMR data in the measurement domain, wherein the desired area within the distribution-domain is a subset of the distribution domain; and
>
> using the answer product to estimate a property of the formation.

App. Br. 9 (Claims Appendix).

The Examiner sets forth the rejection of claims 1–19 and 21–29 under 35 U.S.C. § 101 in the Final Office Action entered July 28, 2016 ("Final Act."), and maintains the rejection in the Examiner's Answer entered April 28, 2017 ("Ans.")

DISCUSSION

Upon consideration of the evidence relied upon in this appeal and each of Appellants' contentions, we affirm the Examiner's rejection of claims 1–19 and 21–29 under 35 U.S.C. § 101 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").

Appellants argue claims 1–19 and 21–29 as a group on the basis of claim 1, to which we accordingly limit our discussion. App. Br. 4–8; 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 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 1 under 35 U.S.C. § 101. Ans. 3–8. In the first step, the Examiner determines that calculating an answer product by computing an integral transform on NMR data, and using the answer product to estimate a property of a subterranean formation, is directed to an abstract idea. Ans. 2. The Examiner determines that these steps involve processing NMR measurement data using mathematical relationships and formulas to calculate an answer

product used to estimate a property of a subterranean formation, which the Examiner determines is similar 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 (*Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016), and a formula for computing an alarm limit (*Parker v. Flook*, 437 U.S. 584 (1978)). *Id.*

For the second step of the *Alice* framework, the Examiner determines that the additional elements recited in claim 1 do not amount to significantly more than the judicial exception (the abstract idea). *Id.* Specifically, the Examiner determines that performing an NMR measurement on a subterranean formation using an NMR apparatus by applying an NMR pulse sequence to the subterranean formation is a mere data gathering step that uses conventional measurement equipment. *Id.* The Examiner determines that claim 1 therefore does not amount to significantly more than a claim to the abstract idea itself. *Id.*

Appellants argue that claim 1 is not directed to an abstract idea, but rather is directed to solving a problem of a technical and industrial nature: estimating a property of a subterranean formation using nuclear magnetic resonance (NMR). App. Br. 4. Appellants contend that the method of claim 1 uses physical actions (performing NMR measurements on a subterranean formation using an NMR apparatus) and real world subject matter (an NMR apparatus, NMR data, and physical properties of the formation) to overcome a technical and industrial problem. App. Br. 5. Appellants assert that claim 1 does more than merely limit the claimed method to a particular technological environment, such as limiting the method to performance on a

general purpose computer, because the "claim ties the method to a manner of performing NMR measurements and processing the data from the NMR measurements to determine a property of a subterranean formation." *Id.* Appellants argue that claim 1 does not preempt all processes for estimating properties of a subterranean formation using NMR measurements and an integral transform, because the claim recites a specific manner of applying the integral transform. App. Br. 5.

Claim 1 recites calculating an answer product for a desired area within a distribution-domain by computing an integral transform for the desired area on NMR data in the measurement domain, and using the answer product to estimate a property of the formation. These steps, taken individually, are directed to the abstract idea of manipulating or analyzing data or information (NMR data) to generate additional data or information (an answer product and a property of a subterranean formation). Merely combining these abstract steps as recited in claim 1 fails to render the combination any less abstract. *See Digitech*, 758 F.3d at 1351 ("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).

The step recited in claim 1 of performing a nuclear magnetic resonance (NMR) measurement on a subterranean formation using an NMR apparatus to obtain NMR data in a measurement-domain by applying an NMR pulse sequence to the subterranean formation constitutes mere data gathering using conventional equipment. Thus, claim 1 is directed to conventional data gathering, and carrying out computations on the gathered data to generate new data or information—corresponding to a mathematical algorithm. The features of claim 1, 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.)

Although Appellants argue that the method of claim 1 overcomes the technical and industrial problem of estimating a property of a subterranean formation using nuclear magnetic resonance (NMR), Appellants do not direct us to any factual evidence supporting this conclusory assertion, such

as evidence of record comparing Appellants' method to the existing technology. App. Br. 4–8. Unsupported attorney arguments cannot take the place of evidence necessary to resolve a disputed question of fact. *See Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018) ("Whether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination."); *In re Schulze*, 346 F.2d 600, 602 (CCPA 1965) ("Argument in the brief does not take the place of evidence in the record.").

Although claim 1 is directed to a specific process that involves "performing NMR measurements and processing the data from the NMR measurements to determine a property of a subterranean formation," as Appellants assert, it 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 1 would pre-empt use of the algorithm itself, rather than a patent-eligible application of the algorithm, and claim 1 is therefore ineligible for patenting. *Parker v. Flook*, 437 U.S. 584, 595 (1978) ("if 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." (internal quote marks omitted)).

Appellants argue that claim 1 is directed to significantly more than an abstract idea by itself because the claim is directed to improvements in oilfield technology and NMR technology. App. Br. 6. Appellants contend that the method of claim 1 can be used to obtain more stable and reliable estimates for specific portions of NMR distributions "as compared to the conventional Laplace transform method that is typically used in NMR," and can be used to provide more reliable estimates for certain properties of the subterranean formation, such as porosity or permeability. *Id.*

As discussed above, however, claim 1 is directed to conventional data gathering, and carrying out computations on the gathered data to generate new data or information—corresponding to a mathematical algorithm. Accordingly, the features of claim 1, considered individually and as an ordered combination, do not constitute an inventive concept that transforms the abstract idea into a patent-eligible application of the abstract idea. Appellants do not direct us to any factual evidence supporting the asserted improvements in oilfield and NMR technology, such as evidence of record comparing Appellants' method to the existing technology, including the Laplace transform method. App. Br. 4–8; *Schulze*, 346 F.2d at 602 (CCPA 1965).

Appellants argue that claim 1 is directed to significantly more than an abstract idea by itself because the claim requires performing NMR measurements on a subterranean formation using a specific machine—an NMR apparatus—that applies an NMR pulse sequence to the subterranean formation. App. Br. 7.

Appellants' Specification indicates, however, that NMR machines are conventionally used in the art to apply a pulse sequence to subterranean formations. Spec. ¶¶ 2–5. Therefore, as discussed above, performing a nuclear magnetic resonance (NMR) measurement on a subterranean formation using an NMR apparatus to obtain NMR data in a measurement-domain by applying a NMR pulse sequence to the subterranean formation constitutes mere data gathering using conventional equipment.

Appellants argue that claim 1 is directed to significantly more than an abstract idea by itself because the claimed method requires performing NMR measurements on a subterranean formation by applying an NMR pulse sequence to the formation. App. Br. 7. Appellants contend that this application of an NMR pulse excites nuclei within the formation, which transforms the nuclei from an unexcited state to an excited state, thereby effecting a transformation or reduction of a particular article to a different state or thing. *Id.*

Contrary to Appellants' arguments, the method of claim 1 is not analogous the claimed method in *Diamond v. Diehr*, 450 U.S. 175, 184–85 (1981), which involved operating a rubber mold to transform raw, uncured synthetic rubber into cured rubber. Although applying NMR pulses to a formation as recited in claim 1 may temporarily excite nuclei within the formation, the nuclei nonetheless rapidly return to their original state (known as "relaxation"). Spec. ¶¶ 2–4. Even if the temporary excitation of nuclei within a subterranean formation were considered transformation of the nuclei into a different state or thing, as discussed above, using an NMR apparatus to obtain NMR data by applying an NMR pulse sequence to a

subterranean formation as recited in claim 1 constitutes mere data gathering using conventional equipment, and therefore does not transform the recited abstract idea into a patent eligible application of the abstract idea.

Appellants argue that claim 1 is directed to significantly more than an abstract idea by itself because the step of "calculating an answer product for a desired area within an NMR distribution-domain by computing an integral transform for the desired area on [] NMR data in [a] measurement-domain, wherein the desired area within the NMR distribution-domain is a subset of the NMR distribution-domain," is an unconventional step that is not disclosed in any of the prior art references that were cited previously during prosecution of the present application in prior art rejections. App. Br. 7–8.

However, a "claim for a *new* abstract idea is still an abstract idea." *Synopsis, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016).

Therefore, Appellants' arguments are unpersuasive of reversible error in the Examiner's rejection of claims 1–19 and 21–29 under 35 U.S.C. § 101, which we accordingly sustain.

DECISION

We affirm the Examiner's rejection of claims 1–19 and 21–29 under 35 U.S.C. § 101.

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