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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YU ZHANG

Appeal 2017-000279
Application 13/442,158¹
Technology Center 3600

Before ANTON W. FETTING, MICHAEL C. ASTORINO, and
AMEE A. SHAH, *Administrative Patent Judges*.

ASTORINO, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), the Appellant appeals from the Examiner’s decision rejecting claims 1–8 and 17–20 under 35 U.S.C. § 101 as being directed to a judicial exception without significantly more.² Final Act. 5. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We REVERSE.

¹ According to the Appellant, “[t]he real party in interest is the assignee, CGGVERITAS SERVICES SA.” Appeal Br. 2.

² The Examiner has withdrawn the rejection of claims 9–16 under 35 U.S.C. § 101. Ans. 3.

STATEMENT OF THE CASE

Claimed Subject Matter

Claims 1 and 17 are the independent claims on appeal. Claim 1, reproduced below, is illustrative of the subject matter on appeal.

1. A method for generating an image of a tilted orthorhombic medium, the method comprising:
 - receiving seismic data related to the tilted orthorhombic medium;
 - propagating wave-fields with a processing device by applying a second-order equation for reverse time migration to the seismic data to obtain tilted orthorhombic wave propagation;
 - and
 - generating the image of the tilted orthorhombic medium based on the tilted orthorhombic wave propagation.

ANALYSIS

Under 35 U.S.C. § 101, a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” The Supreme Court has “long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 588–89 (2013)).

The Supreme Court in *Alice* reiterated the two-step framework, set forth previously in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 78–79 (2012), “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice*, 134 S. Ct. at 2355. The first step in that analysis is to “determine whether the claims at issue are *directed to* one of those patent-ineligible concepts.” *Id.* (emphasis

added) (citing *Mayo*, 566 U.S. at 79). If so, the second step is to consider the elements of the claims “individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 566 U.S. at 78–79).

Turning to step one of the *Mayo/Alice* two-step framework, we consider the claims “in their entirety to ascertain whether their character as a whole is directed to excluded subject matter.” *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015). The question is whether the claims as a whole “focus on a specific means or method that improves the relevant technology” or are “directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery.” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016).

In the Final Office Action, the Examiner determines that the:

[c]laims . . . are directed to a method including steps for receiving seismic data, propagating wave-fields with a processing device by applying a second-order equation for reverse time migration to the seismic data to obtain tilted orthorhombic wave propagation; and generating an image of the tilted orthorhombic medium based on the tilted orthorhombic wave propagation, a computer-readable medium encoded with instructions to practice such a method, and a computing device including an interface to receive seismic data and a processor to execute the steps.

Final Act. 5. Additionally, the Examiner determines “first, the wavefield propagation using a second order equation is an implementation of an abstract idea, namely reverse time migration in a discretized form with application of mathematical rotation operators, and second, the generating an image is itself merely an implementation of an abstract idea, i.e.,

mathematical operations.” *Id.* at 6. In the Answer, the Examiner appears to focus solely on the claim limitation directed to propagating wave-fields with a processing device by applying a second-order equation is a mathematical relation or algorithm. *See* Ans. 5–7 (citing *Alice*; *Parker v. Flook*, 437 U.S. 584 (1978); *Diamond v. Diehr*, 450 U.S. 175 (1981)); *see also* Final Act. 4 (“claim 1 recites ‘a second order equation for reverse time migration.’ This is nothing if not a recitation of a mathematical relationship or a formula.”).

The Appellant argues that “[t]he claimed subject matter is not directed to an abstract idea just because one of the steps recites a step that – among other features – is performed by applying an [sic] second order differential equation.” Reply Br. 3. Further, the Appellant points out that:

claim 1 sets forth a method for generating an image of a tilted orthorhombic medium including the steps of receiving seismic data related to the tilted orthorhombic medium, propagating wave-fields . . . [to the seismic data] to obtain tilted orthorhombic wave propagation, and generating the image of the tilted orthorhombic medium based on the tilted orthorhombic wave propagation.

Id. And, the Appellant argues that claims are directed to “methods . . . able to process seismic data acquired over tilted orthorhombic medium and to generate stable images thereof, thus improving geological survey.” Appeal Br. 15. The Appellants’ arguments are persuasive.

The Specification provides evidence as to what the claimed invention is directed. The Specification describes the field of the invention as “generally relat[ing] to methods . . . for generating high quality Reverse Time Migration (RTM) images of a subsurface and, more particularly, to mechanisms and techniques for generating the RTM images for corresponding tilted orthorhombic media.” Spec. ¶ 2. The Specification

instructs that imaging processing of seismic data is useful to those trained in the field as it suggests the presence or absence of oil and/or gas. *See id.* ¶ 3. The Specification expresses the purpose of the claimed invention; namely, “it would be desirable to provide systems and methods that extend the RTM equations from TTI to tilted orthorhombic medium and are also stable from a numerical point of view and provide high-quality RTM images.” *Id.* ¶ 10. The preambles of independent claims 1 and 17 provide for a method and apparatus for “generating an image of a tilted orthorhombic medium.”
Appeal Br. 16, 20, Claims App.

In light of the evidence, we determine that the Examiner’s characterization of claim 1 does not consider the claim as a whole. Also, we determine that claim 1 is more accurately characterized as a method of generating images by processing seismic data acquired over a tilted orthorhombic medium. We make no determinations as to whether this is an abstract idea, is a “specific means or method that improves the relevant technology,” or is “a result or effect that itself is the abstract idea and merely invokes generic processes and machinery.” *McRO*, 837 F.3d at 1314.

Thus, we do not sustain the Examiner’s rejection of claims 1–8 and 17–20.

DECISION

We REVERSE the Examiner’s decision rejecting claims 1–8 and 17–20.

REVERSED