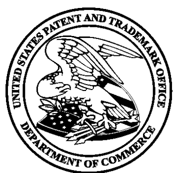

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PUNEET SHARMA, LUCIAN MIHAI ITU,
SAIKIRAN RAPAKA, and FRANK SAUER

Appeal 2020-000280
Application 14/599,678
Technology Center 3700

Before JENNIFER D. BAHR, BRETT C. MARTIN, and
MICHAEL J. FITZPATRICK, *Administrative Patent Judges*.

FITZPATRICK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant, Siemens Aktiengesellschaft,[1] appeals under 35 U.S.C. § 134(a) from the Examiner's final decision rejecting claims 23–26. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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[1] "Appellant" refers to the applicant as defined in 37 C.F.R. § 1.42. Appellant identifies itself as the sole real party in interest. Appeal Br. 1.

STATEMENT OF THE CASE

The Specification

The Specification "relates generally to representing a patient at a particular physiological state and more particularly to mapping patient data from one physiological state to another physiological state." Spec. ¶2.

The Claims

Claims 23–26 are rejected. Final Act. 1. Claims 1–22 have been withdrawn from consideration, and no other claims are pending. *Id.* Claim 23, the sole independent claim on appeal, is reproduced below.

> 23. A method for determining fractional flow reserve (FFR) for a coronary stenosis of a patient at a hyperemia state, comprising:
>
> [a] receiving patient data of the patient at a rest state;
>
> [b] calculating a value of a pressure drop over the coronary stenosis of the patient at the rest state based on the patient data;
>
> [c] extracting features from the patient data;
>
> [d] mapping the value of the pressure drop over the coronary stenosis of the patient at the rest state to a value of the pressure drop over the coronary stenosis of the patient at the hyperemia state based on the extracted features; and
>
> [e] outputting the FFR for the coronary stenosis of the patient based on the pressure drop over the coronary stenosis of the patient at the hyperemia state.

Appeal Br. 20.

The Examiner's Rejections

There are two rejections before us:

1. claims 23–26 as ineligible under the judicial exception to 35 U.S.C. § 101 (Final Act. 2); and

2. claims 23–26 as unpatentable over Sharma[2] and Taylor[3] (*id.* at 6).

DISCUSSION

Rejection 1—Eligibility

Patent Eligibility Framework

Section 101 provides that "[w]hoever 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. However, the Supreme Court has "long held that this provision contains an important implicit exception: [l]aws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In analyzing patent-eligibility questions under the judicial exception to 35 U.S.C. § 101, we "first determine whether the claims at issue are directed to a patent-ineligible concept." *Alice*, 573 U.S. at 218. If the claims are determined to be directed to an ineligible concept, then we "consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* at 217 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 77 (2012)).

On January 7, 2019, the Director issued *2019 Revised Patent Subject Matter Eligibility Guidance* ("*Revised Guidance*"), which explains how the Director directs that patent-eligibility questions under the judicial exception

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[2] US 2012/0072190 A1, published Mar. 22, 2012 ("Sharma")
[3] US 2014/0107935 A1, published Apr. 17, 2014 ("Taylor").

to 35 U.S.C. § 101 be analyzed. 84 Fed. Reg. 50–57; *see also October 2019 Update: Subject Matter Eligibility* (available at https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf).

Per the *Revised Guidance*, the first step of *Alice* (i.e., Office Step 2A) consists of two prongs. In Prong One, we must determine whether the claim recites a judicial exception, i.e., an abstract idea, a law of nature, or a natural phenomenon. 84 Fed. Reg. at 54 (Section III.A.1.). If it does not, the claim is patent eligible. *Id.* With respect to the abstract idea category of judicial exceptions, an abstract idea must fall within one of the enumerated groupings of abstract ideas in the *Revised Guidance* or be a "tentative abstract idea," with the latter situation predicted to be rare. *Id.* at 51–52 (Section I, enumerating three groupings of abstract ideas), 54 (Section III.A.1., describing Step 2A Prong One), 56–57 (Section III.C., explaining the identification of claims directed to a tentative abstract idea).

If a claim does recite a judicial exception, we proceed to Step 2A Prong Two, in which we determine if the "claim as a whole integrates the recited judicial exception into a practical application of the exception." *Id.* at 54 (Section II.A.2.). If it does, the claim is patent eligible. *Id.*

If a claim recites a judicial exception and fails to integrate it into a practical application, we then proceed to the second step of *Alice* (i.e., Office Step 2B). In that step, we evaluate the additional limitations of the claim, both individually and as an ordered combination, to determine whether they provide an inventive concept. *Id.* at 56 (Section III.B.). In particular, we look to whether the claim:

- Adds a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the

field, which is indicative that an inventive concept may be present; or

- simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception, which is indicative that an inventive concept may not be present.

Id.

<u>*Revised Guidance*, Step 2A, Prong One</u>

In Prong One of Step 2A, we determine whether claim 23 recites a judicial exception (i.e., a law of nature, natural phenomenon, or abstract idea).[4]

The Examiner determined that claim 23 recites abstract ideas in both the mathematical concepts and mental processes categories set forth in the *Revised Guidance* (84 Fed. Reg. at 52). Final Act. 3–4; Ans. 5–8.[5]

In particular, the Examiner determined that, and explains why, all of the steps constitute abstract ideas within the mental processes category. Ans. 6–8. Additionally, the Examiner determined that steps [b]–[d] also constitute abstract ideas within the mathematical concepts category. *Id.* at 10–11 (noting step [b]'s explicit recitation of "calculating" and the Specification's description, at paragraphs 16 through 31, of steps [c] and [d] as calculations).

Appellant argues that, "[w]hile some of the above-identified steps of claim 23 may involve mathematical calculations in some embodiments, claim 23 does not explicitly claim a mathematical equation." Appeal Br. 5.

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[4] Appellant argues against the rejection of all claims together. Appeal Br. 3–8. We choose claim 23 as representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).
[5] The *Revised Guidance* was issued subsequent to the Final Action but prior to the Answer.

This argument is inapposite to the issue at hand: whether claim 23 recites an abstract idea.

Appellant's only specific argument on point is that step [d] (the "mapping" step) does not recite an abstract idea within the mental process category. Appeal Br. 5. In that regard, Appellant argues "the 'mapping' in claim 23 cannot be performed mentally to determine a value of the pressure drop over the coronary stenosis of the patient at the hyperemia state *due to the complexity of such mapping*." *Id.* (emphasis added). Appellant's argument is not persuasive because Appellant has not demonstrated that the mapping cannot be performed mentally (or with pen and paper). *See Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1318 (Fed. Cir. 2016) ("[W]ith the exception of generic computer-implemented steps, there is nothing in the claims themselves that foreclose them from being performed by a human, mentally or with pen and paper."). And the Specification indicates that the mapping can be "compute[d]" mentally or via pen and paper and provides a general function for the computing the same. Spec. ¶¶22–23.

On the record presented, we are not apprised of error in the Examiner's determination, under Step 2A, Prong One of the *Revised Guidance*, that claim 23 recites an abstract idea, indeed multiple abstract ideas, in the mathematical concepts and mental processes categories.

Revised Guidance, Step 2A, Prong Two

In Prong Two of Step 2A, we determine whether claim 23 as a whole integrates the recited judicial exceptions (here, abstract ideas) into a practical application of the exceptions. In doing so, we first determine "whether there are any additional elements recited in the claim beyond the judicial

exception(s)." 84 Fed. Reg. at 54–55. There are none. Each limitation of claim 23 recites an abstract idea.

Appellant, however, directs us to the preamble, arguing: "The claims are integrated into the practical application of determining a fractional flow reserve (FFR) for a coronary stenosis of a patient. *See, e.g.,* Claim 23, preamble." Appeal Br. 6; *see also* claim 23 ("A method for determining fractional flow reserve (FFR) for a coronary stenosis of a patient at a hyperemia state, comprising . . . ."). Appellant asserts that, "[b]y determining the FFR for the coronary stenosis of the patient, a particular treatment or prophylaxis for the coronary stenosis is thereby effected." Appeal Br. 6.

It is true that, if a claim includes "an additional element that applies or uses a judicial exception to effect a particular treatment or prophylaxis for a disease or medical condition," that fact is indicative of integration into a practical application. 84 Fed. Reg. at 55. However, even assuming the preamble of claim 23 constitutes a claim element, the preamble, like the rest of claim 23, lacks a recitation of any particular treatment or prophylaxis. In other words, Appellant's argument is inapposite in view of the language of the claim.

On the record presented, we are not apprised of error in the Examiner's determination, under Step 2A, Prong Two of the *Revised Guidance*, that claim 23 fails to integrate any of the recited abstract ideas into a practical application.

Revised Guidance, Step 2B

In Prong Two of Step 2B, we evaluate the additional limitations of claim 23, both individually and as an ordered combination, to determine

whether they provide an inventive concept. Again, however, there are no additional limitations.

Appellant nonetheless relies on step [d] (the "mapping" step), arguing "[s]imilar to the claims in Berkheimer, claim 23 provides for the unconventional manner in which the mapping is performed that goes beyond the alleged abstract idea of mapping." Appeal Br. 8. *Berkheimer* affirmed a district court's summary judgment that claims 1–3 and 9 of the subject patent were ineligible and vacated the summary judgment that claims 4–7 were ineligible because a genuine of issue of fact precluded summary judgment. *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1370–71 (Fed. Cir. 2018), *cert. denied*, 140 S. Ct. 911 (2020).[6]

Appellant compares its claim 23 to claim 4 at issue in *Berkheimer*. Appeal Br. 8. *Berkheimer*, however, did not rule that claim 4, or claims 5–7, were eligible. 881 F.3d at 1370 ("We do not decide today that claims 4–7 are patent eligible under § 101. We only decide that on this record summary judgment was improper, given the fact questions created by the specification's disclosure."). In any event, Appellant's comparison of its claim 23 to claim 4 at issue in *Berkheimer* is unfounded. *Berkheimer* noted that "[c]laim 4 recites 'storing a reconciled object structure in the archive without substantial redundancy'" and "[t]he specification states that storing object structures in the archive without substantial redundancy *improves system operating efficiency and reduces storage costs*." *Id.* (emphasis added). Based on these facts, *Berkheimer* held a genuine issue of disputed fact existed as to whether claim 4 provided benefits that improve computer

[6] *Berkheimer* also affirmed the summary judgment that claims 10–19 were invalid as indefinite. 881 F.3d at 1370–71.

functionality. *Id.* Here, Appellant does not explain how claim 23's "mapping" limitation improves computer functionality or provide evidence to support such a finding. Instead, Appellant merely argues that claim 23's "mapping" is "unconventional." Appeal Br. 8. Appellant's reliance on *Berkheimer* is misplaced.

As for the allegation of unconventional "mapping," that argument does not support eligibility for at least two reasons. First, as discussed above, Appellant has not shown error in the Examiner's determination that the "mapping" limitation itself recites an abstract idea. Accordingly, it is not an "additional element." *See* 84 Fed. Reg. at 56. Second, the "mapping" limitation is "specified at a high level of generality." *Id.* It recites, in entirety: "mapping the value of the pressure drop over the coronary stenosis of the patient at the rest state to a value of the pressure drop over the coronary stenosis of the patient at the hyperemia state based on the extracted features." Neither this limitation nor the Specification provides details for how the allegedly unconventional and inventive "mapping" is specifically performed. Rather, the Specification and claim 23 merely indicate that it is some function of extracted features and a Quality of Interest ("QoI"). *See, e.g.*, Spec. ¶23 ("*QoI*(State 2) = *f*(*QoI*(*State* 1), *Features*(*State* 1))").

For the foregoing reasons, we affirm the rejection of claim 23 under the judicial exception to § 101, as well as that of claims 24–26, which fall therewith.

Rejection 2—Nonobviousness

The Examiner concluded that claims 23–26 would have been obvious over Sharma and Taylor. Critical to that conclusion is the following finding:

> [Sharma teaches] mapping the value over the coronary stenosis of the patient at the rest state to a value over the coronary stenosis of the patient at the hyperemia state based on the extracted features ("pressure/flow based measurements are used to determine these flow reserves" [0026]; "maximum velocity at rest is mapped to an average rest velocity and a maximum velocity at hyperemia is mapped to an average hyperemia velocity using patient-specific CFO simulations" [0030])

Final Act. 7 (citing Sharma ¶¶26, 30).

Appellant argues that "the mapping in the cited portions of Sharma is 1) from a maximum velocity at rest to an average velocity at rest, or 2) from a maximum velocity at hyperemia to an average velocity at hyperemia." Appeal Br. 9. In other words, Sharma does not teach mapping blood velocity (or any other datum) *at rest* to the same *at hyperemia*.

The Examiner responds that Sharma teaches mapping rest-to-rest and hyperemia-to-hyperemia, not merely one or the other. Ans. 16 ("Initially, it is noted that the appellant appears to intentionally note that Sharma teaches mapping **rest 'or' hyperemia** conditions which appears to be an error since Sharma specifically teaches mapping in both resting conditions and hyperemia conditions."). Understood. But it is not responsive to Appellant's argument.

The Examiner also responds that Sharma's blood velocity can be used to calculate blood "pressure drop," as recited in claim 23. Ans. 17. This too is non-responsive to the heart of Appellant's argument. Nowhere in the Final Action or Answer does the Examiner satisfactorily explain how the asserted prior art teaches or renders obvious mapping the value of anything at a rest state to a value at a hyperemia state.

Appellant has apprised us of error in the obviousness rejection of claim 23, as well as claims 24–26, which ultimately depend from claim 23. Accordingly, we reverse the obviousness rejection of claims 23–26.

SUMMARY

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
23–26	101	Judicial exception	23–26	
23–26	103	Sharma, Taylor		23–26
Overall Outcome			23–26	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED