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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD STUART SMITH and
ALEXANDER PETER ANNAN[1]

Appeal 2018-006179
Application 14/386,192
Technology Center 2800

Before CATHERINE Q. TIMM, MICHELLE N. ANKENBRAND, and CHRISTOPHER C. KENNEDY, *Administrative Patent Judges*.

KENNEDY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1, 4, 5, and 10–26. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

BACKGROUND

The subject matter on appeal relates to "methods for conducting geophysical surveys using electromagnetic fields and gradients," and to associated systems and computer-readable media. *E.g.*, Spec. 1; Claims 1, 4,

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[1] The Appellant is the Applicant, FUGRO CANADA CORP., and the real party in interest is identified as CGG SERVICES SA. App. Br. 2.

and 5. Claim 1 is reproduced below from page 19 (Claims Appendix) of the Appeal Brief:

> 1. A method for processing electromagnetic field measurements from a survey of an underground target embedded in a background material, the method comprising:
>
> receiving the electromagnetic field measurements that are indicative of the underground and the underground target;
>
> applying at least one spatial derivative to the electromagnetic field measurements to calculate an indicator, wherein the indicator has a first value for a uniform portion of the underground and the indicator has a second value, different from the first value, for the underground target, such that measurements associated with the underground target are enhanced and measurements associated with a background material or a primary electromagnetic field are suppressed; and
>
> based on the first and second values of the indicator, identifying a physical location of the underground target,
>
> wherein the first value of the indicator is zero and the second value of the indicator is non-zero.

ANALYSIS

Claims 1, 4, 5, and 10–26 stand rejected under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. The Appellant focuses on claim 1 but provides additional discussion of claims 4 and 16. We address claims 1, 4, and 16 below. Claims 5, 10–15, 17, and 18 will stand or fall with claim 1, and claims 19–26 will stand or fall with claim 4. *See* 37 C.F.R. § 41.37(c)(1)(iv).

After review of the cited evidence in the appeal record and the opposing positions of the Appellant and the Examiner, we determine that the Appellant has not identified reversible error in the Examiner's rejection. Accordingly, we affirm the rejection for reasons set forth below, in the Final

Action, and in the Examiner's Answer. *See generally* Final Act. 2–12; Ans. 2–9.

Claim 1. Determining whether a claimed invention is directed to patent-eligible subject matter is a two-step process that requires (1) evaluating whether the claim is "directed to" a patent-ineligible concept, i.e., a law of nature, natural phenomenon, or abstract idea; and, if so, (2) determining whether the claim's elements, considered both individually and as an ordered combination, transform the nature of the claim into a patent-eligible application. *See Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216–18 (2014).

As to *Alice* step 1, the Examiner determines that claim 1 is directed to the abstract ideas of (1) collecting, analyzing, and displaying information, (2) mathematical relationships or formulas, and (3) "computer functions of receiving, applying, and identifying." Final Act. 3–4.

As to *Alice* step 2, the Examiner determines:

> The claim(s) does/do not include additional elements that are sufficient to amount to significantly more than the judicial exception because the additional elements (i.e., applying at least one spatial derivative to the electromagnetic field measurements to calculate an indicator, wherein the indicator has a first value for a uniform portion of the underground and the indicator has a second value, different from the first value, for the underground target) are recited at a high level of generality, necessary, routine, or conventional to facilitate the application of the abstract idea.
>
> The final step "based on the first and second values of the indicator, identifying a physical location of the underground target, wherein the first value of the indicator is zero and the second value of the indicator is non-zero" does not show any tangible result in the real world that to lean towards significantly more. There is no indication that the combination of elements improves the functioning of a computer or improves any other

> technology that import into the claim. The claim is not patent eligible.

Final Act. 4–5.

The Appellant argues that the rejected claims are not directed to an abstract idea because the claims are not similar to the claims in several cases that the Federal Circuit or Supreme Court has found to recite ineligible subject matter. App. Br. 5–10. The Appellant also argues that, even if directed to an abstract idea, the claims "recite additional elements that add significantly more" and "improve an existing technological process." *Id.* at 11–17.

Legal Framework

In determining whether a claim falls within a category excluded from eligible subject matter, our inquiry focuses on the Supreme Court's two-step framework described in *Mayo* and *Alice*, set forth above. *Alice*, 573 U.S. at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)).

In accordance with that framework, we first determine what concept the claim is "directed to." *See Alice*, 573 U.S. at 219. Concepts determined to be abstract ideas, and thus patent ineligible, include mathematical formulas. *E.g.*, *Parker v. Flook*, 437 U.S. 584, 594–95 (1978). However, not every claim that recites a mathematical formula is patent ineligible. In *Diamond v. Diehr*, 450 U.S. 175, 191 (1981), the claim at issue recited a mathematical formula, but the Supreme Court held that "[a] claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula." *Diehr*, 450 U.S. at 176; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for

molding rubber products and not as an attempt to patent a mathematical formula."). The Supreme Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citing *Flook* and *Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)); *see also, e.g.*, *id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "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*, 573 U.S. at 221 (quotation marks omitted). "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*, 566 U.S. at 77).

The USPTO recently published revised guidance on the application of § 101. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) ("Guidance"). Under the 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 activities 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) (9th ed. 2018)).

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.

See Guidance 52, 55–56.

Judicial Exception (Guidance step (1))

Consistent with the Examiner's analysis, claim 1 applies mathematical formulas (i.e., "applying at least one spatial derivative") to collected data (i.e., "electromagnetic field measurements") to calculate values (i.e., "an indicator"), and then uses the values to "identify[] a physical location" of an underground target. The Specification provides mathematical formulas that represent "spatial derivative operators" used in the "applying" step. Spec. 8. The Examiner finds that the "identifying a physical location" step could also "be simply a . . . mathematical analysis." Final Act. 7. The Appellant does not meaningfully contend that the claim does not recite mathematical concepts, *see* App. Br. 10 (acknowledging that "the current claims us[e] a mathematical operation" in the "applying at least one spatial derivative" limitation), and instead, relevant to step (2) of the Guidance (discussed below), focuses on whether the claim is "directed to" those concepts, i.e., whether the claim integrates the abstract idea into a practical application, *see id.* at 6–10.

Similar to the use of mathematical equations to determine *Flook*'s alarm base, the Appellant's claims use mathematical equations in conducting

geophysical surveys using electromagnetic field measurements. *See Flook*, 437 U.S. at 585. In accordance with the Guidance, step (1), we determine that claim 1 recites mathematical concepts and thus recites an abstract idea.

Integration into a Practical Application (Guidance step (2))

Turning to step (2) of the Guidance, we determine that claim 1, as a whole, does not integrate the judicial exception into a practical application. Integration into a practical application requires an additional element or a combination of additional elements in the claim to "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 exception." Guidance 53–54; *see also id.* at 55 (setting forth exemplary considerations indicative that an additional element or combination of elements may have integrated the judicial exception into a practical application).

The Appellant's argument that the claims are not "directed to" mathematical concepts or formulas is not persuasive. *See* App. Br. 6–10. Contrary to the Appellant's argument, *see id.* at 9, claim 1 is similar in nature to the claims at issue in *Parker v. Flook*, 437 U.S. 584 (1978), which were held to be directed to ineligible subject matter. The claims in *Flook* required (1) collecting data (i.e., "[d]etermining the present value of [a] process variable" such as temperature), (2) subjecting the data to a mathematical operation to "[d]etermin[e] a new alarm base," and (3) on the basis of the result of that operation, making a determination. *Flook,* 437 U.S. at 585, 597.

Claim 1 similarly requires (1) collecting data ("receiving the electromagnetic field measurements"), (2) subjecting the data to a

mathematical operation ("applying at least one spatial derivative to the electromagnetic field measurements"), and (3) on the basis of the results of that operation, making a determination ("based on the first and second values of the indicator, identifying a physical location of the underground target"). The fact that claim 1 itself does not expressly recite the spatial derivative operator that is applied to the collected measurements, or identify the precise mathematical relationship between the indicator values and the physical location of the underground target, *see* App. Br. 9–10 ("The current claims do not include any mathematical formula . . . ."), does not preclude the claims from being directed to mathematical concepts. *See Bancorp Servs., LLC v. Sun Life Assurance Co. of Canada (U.S.)*, 687 F.3d 1266, 1280 (Fed. Cir. 2012) (holding ineligible claims that did not expressly recite mathematical formulas and explaining, "[a]s the formulae in the specification indicate, the determination of [values recited by the claims], and their subsequent manipulation, is a matter of mere mathematical computation."); *see also* Spec. 8 (providing formula for "spatial derivative operators").

The Appellant argues that *Thales Visionix Inc. v. United States*, 850 F.3d 1343 (Fed. Cir. 2017), indicates that the "current claims should be found as NOT directed to abstract ideas." App. Br. 10. The Appellant's argument appears to be that, because the claims in *Thales* involved mathematical formulas but were nevertheless determined to be eligible under § 101, claim 1 in this case should likewise be determined to be eligible. *See id.* That argument is not persuasive. The fact that certain claims (of unrelated patents) involving mathematical formulas have previously been determined to recite eligible subject matter, of itself, does not establish that

the specific claims at issue here likewise recite eligible subject matter. Critical to the eligibility determination in *Thales* was the recitation in the claims of an "unconventional configuration of sensors." *E.g.*, *Thales*, 850 F.3d at 1349. The Appellant identifies no "unconventional configuration of sensors" or similar subject matter in claim 1 that might warrant reversal of the Examiner's rejection based on *Thales*. On the contrary, the Specification states that "[t]he system used for obtaining or measuring the response fields can be a *standard electromagnetic system using industry standard transmitter and receiver technology*." Spec. 12–13 (emphasis added).

We also do not agree with the Appellant that references in case law to "building blocks of human ingenuity" are indicative of reversible error in this case. *See* App. Br. 15. The Appellant's discussion appears to be an argument that, because the claims do not completely preempt the calculation of indicators, they are patent eligible. *See id.* at 15 ("[N]ote that [claim 1] does not claim calculating an indicator by itself . . . . [T]he claims do not try to protect purely calculating an indicator . . . ."), 16 ("[T]hose who would like to advance the 'human ingenuity' are not prevented from calculating other indicators that do not use the spatial derivative of the electromagnetic field measurements, as the claims do."). The mere fact that claim 1 may not preempt all calculation of indicators fails to persuade us that claim 1 integrates the judicial exception into a practical application. *See Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) ("[T]he absence of complete preemption does not demonstrate patent eligibility."); *see also BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1287 (Fed. Cir. 2018) (explaining that a claim does not become eligible

merely because "it recites limitations that render it narrower than the abstract idea").

The Appellant also argues that the claimed method "improves an existing technological process" because it "uses a gradient of the electromagnetic fields for generating the image," whereas the "traditional methods" use "either the electric field or the magnetic field for generating the image." App. Br. 14. Claim 1, however, does not recite the generation of an image. Nor does claim 1 specifically recite a "gradient," and the Appellant has not established or asserted that the use of a "spatial derivative" as recited by claim 1 is necessarily the same as the allegedly inventive use of a "gradient." Additionally, we observe that the Specification identifies a particular technical problem in "identify[ing] conductive targets that are embedded in a conductive background material," *see* Spec. 1, but claim 1 does not appear to be limited to that problem.

Thus, even were we to agree that the Appellant describes an improvement to an existing technological process in the Appeal Brief or in the Specification, it is unclear on the record before us how that specific improvement is reflected in claim 1. Rather, claim 1 appears to be broader in scope than any improvement that the Appellant identifies in the Appeal Brief or in the Specification. *Cf. Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1149 (Fed. Cir. 2016) ("While Synopsys may be correct that the inventions of the Gregory Patents were intended to be used in conjunction with computer-based design tools, the Asserted Claims are not confined to that conception. The § 101 inquiry must focus on the language of the Asserted Claims themselves."); *cf. also Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013)

(admonishing that "the important inquiry for a § 101 analysis is to look to the claim"); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1346 (Fed. Cir. 2014) ("We focus here on whether the claims of the asserted patents fall within the excluded category of abstract ideas.").

We are also not persuaded that *In re Abele*, 684 F.2d 902 (CCPA 1982), supports the Appellant's position that the claimed subject matter integrates the judicial exception into a practical application. *See* App. Br. 11–12. In *In re Bilski*, 545 F.3d 943, 962–63 (Fed Cir. 2008), *aff'd sub nom. Bilski v. Kappos*, 561 U.S. 593 (2010), the Federal Circuit discussed *Abele* and explained that "*the transformation* of that raw data into a particular visual depiction of a physical object on a display was sufficient to render that more narrowly-claimed process patent-eligible" (emphasis added). Contrary to the Appellant's suggestion, *see* App. Br. 12, the fact that data must be generated using conventional elements such as transmitters and receivers before a calculation can be performed does not, of itself, indicate a practical application. The Appellant does not identify any "transformation" that claim 1 implicates, *see Bilski*, 545 F.3d at 963, sufficient to integrate the judicial exception into a practical application.

We are not persuaded that claim 1 integrates the judicial exception into a practical application. Thus, claim 1 is directed to the recited abstract idea.

Inventive Concept (Guidance steps (3) and (4))

Turning to steps (3) and (4) of the Guidance, the Appellant has not shown error in the Examiner's determination that the limitations of claim 1 beyond the abstract idea itself are well understood, routine, and

conventional. *See* Final Act. 4, 8–9. The Appellant argues that "the claimed 'identifying a physical location of the underground target' 'based on the first and second values of the indicator' calculated by 'applying at least one spatial derivative of the electromagnetic field measurements' are not generic computer functions" and "have NOT been found by courts to be generic computer functions, routine or conventional." App. Br. 12. The "applying" and "identifying" steps, however, are steps that the Examiner identifies as encompassing mathematical concepts. *See* Final Act. 3, 7. "It has been clear since *Alice* that a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention 'significantly more' than that ineligible concept." *BSG Tech*, 899 F.3d at 1290.

Even were we to not consider the "identifying" step as reciting abstract subject matter, in the Appeal Brief and the Specification, the Appellant uses phrases such as "traditional methods," App. Br. 14, "[c]urrent industry practice," Spec. 9, and "well known approach," *id.*, to describe known methods of processing electromagnetic fields "for generating the image," App. Br. 14. The Appellant does not argue that the known, traditional methods fail to involve identifying a physical location of an underground target. The Specification indicates that identification of targets is a goal of "existing EM systems." *E.g.*, Spec. 1–2. On this record, we are not persuaded that any step of claim 1 beyond those encompassing the abstract idea itself recites subject matter that is not well understood, routine, and conventional.

In summary, we have carefully considered the Appellants' arguments but are not persuaded of reversible error in the Examiner's rejection of claim 1.

Claim 4. Independent claim 4 is similar to claim 1 (our analysis of which applies equally here) but recites a system, rather than a method, and the system includes, *inter alia*, "a transmitter for generating a primary electromagnetic field" and "one or more receivers for measuring the response electromagnetic field measurements." Relevant to the arguments discussed above concerning whether the claim elements are well understood, routine, and conventional, the Appellant's only argument concerning claim 4 is that the Examiner "does not appear to give any deference to the claimed" transmitter and receivers, "alleging they are recited at a high level of generality, necessary, routine, or conventional to facilitate the application of the abstract idea." App. Br. 13. The Appellant states: "Appellants respectfully disagree as the transmitter and the receivers are not mere facilitators of the indicator calculation, but a system for electromagnetic probe of underground structures." *Id.*

That argument is not persuasive. As an initial matter, we observe that the Appellant does not actually dispute the Examiner's findings that transmitters and receivers are well understood, routine, and conventional elements of geological survey systems. Even if transmitters and receivers are "not mere facilitators of the indicator calculation," *id.*, the record supports the Examiner's determination that they are well understood, routine, and conventional. *See* Final Act. 5. In that regard, and as set forth above, the Specification describes "[c]urrent industry practice" and "[t]he well known approach" for obtaining and interpreting electromagnetic

measurements. Spec. 8–9. It is unclear how electromagnetic measurements could be obtained and understood without transmitters and receivers. Indeed, the Specification states that "[t]he system used for obtaining or measuring the response fields can be a *standard electromagnetic system using industry standard transmitter and receiver technology*." Spec. 12–13 (emphasis added).

On the record before us, we are not persuaded that the transmitters and receivers of claim 4 are not well understood, routine, and conventional, or that they otherwise impart subject matter eligibility to claim 4.

The Appellant raises no other arguments specific to claim 4. We affirm the Examiner's rejection of claim 4.

Claim 16. Claim 16 depends from claim 1 and further recites, *inter alia*, "generating a plot of the indicator based on which the location of the underground target is identified."

The entirety of the Appellant's argument concerning claim 16 is reproduced below:

> Unlike *Flook*'s claims, the current claims are not directed to a mathematical formula for calculating some numbers, but identify a physical location of an underground target. Appellants note that one embodiment (see claim 16) specifies that the location of the underground target is identified based on a plot of the indicator, i.e., associating locations with values of the indicator, not bare numbers as in *Flook*. Thus, *Flook*'s decision is not relevant to the claimed subject matter.

App. Br. 9. We understand the Appellant's position to be that, because claim 16 recites the generation and use of a data plot, whereas the claims in *Parker v. Flook* did not involve a data plot, *Flook* is irrelevant to the analysis of claim 16.

That argument is not persuasive. As set forth above, at least the "applying" step of claim 1 (from which claim 16 depends) encompasses the judicial exception of mathematical concepts, and claim 1 does not integrate the judicial exception into a practical application. The Federal Circuit has held that certain claims directed to, *inter alia*, displaying data (which is presumably a purpose of the data plot recited in claim 16) encompass abstract ideas. *See FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1097–98 (Fed. Cir. 2016) ("the practices of collecting, analyzing, and displaying data, with nothing more, are practices 'whose implicit exclusion from § 101 undergirds the information-based category of abstract ideas"'). Additionally, the Appellant indicates that using data to generate images is routine and conventional. *E.g.*, App. Br. 14 (noting that "traditional methods . . . for generating the image" are described on page 9 of the Specification); *see also* Spec. 9 (describing "[c]urrent industry practice" and "[t]he well known approach").

The Appellant's limited argument concerning claim 16 does not persuade us that recitation of "generating a plot" precludes claim 16 from being "directed to" an abstract idea. *See In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections . . . .").

CONCLUSION

We AFFIRM the Examiner's rejections of claims 1, 4, 5, and 10–26

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