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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte XUEJUN SHENG and WAYNE CATALFANO¹

Appeal 2018-006974
Application 13/787,570
Technology Center 2100

Before MARC S. HOFF, JAMES R. HUGHES, and
BETH Z. SHAW, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellant seeks our review under 35 U.S.C. § 134(a) of the Examiner’s Final Decision rejecting claims 1, 5–9, 13–17, and 21–33. Claims 2–4, 10–12, and 18–20 have been canceled. *See* Final Act. 1–2.² We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ Autodesk, Inc. (“Appellant”) is the applicant as provided in 37 C.F.R. § 1.46 and is identified as the real party in interest. Appeal Br. 1.

² We refer to Appellant’s Specification (“Spec.”) filed Mar. 6, 2013; Appeal Brief (“Appeal Br.”) filed Jan. 18, 2018; and Reply Brief (“Reply Br.”) filed June 22, 2018. We also refer to the Examiner’s Final Office Action (“Final Act.”) mailed June 19, 2017; and Answer (“Ans.”) mailed Apr. 25, 2018.

Appellant's Invention

The invention “relates to computer-aided design (CAD) applications and, in particular, to computing boundary constraints for patching arbitrary curve networks.” Spec. 1:4–5; *see* Spec. 1:28–3:7; Abstract.

Representative Claim

Independent claim 1, reproduced below, further illustrates the invention:

1. A method implemented by a computer-aided design (CAD) system comprising one or more computers, the method comprising:

receiving a model representing a three-dimensional object in the CAD system, the model including a plurality of edges of a curve network, wherein the curve network includes one or more closed loops of edges, and wherein each respective closed loop of edges in the curve network represents a respective face of the object;

determining, by the CAD system for a first end point of a particular edge of a face of the model, a first vector of a first adjacent edge of the face, wherein the first adjacent edge meets the particular edge at the first end point, and wherein the first vector represents an orientation of the first adjacent edge where the first adjacent edge meets the first end point of the particular edge;

determining, by the CAD system for a second end point of the particular edge of the face of the model, a second vector of a second adjacent edge of the face, wherein the second adjacent edge meets the particular edge at the second end point, and wherein the second vector represents an orientation of the second adjacent edge where the second adjacent edge meets the second end point of the particular edge;

generating, by the CAD system, a first derivative field including sweeping the first vector of the first adjacent edge along the particular edge between the first end point and the second end point;

generating, by the CAD system, a second derivative field including sweeping the second vector of the second adjacent edge along the particular edge between the first end point and the second end point; and

generating, by the CAD system, boundary continuity constraints for the particular edge of the face by applying a blending function to respective components of the first derivative field and the second derivative field to generate a blended derivative field defining the boundary continuity constraints for the particular edge.

Appeal Br. 20–21 (Claims App.).

Rejection on Appeal

The Examiner rejects claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. *See* Final Act. 14–16.

ISSUE

Based upon our review of the record, Appellant’s contentions, and the Examiner’s findings and conclusion, the issue before us follows:

Did the Examiner err in determining Appellant’s claims were directed to patent-ineligible subject matter, without significantly more, under 35 U.S.C. § 101?

ANALYSIS

Eligibility Analysis

Under 35 U.S.C. § 101, a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” 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 Int’l*, 573 U.S. 208, 216 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)).

The Supreme Court, in *Alice*, reiterated the two-step framework previously set forth in *Mayo Collaborative Services v. Prometheus Labs., Inc.*, 566 U.S. 66, 77–80 (2012), “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice*, 573 U.S. at 217. Assuming that a claim nominally falls within one of the statutory categories of machine, manufacture, process, or composition of matter, the first step in the analysis is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts” (*id.*), e.g., to an abstract idea. *See Alice*, 573 U.S. at 219 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging, or protecting against risk.”). Concepts determined to be abstract ideas, and thus patent ineligible include, but are not limited to, certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as “molding rubber products” (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); “tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores” (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S.

(15 How.) 252, 267–68 (1854)); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, 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 continued by qualifying its findings, indicating 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 *Benson* and *Flook*); *see, 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 claims are not directed to an abstract idea, the inquiry ends. Otherwise, the inquiry proceeds to the second step of the *Alice* and *Mayo* framework where the elements of the claims are considered “individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Alice*, 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 78–79). This second step is described as “a search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is ‘. . . significantly more than . . . the [ineligible concept] itself.’” *Id.* at 217–18 (alteration in original) (quoting *Mayo*, 566 U.S. at 72–73). “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].’” *Alice*, 573 U.S. at 221 (quoting *Mayo*, 566 U.S. at 77). “[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention.” *Id.*

The Court acknowledged in *Mayo* that “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.” *Mayo*, 566 U.S. at 71. We, therefore, look to whether the claims focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery. *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016).

The PTO recently published revised guidance on the application of § 101. USPTO’s *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (hereinafter “2019 Revised Guidance”).

Under that guidance, we first look to whether the claim recites:

- (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, mental processes, or certain methods of organizing human activity such as a fundamental economic practice or managing personal behavior or relationships or interactions between people) (hereinafter “Step 2A, prong 1”); and
- (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h)) (hereinafter “Step 2A, prong 2”).³

See 2019 Revised Guidance, 84 Fed. Reg. at 51–52, 55.

³ All references to the MPEP are to the Ninth Edition, Revision 08–2017 (rev. Jan. 2018).

A claim that integrates a judicial exception into a practical application applies, relies on, or uses 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 judicial exception. *See* 2019 Revised Guidance, 84 Fed. Reg. at 54. When the judicial exception is so integrated, then the claim is not directed to a judicial exception and is patent eligible under 35 U.S.C. § 101. *Id.*

Only if a claim: (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then evaluate whether the claim provides an inventive concept. *See* 2019 Revised Guidance 84 Fed. Reg. at 56; *Alice*, 573 U.S. at 217–18.

For example, we 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.⁴

See 2019 Revised Guidance, 84 Fed. Reg. at 56.

With these principles in mind, we turn to the merits of the § 101 rejection.

Revised Guidance Step 1—Statutory Category

We find that claim 1 (*see* Appeal Br. 20–21 (Claims App.)), on its face, recites a “method” (i.e., a process)—a method implemented by a CAD system to compute boundary constraints for patching arbitrary curve

⁴ Items (3) and (4) are collectively referred to as “Step 2B” hereinafter and in the 2019 Revised Guidance.

networks. A process is a statutory category of invention (subject matter) (USPTO’s Step 1). Appellant’s claim 1 presents a statutory category of invention. Accordingly, we next analyze whether the claim is directed to an abstract idea (USPTO’s Step 2A).

Revised Guidance Step 2A, Prong 1—Abstract Idea

Turning to the next step of the eligibility analysis, “the *Alice* inquiry . . . asks whether the focus of the claims is on the 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 abstract idea exception prevents patenting a result where ‘it matters not by what process or machinery the result is accomplished.’” *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016) (quoting *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 113 (1854)).

The Examiner rejects Appellant’s claims 1, 5–9, 13–17, and 21–33 as being directed to patent ineligible subject matter. *See* Final Act. 14–16; Ans. 8–12. Appellant argues claims 1, 5–9, 13–17, and 21–33 together for this rejection. *See* Appeal Br. 4–18. Accordingly, as permitted by 37 C.F.R. § 41.37(c)(1)(iv), we decide the appeal for this rejection based on claim 1.

Specifically, the Examiner rejects Appellant’s claim 1 as being directed to patent ineligible subject matter (*see* Final Act. 14–15) and concludes claim 1 “is directed to a judicial exception (i.e., . . . an abstract idea) without significantly more” because claim 1 is “directed to the abstract idea of performing mathematical operations to blend geometry, representing as a mathematical construct. . . . Further each element of the claim[] is directed to either abstract data manipulation (providing models or

constraints) or mathematical calculations (calculating parameters such as tangents or derivatives).” Final Act. 14–15. Additionally, the Examiner explains that:

The abstract data manipulation of the claim, namely the provision of models, is equivalent to sorting information. The “determining” and “generating” steps, when examined closely for content, are clearly mathematical calculations (e.g. determining a vector which would include calculating a tangent vector). These together constitute an abstract idea similar to the concepts that have been identified as abstract by the courts, such as organizing information through mathematical correlations in *Digitech*[,] or data recognition and storage in *Content Extraction*[, or] . . . obtaining and comparing intangible data [as in] *CyberSource*.

Final Act. 15 (citing *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344 (Fed. Cir. 2014); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat’l Ass’n*, 776 F.3d 1343 (Fed. Cir. 2014); *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366 (Fed. Cir. 2011)); *see* Ans. 8–11.

Here, in rejecting the claims (in particular claim 1) under 35 U.S.C. § 101, the Examiner analyzed the claims using the *Mayo/Alice* two-step framework, consistent with the guidance set forth in the USPTO’s “2014 Interim Guidance on Patent Subject Matter Eligibility,” 79 Fed. Reg. 74618 (Dec. 16, 2014), in effect at the time the rejection was made, i.e., on June 19, 2017.

Appellant contends that the Examiner erred in rejecting the claims as being directed to patent-ineligible subject matter. *See* Appeal Br. 4–18; Reply Br. 1–5. Specifically, Appellant contends, with respect to the first step of the *Alice* analysis, that the Examiner “oversimplified [claim 1] and ignored the specific requirements of the claims in formulating the alleged

abstract idea” (Appeal Br. 11; *see* Appeal Br. 10–11), the Examiner misinterpreted claim 1 because the claim “do[es] not seek to claim any mathematical constructs themselves” (Appeal Br. 11; *see* Appeal Br. 11–12), and claim 1 is “not directed to an abstract idea because [it] recite[s] an improvement to computer capabilities” and is “directed to a specific method that improves the relevant technology” similar to *McRO* (Appeal Br. 9; *see* Appeal Br. 9–14). *See* Appeal Br. 4–14; Reply Br. 1–5.

For the reasons discussed below, we conclude that Appellant’s claim 1 (and the other pending claims) recite abstract ideas, these abstract ideas are not integrated into a practical application, nor do they include an inventive concept. In view of the 2019 Revised Guidance, we clarify and expand the Examiner’s reasoning as follows.

The Revised Guidance explains that the abstract idea exception includes “[m]athematical concepts” including “mathematical relationships, mathematical formulas or equations, [and] mathematical calculations.” Revised Guidance, 84 Fed. Reg. at 52. The Examiner determined (*supra*) that claim 1 recites subject matter that falls within this abstract idea grouping. *See* Final Act. 14–15; Ans. 8–11. We concur with the Examiner’s interpretation of claim 1.

Claim 1 recites mathematical constructs—a three-dimensional object model including edges of a curve network and face of the object, which are closed loops of edges. Claim 1 also recites several mathematical calculations: (1) calculating a mathematical concept or relationship (a first vector) and specifying the relationship among the various data in the model—“determining . . . for a first end point of a particular edge of a face of the model, a first vector of a first adjacent edge of the face”; (2)

calculating a second mathematical concept (a second vector) and specifying the relationship among the various data—“determining . . . for a second end point of the particular edge of the face of the model, a second vector of a second adjacent edge of the face”; (3) performing a mathematical calculation of derivatives—“generating . . . a first derivative field” by (including) “sweeping the first vector of the first adjacent edge along the particular edge between the first end point and the second end point”; (4) performing a second mathematical calculation of derivatives—“generating . . . a second derivative field” by (including) “sweeping the second vector of the second adjacent edge along the particular edge between the first end point and the second end point”; and (5) performing an additional mathematical calculation—“generating . . . boundary continuity constraints for the particular edge of the face” by applying a function (“a blending function”) “to respective components of the first derivative field and the second derivative field to generate a blended derivative field defining the boundary continuity constraints for the particular edge.” Appeal Br. 20–21 (claim 1) (Claims App.).

Each of the limitations discussed above encompasses mathematical concepts. Claim 1 recites a process implemented utilizing a CAD system (a computer executing instructions). The CAD system receives a model. The model, which is data, represents a physical three-dimensional object. The data (model) is then used in the calculations, summarized above, to calculate vectors and derivative fields. A blending function is then applied to the derivative fields (a calculation is performed) that generates boundary continuity constraints. Aside from the CAD system, claim 1 recites receiving data (the three-dimensional model, which is a mathematical

construct), characterizing the relationships among the data (within the mathematical construct of the three-dimensional model), and mathematical calculations performed on the data. As pointed out by the Examiner, claim 1 essentially recites “performing mathematical operations to blend geometry, representing as a mathematical construct,” “abstract data manipulation (providing models or constraints),” and “mathematical calculations (calculating parameters such as tangents or derivatives).” Final Act. 14–15.

Similar to the claims found patent-ineligible in *Digitech*, Appellant’s claim 1 “recites an ineligible abstract process of gathering and combining data” and “employs mathematical algorithms [(calculations)] to manipulate existing information to generate additional information[, which] is not patent eligible. ‘If a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory.’” *Digitech*, 758 F.3d at 1351 (quoting *Flook*, 437 U.S. at 595 (internal quotations omitted)). More recently, our reviewing court explained that, similar to *Digitech*, claims applying a mathematical formula (to assign image codes) as well as encoding and decoding image data recite an abstract idea. *See RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1326–27 (Fed. Cir. 2017). In particular, the Federal Circuit explained that claims focused on mathematical concepts are abstract—“outside of the math, claim 1 . . . is not directed to otherwise eligible subject matter. Adding one abstract idea (math) to another abstract idea (encoding and decoding) does not render the claim non-abstract.” *RecogniCorp*, 855 F.3d at 1327.

With respect to Appellant’s arguments (*supra*) that the Examiner oversimplified the interpretation of claim 1 (*see* Appeal Br. 10–11), claim 1

does not “seek to claim any mathematical constructs themselves” (Appeal Br. 11), and is not abstract “because [it] recite[s] an improvement to computer capabilities” and is “directed to a specific method that improves the relevant technology” (Appeal Br. 9) similar to *McRO* and *Enfish* (see Appeal Br. 4, 9–10), *RecogniCorp* also distinguishes claims focusing on mathematical concepts, similar to Appellant’s claim 1, from claims that merely include mathematical calculations. See *RecogniCorp*, 855 F.3d at 1326–27 (distinguishing *Diehr* and *Enfish*, and explaining why the at-issue claims were not mischaracterized (oversimplified)). Appellant also invokes *Thales* (*Thales Visionix Inc. v. U.S.*, 850 F.3d 1343, 1348–49 (Fed. Cir. 2017)) to support Appellant’s contention that claim 1 does not seek to claim mathematical constructs. See Appeal Br. 11. Further to our detailed interpretation of Appellant’s claim 1 (*supra*), and our discussion with respect to *Digitech* and *RecogniCorp*, the reasoning in *Thales* is inapposite to Appellant’s claim 1. Similar to the claims in *InvestPic*, which distinguished the claims in *Thales*, the focus of Appellant’s claim 1 “is not a physical-realm improvement but an improvement in wholly abstract ideas—the selection and mathematical analysis of information.” *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1168 (Fed. Cir. 2018).

In summary, claim 1 recites a method (process) implemented using a computer-aided design (CAD) system to calculate vectors and derivative fields, and apply a blending function to generate boundary continuity constraints for patching arbitrary curve networks. Hereinafter, we refer to this process as the “boundary continuity constraint calculation process.”

Here, Appellant’s claims generally, and independent claim 1 in particular (as summarized, *supra*), recite a process for calculating vectors

and derivative fields, and applying a blending function to generate boundary continuity constraints. This is consistent with how Appellant describes the claimed invention—using “computer-aided design (CAD) applications” “to comput[e] boundary constraints for patching arbitrary curve networks” (Spec. 1:4–5). *See* Appeal Br. 1–2, 4 (“[T]he claims are directed to . . . computations of boundary continuity constraints” by “computing derivative fields with a local curve network.” *Id.* at 4.); Spec. 1:28–3:7.

Appellant’s contentions (*supra*) focus on the purported technological improvements or advances provided by the recited boundary continuity constraint calculation process, as well as the specific steps performed in the process. Claim 1, however, recites no substantive limitations on how the various calculations (calculating of vectors and derivative fields) are performed, or how the blending function is applied to the derivative fields to generate the boundary continuity constraints. The limitations are either entirely functional in nature, characterize the structure of the data (utilized in the calculations), or describe the calculations themselves. Appellant’s claim 1 focuses on mathematical concepts. Performing mathematical calculations or reciting mathematical concepts, and the collection of information related to such analysis, is an abstract concept that is not patent eligible. *See InvestPic*, 898 F.3d at 1167–68; *RecogniCorp*, 855 F.3d at 1326–27; *Digitech*, 758 F.3d at 1151. “As many cases make clear, even if a process of collecting and analyzing information is limited to particular content or a particular source, that limitation does not make the collection and analysis other than abstract.” *InvestPic*, 898 F.3d at 1168 (internal citation and quotations omitted). *See also Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016) (characterizing collecting information,

analyzing information by steps people go through in their minds, or by mathematical algorithms, and presenting the results of collecting and analyzing information, without more, as matters within the realm of abstract ideas).

In summary, we conclude that Appellant’s claim 1 recites a judicial exception (USPTO’s Step 2A, Prong 1; *see* 2019 Revised Guidance). Specifically, claim 1 recites mathematical concepts and a mathematical calculation process—the boundary continuity constraint calculation process—for determining or generating vectors, derivative fields, and (applying a blending function to the derivative fields to generate) boundary continuity constraints as discussed *supra*. The boundary continuity constraint calculation process consists of mathematical concepts or calculations. *See* 2019 Revised Guidance, 84 Fed. Reg. at 52.

Eligibility Analysis—Revised Guidance Step 2A, Prong 2

Appellant’s method claim 1 recites a physical component or structure—an additional element—beyond the abstract boundary continuity constraint calculation process (the judicial exception) (*supra*). The only additional element recited is the CAD system comprising one or more computers.

The CAD system (comprising computers) is a generic computer component. For example, Appellant’s Figure 1 depicts “a high-level illustration of a CAD system 100 for determining boundary continuity constraints” (Spec. 4:1–2) “includ[ing] a computing device 104, e.g., a laptop or desktop computer, that is capable of executing a CAD tool 110 (e.g., a computer graphics program)” (Spec. 4:10–11).

The recited CAD system (additional element) does not integrate the abstract idea into a practical application. Using conventional components such as the recited computing device, wholesale device registration system, and registration framework as tools to implement an abstract idea does not integrate the abstract boundary continuity constraint calculation process (the abstract idea) into a practical application. *See Alice*, 573 U.S. at 223–24 (“[W]holly generic computer implementation is not generally the sort of ‘additional featur[e]’ that provides any ‘practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.’” (quoting *Mayo*, 566 U.S. at 77)).

Even so, Appellant contends that the process of claim 1 constitutes a specific process that constitutes a technological improvement similar to *McRO*—the recited techniques provide “real-world computational advantages” (Reply Br. 1), “change how the computer operates” (Reply Br. 2 (internal quotations omitted)), and “improve[] a specific technology” (Reply Br. 3); *see* Appeal Br. 4–14; Reply Br. 1–3. We disagree—Appellant misconstrues the relevant precedent. In *McRO*, the at-issue claims focused on methods of automatic lip synchronization and facial expression animation. Although the limitations were embodied in software executed by a generic computer, the recited rules enabled automation of specific tasks (animation) that previously could not be automated or accomplished using identical manual procedures. The Federal Circuit relied on the specification’s detailed explanation of the rules in finding that the subject matter was patent eligible. It was *McRO*’s rules that (the Federal Circuit found) improved the computer-related technology allowing the computer to

perform a function not previously performable by a computer. *See McRO*, 837 F.3d at 1313–16. Such is not the case in the instant claim.

Similarly, in *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016), the Federal Circuit held that a specific technology-based solution that improved a technological process was patent eligible. Such is not the case in the instant claim. Here, as explained *supra*, the claims recite mathematical concepts and calculations. no technological solution is claimed or explained in detail in the Specification beyond these abstract mathematical concepts and calculations.

To the extent that Appellant’s contentions correspond to the reasoning in MPEP §§ 2106.05(a)–(c), we note that these sections of the MPEP explicitly correspond to additional elements that integrate the judicial exception into a practical application. Appellant’s claim 1 merely recites a generic computer implementation (the CAD system) and, accordingly, does not apply or use the boundary continuity constraint calculation process (the judicial exception) in a manner that imposes a meaningful limit on the judicial exception, such that it is more than a drafting effort designed to monopolize the exception. *See Alice*, 573 U.S. at 221–24 (citing *Mayo*, 566 U.S. at 77–85).

Even if we agree with Appellant that the techniques of claim 1 provide advantages such as increased efficiency, the fact that a computer or computer implementation may increase efficiency does not change the abstract-idea analysis. *See Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1370 (Fed. Cir. 2015) (holding that “merely adding computer functionality to increase the speed or efficiency of the process

does not confer patent eligibility on an otherwise abstract idea”); *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1363 (Fed. Cir. 2015) (“[R]elying on a computer to perform routine tasks more quickly or more accurately is insufficient to render a claim patent eligible.”); *see also FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1095 (Fed. Cir. 2016).

Thus, we conclude the claims are directed to an abstract idea that is not integrated into a practical application.

Step 2B Analysis—Inventive Concept or Significantly More

Having concluded Appellant’s claims are directed to an abstract idea under the 2019 Revised Guidance Step 2A analysis, we next address whether the claims add significantly more to the alleged abstract idea. As directed by our reviewing court, we search for an “‘inventive concept’ sufficient to ‘transform the nature of the claim into a patent-eligible application.’” *McRO*, 837 F.3d at 1312 (quoting *Alice*, 573 U.S. at 217). The implementation of the abstract idea involved must be “more than performance of ‘well-understood, routine, [and] conventional activities previously known to the industry.’” *Content Extraction*, 776 F.3d at 1347–48 (alteration in original) (quoting *Alice*, 573 U.S. at 225). The “‘inventive concept” “must be significantly more than the abstract idea itself, and cannot simply be an instruction to implement or apply the abstract idea on a computer.” *BASCOM*, 827 F.3d at 1349 (internal citation omitted). As discussed above, this requires us to evaluate whether the additional claim elements add “a specific limitation or combination of limitations that are not well-understood, routine, conventional activity in the field” or “simply append[] well-understood, routine, conventional activities previously known

to the industry, specified at a high level of generality.” Revised Guidance, 84 Fed. Reg. at 56.

With respect to the § 101 rejection of claim 1, the Examiner maintains that Appellant’s claim 1 “do[es] not include additional elements that are sufficient to amount to significantly more than the judicial exception because [the claim] contains no additional elements other than the judicial exception of an abstract idea and generic hardware” Final Act. 15–16. Appellant, on the other hand, contends Appellant’s claim 1 “recite[s] unconventional elements that provide an inventive concept, which amounts to significantly more than just the abstract idea identified by the examiner” (Appeal Br. 14) and these elements include “generating vectors,” “generating derivative fields,” and “using the generated derivative fields to generate a blended derivative field defining the boundary continuity constraints for the particular edge” (Appeal Br. 15). *See* Appeal Br. 14–18; Reply Br. 3–5.

As we explain *supra*, claim 1 does not include any additional elements beyond the generic computer implementation of the CAD system. Each of Appellant’s listed “elements” (*supra*) is part of the abstract boundary continuity constraint calculation process. The listed elements are not in addition to or beyond the judicial exception—they are part and parcel of the abstract concept. Appellant fails to persuade us of error in the Examiner’s rejection with respect to the second *Alice* step (Revised Guidance Step 2B).

We agree with the Examiner that Appellant’s claim 1 (and the other pending claims) does not evince an “inventive concept” that is significantly more than the abstract idea itself. In particular, Appellant fails to explain what additional elements, beyond the abstract affinity computation process,

are recited in claim 1 or how such additional elements (Appellant’s “elements” listed *supra*) add specific limitations beyond the judicial exception that are not well-understood, routine, and conventional in the field. As discussed above, Appellant’s Specification indicates that the additional element (the CAD system) is conventional. *See, e.g.*, Spec. 4:1–2, 10–11. Appellant’s own Specification (*id.*) shows that the CAD system (and its intrinsic functionality) is well-understood, routine, and conventional. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384 (Fed. Cir. 1986) (“[A] patent need not teach, and preferably omits, what is well known in the art.”); *Intellectual Ventures I LLC v. Erie Indem. Co.*, 850 F.3d 1315, 1331 (Fed. Cir. 2017) (“The claimed mobile interface is so lacking in implementation details that it amounts to merely a generic component (software, hardware, or firmware) that permits the performance of the abstract idea, i.e., to retrieve the user-specific resources.”).

For at least the reasons above, we are not persuaded of Examiner error in the rejection of claim 1 under 35 U.S.C. § 101. Thus, we sustain the Examiner’s rejection under § 101 of independent claim 1, independent claims 9 and 17, and dependent claims 5–8, 13–16, and 21–33, which depend from claims 1, 9, and 17 (respectively) and which were not separately argued with specificity.

CONCLUSION

Appellant has not shown that the Examiner erred in rejecting claims 1, 5–9, 13–17, and 21–33 under 35 U.S.C. § 101.

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DECISION

We affirm the Examiner's rejection of claims 1, 5–9, 13–17, and 21–33.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv). *See* 37 C.F.R. § 41.50(f).

AFFIRMED