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HALLIBURTON ENERGY SERVICES, INC. C/O PARKER JUSTISS, P.C. 14241 DALLAS PARKWAY SUITE 620 DALLAS, TX 75254			DICKEY, THOMAS L	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MATHEW DENNIS ROWE and
WALTER VARNEY ANDREW GRAVES

Appeal 2019-006122
Application 15/028,769
Technology Center 2800

Before CATHERINE Q. TIMM, BEVERLY A. FRANKLIN, and
N. WHITNEY WILSON, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–20. *See* Final Act. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Halliburton Energy Services, Inc. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The subject matter of the claims relates to computer software used in well drilling. Spec. ¶¶ 8–9; claims 1, 11, and 16. The claims recite a computer-implemented method (*see, e.g.*, claim 1), a non-transitory computer-readable medium storing instructions for executing the method (*see, e.g.*, claim 11), and a system including one or more processors and a computer-readable medium storing the instructions executable by the one or more processors to perform the method (*see, e.g.*, claim 16).

According to the Specification, formation gas, i.e., gas trapped in a subterranean formation, is released when a well is drilled. Spec. ¶ 8. This released gas can be composed of different hydrocarbons at different concentrations in different subterranean reservoirs. Spec. ¶¶ 3, 8. The gas composition can serve as fingerprint for the reservoir as it identifies a reservoir by its unique composition. Spec. ¶ 3. By determining the composition's fingerprint one can determine if a new well lies in a new reservoir or lies in an extension of a previously discovered reservoir. *Id.* Knowledge of the fingerprint also enables mapping the extent of the reservoir and estimating the reservoir's size. *Id.* Fingerprinting requires evaluating the extracted gas to determine the constituent species and their concentrations. Spec. ¶ 8.

Appellant's computer-implemented method corrects for deficiencies in the gas extraction from the drilling fluid. Spec. ¶¶ 9–10. The method implements a mathematical model based on Fick's laws of diffusion. Spec. ¶ 9. The mathematical model is used to calculate two diffusion coefficients, a theoretical diffusion coefficient and an experimental diffusion coefficient. Spec. ¶ 9. The theoretical diffusion coefficient is calculated using a perfect mass flux. *Id.* The experimental diffusion coefficient is determined using an

experimental mass flux. *Id.* The difference in values is used to correct the experimental data to the experimental mass flux. *Id.* This data is used to determine a concentration of the gas at the formation. Spec. ¶ 41. Knowing the composition and concentrations of the gas at different locations (e.g., depths) in the well can enable fingerprinting the formation gas. Spec. ¶ 10.

Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A computer-implemented method of drilling a well comprising:

determining a theoretical diffusion coefficient for a drilling fluid comprising a gas from a formation, the theoretical diffusion coefficient determined based on an extraction of all of the gas from the drilling fluid;

determining an experimental diffusion coefficient for the drilling fluid based on well drilling parameters including a flow rate of the drilling fluid through the well;

determining a concentration of the gas at the formation based, at least in part, on a difference between the theoretical diffusion coefficient and the experimental diffusion coefficient; and

providing the determined concentration of the gas at the formation, wherein the determined concentration of the formation gas enables fingerprinting the formation gas, the fingerprinting used to:

determine if the formation gas is from a new gas reservoir or is part of an existing gas reservoir;

enable mapping the extent of the new or existing gas reservoir; and

estimate a size of the new or existing reservoir, the fingerprinting performed while the well is being drilled.

REJECTION

The Examiner rejects claims 1–20 under 35 U.S.C. § 101 as patent ineligible. Final Act. 2.

OPINION

The Examiner’s rejection is based on a determination that the claimed invention is directed to a judicial exception (an abstract idea) without significantly more. Final Act. 2; Ans. 4.

Appellant contends that claims 1, 11, and 16 are patent eligible after applying the *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (“2019 PEG”)². Appeal Br. 6. The issue is the same for all the claims. Thus, we select claim 1 as representative.

The 2019 PEG provides a framework for evaluating questions of patent eligibility. Under the framework, we look to see whether the claim recites:

(1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human interactions such as a fundamental economic practice, or mental processes), (designated as Step 2A (Prong One) in the 2019 PEG); and

(2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h)) (designated as Step 2A (Prong Two)).

² Updated October 17, 2019. *See* October 2019 Patent Eligibility Guidance Update, available at uspto.gov/PatentEligibility.

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception (designated as Step 2B).

The first issue we encounter relates to Step 2A, Prong One. Under Step 2A, Prong One if the claim recites any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human interactions such as a fundamental economic practice, or mental processes, we must move to Step 2A, Prong Two.

We agree with the Examiner that claim 1 recites abstract ideas. The determining steps are steps of computing using Fick’s laws of diffusion and other mathematical calculations. Spec. ¶¶ 16–41. These are mathematical concepts and can be performed as mental processes.

Appellant contends that the determination of the concentration of the gas at the formation (by the comparison of the theoretical and experimental diffusion coefficients) identifies unique compositions of components of the formation gas and this identification is not an abstract idea. Appeal Br. 6–7.

We are not persuaded by Appellant’s contention. The Specification describes the step of determining a concentration of the gas at the formation as a computer-implemented step based on determining the difference between two values, the theoretical diffusion coefficient and the experimental diffusion coefficient. Spec. ¶ 41. Taking the difference

between two values is a mathematical operation. Nothing in the claim nor in the Specification describes it as anything more. Thus, the determining steps recite mathematical concepts and mental processes under Step 2A, Prong One.

The second issue we encounter relates to Step 2A, Prong Two. Under Prong Two if additional elements integrate the judicial exception into a practical application, the claim is not directed to a judicial exception.

We agree with the Examiner that claim 1 fails to integrate the mathematical and mental steps into a practical application.

To decide the question of whether claim 1 has additional elements which integrate the judicial exception into a practical application, we must identify the additional elements of claim 1.

First, we determine that the step of providing the determined concentration of the gas at the formation, according to the Specification, is a step of providing a value or data representing the concentration as an output of the computer-implemented method. Spec. ¶ 42. The Specification describes providing the determined concentration of the formation gas as, for example, an output to an output device such as a monitor, a printer, or other output device (*id.*), but claim 1 is not so limited. Providing the determined concentration encompasses writing the concentration information on paper or speaking the result of the calculation. In other words, providing the determined concentration may be part of the mental process.

Second, we determine that the recitations after the word “enable” convey abstract ideas. *Enabling* fingerprinting is not an affirmative method step, it is merely the statement of a capability or what might be accomplished in the future using the data. Outputting the concentration data from the computer-implemented method enables fingerprinting, i.e., it

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allows fingerprinting to be possible. Articulating this possibility represents an abstract concept performed in the human mind, i.e., a mental process under Prong One.

Claim 1 further recites uses for fingerprinting and the timing of it. But these potential uses and timing for fingerprinting are abstract because they represent more aspects of the mental process of a wish or a plan to accomplish fingerprinting. Again, claim 1 recites no affirmative step of performing fingerprinting.

Thus, we determine that claim 1 recites four affirmative method steps, three determining steps and one providing step. We further determine the determining steps recite mathematical concepts and the providing step is a step of reporting the result of the mathematical calculations that can be performed as a mental step and further recites what the reporting of the result enables, which is a further abstract concept.

Now that we have determined which portions of the claim 1 recite abstract ideas, we turn to the question of Prong Two. In Prong Two, we “evaluate whether the claim as a whole integrates the recited judicial exception into a practical application of the exception.” 2019 PEG at 54. To integrate the judicial exception into a practical application, the claim must “apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception.” *Id.*

Appellant contends that the claims pass Prong Two because the claimed fingerprinting is a practical application of the determination of the concentration of formation gas that is performed “‘in a manner that imposes a meaningful limit’ on the comparison of the theoretical and experimental diffusion coefficients that is ‘more than a drafting effort designed to

monopolize’ the comparison of the theoretical and experimental diffusion coefficients.” Appeal Br. 7. Although we agree with Appellant that fingerprinting is an application of the calculations, the manner in which fingerprinting is described in the claim does not impose a meaningful limit on the claim. There are no affirmative steps of performing fingerprinting in claim 1.

Further, the required integration is not present because the claim merely recites instructions for implementing an abstract idea (mathematical calculations) on a computer and what that calculation enables. The computer is used as a tool to perform calculations and the method is not an improvement to the computer. Such generic computer implementation is not sufficient to transform an abstract idea into a patent eligible process or device. *Alice*, 573 U.S. at 223–24 (“wholly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself’” (quoting *Mayo*, 566 U.S. at 77)); *Electric Power Group*, 830 F.3d at 1355 (“the claims’ invocation of computers, networks, and displays does not transform the claimed subject matter into patent-eligible applications”).

Appellant presents no persuasive arguments against the Examiner’s determination that claim 1 fails to provide an inventive concept. As Appellant does not challenge the Examiner’s evaluation under Step 2B of the 2019 PEG, Appellant has not identified a reversible error in the Examiner’s Step 2B determination.

Appellant has not identified a reversible error in the Examiner’s determination that the claims are ineligible for a patent.

CONCLUSION

The Examiner's decision to reject claims 1–20 is AFFIRMED.

DECISION SUMMARY

In summary:

Claim(s)	35 U.S.C. §	Basis/Reference(s)	Affirmed	Reversed
1–20	101	Eligibility	1–20	

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). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED