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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JEAN HONG, MANFRED KÖHLER, LAURA PEYTHIEUX,
CHRISTOPHE BOYER, FRÉDÉRIC LETZELTER,
ROBERT BERAUD, and MATHIEU GUNTHER

Appeal 2019-002381
Application 14/629,936
Technology Center 2600

Before ERIC S. FRAHM, JOHN A. EVANS, and
JASON J. CHUNG, *Administrative Patent Judges*.

EVANS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Jurisdiction

Appellant¹ seeks our review under 35 U.S.C. § 134(a) of the Examiner's final rejection of Claims 1–17 all pending claims. Appeal Br. 2. We have jurisdiction under 35 U.S.C. § 6(b).

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42 (2017). Appellant states the real party in interest is Dassault Systemes. Appeal Br. 3.

We REVERSE.²

Summary of the Invention

The claims relate to a computer-implemented method for designing a three dimensional modeled object in a three dimensional scene. *See* Abstract.

Invention

Claims 1, 11, and 12 are independent. Appeal Br. 5. An understanding of the invention can be derived from a reading of Claim 1, which is reproduced in Table 1, *infra*.

References

Name	Publication Number	Date
Krishnan	US 2008/0030500 A1	Feb. 7, 2008
Shimada	US 2009/0284550 A1	Nov. 19, 2009
Joshi	US 2013/0127836 A1	May 23, 2013
Bandyopadhyay	US 2015/0354965 A1	Filed June 12, 2013

Egglı L, et al., *Inferring 3D models from freehand sketches and constraints*, 29(2) Computer-Aided Design, 101–112 (1997).

² Rather than reiterate the arguments of Appellant and the Examiner, we refer to the Appeal Brief (filed August 28, 2018, “Appeal Br.”), the Reply Brief (filed January 29, 2019, “Reply Brief”), the Examiner’s Answer (mailed November 29, 2018, “Ans.”), the Non-Final Action (mailed January 30, 2018, “Non-Final Act.”), and the Specification (filed February 24, 2015, “Spec.”) for their respective details.

Qin SF, Wright DK, Jordanov IN, *From on-line sketching to 2D and 3D geometry: a system based on fuzzy knowledge*, 32 Computer-Aided Design, 851–866 (2000).

Heckbert PS, Garland M, *Survey of Polygonal Surface Simplification Algorithms*, Carnegie-Mellon Univ., Pittsburgh Pa, School Of Computer Science, 1997.

*Rejections*³

Claims Rejected	35 U.S.C. §	References/Basis
1–17	101	Ineligible Subject Matter; Non-Final Act. 3–9.
1, 2, 4–10, 13–17	103	Eggl, Qin, Joshi; Non-Final Act. 10–25.
3	103	Eggl, Qin, Joshi, Shimada; Non-Final Act. 25–26.
11	103	Eggl, Qin, Joshi, Krishnan, Heckbert; Non-Final Act. 27–30.
12	103	Eggl, Qin, Joshi, Krishnan, Heckbert, Bandyopadhyay; Non-Final Act. 30–31.

ANALYSIS

We have reviewed the rejections of Claims 1–17 in light of Appellant’s arguments that the Examiner erred. We consider Appellant’s arguments as they are presented in the Appeal Brief and the Reply Brief.

CLAIMS 1–17: INELIGIBLE SUBJECT MATTER

³ The Application was examined under the AIA first inventor to file provisions. Non-Final Act. 2.

Appellant argues the merits of the claims as a group with reference to the limitations of Claim 1. *See* Appeal Br. 15. Therefore, we decide the appeal of the § 101 rejection on the basis of illustrative Claim 1 and refer to the rejected claims collectively herein as “the claims.” *See* 37 C.F.R. § 41.37(c)(1)(iv); *In re King*, 801 F.2d 1324, 1325 (Fed. Cir. 1986).

We reviewed the record *de novo*. *SiRF Tech., Inc. v. Int’l Trade Comm’n*, 601 F.3d 1319, 1331 (Fed. Cir. 2010) (“Whether a claim is drawn to patent-eligible subject matter is an issue of law that we review *de novo*.”). Based upon our review of the record in light of recent policy guidance with respect to patent-eligible subject matter rejections under 35 U.S.C. § 101,⁴ we reverse the rejection of Claims 1–17 for the specific reasons discussed below.

35 U.S.C. § 101

Section 101 provides that a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 35 U.S.C. § 101. The Supreme Court has long recognized, however, that § 101 implicitly excludes “[l]aws of nature, natural phenomena, and abstract ideas” from the realm of patent-eligible subject matter, as monopolization of these ““basic tools of scientific and technological work”” would stifle the very innovation that the patent system aims to promote. *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)); *see also Mayo Collaborative Servs. v. Prometheus Labs.*,

⁴ *See* 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Revised Guidance”).

Inc., 566 U.S. 66, 72–78 (2012); *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

Under the mandatory Revised Guidance, we reconsider whether Appellant’s claims recite:

1. any **judicial exceptions**, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing human activity 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)).

Only if a claim, (1) recites a judicial exception, and (2) does not integrate that exception into a practical application, do we then reach the issue of 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.

A. Whether the claims recite a judicial exception

The Revised Guidance extracts and synthesizes key concepts identified by the courts as abstract ideas to explain that the abstract-idea exception includes the following groupings of subject matter:

(a) mathematical concepts,⁵ i.e., mathematical relationships, mathematical formulas, equations,⁶ and mathematical calculations⁷; (b) certain methods of organizing human activity—fundamental economic principles or practices (including hedging, insurance, mitigating risk); commercial or legal interactions (including agreements in the form of contracts; legal obligations; advertising, marketing or sales activities or behaviors; business relations); managing personal behavior or relationships or interactions between people (including social activities, teaching, and following rules or instructions)⁸; and (c) mental processes—concepts performed in the human mind (including observation, evaluation, judgment, opinion).⁹

The preamble of independent Claim 1 recites: “A computer-implemented method for designing a three dimensional modeled object in a three

⁵ *Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“The concept of hedging . . . reduced to a mathematical formula . . . is an unpatentable abstract idea.”).

⁶ *Diehr*, 450 U.S. at 191 (“A mathematical formula as such is not accorded the protection of our patent laws”); *Parker v. Flook*, 437 U.S. 584, 594 (1978) (“[T]he discovery of [a mathematical formula] cannot support a patent unless there is some other inventive concept in its application.”).

⁷ *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) (holding that claims to a “series of mathematical calculations based on selected information” are directed to abstract ideas).

⁸ *Alice*, 573 U.S. at 219–20 (concluding that use of a third party to mediate settlement risk is a “fundamental economic practice” and thus an abstract idea); see Revised Guidance, at 52 n.13 for a more extensive listing of “[c]ertain methods of organizing human activity” that have been found to be abstract ideas.

⁹ *Mayo*, 566 U.S. at 71 (“[M]ental processes[] and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work” (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972))).

dimensional scene in a system of computer-aided design (CAD), computer-aided manufacturing (CAM) or computer aided engineering (CAE), wherein the method comprises the steps of.” The limitations recited in the body of the claim are analyzed in Table I against the categories of abstract ideas as set forth in the Revised Guidance. As set forth in Table I below, we find limitations [b] through [g] of independent Claim 1 recite abstract ideas, i.e., “mathematical concepts” and “mental processes.”

Table I

Claim 1	Revised Guidance
[a] ¹⁰ providing a first curve in the three dimensional scene;	An additional element that adds insignificant extra-solution activity to the judicial exception, i.e., mere data-gathering. <i>See</i> Revised Guidance 55.
[b] duplicating the first curve to obtain a second curve in the three dimensional scene;	Mathematical concepts, i.e., mathematical relationships, mathematical formulas or equations, mathematical calculations; <i>See</i> Revised Guidance at 52.
[d] automatically, by a processor, determining a set of at least one starting point belonging to the first curve;	Mental processes, i.e., concepts performed in the human mind (including an observation, evaluation, judgment, opinion). <i>See</i> Revised Guidance at 52. ¹¹

¹⁰ Step designators, e.g., “[a],” were added to facilitate discussion.

¹¹ If a claim, under its broadest reasonable interpretation, covers performance in the mind but for the recitation of generic computer components, then it is still in the mental processes category unless the claim cannot practically be performed in the mind. *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

<p>[e] automatically, by the processor, determining a set of at least one target point belonging to the second curve, each target point being associated at least one starting point;</p>	<p>Mental processes.</p>
<p>[f] linking the relevant points with their associated target points by using at least a connecting curve;</p>	<p>Mental processes.</p>
<p>[g] applying at least a transformation to the second curve, this transformation being chosen among axis rotation and stretching, the transformation generating, by the processor, a three dimensional modeled object in the three dimensional scene including the first curve, the second curve, and the connecting curve displaying the three-dimensional modeled object having the first curve, second curve, and connecting curve in the CAD, CAM, or CAE system.</p>	<p>Mathematical concepts.</p>

claims themselves that foreclose them from being performed by a human, mentally or with pen and paper.’’); *Versata Dev. Grp. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015) (“Courts have examined claims that required the use of a computer and still found that the underlying, patent-ineligible invention could be performed via pen and paper or in a person’s mind.’”).

Step 2A(ii): Judicial Exception Integrated into a Practical Application?

If the claims recite a patent-ineligible concept, as we conclude above, we proceed to the “practical application” *Step 2A(ii)* wherein the “claims are considered in their entirety to ascertain whether their character as a whole is directed to excluded subject matter.” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016) (quotes and citation omitted). This test determines whether the recited judicial exception is integrated into a practical application of that exception by: (a) identifying whether there are any additional elements recited in the claim beyond the judicial exception(s); and (b) evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application.

The Examiner finds the independent claims “correspond[]” to the abstract idea of a mathematical relationship or formula in view of their curve-generation limitations. Non-Final Act. 4. In view of limitations [b] and [g], we agree the claims at least recite a mathematical relationship. The Examiner further finds the claims correspond to an “idea of itself” because the claims perform geometric operations which can be performed by a human with pen and paper. *Id.* (citing *Gottschalk v. Benson*, 409 U.S. 63 (1972)).

Claim 1 recites, *inter alia*, “designing a [3D] modeled object in a [3D] scene . . . in a [CAD, CAE, or CAM system].” Appellant contends a human could not perform the claimed geometric operations inside a CAD/CAM 3D-scene. Appeal Br. 14. Appellant argues the Examiner’s determination

ignores the fact that a human, with pen and paper, cannot designed a 3D modeled object within a 3D scene. *Id.*

The Examiner finds “generating a 3d model is an abstract idea because generating a 3d model requires some input lines/curves and these input lines/curves are organized to build a 3d model, which is a mathematical or geometrical problem and a person can perform this using pen and paper. Ans. 11.

Appellant contends the “recited practical application is more than a drafting effort, as the recited ‘first curve’ and ‘second curve’ are recited to be “in the three dimensional scene.” Reply Br. 3.

The question before us is whether the Examiner’s “pen and paper” analogy is well-founded. *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.”). A sheet of paper is a two-dimensional surface having an area, but lacking a three-dimensional volume. The rules of drawing allow us to imagine what is drawn in the two dimensions of the paper exists in three-dimensional space, but that is our imagination.

In *SiRF Tech.*¹² the claims included limitations to, *inter alia*, “calculating an absolute position of a GPS receiver,” “computing absolute position,” and updating an “estimate of position of the GPS receiver.” *SiRF Tech.*, at 1332. In the abstract, “calculating,” “computing,” and “estimating”

¹² *SiRF Technology, Inc. v. International Trade Com’n*, 601 F.3d 1319 (2010).

are mental process involving mathematical concepts. However, the Federal Circuit found:

We are not dealing with a situation in which there is a method that can be performed without a machine. Contrary to appellants' contention, there is no evidence here that the calculations here can be performed entirely in the human mind. Here, as described, the use of a GPS receiver is essential to the operation of the claimed methods.

SiRF Tech., at 1333. Similarly, we find the claimed 3D rendering cannot be performed by a human on a 2D surface.

In *Research Corp.*,¹³ the Court observed that the claimed methods incorporate algorithms and formulas that control the process for rendering a halftone image, but that the claimed algorithms and formulas which form a significant part of the claimed combination, do not bring this invention even close to the degree of abstractness that would override the statutory categories and context. *Research Corp.*, at 869. The instant application claims a method for rendering and “displaying [a] three-dimensional modeled object having the first curve, second curve, and connecting curve in the CAD, CAM, or CAE system.” Similarly, we find the mathematical concepts which underlie the claimed invention “do not bring this invention even close to abstractness that would override the statutory categories and context.” *Research Corp.*, at 869.

In view of the foregoing, we conclude that Appellant's claims do, in fact, integrate the judicial exception into a practical application. We,

¹³ *Research Corp. Technologies, Inc. v. Microsoft Corp.*, 627 F.3d 859 (2010).

therefore, decline to sustain the rejection of Claims 1–17 under 35 U.S.C. § 101.

CLAIMS 1–17: OBVIOUSNESS OVER EGGLE, QIN,
AND VARIOUS SECONDARY REFERENCES

Appellant argues the merits of the claims as a group with reference to the limitations of Claim 1. *See* Appeal Br. 13. Therefore, we decide the appeal of the § 103 rejection on the basis of illustrative Claim 1 and refer to the rejected claims collectively herein as “the claims.” *See* 37 C.F.R. § 41.37(c)(1)(iv); *In re King*, 801 F.2d 1324, 1325 (Fed. Cir. 1986).

Duplicating the first curve to obtain a second curve.

Claim 1 recites, *inter alia*, “providing a first curve in the three dimensional scene; duplicating the first curve to obtain a second curve in the three dimensional scene.”

The Examiner finds Eggli teaches a first curve, in a bold line, duplicated into a second curve, in a light line. Non-Final Act. 12 (citing Eggli, Fig. 11). The Examiner finds Eggli is silent regarding determining one starting point and one target point by a processor. *Id.* The Examiner finds Qin teaches determining a starting point, i.e., a corner point, and a target point, i.e., a corner point of a different curve. *Id.* Thus, the Examiner finds “one point of a curve is the claimed starting point and starting point of another curve is the target point.” Non-Final Act. 12.

Appellant contends Qin teaches a method that segments a single curve and finds corner points and inflection points of a single curve instead of points on the claimed first and second curve. Appeal Br. 11. Appellant argues the combination of Eggli and Qin does not teach or suggest the

claimed “linking the relevant points with their associated target points by using at least a connecting curve” because the points of Qin are the points of a same curve. *Id.*

The Examiner finds Qin segments a 2d curve and where a curve is segmented at least two curves are created. Ans. 5. The Examiner finds Egli teaches the claimed “linking the relevant points with their associated target points by using at least a connecting curve.” Ans. 6.

Appellant contends Qin’s segmentation method finds corner and inflection points in the same 2D curve, instead of separate first and second curves as recited in Claim 1. Appeal Br. 11. Appellant argues:

It is unclear how this combination is compatible with Appellant’s Claim 1, which recites “duplicating the first curve to obtain a second curve” and “automatically ... determining a set of at least one target point belonging to the second curve.” Instead, such a combination divides one curve, as disclosed in Qin, to reach two independent curves, and therefore, the resulting combination is distinct from Appellant’s Claim 1.”

Reply Br. 2.

Even if we were to accept, *arguendo*, Qin’s teaching of segmenting a first curve into first and second curves, the “second” curve thereby produced is not a duplication of a first curve, as claimed. Therefore, any “target” point found on the “second” curve would not be a point of a curve that is duplicative of the claimed first curve. The Examiner finds Joshi is not used to rejecting the argued limitation, nor does the Examiner apply any of the secondary references against this limitation. Ans. 6. Thus, we find the claimed limitation is not taught by the prior art. In view of the foregoing, we decline to sustain the rejection of Claims 1–17 under 35 U.S.C. § 103.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-17	101	Eligibility		1-17
1, 2, 4-10, 13-17	103	Eggli, Qin, Joshi,	--	1, 2, 4-10, 13-17
3	103	Eggli, Qin, Joshi, Shimada	--	3
11	103	Eggli, Qin, Joshi, Krishnan, Heckbert	--	11
12	103	Eggli, Qin, Joshi, Krishnan, Heckbert, Bandyopadhyay	--	12
Overall			--	1-17

REVERSED