UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/417,439	01/26/2015	Tianrun Chen	2013-077559 U1 US	2416

142050 7590 08/02/2018

HALLIBURTON ENERGY SERVICES, INC.
C/O PARKER JUSTISS, P.C.
14241 DALLAS PARKWAY
SUITE 620
DALLAS, TX 75254

EXAMINER
AIELLO, JEFFREY P

ART UNIT	PAPER NUMBER
2864	

NOTIFICATION DATE	DELIVERY MODE
08/02/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@pj-iplaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TIANRUN CHEN, YIBING ZHENG, TATIANA GILSTRAP, ARTHUR CHEN HON CHENG, ROBERT ERIC EPSTEIN, and ZHIJUAN ZHANG

Appeal 2018-001944
Application 14/417,439
Technology Center 2800

Before JEFFREY T. SMITH, JULIA HEANEY, and MONTÉ T. SQUIRE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

Appellant[2] appeals under 35 U.S.C. § 134(a) from the Examiner's decision to 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).

---

[1] In our Decision, we refer to the Specification filed January 26, 2015 ("Spec."); Final Office Action dated September 16, 2016 ("Final Act."); Advisory Action dated January 26, 2017 ("Adv. Act."); Appeal Brief filed April 17, 2017 ("Appeal Br."); and Examiner's Answer dated August 28, 2017 ("Ans.").

[2] Appellant is the Applicant, Halliburton Energy Services, Inc., which is also identified as the real party in interest. Appeal Br. 3.

We AFFIRM.

The Claimed Invention

The claimed subject matter relates to a method for determining impedance of a casing-cement bond of a well structure based on results of comparing a measured waveform and a model waveform. Abstract; Spec. ¶ 1. According to the Specification, analysis of ultrasonic waves reverberating within the casing can provide an estimation of the impedance of cement-casing bonding, and therefore can be used to determine whether the material behind the casing is solid or liquid. Spec. ¶ 2.

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

1. A method comprising:

emitting, by an acoustic transmitter of a logging tool disposed within a well bore, acoustic energy towards a well casing of the wellbore;

detecting, by an acoustic receiver of the logging tool, an acoustic signal returning via the well casing;

determining, based on the acoustic signal, a measured waveform associated with the acoustic signal;

comparing the measured waveform to a model waveform, wherein the model waveform corresponds to an estimated impedance of a medium surrounding an exterior portion of the well casing, and the model waveform corresponds to a ray tracing of the acoustic signal that accounts for a radiation pattern of the acoustic transmitter and a curvature of the well casing;

determining, by operation of data processing apparatus, an impedance of the medium surrounding the exterior portion of the well casing based on results of comparing the measured waveform to the model waveform; and

> ***determining, by operation of the data processing apparatus, a thickness of the well casing based on a correlation between the measured waveform and the model waveform.***

Appeal Br. 14 (Claims App'x) (key disputed claim language italicized and bolded).

The Rejection

On appeal, the Examiner maintains (Ans. 2) the following rejection: claims 1–20 rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Final Act. 2.

OPINION

Having considered the respective positions advanced by the Examiner and Appellant in light of this appeal record, we affirm the Examiner's rejection based on the fact finding and reasoning set forth in the Answer, Advisory Action, and Final Office Action, which we adopt as our own. We highlight and address specific findings and arguments below for emphasis.

Appellant argues independent claims 1, 9, and 17 as a group and does not present separate argument for the patentability of claims 2–8, 10–16, and 18–20. Appeal Br. 6, 12. We select claim 1 as representative and the remaining claims subject to the Examiner's rejection stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner determines that Appellant's claimed invention is unpatentable under 35 U.S.C. § 101 because it is directed to non-statutory subject matter. Final Act. 2–4; *see also* Ans. 3–7. In particular, the Examiner determines that the claims are drawn to the abstract idea of evaluating a casing and cement of a well structure by comparing a measured

waveform and a model waveform, calculating the results, and using the calculated results (i.e., a mathematical correlation) to determine the impedance and thickness of a well casing, and further determines that the recited claim steps "do not amount to significantly more than the abstract idea judicial exception because they solely use generic/conventional hardware and data gathering techniques." Ans. 2–3 (citing *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014)).

The Examiner also determines that

> the recited method steps comprise a series [of] mathematical/algorithmic and/or mathematical formula and/or data processing/analysis steps which correspond to concepts identified as an abstract idea, or ideas, in the form of a mathematical formula similar to those found to be non-patent eligible in, e.g., *Alice*, *Benson*, *Electric Power Group*, *FairWarning*, and *Parker v Flook*.

Id. at 4.

The Examiner concludes that the additional elements recited in the claims, for example, a "data processing apparatus," when considered both individually and as an ordered combination do not amount to significantly more than the abstract idea because the elements comprise generic/conventional data gathering and data processing and computer/computing components. *Id.* at 5 (citing Spec. ¶¶ 16–17, 25, 33, 39–40, 43, 47); *see also Elec. Power Grp. v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016)).

Appellant argues that the Examiner's rejection should be reversed because the claims closely align with certain of the examples provided in the

2014 Interim Guidance on Patent Subject Matter Eligibility[3]; (b) July 2015 Update on Subject Matter Eligibility[4]; and (c) Abstract Ideas Examples of the 2014 IEG[5]. Appeal Br. 7–10.

In particular, citing Example 3 of the 2014 IEG, Example 25 of the July 2015 Update, and Example 3 of the Abstract Ideas, Appellant argues that the combination of steps recited in the claims "taken together (viewed as a whole) amount to significantly more because the steps act 'in concert' to improve another technical field (other than the computer itself)." *Id.* at 8.

Appellant further argues that the recitation "comparing a measured waveform to a model waveform" of the claims "adds meaningful limitations to [the] 'generic/conventional hardware' and 'conventional/generic data gathering' that amount to significantly more than the (abstract idea) judicial exception." *Id.* at 9–10 (citing *Research Corporation Technologies Inc. v. Microsoft Corp.*, 627 F.3d 859 (Fed. Cir. 2010)).

Appellant also argues that the claims do not only contain "generic/conventional hardware" and "conventional/generic data gathering" but that they also "recite an inventive concept tied to a specific machine." *Id.* at 10–11. In particular, Appellant contends that the claims amount to significantly more than the abstract idea because the recited "steps are

---

[3] 2014 Interim Guidance on Patent Subject Matter Eligibility, 79 Fed. Reg. 74618 (published on Dec. 16, 2014) ("2014 IEG").

[4] July 2015 Update on Subject Matter Eligibility, 80 Fed. Reg. 45429 (published July 30, 2015) ("July 2015 Update")

[5] Abstract Ideas Examples of the 2014 IEG (issued January 27, 2015) ("Abstract Ideas").

performed by an acoustic transmitter/receiver and data processing apparatus." *Id.* at 11.

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

The Supreme Court's decision in *Alice* 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 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72 (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*, 566 U.S at 79.

Beginning with the first step of the *Alice* framework, 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) "emitting, by an acoustic transmitter of a logging tool disposed within a well bore"; (2) "detecting, by an acoustic receiver of the logging tool, an acoustic signal"; (3) "determining, based on the acoustic signal, a measured

waveform associated with the acoustic signal"; (4) "comparing the measured waveform to a model waveform"; (5) "determining, by operation of data processing apparatus, an impedance of the medium surrounding the exterior portion of the well casing"; and (6) "determining, by operation of the data processing apparatus, a thickness of the well casing based on a correlation between the measured waveform and the model waveform." Appeal Br. 14 (Claims App'x).

Based on the language of the claim and the Specification, we concur with the Examiner (Ans. 4) and conclude that claim 1 is, at its core, directed to the abstract idea of evaluating a casing and cement of a well structure by collecting, processing, and mathematically manipulating data. *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.*, 830 F.3d at 1353 (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 method for evaluating a casing and cement of a well structure, as opposed to some business method, and the claimed method may be implemented using general purpose computer equipment (i.e., "by operation of data processing apparatus") does not render the claim patent-eligible or the underlying idea any less abstract. *See Alice*, 134 S. Ct. at 2358 (holding that "the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention"); *see also Fair Warning IP, LLC v. Iatric Systems, Inc.*, 839 F.3d 1089, 1095 (Fed. Cir. 2016) (citing *Bancorp*

Services, LLC v. Sun Life Assurance Co., 687 F.3d 1266, 1278 (Fed. Cir. 2012) ("[T]he fact that the required calculations could be performed more efficiently via a computer does not materially alter the patent eligibility of the claimed subject matter.").

Moreover, the Federal Circuit has explained that, in determining whether claims are patent-eligible under Section 101, "the decisional mechanism courts now apply is to examine earlier cases in which a similar or parallel descriptive nature can be seen—what prior cases were about, and which way they were decided." *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016).

We concur with the Examiner that Appellant's claims are similar to those found to be patent-ineligible in prior cases, particularly because, as the Examiner finds, "the recited method steps comprise a series of mathematical/algorithmic . . . and/or data processing/analysis steps which correspond to concepts identified as an abstract idea." Ans. 6 (citing "*Alice Corp.*, *Benson*, *Electric Power Group*, and *Parker v Flook*" as exemplary cases).

Unlike the claims found non-abstract in prior cases, Appellant's 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").

For example, the steps of "determining, by operation of data processing apparatus, an impedance" and "determining, by operation of the data processing apparatus, a thickness of the well casing" recited in claim 1

(steps (5) and (6) enumerated above) could each conceivably be performed using mental steps, pen, and paper. *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"); *see also Elec. Power Grp.*, 830 F.3d at 1354 (treating "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").

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.

Based on the fact-finding and reasons provided by the Examiner at pages 3–6, 8–10, and 12–13 of the Answer and pages 3–4 of the Final Office Action, we concur with the Examiner's determination 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").

As the Examiner finds (Ans. 5–6), claim 1 is directed to and the Specification discloses "generic/conventional data gathering and data processing and computer/computing components" for performing the steps of the method. *See, e.g.,* Spec. ¶ 28 (disclosing general purpose "computing system 200" including a memory, processor, and input/output controller

components), ¶ 58 (disclosing that a general purpose "electronic processor may be used to control acoustic transmitters and receivers" and "used to analyze and process data, for instance to determine an impedance of the casing based on a comparison between the detected acoustic signal and a modeled signal").

As the Examiner further finds (Ans. 10), the claims do not require or recite a special/unique ordered combination of method steps for evaluating a casing and cement of a well structure. Rather, as discussed above, we find that the recited steps are nothing more than instructions to gather and manipulate data implemented using conventional data processing and computer equipment. *Mayo*, 566 U.S. at 82 (explaining that pre- or post-solution activities that are "purely 'conventional or obvious . . . can[not] transform an unpatentable principle into a patentable process'") (quoting *Parker v. Flook,* 437 U.S. 584, 589–90 (1978)).

Appellant does not adequately explain what element or combination of elements transforms the nature of the claim into significantly more than a patent upon the ineligible concept itself. Appellant's contention that the claims amount to significantly more than the abstract idea because the "steps are performed by an acoustic transmitter/receiver and data processing apparatus" (Appeal Br. 11) is not persuasive because it is conclusory and Appellant does not provide an adequate technical explanation to support it. *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984).

Moreover, a patent-ineligible abstract idea is not transformed into a patent-eligible invention merely by "limit[ing] the use of [an abstract idea] 'to a particular technological environment.'" *Alice*, 134 S. Ct. at 2358 (quoting *Bilski v. Kappos*, 561 U.S. 593, 610–11 (2010)).

Appellant's arguments regarding the examples provided in the guidance materials (Appeal Br. 7–10) are not persuasive of reversible error in the Examiner's rejection because determining whether a claim is directed to an abstract idea under § 101 is not limited to the exemplary categories of abstract ideas and examples provided in the guidance materials. Rather, as noted above and we apply here, it is the two-step framework from *Alice* that is used for making such determination.

Appellant's argument regarding the *Research Corporation Technologies* ("*RCT*") decision (Appeal Br. 9–10) is misplaced because, as the Examiner finds (Ans. 12–13), the instant claims are distinguishable from the claims at issue in that case. In *Research Corporation Technologies*, the court observed that the claimed methods (i.e., claims 1 and 2 of US 5,111,310 and claim 11 of US 5,341,228) at issue incorporated algorithms and formulas that control the masks and half-toning. *Research Corporation Technologies*, 627 F.3d at 869 (finding that "[t]he invention presents functional and palpable applications in the field of computer technology").

Here, however, the claimed subject matter is not in the field of computer technology. Rather, it involves evaluating a casing and cement of a well structure by collecting, processing, and mathematically manipulating data.

We, therefore, determine that claim 1 is directed to an abstract idea and fails to recite an inventive concept sufficient to transform the abstract idea into patent-eligible subject matter.

Although claims 9 and 17 are directed to a "non-transitory computer-readable medium encoded with instructions" (claim 9) and a "system" (claim 17), respectively, each of these claims recites limitations nearly

identical to claim 1. *Compare* claim 1 (Appeal Br. 14) *with* claim 9 (Appeal Br. 16) and claim 17 (Appeal Br. 18).

Thus, for principally the same reasons discussed above with respect to claim 1, we determine that claims 9 and 17 are likewise directed to the abstract idea of collecting, analyzing, and mathematically manipulating data and do 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 method, systems, and apparatus claims of a patent "ineligible under § 101 for reciting similar data manipulation steps").

Accordingly, we affirm the Examiner's rejection of claims 1–20 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

DECISION/ORDER

The Examiner's rejection of claims 1–20 is affirmed.

It is ordered that the Examiner's decision is affirmed.

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