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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/760,142	07/09/2015	Donghong Pei	2013-IP-072302 U1 US	9316

142050 7590 02/07/2020

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ART UNIT	PAPER NUMBER
2826	

NOTIFICATION DATE	DELIVERY MODE
02/07/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DONGHONG PEI,
ROBERT JASON GIBBS, and RAN ZHOU

Appeal 2019–001111
Application 14/760,142
Technology Center 2800

Before JEFFREY T. SMITH, N. WHITNEY WILSON,
and MERRELL C. CASHION, JR., *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant appeals from the Examiner's Final decision to reject claims 1–20.[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 Halliburton Energy Services, Inc. as the real party in interest. (Appeal Br. 2.)

STATEMENT OF THE CASE

Claim 1 illustrates the subject matter on appeal and is reproduced below:

> 1. A seismic data analysis system, comprising:
> one or more seismic receivers that gather seismic data from a plurality of positions in a borehole that penetrates a formation;
> memory that stores the seismic data; and
> logic that analyzes the seismic data using a tilted transversely isotropic (TTI) model based on simultaneous inversion of asymmetric axis velocity (V_0) and Thomsen parameters, epsilon (ε), and delta (δ), the simultaneous inversion of V_0, ε, and δ including applying a Very Fast Simulated Annealing (VFSA) process to values for V_0, ε, and δ.

(Appeal Br. 15, Claims App.)

The following rejection is presented for our review: [2]

Claims 1–20 are rejected under 35 U.S.C. § 101.

OPINION

After review of the respective positions Appellant and the Examiner provide, we AFFIRM the Examiner's rejection under 35 U.S.C. § 101.

Appellant relies on the same line of arguments to address the rejection of independent claims 1, 11, and 17 and does not present separate arguments for their respective dependent claims. (Appeal Br. 6–13.) Accordingly, we select claims 1, 11, and 17 as representative of the claimed subject matter for

[2] The complete statement of the rejection on appeal appears in the Final Office Action, mailed February 8, 2018 (hereinafter "Final Act."). (Final Act. 2–5.)

review on appeal for this rejection. Claims 2–10, 12–16, and 18–20 stand or fall with their respective independent claim. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that the subject matter of claim 1 is directed to the abstract idea particularly the combination of data collection and analysis utilizing mathematical concepts. (Ans. 3). The Examiner finds that the subject matter of claims 11 and 17 is analogous to independent claim 1. (Ans. 4–5). According to the Examiner, the subject matter of claim 1 is analogous to organizing information through mathematical correlations (*Digitech Image Technologies, LLC v. Electronics for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014)), an algorithm for calculating parameters indicating an abnormal condition (*In re Grams*, 888 F.2d 835, 836–37 (Fed. Cir. 1989)), mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)), and collecting information, analyzing it, and displaying certain results of the collection and analysis (*Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016)). The Examiner also determines that claims 1, 11, and 17 do not include additional elements that are sufficient to amount to significantly more than the judicial exception. (Ans. 3–5.)

In *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2355 (2014), the Supreme Court reiterated the following two-step analysis (previously set forth in *Mayo Collaborative Services v. Prometheus Labs., Inc.*, 132 S.Ct. 1289, 1300 (2012)) for distinguishing patents that claim patent-ineligible laws of nature, natural phenomenon, and abstract ideas from those that claim patent-eligible applications of those concepts:

> 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? [] 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.

The Office published revised guidance on the application of § 101. USPTO's January 7, 2019 Memorandum, *2019 Revised Patent Subject Matter Eligibility Guidance* ("Memorandum"), 84 Fed. Reg. 50.[3] Under that guidance, we first look to whether the claim recites:

(1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activity such as a fundamental economic practice, or mental processes); and

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

Only if a claim recites a judicial exception and 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.

See generally Memorandum.

[3] We recognize that the Memorandum was not available to the Examiner and Appellant during the prosecution of the instant Application.

With respect to the first step under Alice, we agree with the Examiner that the claims fall under a statutory category, a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. In this case, the claims are directed to a method and a device. (Ans. 3.)

We now follow the Memorandum to analyze claims 1, 11, and 17 to determine if they are directed to a patent-ineligible subject matter (Step 2A).

Applying the guidance set forth in the Memorandum, we conclude that claims 1–20 do not recite patent-eligible subject matter.

Claim 11

We first address independent method claim 11. Claim 11 recites a method for seismic data analysis comprising a step of "analyzing [] seismic data using a tilted transversely isotropic (TTI) model based on simultaneous inversion of an asymmetric axis velocity (V_0) and Thomsen parameters, epsilon (ε,), and delta (δ), the simultaneous inversion of V_0, ε, and δ including applying a Very Fast Simulated Annealing (VFSA) process to values for V_0, ε, and δ.

The step of analyzing the seismic data using a tilted transversely isotropic (TTI) model based on simultaneous inversion of an asymmetric axis velocity (V_0) and Thomsen parameters, epsilon (ε,), and delta (δ), the simultaneous inversion of V_0, ε, and δ including applying a Very Fast Simulated Annealing (VFSA) process to values for V_0, ε, and δ is recites a mathematical concept. According to the Specification, the TTI model is optimized based on simultaneous inversion of V_0, ε, and δ. Spec. 11. The Specification also discloses that "the formation analysis module 272 may cause the processor 256 to produce a seismic section from VSP walkaway data, select a first arrival pick from the seismic section, *calculate* a first

arrival time as a travel time from a seismic source to a geophone through the TTI model, and determine values for V_0, ε, and δ by minimizing the difference between the first arrival pick and the *calculated* first arrival time." *Id*. (emphasis added); *see also id.* 12–13 (discussing equations used in the optimization). Because these are mathematical calculations/analyses, this step is recites a mathematical concept.

Claim 1

Independent claim 1 recites a seismic data analysis system comprising one or more seismic receivers that gather seismic data, a memory that stores the seismic data; and a logic that performs the seismic data analysis step of claim 11. As the Examiner notes, claim 1 recites these components at a high level of generality. Final Act. 3. The Specification describes the seismic receivers in broad terms as traditionally used to detect and record direct or reflected seismic waves for later analysis. Spec. 1. The Specification also indicates that the memory may be a FLASH memory or other non-volatile memory. *Id*. at 8. The claimed logic appears to be a program code/software that is executable to perform the analysis of the seismic data. Appeal Br. 4.

These devices are merely configured so as to perform the method of claim 11, which recites a judicial exception, i.e., mathematical concept, and the system likewise also recites this judicial exception. Fundamentally, this claim recites the same judicial exception, a mathematical concept, for substantially the same reasons as provided above regarding claim 11.

Claim 17

Independent claim 17 recites a non-transitory computer-readable medium storing seismic data analysis software that, when executed, performs the computer-implemented method corresponding to that of claim 11. As such, claim 17 recites the same judicial exception as claim 11—a mathematical concept.

Accordingly, applying the guidance in the Memorandum, we conclude that claims 1, 11 and 17 each recite an abstract idea, i.e., a mathematical concept, and thus recite a judicial exception.

Appellant argues that independent claims 1, 11, and 17 are not a patent ineligible abstract idea because:

> the Claims are directed to a method, non-transitory computer-readable mediums, and a system of seismic data analysis that analyze seismic data gathered by seismic receivers in a downhole using a tilted transversely isotropic (TTI) model, parameters of which are simultaneously determined using a Very Fast Simulated Annealing (VFSA) process. As such, while the Claims may involve an abstract idea, they do not recite it and thus are not directed to an abstract idea.

(Appeal Br. 9.)

We have considered Appellant's arguments and are unpersuaded of reversible error in the Examiner's determination.

Based on the foregoing analysis, we have determined that the claims recite a judicial exception. For the reasons discussed below, Appellant's argument that the claims may involve an abstract idea but, at the same time, are not directed to an abstract idea lacks persuasive merit.

Having determined that the subject matter of claims 1, 11, and 17 recites an abstract idea, we now consider under Step 2A (Prong 2)[4] of the Guidance whether the claim as a whole integrates the recited judicial exception into a practical application of the exception. Guidance, 84 Fed. Reg. at 54. "A claim that integrates a judicial exception into a practical application will 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.* When a claim recites a judicial exception and fails to integrate the exception into a practical application, the claim is "directed to" the judicial exception. *Id.* at 51.

Here, Appellant argues that "[a]s an ordered combination, the limitations in the Claims provide, for example, an improvement to the field of exploration seismology by enhancing the ability to analyze seismic data and find an ideal site for an exploratory well. Appeal Br. 11.

Appellant has not directed us to portions of the Specification to support the position that the claimed invention is an improvement to the field of exploration seismology. The Specification lacks any description or evidence as to how the field of exploration seismology is improved. The Specification lacks sufficient detail about how the ability to analyze seismic data is enhanced and how this analysis is utilized to improve to the field of exploration seismology as argued by Appellant.

[4] We acknowledge that some of these considerations may be properly evaluated under Step 2 of *Alice* (Step 2B of Office Guidance). Solely for purposes of maintaining consistent treatment within the Office, we evaluate it under Step 1 of *Alice* (Step 2A of Office Guidance). *See generally* Guidance, 84 Fed. Reg. 50.

Appellant argues the claims amount to significantly more than the abstract idea because the claims improve another technological field. Appellants specifically states:

> As an ordered combination, the limitations in the Claims provide, for example, an improvement to the field of exploration seismology by enhancing the ability to analyze seismic data and find an ideal site for an exploratory well. By optimizing a TTI model using a VFSA process and VSP walkway data and using the optimized TTI model to analyze seismic data, the seismic data can be analyzed to reveal information about the structure and distribution of rock types and their contents even in anisotropic formation.

(Appeal Br. 11 (citing Spec ¶¶ 42–44 and 54–55).)

To show that the invention is an improvement in the field of exploration seismology, the disclosure must provide sufficient details such that one of ordinary skill in the art would recognize the claimed invention as providing an improvement. *Compare McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314–16 (Fed. Cir. 2016) (the Specification explained how the particular rules recited in the claim enabled the automation of specific animation tasks), *with Affinity Labs of Tex. v. DirecTV, LLC*, 838 F.3d 1253, 1264–65 (Fed. Cir. 2016) (the Specification failed to provide details regarding the manner in which the invention accomplished the alleged improvement); *and* MPEP § 2016.05(a).

The Specification lacks any description or evidence as to how the field of exploration seismology is improved. Rather, the Specification describes using seismic receivers to gather data was well-understood, routine, conventional activity in the industry. (Spec. 1–2.) The

Specification lacks sufficient detail about how the ability to analyze seismic data is enhanced and how this analysis is utilized to improve to the field of exploration seismology as argued by Appellant. (Appeal Br. 11.) We, thus, find nothing in the claims which goes beyond the abstract idea to transform the claim into eligible subject matter. Therefore, the additional elements recited in independent claims 1, 11, and 17 do not provide "significantly more" than the recited judicial exception and the recited abstract idea is not integrated into a practical application.

We now turn to the step 2B under *Alice* to consider if there is an inventive concept that is sufficient to ensure that the patent amounts to significantly more than a patent on the patent-ineligible concept. *Alice*, 134 S.Ct. at 2355 (citing *Mayo*, 132 S.Ct. at 1294). This includes whether the claims add a specific limitation beyond the judicial exception that is not "well-understood, routine, conventional" in the field. Memorandum, 84 Fed. Reg. at 56.

Independent claim 11 only generally recites the use of a seismic receivers that gather seismic data from a plurality of positions in a borehole that penetrates a formation. As we note above, the Specification describes the seismic receivers in broad terms as traditionally used to detect and record direct or reflected seismic waves for later analysis. Spec. 1.

Independent claim 1 recites a seismic data analysis system comprising one or more seismic receivers that gather seismic data, a memory that stores the seismic data; and a logic that performs the seismic data analysis step of claim 11. The Specification describes the seismic receivers in broad terms as traditionally used to detect and record direct or reflected seismic waves for later analysis. Spec. 1. The Specification also indicates that the memory

may be a FLASH memory or other non-volatile memory. *Id*. at 8. The claimed logic appears to a program code/software that is executable to perform the analysis of the seismic data. Appeal Br. 4.

Independent claim 17 merely recites a non-transitory computer-readable medium storing seismic data analysis software that, when executed, performs the computer-implemented method corresponding to that of claim 11.

The independent and dependent claims do not include additional elements that contain inventive concept that would amount to significantly more than the judicial exception. As pointed out by the Examiner, the limitations one or more seismic receivers, memory, and logic, taken alone or as an ordered combination, are not considered significantly more since they are recited at a high level of generality. (Ans. 2–3.) Furthermore, using seismic receivers to gather data was well-understood, routine, conventional activity in the industry. (Spec. 1–2.) Thus, Appellant has not established reversible error in the Examiner's determination that the subject matter of claims 1, 11, and 17 lack additional elements that transforms the subject matter of the claim into a patent-eligible application under the second step of Alice. (Ans. 3.)

Appellant further argues

> the independent [c]laims recite gathering seismic data using specific tools, e.g., downhole seismic receivers that are positioned inside a borehole, and analyzing the gathered seismic data using a specific earth model, e.g., a TTI model, which is optimized using a specific optimization process, e.g., a VFSA process and VSP walkaway data. By reciting specific tools and processes in gathering and analyzing seismic data, the Claims do not merely recite the alleged abstract idea in isolation but effectively integrates and ties the idea to a physical process

> of a seismic while drilling (SWD) and/or logging or measurement while drilling (L/MWD). As such, the Claims place meaningful limitations on the use of the alleged abstract idea and, when viewed as a whole, these limitations amount to significantly more than the alleged abstract idea.

(Appeal Br. 12.)

We are unpersuaded by these arguments. Appellant has not directed us to limitations in the claims or descriptions in the Specification that specifically describes meaningful limitations on the use of the abstract idea that amount to significantly more than the abstract idea.

Accordingly, we conclude that claims 1–20 are directed to patent-ineligible subject matter under 35 U.S.C. § 101.

CONCLUSION

In summary:

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

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