UNITED STATES PATENT AND TRADEMARK OFFICE

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ExxonMobil Upstream Research Company
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EXAMINER
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte LEI WANG, JEFFREY R. BAILEY, BRIAN J. O'DONNELL,
DAR-LON CHANG, and GREGORY S. PAYETTE

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Appeal 2018-007442
Application 14/428,212
Technology Center 2800

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Before CAHTERINE Q. TIMM, JEFFREY R. SNAY, and LILAN REN,
Administrative Patent Judges.

TIMM, *Administrative Patent Judge.*

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellants[2] appeal from the

Examiner's decision to reject claims 1–5, 7–32, 38–43, 46, and 47 under 35

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[1] In explaining our Decision, we cite to the Non-Final Office Action of June
22, 2017 (Non-Final), Appeal Brief of December 20, 2017 (Appeal Br.),
Examiner's Answer of May 31, 2018 (Ans.), and Reply Brief of June 29,
2018 (Reply Br.).
[2] Appellants identify the real party in interest as ExxonMobil Upstream
Research Company. Appeal Br. 2.

U.S.C. § 101 because the claims are patent ineligible. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM. In so doing, we adopt the Examiner's well-supported findings and conclusions as stated in the rejection appealed from. Non-Final 2–8. As the Examiner has cogently and thoroughly addressed Appellants' arguments in the Answer (Ans. 2–19), there is little need to elaborate in any detail on those responses. Instead, we add the following for emphasis.

OPINION

Appellants do not argue any claim apart from the others. Appeal Br. 6–15. We select claim 1 as representative.

The Examiner rejects claim 1 because it is directed to an abstract idea without significantly more. Non-Final 2; Ans. 2–3. The Examiner reproduces claim 1, with underlining to identify the portions of the claim directed to the abstract idea. Ans. 2–3.

Claim 1, as reproduced by the Examiner, reads:

> 1. A method of drilling a wellbore in a subterranean formation using a drill bit on a drill string while detecting for a downhole bit dysfunction, comprising:
>
> receiving at frequent points during drilling at least two of a plurality of drilling parameters for each of a plurality of points during drilling characterizing a wellbore drilling operation, wherein each point corresponds to at least one of a time point and a depth point, and wherein the plurality of drilling parameters comprise at least one of a surface torque (TO_b), a downhole bit torque (TO_b), a weight on bit (WOB), a drillstring rotation rate (RPM), a rate of penetration (ROP), a time, a wellbore depth, a bit depth, and a depth of cut (DOC);

        calculating a bit aggressiveness (μ) at each of the plurality of points during drilling;

        calculating a depth-of-cut (DOC) and a time derivative of bit aggressiveness (μ) calculated as $d\mu/dt$ at each of the plurality of points;

        generating using a processor a two-dimensional data representation of the plurality of points comprising μ in one dimension and at least one of DOC and μ in another dimension, in a moving window using a first-in-first-out data buffer to update the generated two-dimensional data representation;

        predefining criteria for the generated two-dimensional data representation corresponding to a downhole bit dysfunction;

        extracting at least one of trend and discrete data features from the generated two-dimensional data representation of the plurality of points in the moving window;

        comparing the extracted data features with the predefined criteria to assess bit performance to detect a downhole bit dysfunction;

        adjusting in response to the detected downhole bit dysfunction at least one of the plurality of drilling parameters, including adjusting at least one of a weight on bit and a drillstring rotation rate; and

        operating the drill bit to drill at least a portion of the wellbore according to at least one of an adjusted weight on bit and an adjusted drillstring rotation rate.

Ans. 2–3.

The Examiner determines that the identified abstract idea involves processing data through mathematical relations or algorithms. Non-Final 2–4; Ans. 3. Appellants concede this point and acknowledge that step 2A of

the *Mayo* framework is met. Appeal Br. 7. Appellants, however, contend that the Examiner improperly conducted step 2B of the *Mayo* framework because the Examiner did not consider all the limitations of the claims as a whole. Appeal Br. 7–15.

Appellants have not persuaded us of reversible error in the Examiner's step 2B analysis. We determine that the Examiner's analysis includes both an analysis of the individual steps and considers the process as a whole as is required by the *Mayo* framework. Non-Final 4–5; Ans. 4–6.

First, we summarize the present state of the law, which we must follow until such time as either the Supreme Court or Congress changes it.

Section 101 states 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 even if a claim at first blush appears to be directed to one of the statutory classes of invention listed in § 101, it may be not eligible for a patent. "Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70–72 (2012) (quoting *Diamond v. Diehr,* 450 U.S. 175, 185 (1981) (quoting *Gottschalk v. Benson,* 409 U.S. 63, 67 (1972)). Thus, a claim that, due to the drafting efforts of the applicant, appears to fit into one of the statutory classes, but, in fact, would unduly pre-empt others from making and using the basic tools of scientific and technological work, is not patentable. *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354–55, 57 (2014).

In *Alice*, the Court extended a framework that had been used in *Mayo* for distinguishing claims pre-empting laws of nature, natural phenomena, and abstract ideas from claims amounting to patent-eligible applications of those concepts. *Alice*, 134 S. Ct. at 2355. As stated in *Alice*:

> First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, "what else is there in the claims before us?" To answer that question, we consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application. We have described step two of this analysis as 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.

Alice, 134 S. Ct. at 2355 (internal quotation marks and citations to *Mayo* omitted).

The *Alice/Mayo* analysis begins with the question "whether the claims at issue are directed to a patent-ineligible concept." *Alice*, at 2355. "[T]he 'directed to' inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether 'their character as a whole is directed to excluded subject matter.'" *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (quoting *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)).

"At *Mayo* step two, we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, at 2357 (quoting *Mayo*, at 1294, 1298). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is

more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (quoting *Mayo,* at 1297). The advance cannot wholly reside in patent-ineligible concepts themselves such as mathematical formulas and algorithms. *See Parker v. Flook,* 437 U.S. 584, 591 (1978) ("The process itself, not merely the mathematical algorithm, must be new and useful."). Nor does an abstract idea become non-abstract by limiting the invention to a particular field of use or technological environment. *See Alice,* 134 S.Ct. at 2358 (limiting an abstract idea to a particular technological environment, such as a computer, does not confer patent eligibility); *Bilski v. Kappos,* 561 U.S. 593, 612 (2010) ("[L]imiting an abstract idea to one field of use ... d[oes] not make the concept patentable."); *Flook,* 437 U.S. at 595 ("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 quotations omitted)).

We now turn to the Examiner's rejection.

The Examiner established that the underlined steps were directed to an abstract idea, an algorithm, i.e., a procedure for solving a given type of mathematical problem. The Examiner further established that the other steps of receiving, adjusting, and operating were recited at a high level of generality and were well understood, routine, and conventional. Ans. 4–5, citing Wang ¶ 57 ("It is well-known that one means of mitigating stick-slip is to increase the surface RPM and/or reduce WOB"); Gregg ¶ 8 ("Once bit balling is diagnosed, conventional methods of remediation are to increase the weight on the bit, add chemicals and perhaps pull the drill pipe out of the hole to clean the bit and bottom hole assembly"); Mauldin ¶ 2 ("it is useful

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to monitor vibration of the drillstring, bit, and BHA and to monitor the drilling assembly's rate of rotation to determine what is occurring downhole during drilling. Based on the monitored information, a driller can then change operating parameters, such as weight on the bit (WOB), drilling collar RPM, and the like, to increase drilling efficiency").

As acknowledged by Appellants, the novel and non-obvious aspect of the claim resides in the combination of calculations, plotted two-dimensional relationships, and time derivative determinations of the algorithm. Reply Br. 6. Appellants contend that the additional limitations tie the mathematical and graphical operations to a process that transforms a subterranean formation into a subterranean formation having a useful, efficiently constructed wellbore therein that is a technological improvement. Reply Br. 7. But the prior art also constructed a wellbore while monitoring and adjusting such parameters as WOB and RPM, and merely tying the abstract idea to a technological process is not enough when the steps of the technological process are the type of well-known, routine, and conventional steps conducted in the prior art. *See Flook*, 437 U.S. at 595 ("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 quotations omitted)). There must be something more to the inventive concept than the abstract algorithm itself. *See, e.g., Diamond v. Diehr*, 450 U.S. 175, 178–79 (1981) (holding claims eligible because the improvement was not solely in the use of the Arrhenius equation, but was in the combination of steps including constantly measuring the actual temperature inside the mold (which had not been

previously done), recalculating the ideal cure time, and automatically opening the press when the ideal cure time equaled the actual time elapsed).

The Examiner did not conclude the claim was ineligible merely because it contains a mathematical algorithm. The Examiner took into account all the steps of the process when determining that the inventive concept resides within the algorithm itself and not in its combination with the other steps. This is not inconsistent with the view that a patent claim must be considered as a whole. *See Flook*, 437 U.S. at 594.

CONCLUSION

We sustain the Examiner's rejection under 35 U.S.C. § 101.

DECISION

The Examiner's decision is affirmed.

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)(1).

AFFIRMED