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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SAAD J. BEDROS, KWONG WING AU, and
DARRYL BUSCH

Appeal 2017-002403
Application 12/269,569
Technology Center 2800

Before KAREN M. HASTINGS, DONNA M. PRAISS, and
WESLEY B. DERRICK, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL¹

STATEMENT OF THE CASE

Appellants² seek our review under 35 U.S.C. § 134(a) from the non-final rejection of claims 1–14, 17–20, and 23–25. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ In this Opinion, we refer to the Specification filed Nov. 12, 2008 (“Spec.”), the Non-Final Office Action entered Aug. 28, 2015 (“Non-Final Act.”), the Appeal Brief filed Feb. 29, 2016 (“App. Br.”), the Examiner’s Answer entered Sept. 27, 2016, as corrected Oct. 25, 2016 (“Ans.”), and the Reply Brief filed Nov. 25, 2016 (“Reply Br.”).

² Honeywell International Inc. is identified in the Brief as the real party in interest. App. Br. 3.

THE INVENTION

The invention relates to chemical detection. Spec. ¶ 2. According to the Specification, the complexity in detecting a chemical is that its unique infrared spectral characteristics change based on the characteristics of a chemical cloud and its environment (e.g. a cloud at long distance). *Id.* ¶ 22. Thus, a chemical can have multiple sets of spectral peaks (chemical signatures) as well as feature signatures, which are salient features extracted from a chemical signature. *Id.* ¶¶ 22, 23. The target chemical may also be present with other interfering chemicals, therefore, the target chemical features signature may be augmented with salient features of selected interfering chemicals to create an augmented feature signature. *Id.* ¶ 24.

Claim 1 is illustrative, and is reproduced below from the Claims Appendix to the Appeal Brief (bracketed matter added):

1. A method comprising:

[a] obtaining at least one measurement of a sample, wherein the at least one measurement is within a spectral domain;

[b] computing at least one feature signature of the sample in the spectral domain;

[c] classifying, using at least one processing device, the at least one computed feature signature using multiple known chemical feature signatures, wherein the multiple known chemical feature signatures comprise at least one characteristic of a target chemical in the spectral domain under different environmental conditions; and

[d] determining if the target chemical is present in the sample based on the classification;

[e] wherein classifying the at least one computed feature signature comprises:

[e1] using a first match filter template to detect a primary peak associated with the target chemical and to

detect a modest-amplitude positive peak present with a modest slope that is a good fit with the primary peak associated with one of the known chemical feature signatures;

and [e2] using second and third match filter templates to detect that the primary peak returns to a baseline on different sides of the primary peak and to detect that the modest-amplitude positive peak has appropriate negative amplitudes relative to the detected modest-amplitude positive peak, and

[f] wherein at least two chemical feature signatures used to detect the target chemical are augmented chemical feature signatures of the target chemical created by augmenting a chemical feature signature of the target chemical to include one or more features of one or more interfering chemicals, different ones of the augmented chemical feature signatures associated with different interfering chemicals.

Claims 13 and 17 are also independent and similar to claim 1, but recite “[a] system comprising: a memory configured to store at least one measurement of a sample, wherein the at least one measurement is within a spectral domain” and “[a] non-transitory computer readable medium having instructions for causing a processor to perform a method that comprises the steps of,” respectively.

THE REJECTION

The Examiner maintains and Appellants appeal the rejection of claims 1–14, 17–20, and 23–25 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Ans. 2; App. Br. 9.

ANALYSIS

Appellants argue independent claims 1, 13, 17 and their respective dependent claims as a group.³ *See* App. Br. 23; *cf. id.* at 31. We select claim 1 as the representative claim for this group, and the remaining claims stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

Alice Corp. Pty. Ltd. v. CLS Bank International, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101.

According to *Alice* step one, “[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept,” such as an abstract idea. *Alice*, 134 S. Ct. at 2355.

In that regard, the Examiner determined that the claims are directed to an abstract idea since they are directed to a mathematical concept or algorithm. Non-Final Act. 6; *see also* Ans. 6. According to the Examiner, the “match filter” recited in claim 1 “is a linear filter that is designed to detect the presence of a waveform based on [a] mathematical concept, as

³ Appellants additionally assert (App. Br. 24–30) that dependent claims 2, 4, 6, 10–12, 19, 24, and 25 are “patent eligible based on [their] own recitations” and that, taken in combination with the other elements recited in claim 1, add to the ordered combination of elements recited to further demonstrate that the claim amounts to significantly more than the alleged abstract idea. With respect to the alleged abstract idea, Appellants contend that the recitations in claims 4, 6, and 25 are “significantly more than simply a mathematical concept or an algorithm.” *Id.* at 25–26. These assertions do not constitute separate arguments on the merits, because “[a] statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim.” 37 C.F.R. § 41.37(c)(1)(iv).

evidenced by Ingram, Matched filter, (2006).” Ans. 6–7. The Examiner further notes that the recitation of a “neural network” in dependent claim 7 is also an algorithm. *Id.* at 7 (citing *Basic Introduction to Neural Networks* (2007) (<http://www.wisc.edu>)).

Appellants contend that the Examiner erred in applying the first step to conclude that claim 1 is directed to an abstract idea. App. Br. 14–19. According to Appellants, the Examiner’s evidence that a match filter is a linear filter based on a mathematical concept is insufficient because

the determination of what is an abstract idea is based on *factual evidence* using a standard that is higher than even the standard for prior art (*i.e.*, not just “by others” and “before the invention” as required by 35 U.S.C. § 102(a)—but known by so many people so as to be “*fundamental*” and known for so long before the invention so as to be a “*long prevalent*” practice).

Id. at 16.

There is no requirement that the Examiner must provide evidence in support of a determination that the invention is directed to an abstract idea. *See Secured Mail Solutions LLC v. Universal Wilde, Inc.*, 873 F.3d 905, 912 (Fed. Cir. 2017) (“this court has determined claims to be patent-ineligible at the motion to dismiss stage based on intrinsic evidence from the specification without need for ‘extraneous fact finding outside the record.’”); *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1362 (Fed. Cir. 2015) (holding that a Section 101 inquiry is a question of law); *see also* para. IV “July 2015 Update: Subject Matter Eligibility” to 2014 Interim Guidance on Subject Matter Eligibility (2014 IEG), 79 Fed. Reg. 74618 (Dec. 16, 2014):

The courts consider the determination of whether a claim is eligible (which involves identifying whether an exception such as an abstract idea is being claimed) to be a question of law. Accordingly, courts do not rely on evidence that a claimed

concept is a judicial exception, and in most cases resolve the ultimate legal conclusion on eligibility without making any factual findings.

Nevertheless, evidence may be helpful in certain situations where, for instance, facts are in dispute. But it is not always necessary. It is not necessary in this case. A factual dispute has not been raised. For instance, Appellants have not submitted rebuttal evidence tending to show that the claims are not directed to an abstract idea.

Appellants argue that the Examiner did not properly analyze the claims (App. Br. 15–19). According to Appellants, the Examiner quotes the elements of claim 1 “and declares those elements to be ‘mathematical concepts’ and ‘algorithms’ in a conclusory manner.” *Id.* at 15. Appellants contend that “[s]imply because a claim may involve, at some level, a mathematical concept or algorithm does not mean that the claim is *directed to an abstract idea.*” *Id.* at 18.

Appellants’ argument is unpersuasive because the Examiner did address the claim elements, identify the judicial exception, and articulate the abstract idea found in the claims. *See* pages 5–6 of the Non-Final Office Action where the Examiner stated that the claimed steps of computing, classifying, and determining are “an abstract idea, since they are directed to [a] mathematical concept (*algorithm*, MPEP 2106).” We are satisfied that the Examiner’s reasoning was sufficiently clear and specific to provide applicant sufficient notice of the reasons for ineligibility. *See* May 2016 USPTO Memorandum (“*Formulating a Subject Matter Eligibility Rejection and Evaluating the Applicant's Response to a Subject Matter Eligibility Rejection*”), page 2 (“the rejection . . . must provide an explanation . . .

which [is] sufficiently clear and specific to provide applicant sufficient notice of the reasons for ineligibility.”).

The “directed to” inquiry applies a stage-one filter to the claims which, when considered in light of the Specification, is based on 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); *see also Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1376 (Fed. Cir. 2016); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (“inquiring into ‘the focus of the claimed advance over the prior art.’” (Citation omitted)).

“In determining the eligibility of respondents’ claimed process for patent protection under § 101, their claims must be considered as a whole.” *Diamond v. Diehr*, 450 U.S. 175, 188 (1981). 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).

According to *Enfish*, the question is “whether the focus of the claims is on [a] specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.” *Enfish*, 822 F.3d at 1335–36. The court found in that case that the “plain focus of the claims” was on “an improvement to computer functionality itself, not on economic or other tasks for which a computer is used in its ordinary capacity.” *Id.* at 1336.

Here claim 1 sets forth

[a] obtaining at least one measurement of a sample . . . within a spectral domain, [b] computing at least one feature signature of the sample in the spectral domain, [c] classifying, using at least one processing device, the at least one computed feature signature using multiple known chemical feature signatures, and [d] determining if the target chemical is present in the sample based on the classification, [e] wherein classifying the at least one computed feature signature comprises [e1] using a first match filter template to detect a primary peak associated with the target chemical and to detect a modest-amplitude positive peak present with a modest slope that is a good fit with the primary peak associated with one of the known chemical feature signatures, and [e2] using second and third match filter templates to detect that the primary peak returns to a baseline on different sides of the primary peak and to detect that the modest-amplitude positive peak has appropriate negative amplitudes relative to the detected modest-amplitude positive peak, and [f] wherein at least two chemical feature signatures used to detect the target chemical are augmented chemical feature signatures of the target chemical created by augmenting a chemical feature signature of the target chemical to include one or more features of an one or more interfering chemicals.

Claim 1, as a whole, is plainly focused on an algorithm for matching a characteristic property of a chemical in order to detect a target chemical.

Claim 1 is not focused on an improvement to the recited “processing device” or other tools used to perform the claimed obtaining, computing, classifying, and determining operations. *Cf. In re TLI Communications LLC Patent Litigation*, 823 F.3d 607, 613 (Fed. Cir. 2016) (The claims’ focus “was not on an improved telephone unit or an improved server.”).

In addition, “[t]he ‘abstract idea’ step of the inquiry calls upon us to look at the ‘focus of the claimed advance over the prior art’ to determine if the claim’s ‘character as a whole’ is directed to excluded subject matter.”

Affinity Labs of Texas, LLC v. DirectTV, LLC, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016)); see also *Enfish*, 822 F.3d at 1335, quoted in *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1241 (Fed. Cir. 2016).

In that regard, the Specification discusses the problem as being that “[t]he detection of nitric acid is difficult because of the reactivity of nitric acid, the false positives created by the presence of other compounds in a sample, and the interference caused by other compounds in a sample.” Spec. ¶ 20. According to the Specification, the inventors solved the problem by “using feature signatures of nitric acid that has been obtained through measurements in the infrared (IR) spectral domain.” *Id.* According to the Specification, “[t]hese feature signatures are created from the extracted features of the nitric acid as match to other near extracted features of typical interferences.” *Id.* In light of the Specification’s description of the problem and solution, we find that the invention’s advance over the prior art is in improving the collection and evaluation of data for detecting the presence of a chemical.

Given that the plain focus of claim 1, as a whole, is on data gathering activities⁴ in support of detecting characteristic properties of a chemical and the Specification’s description of the problem and that the solution is improving the collection and evaluation of data measuring the characteristic properties of a target chemical, claim 1 is properly characterized as being

⁴ *Cf. Elec. Power Grp., LLC*, 830 F.3d at 1353 (When “the focus of the asserted claims” is “on collecting information, analyzing it, and displaying certain results of the collection and analysis,” the claims are directed to an abstract idea.)

“directed to” a mathematical concept or algorithm for evaluating data to detect or identify a target chemical. Algorithms or mathematical formulas are, like a law of nature, abstract ideas. *Diamond v. Diehr*, 450 U.S. at 191; *Parker v. Flook*, 437 U.S. 584, 589 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972). As such, the method of claim 1 is directed to an abstract idea. Accordingly, we agree with the Examiner that claim 1 is directed to an abstract idea. *Cf. Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d at 1354 (claims directed to a “process of gathering and analyzing information of a specified content,” i.e., data describing operations in a power grid, and then displaying the results were directed to an abstract idea).

Step two of the *Alice* framework is “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 (alteration in original) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2012)).

In that regard, the Examiner found that:

In Claim 1, the limitations “obtaining at least one feature signature of the sample in the spectral domain” are recited, but said limitations are merely directed to data collection activity that is previously known and conventional (*similar to other data collection activity held as insignificant by the Courts such as in Electric Power Group vs Alstrom*).

Ans. 7. The Examiner further found that:

In Claim 13, the limitations involving “a memory configured to store at least one measurement of the sample, wherein the at least one measurements is within a spectral domain,” are cited, but said limitations would not be considered significantly more and something that the industry had not been able to obtain, since such step is a mere recitation of generic computer

structure that serves to perform generic computer functions that are well-understood, routine, and conventional activities previously known to the pertinent industry. As such, the claims are directed to data collection and abstract ideas, and taken as a whole, are not eligible under the 35 USC 101.

Ans. 7 (emphasis omitted).

The Appellants contend that the Examiner “commits clear legal error by failing to consider all the elements recited in Claim 1 both individually and in an ordered combination as required under the second step of the *Mayo* test.” Reply Br. 8. Appellants assert that the Examiner’s analysis is flawed because it “only addresses the one claim feature not overgeneralized in the *directed to inquiry*.” *Id.*

According to the Appellants, the Examiner fails to consider the recited steps labeled [c], [d], and [f] in claim 1 above. *Id.* Appellants contend that these steps “are specific features other than what is well-understood, routine and conventional in the field, at least because no combination of prior art discloses these elements as recited in Claim 1.” *Id.* at 9. Appellants argue that “[t]he claim also provides improvement to another technical field of target chemical detection by improving detection in the presence of interfering chemicals through the augmented chemical feature signatures” qualifying as “significantly more” than an algorithm or mathematical concept. *Id.* But claim 1, as currently drafted, is not directed to a technological process for sensing, measuring, or obtaining augmented chemical feature signatures. *See* our analysis under *Alice* step 1. Rather, the target chemical detection as claimed gives the claimed evaluation of data scheme a particular context for its application. *Cf. CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1371 (Fed. Cir. 2011). “The Court [*Parker v. Flook*, 437 U.S. 584 (1978)] rejected the notion that the recitation

of a practical application for the calculation could alone make the invention patentable.”

Also, claim 1 is not limited to any particular type or manner of creating augmented chemical feature signatures. According to Appellants’ Specification, an augmented feature signature of the target chemical is the target chemical feature signature or properties along with “salient features of selected interfering chemicals” (Spec. ¶ 24). As such, the use of the recited “augmented chemical feature signatures associated with different interfering chemicals” for the recited “chemical feature signatures” in claim 1 is also “merely directed to data collection activity” as determined by the Examiner (Ans. 7). Therefore, considering all the elements recited in claim 1 both individually and in an ordered combination, we agree with the Examiner that the claim is patent ineligible subject matter because the claimed method uses a computer to perform a series of mental steps comparing new and stored information using rules to identify or match a target chemical. *See SmartGene, Inc. v. Advanced Biological Labs., SA*, 555 Fed. Appx. 950, 955 (Fed. Cir. 2014) (finding patent-ineligible claims to a method performed by or with a computer using expert rules for evaluating and selecting from a stored plurality of different therapeutic treatment regimens).

In addition, we are not persuaded by Appellants’ argument that known chemical features being augmented to include one or more features of one or more interfering chemicals “is something that the industry had not been able to obtain as evidenced by the fact that these elements of Claim 1 are not disclosed by and patentable over the cited references of record.” App. Br. 21; Reply Br. 9. An abstract idea does not transform into an inventive concept just because various features are not disclosed in or suggested by the

prior art. *See, e.g., Genetic Techs.*, 818 F.3d at 1376 (“[A] claim directed to a newly discovered law of nature (or natural phenomenon or abstract idea) cannot rely on the novelty of that discovery for the inventive concept necessary for patent eligibility.”).

Finally, we are not persuaded of error by the Appellants’ arguments regarding pre-emption. *See* App. Br. 12–14; Reply Br. 2–3.

It is true that the Supreme Court has characterized pre-emption as a driving concern for patent eligibility. *See Alice*, 134 S. Ct. at 2354. But characterizing pre-emption as a driving concern for patent eligibility is not the same as characterizing pre-emption as the determinative test for patent eligibility. “The Supreme Court has made clear that the principle of preemption is the basis for the judicial exceptions to patentability” and “[f]or this reason, questions on preemption are inherent in and resolved by the § 101 analysis.” *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (citing *Alice Corp.*, 134 S. Ct. at 2354). However, “[w]hile preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility.” *Id.* at 1379. *Cf. OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1362–63 (Fed. Cir.) (“[T]hat the claims do not preempt all price optimization or may be limited to price optimization in the e-commerce setting do not make them any less abstract.”), cert. denied, 136 S. Ct. 701 (2015). “What matters is whether a claim threatens to subsume the full scope of a fundamental concept, and when those concerns arise, we must look for meaningful limitations that prevent the claim as a whole from covering the concept’s every practical application.” *CLS Bank Intern. v. Alice Corp. Pty. Ltd.*, 717 F.3d 1269, 1281 (Fed. Cir. 2013) (Lourie, J., concurring). Here, we find

the claimed subject matter covers patent-ineligible subject matter. Accordingly, the pre-emption concern is necessarily addressed. “Where a patent’s claims are deemed only to disclose patent ineligible subject matter under the *Mayo* framework, . . . preemption concerns are fully addressed and made moot.” *Ariosa Diagnostics*, 788 F.3d at 1379.

Appellants’ assertion that our reviewing court found claims patent-eligible because the claim “does not preempt approaches that use rules of a different structure or different techniques” is inaccurate. Reply Br. 2 n.2 (quoting *McRO, Inc. v. Bandai Namco Games America Inc.*, 837 F.3d. 1299 (Fed. Cir. 2016)). The court determined that *McRO*’s claim was not directed to an abstract idea because it “uses the limited rules in a process specifically designed to achieve an improved technological result in conventional industry practice.” *McRO*, 837 F.3d at 1316. The court also explicitly “recognized that ‘the absence of complete preemption does not demonstrate patent eligibility.’” *McRO*, at 1315 (quoting *Ariosa Diagnostics*, 788 F.3d at 1379).

We have fully considered Appellants’ arguments. For the foregoing reasons, they are unpersuasive as to error in the rejection of claim 1, and claims which stand or fall with it.

The rejection is sustained.

CONCLUSION

Appellants have not shown that the Examiner erred in rejecting claims 1–14, 17–20, and 23–25 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

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Application 12/269,569

DECISION

The decision of the Examiner to reject claims 1–14, 17–20, and 23–25 is affirmed.

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