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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SAMI KILPINEN, REIJA AUTIO, and MATTI SAARELA

Appeal 2017-007883[1]
Application 12/936,931
Technology Center 1600

Before ERIC B. GRIMES, FRANCISCO C. PRATS, and RYAN H. FLAX, *Administrative Patent Judges*.

PRATS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal under 35 U.S.C. § 134(a) involves claims to methods that involve obtaining data sets from experiments in which biological samples are contacted with microarrays. The Examiner rejected the claims as being directed to subject matter ineligible for patenting, and for obviousness.

We have jurisdiction under 35 U.S.C. § 6(b)(1).

We affirm.

The following rejections are before us for review:

(1) Claims 16–24 and 29, under 35 U.S.C. § 101 as being directed to subject matter ineligible for patenting (Ans. 2–3); and

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[1] Appellants state that the "real party in interest in this appeal is the assignee Medisapiens Oy, Helsinki, Finland." Br. 2.

(2) Claims 16–24 and 29, under 35 U.S.C. § 103(a) as being obvious over Conway[2] and Sidorov[3] (*id.* at 3; *see also* Final Act. 5–9 (setting forth Examiner's obviousness rationale)).

Claim 16 is representative and reads as follows:

> 16. A method, comprising: performing the following steps by a data processor:
>
> obtaining data sets from measurements of properties of biological samples made with several different versions of a microarray, each data set originating from one microarray, wherein each microarray comprises several spots, each spot indicating a biological quantity selected from a group consisting of gene expression, microRNA expression, protein abundance, protein binding, carbohydrate level and small molecule activity;
>
> storing the obtained data sets, wherein the storing comprises associating each data set with an indication of a version of the microarray the data set originates from;
>
> determining at least one first spot-specific distribution parameter and at least one second spot-specific distribution parameter for each spot, wherein the at least one first spot-specific distribution parameter is determined for each version (i) of the microarray and the at least one second spot-specific distribution parameter is determined for a combination of one or more of the versions of the microarray, wherein said combination of the one or more the versions comprises at least one version other than version (i);
>
> determining a spot-specific correction element for each version of the microarray based on the discrepancy between the at least one first spot-specific distribution parameter and the at least one second property-specific distribution parameter;

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[2] US 2006/0047697 A1 (published Mar. 2, 2006).
[3] I.A. Sidorov et al., *Oligonucleotide microarray data distribution and normalization*, 146 INFORMATION SCIENCES 67–73 (2002).

> correcting a spot's indicated biological quantity with the spot-specific correction element for the version of the microarray on which the spot's indicated biological quantity is based, thereby producing the spot's corrected indicated biological quantity; and
>
> outputting the spot's corrected indicated biological quantity to a physical memory and/or display.

Br. 15–16.

STANDARD OF REVIEW

As stated in *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992):

> [T]he examiner bears the initial burden . . . of presenting a *prima facie* case of unpatentability. . . .
>
> After evidence or argument is submitted by the applicant in response, patentability is determined on the totality of the record, by a preponderance of evidence with due consideration to persuasiveness of argument.

PATENT ELIGIBILITY

The Examiner's Prima Facie Case

In determining that Appellants' claims are directed to subject matter ineligible for patenting, the Examiner finds that the "claims as a whole, considering all claim elements both individually and in combination, do not amount to significantly more than an algorithm that corrects biological property measurements from one or more microarrays . . . ." Ans. 2.

In particular, the Examiner contends, a "series of data processing steps or algorithm is a court-established abstract idea, and further is similar to other court-established abstract ideas such as mathematical operations and procedures for organizing information." *Id.*

The Examiner finds that the non-abstract steps recited in the claims, i.e. obtaining data sets from microarray measurement, storing the data sets, and outputting corrected values for the data based on the claimed algorithm

"are highly generic data-input and -output steps, and are ubiquitous to any data processing algorithm. Hence, they constitute insignificant extrasolution activity." *Id.*

In addition, the Examiner finds, "numerous references of record (*e.g.* Conway) establish that such steps are ubiquitous when implementing microarray measurement correction algorithms using a generic computer, and that using computers for this purpose was a well-understood, routine and conventional practice in the art prior to the time of invention." *Id.* at 2–3.

Therefore, the Examiner reasons, "[v]iewed individually and in their context within the claims as a whole, these additional non-abstract claim elements do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claims amount to significantly more than the abstract idea itself." *Id.* at 3.

Analysis

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101.

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. Pty. Ltd. v. CLS Bank Intern.*, 134 S. Ct. 2347, 2354 (2014).

Our reviewing court has summarized the Supreme Court's two-part test for distinguishing between claims to patent-ineligible exceptions, and claims to patent-eligible applications of those exceptions, as follows:

> Step one asks whether the claim is "directed to one of [the] patent-ineligible concepts." [*Alice*, 134 S. Ct. at 2354]. If the answer is no, the inquiry is over: the claim falls within the ambit of § 101. If the answer is yes, the inquiry moves to step two, which asks whether, considered both individually and as an ordered combination, "the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* (quoting *Mayo* [*Collaborative Services v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1297 (2012)]).
>
> Step two is described "as a search for an 'inventive concept.'" *Id.* (quoting *Mayo*, 132 S. Ct. at 1294). At step two, more is required than "well-understood, routine, conventional activity already engaged in by the scientific community," which fails to transform the claim into "significantly more than a patent upon the" ineligible concept itself. *Mayo*, 132 S. Ct. at 1298, 1294.

Rapid Litigation Mgmt. Ltd. v. CellzDirect, Inc., 827 F.3d 1042, 1047 (Fed. Cir. 2016) (paragraphing added).

In the present case, Appellants do not persuade us that the preponderance of the evidence fails to support the Examiner's conclusion that representative claim 16 recites subject matter ineligible for patenting. In particular, Appellants do not persuade us that the Examiner failed to show sufficiently that Appellants' claim 16 is directed to an abstract idea, without significantly more.

Appellants contend that, under *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016), the method recited in claim 16 is eligible for patenting because "it **improves the functionality of a computer-assisted measurement system**. Specifically, the present invention removes or reduces the limitations of the prior art that measurements made with microarrays of different versions are not comparable with each other." Br. 7–8.

As support for the assertion that claim 16's process improves computer functionality, Appellants direct us to claim 16's step in which first and second spot-specific distribution parameters are determined, and the subsequent step in which a spot-specific correction element is determined, based on the discrepancy between those distribution parameters. *Id.* at 8. Appellants note that the correction element is then used to correct the biological quantity indicated from a microarray experiment. *See id.* at 8–9.

Determining the claimed spot-specific distribution parameters, however, is merely ascertaining the result of performing a mathematical function. *See* Spec. ¶ 8 (describing "an appropriate distribution parameter . . . as average, mean, or the like"). And Appellants identify no error in the Examiner's finding that the claimed step of determining a correction element, based on the discrepancy between two such mathematical values, as well as the claimed step of applying that correction element to gathered data, are also entirely mathematical operations.

Appellants do not identify any persuasive evidence of record supporting their assertion that performing the mathematical operations recited in claim 16 improves computer functionality, or solves a problem in the software arts. Unlike the claim held patent-eligible in *Enfish*, claim 16 does not require the claimed data processor to employ any specific data structures or other features that might distinguish the data processor from a conventional computer. *See Enfish*, 822 F.3d at 1339 (distinguishing "the self-referential table recited in the claims on appeal[, which] is a specific type of data structure designed to improve the way a computer stores and retrieves data in memory" from "a situation where general-purpose computer components are added post-hoc to a . . . mathematical equation").

To the contrary, claim 16 involves only data gathering ("obtaining data sets", "storing the obtained data sets"), data manipulation (determining first and second spot-specific distribution parameters, determining a "correction element," using the correction element to correct data), and data "outputting." Br. 15–16.

Claim 16, therefore, is similar to claims found ineligible for patenting in cases like *Parker v. Flook*, 437 U.S. 584 (1978) and *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016), which also involved data gathering, data manipulation, and outputting data based on the manipulation. *See Parker*, 437 U.S. at 585 (explaining that the process at issue included three basic steps: "an initial step which merely measures the present value of the process variable (*e.g.*, the temperature); an intermediate step which uses an algorithm to calculate an updated alarm-limit value; and a final step in which the actual alarm limit is adjusted to the updated value") (citations omitted); *see also Electric Power Group*, 830 F.3d at 1351–52 (claim at issue involved collecting and receiving data, analyzing the data to determine whether there was a potential deficiency in the underlying system (the power grid), and displaying (i.e., informing a user of) the analysis results).

Appellants argue "the § 101 rejection can be addressed by carrying over arguments related to the § 103 rejection." Br. 9. There is ample case law support for the proposition that patent-eligibility and patentability (e.g., over prior art) are separate issues and their analyses should not be mingled (*see, e.g.*, *Diamond v. Diehr*, 450 U.S. 175, 177 (1981)); however, as to Appellants' contention (Br. 9–10) that Conway and Sidorov fail to suggest the process recited in claim 16, as discussed below, we are not persuaded

that Appellants have demonstrated error in the Examiner's conclusion of obviousness and that any alleged error determines the outstanding question of patent-eligibility. The fact that the process recited in claim 16 might be novel and unobvious does not demonstrate its eligibility for patenting. *See, e.g., In re BRCA1- and BRCA2-Based Hereditary Cancer Test Patent Litigation,* 774 F.3d 755, 759 (Fed. Cir. 2014) (Even if Appellants "made a '[g]roundbreaking, innovative, or even brilliant discovery,' . . . that is not enough" to establish patent eligibility.) (citing *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S.Ct. 2107, 2117 (2013)).

In sum, for the reasons discussed, Appellants do not persuade us that the preponderance of the evidence fails to support the Examiner's conclusion that representative claim 16 recites subject matter ineligible for patenting. We, therefore, affirm the Examiner's rejection of claim 16 on that ground. Claims 17–24 and 29 fall with claim 16. *See* 37 C.F.R. § 41.37(c)(1)(iv).

OBVIOUSNESS

The Examiner's Prima Facie Case

In rejecting claims 16–24 and 29 over Conway and Sidorov, the Examiner determined that Conway described a process having steps corresponding to each of the steps recited in representative claim 16, including the steps "c–e" of "normalizing (*i.e.* correcting) the data sets of two different plates (0135) using one of several possible normalization procedures, including global normalization (0140–0142)." Final Act. 6.

The Examiner conceded, however, that Conway differed from claim 16, in that "[n]one of the normalization procedures disclosed by Conway teach the procedure recited in claim [16's] steps c–e," which recite the steps

of determining first and second spot-specific distribution parameters, determining a spot-specific correction element based on the discrepancy between the first and second spot-specific distribution parameters, and correcting a spot's indicated biological quantity using the spot-specific correction element. *Id.*

As evidence that the process recited in representative claim 16 would nonetheless have been obvious to an ordinary artisan, the Examiner cited Sidorov as disclosing "a nonparametric normalization (or histogram normalization) procedure for microarray data (p. 70 § 4; see also p. 70 § 3 for introduction to normalization)." *Id.*

The Examiner found that Sidorov described calculating values for intervals of a probe intensity histogram of an "array *N* to be normalized; these constitute 'first spot-specific distribution parameter[s] ... for each version *i* of the microarray' (in the context of data analysis, the 'spot' of Conway is equivalent to the 'probe' of Sidorov; *cf.* Conway ¶ 0005)" and also calculating values for "a model reference array *M*; these constitute 'second spot-specific distribution parameter[s] ... for a combination of one or more of the versions of the microarray, wherein said combination of the one or more the versions comprises at least one version other than version *i*." *Id.* at 7.

As to claim 16's steps of determining a spot-specific correction element based on the discrepancy between the first and second spot-specific distribution parameters, and using that element to correct a spot's indicated biological quantity, the Examiner found that Sidorov disclosed that "[p]arameters a and b are then determined for each interval of array N

(claimed step d), and these parameters are used to transform the probe intensities . . . of array N (claimed step e)." *Id.*

The Examiner further found:

> Sidorov teaches that "both, parametric and nonparametric normalization procedures, were better compared to the standard global normalization approach" (p. 71 § 6), and that the nonparametric approach was the best of the two (Abstract). Furthermore, the nonparametric normalization procedure is a generalization of global normalization (final ¶ of p. 72).

Id.

Based on the references' combined teachings, the Examiner determined that an ordinary artisan would have been "motivated to modify the microarray data processing system of Conway to use the histogram normalization procedure of Sidorov, because Sidorov teaches that the nonparametric/histogram normalization procedure gives better normalization than the standard global normalization procedure taught by Conway." *Id.* at 8.

The Examiner further reasoned that, "[g]iven that Sidorov teaches that the nonparametric normalization is a generalization of, and simple substitute for, the global normalization procedure taught by Conway, said practitioner would have readily predicted that the modification would successfully result in a microarray data processing system that uses nonparametric normalization for the array data." *Id.* at 8–9.

Analysis

Appellants do not persuade us that the preponderance of the evidence fails to support the Examiner's conclusion that the process recited in claim 16 would have been obvious to an ordinary artisan.

Appellants contend that Conway and/or Sidorov do not teach or suggest claim 16's step of determining first and second spot-specific distribution parameters. Br. 11–13 (citing Conway ¶¶ 77 and 78). Specifically, Appellants contend, as "understood by a person of ordinary skill in the art, the cited references disclose correction elements for oligo spots, each of which is an individual or unique species and not a version, i.e. genus of microarrays." *Id.* at 12. Further, Appellants argue that because Conway and/or Sidorov do not teach or suggest claim 16's step of determining first and second spot-specific distribution parameters, the references necessarily cannot teach or suggest claim 16's steps of determining a spot-specific correction element based on the discrepancy between the first and second spot-specific distribution parameters, and correcting a spot's indicated biological quantity using the spot-specific correction element. *Id.* at 13–14.

We are not persuaded. We first note that Appellants concede that the teachings in ¶¶ 77 and 78 of Conway involve issues relating to different microarray versions. *See id.* at 13. Appellants' arguments, moreover, do not address the rejection as presented by the Examiner.

That is, even if it were true that ¶¶ 77 and 78 of Conway did not teach or suggest generating and using a spot-specific correction element as recited by Appellants' claim 16, that fact does not address, much less demonstrate error in, the Examiner's finding that other portions of Conway teach normalizing the data sets of two different array versions. *See* Final Act. 6 (citing Conway ¶¶ 135, 140–142).

We note, in addition, that the Examiner relied on Conway in combination with Sidorov, as discussed above. It is well-settled that "[n]on-

obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references. . . . [The reference] must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole." *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Appellants do not specifically address, allege error in, or rebut by way of a reply brief, the Examiner's finding that Sidorov teaches not only claim 16's step of determining first and second spot-specific distribution parameters, but also the generation and use of a spot-specific correction element as recited in claim 16, as well as the desirability of using Sidorov's calculation method in Conway's across-version normalization procedure. *See* Final Act. 6–9 (citing Sidorov 70–72); *see also* Ans. 6–8 (responding to Appellants' arguments and explaining why the combination of Conway and Sidorov suggests claim 16's process).

Because Appellants do not explain specifically why the Examiner's characterization and interpretation of the particular cited portions of Conway and Sidorov are erroneous, Appellants do not persuade us that the Examiner failed to show, by a preponderance of the evidence, that the process recited in representative claim 16 would have been obvious to an ordinary artisan. We, therefore, affirm the Examiner's rejection of claim 16 over of Conway and Sidorov. Claims 17–24 and 29 fall with claim 16. *See* 37 C.F.R. § 41.37(c)(1)(iv).

SUMMARY

For the reasons discussed, we affirm both of the Examiner's rejections.

TIME PERIOD

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