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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANDREW VAKHUTINSKY, SHIVARAM SUBRAMANIAN,
YEVGENIY POPKOV, and ALEX KUSHKULEY

Appeal 2017-001572
Application 13/101,604¹
Technology Center 3600

Before LARRY J. HUME, JAMES W. DEJMEK, and
MATTHEW J. McNEILL, *Administrative Patent Judges*.

McNEILL, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1–3, 5, 6, 9–12, 14, 16, 17, and 19–25, which are all the claims pending in this application. Claims 4, 7, 8, 13, 15, and 18 were cancelled. App. Br. 17, 19, 21. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

¹ According to Appellants, the real party in interest is Oracle International Corporation. App. Br. 2.

STATEMENT OF THE CASE

Introduction

Appellants' application relates to determining an optimized pre-pack configuration with an optimized pre-pack allocation and an optimized pre-pack design. Spec. ¶ 6. Claim 1 illustrates the appealed subject matter and reads as follows:

1. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, cause the processor to determine an optimized pre-pack allocation and optimized pre-pack design for the shipment of retail products to a plurality of retail stores, the determine comprising:

(a) receive demand data and constraints;

(b) initialize a current pre-pack allocation and a current pre-pack design, wherein the current pre-pack design consists of a plurality of different pre-pack types, wherein each pre-pack type comprises a fixed number of stock keeping units (SKUs) for the retail products and a fixed number of quantity for each SKU, and the current pre-pack allocation comprises a number of units of each pre-pack type shipped to each retail store;

(c) for the current pre-pack allocation, determine a new pre-pack design by solving a multi-choice integer knapsack problem;

(d) determine if the new pre-pack design is different than the current pre-pack design;

(e) when the new pre-pack design is the same as the current pre-pack design, assign the new pre-pack design as the optimized pre-pack design and the current pre-pack allocation as the optimized pre-pack allocation; and

(f) when the new pre-pack design is different than the current pre-pack design, determine a new pre-pack allocation and assign the new pre-pack allocation as the current pre-pack allocation and the new pre-pack design as the current pre-pack design and repeat (c)–(f);

wherein the optimized pre-pack allocation comprises the number of units of each of the different pre-pack types allocated to each of the plurality of retail stores.

*The Examiner's Rejections*²

Claims 1–3, 5, 6, 9–12, 14, 16, 17, and 19–22 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. Final Act. 9–10.

Claims 1, 2, 5, 6, 9–11, 14, 16, and 19–25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Erie et al. (US 2010/0049537 A1; Feb. 25, 2010), McMains et al. (US 2012/0179507 A1; July 12, 2012), and Ashok K. Chandra et al., *Approximate Algorithms for Some Generalized Knapsack Problems* (1976) (“Chandra”). Final Act. 10–16.

Claims 3, 12, and 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Erie, McMains, Chandra, and David Pisinger, *ACKnap: An exact algorithm for the Multiple-Choice Knapsack Problem with equality constraints* (“Pisinger”). Final Act. 16–17.

ANALYSIS

We have reviewed the Examiner's rejections in light of Appellants' contentions that the Examiner has erred. We disagree with Appellants' contentions. Except as noted below, we adopt as our own: (1) the findings and reasons set forth by the Examiner in the Final Action from which this appeal is taken; and (2) the reasons set forth by the Examiner in the

² In the July 14, 2015 Final Rejection (“Final Act.”), the Examiner rejected claims 23–25 under 35 U.S.C. § 112(b) or pre-AIA 35 U.S.C. § 112, second paragraph, as being indefinite. Final Act. 8–9. However, the Examiner withdrew this rejection in the September 22, 2015 Advisory Action. Accordingly, this rejection is not before the Board at this time.

Examiner's Answer in response to Appellants' Appeal Brief. We concur with the Examiner's conclusions. We highlight the following additional points.

Patent-Ineligible Subject Matter

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*, 134 S. Ct. 2347, 2354 (2014) (quoting *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)). Notwithstanding that a law of nature or an abstract idea, by itself, is not patentable, the practical application of these concepts may be deserving of patent protection. *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71–72 (2012).

The Supreme Court, in *Alice*, reiterated the two-step framework previously set forth in *Mayo*, “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice*, 134 S. Ct. at 2355.

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 if the claim is directed to a law of nature, a natural phenomenon, or an abstract idea (judicial exceptions). *Id.* If so, the second step is to determine whether any element or combination of elements in the claim is sufficient to transform the nature of the claim into a patent-

eligible application, that is, to ensure that the claim amounts to significantly more than the judicial exception itself. *Id.*

Alice Step One

Appellants argue the Examiner erred in rejecting claim 1 as directed to the abstract idea of “optimizing pre-packs.” App. Br. 4–10; Reply Br. 2. Appellants argue the Examiner erred because there are no similarities between this allegedly abstract idea and abstract ideas identified by the courts. App. Br. 4. Appellants further contend the Examiner generalizes the abstract idea at such a high level that it no longer has any relationship to the recited limitations. *Id.*

Appellants have not persuaded us of Examiner error with respect to step one in *Alice*. Claim 1 recites “[a] non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, cause the processor to determine an optimized pre-pack allocation and optimized pre-pack design for the shipment of retail products to a plurality of retail stores.” Claim 1 further recites receiving data and constraints, initializing a pre-pack allocation and pre-pack design, determining a new pre-pack design by solving a multi-choice integer knapsack problem, determining whether to assign the new pre-pack design and pre-pack allocation as optimized pre-pack designs and allocations, and potentially repeating this process. We agree with the Examiner that claim 1 is directed to optimizing pre-packs using a mathematical relationship or formula. Indeed, other than the generic computer limitations in the preamble, claim 1 recites nothing more than receiving, analyzing, and storing data. The subject matter of the claims can be performed either mentally or with “pencil and paper.” *CyberSource Corp. v. Retail*

Decisions, Inc., 654 F.3d 1366, 1371 (Fed. Cir. 2011). “[A] method that can be performed by human thought alone is merely an abstract idea and is not patent-eligible under § 101.” *Id.* at 1373.

In this regard, the claims are similar to the claims that the Federal Circuit determined are patent ineligible in *Electric Power Group LLC v. Alstom S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016) (collecting information and “analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, [are] essentially mental processes within the abstract-idea category”), *OIP Technologies, Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1362–63 (Fed. Cir. 2015) (offer-based price optimization), *Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1370 (Fed. Cir. 2015) (tailoring information presented to a user based on particular information), *Digitech Image Technologies, LLC v. Electronics for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (employing mathematical algorithms to manipulate existing information), *Accenture Global Services, GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1346 (Fed. Cir. 2013) (generating tasks in an insurance organization), and *Versata Development Group, Inc. v. SAP America, Inc.*, 793 F.3d 1306, 1333–34 (Fed. Cir. 2015) (price-determination method involving arranging organizational and product group hierarchies).

Appellants’ argument that the Examiner’s evaluation of the abstract idea is performed at such a high level as to no longer have any relationship to the recited limitations is unpersuasive for two reasons. First, Appellants’ argument is conclusory and does not explain how the abstract idea is untethered to the claims. Second, there is no need to include every claim limitation in the “directed to” inquiry of step one. *See Amdocs (Israel) Ltd.*

v. Openet Telecom, Inc., 841 F.3d 1288, 1294 (Fed. Cir. 2016) (“Our cases generally follow the step one/step two Supreme Court format, reserving step two for the more comprehensive analysis in search of the ‘inventive concept.’”). Indeed, while the claims at issue in this case recite additional detail beyond the abstract idea to which they are directed, so too did the claims in *Alice*. In *Alice*, the claims recited limitations such as creating a shadow credit record and a shadow debit record, adjusting these records, and exchanging credits or debits to these records in accordance with the adjustment. *See* 134 S. Ct. at 2359. Nevertheless, the Supreme Court found the claims were directed to the abstract idea of intermediated settlement. *Id.* at 2356–57.

Here, we agree with the Examiner that claim 1 is directed to the abstract idea of optimizing pre-packs. The claims recite additional limitations describing the abstract idea, but Appellants have not persuaded us that these additional limitations change the nature of the claims. Accordingly, we agree with the Examiner that the claims are directed to a mathematical relationship/formula, specifically optimizing pre-packs.

Alice Step Two

With regard to step two in *Alice*, Appellants argue the Examiner erred because the claims do not merely recite conventional functionality. App. Br. 5–7. In particular, Appellants argue the claims go well beyond the mere concepts of retrieving, comparing, and combining data using a computer. *Id.* at 6. According to Appellants, determining optimized pre-pack designs using the recited functionality “elevates the present claims.” *Id.* at 6. Appellants further contend using a computer to determine optimized pre-pack designs by solving a multi-choice integer knapsack problem is a

technical solution that cannot be performed manually or using routine computer data storage and mathematical operations. *Id.* at 6–7.

Appellants have not persuaded us of Examiner error. The Examiner finds, and we agree, claim 1 recites limitations that amount to generic computing elements that perform generic computing functions and insignificant post-solution activities to the abstract idea of optimizing pre-pack designs. Ans. 10. As found by the Examiner, the Specification describes the claimed computing environment in generic terms, indicating that virtually any memory, processor, and computer readable media could be utilized to perform the claimed functions. Ans. 10 (citing Spec. Fig. 1, ¶¶ 16–20).

The Examiner further finds, and we agree, “initial[ing] a current pre-pack allocation and a current pre-pack design” as recited in claim 1 is a well-understood, routine, and conventional activity, as demonstrated by *Erie*. Ans. 11 (citing *Erie* Fig. 18, ¶¶ 35, 73, 83). Moreover, the Specification indicates that multi-choice integer knapsack problems are not a new problem. *See* Spec. ¶ 47. To the contrary, the Specification cites an article (Pisinger, “ACKnap: An exact algorithm for the Multiple-Choice Knapsack Problem with equality constraints”) that discloses pseudocode that can be used to solve generic multi-choice integer knapsack problems, including a profit maximization optimization problem as an example. *Id.* Accordingly, we agree with the Examiner that claim 1 recites well-understood, routine, and conventional activities.

Appellants’ argument that the claims cannot be performed manually or using routine computer data storage and mathematical operations is also unpersuasive because the mere fact that mathematical equations are

“complex” (*see* App. Br. 6) does not necessarily mean that they cannot be performed manually. Moreover, the Specification indicates generic computer hardware could perform the claimed invention and does not indicate that the method could not be performed manually, given enough time. To the extent that Appellants’ recited steps or acts (or functions) may be performed faster or more efficiently using a computer, our reviewing court provides applicable guidance:

While the claimed system and method certainly purport to accelerate the process of analyzing audit log data, the speed increase comes from the capabilities of a general-purpose computer, rather than the patented method itself. *See Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can. (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) (“[T]he fact that the required calculations could be performed more efficiently via a computer does not materially alter the patent eligibility of the claimed subject matter.”).

FairWarning IP, LLC v. Iatric Sys., Inc., 839 F.3d 1089, 1095 (Fed. Cir. 2016).

Appellants’ argument that the claims are necessarily rooted in computer technology and solve a technical problem is also unpersuasive. Unlike the claims in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014), the claimed invention solves a business problem—optimizing pre-packs—using generic computers performing conventional steps such as receiving data and solving math problems. Appellants have not persuasively argued that the claims solve a technical problem rather than a business problem. Appellants’ support for this proposition is that the claimed functionality “leads to better results such as being able to optimize pre-pack designs without needing to execute commercial math libraries.” App. Br. 8–9 (citing Spec. ¶ 57). However, this indicates that using

commercial math libraries would also allow a computer to solve this problem. The claimed method may remove the need for such math libraries, but Appellants have not persuasively argued that eliminating the need for such math libraries improves the functioning of the computer.

Further, our reviewing court has “made clear that mere automation of manual processes using generic computers does not constitute a patentable improvement in computer technology.” *Credit Acceptance Corp. v. Westlake Servs.*, 859 F.3d 1044, 1055 (Fed. Cir. 2017). Like the claims in *Credit Acceptance*, the focus of the claims here is on the business practice (optimizing pre-packs), “and the recited generic computer elements ‘are invoked merely as a tool.’” *Id.* (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335–36 (Fed. Cir. 2016)); *see also Versata Dev. Grp.*, 793 F.3d at 1334 (collecting cases).

Moreover, we are unpersuaded by Appellants’ argument that the claims do not preempt every manner of optimizing pre-packs and are, therefore, patentable. App. Br. 7–8. Indeed, preemption is the concern that drives the exclusionary principle of judicial exceptions to patent-eligible subject matter. *Alice*, 134 S. Ct. at 2354. However, preemption is not a separate test of patent-eligibility, but is inherently addressed within the *Alice* framework. Moreover, lack of complete preemption does not make the claims any less abstract. *See buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1355 (Fed. Cir. 2014) (collecting cases); *Accenture Glob. Servs.*, 728 F.3d at 1345; *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (“While preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility.”).

Accordingly, we agree with the Examiner that the claims do not recite an “inventive concept” sufficient to transform the claims from an abstract idea to a patent-eligible application. We, therefore, sustain the Examiner’s rejection of claim 1 as directed to patent-ineligible subject matter. We also sustain the rejection of independent claims 10 and 14 and dependent claims 2, 3, 5, 6, 9, 11, 12, 16, 17, and 19–22, for which Appellants do not provide separate argument. *See* App. Br. 3–10.

Obviousness

Appellants argue the Examiner erred in rejecting claim 1 as unpatentable over Erie and McMains. *See* App. Br. 10–14; Reply Br. 3. In particular, Appellants argue the prior art fails to disclose determining an optimized pre-pack allocation for the shipment of retail products to a plurality of stores by solving a multi-choice integer knapsack problem. App. Br. 10–11. According to Appellants, Erie teaches a continuous packing process in an assembly line style with an unlimited number of container types, rather than a fixed number of pre-pack types as in the claims. *Id.* at 11–12. Appellants contend claim 1 recites “the current pre-pack design consists of a plurality of different pre-pack types” and the “consists” limitation distinguishes the claim from the unlimited number of container types in Erie. *Id.* at 12–13.

Appellants have not persuaded us of Examiner error. The Examiner finds McMains, not Erie, teaches the claimed pre-pack types. *See* Ans. 17; Final Act. 11–12 (citing McMains ¶¶ 5, 48, 79). Moreover, Appellants’ contention that claim 1 precludes an unlimited number of pre-pack types is not commensurate with the scope of the claims. Claim 1 recites, in relevant part, “the current pre-pack design *consists* of a plurality of different pre-pack

types” (emphasis added). However, the use of “consists” does not preclude an unlimited number of different pre-pack types because the limitation “plurality” is not so limited. Instead, a “plurality” of different pre-pack types simply requires more than one pre-pack type. *See, e.g., Bilstad v. Wakalopoulos*, 386 F.3d 1116, 1122 (Fed. Cir. 2004). Appellants have not identified, nor have we found, anything in the Specification which would limit the “plurality of different pre-pack types” to a finite number. Accordingly, Appellants’ argument that Erie is directed to a “completely different problem” because Erie relates to an unlimited number of different pre-pack types is unavailing.

Appellants further argue McMains is directed to the same problem as Appellants’ claims, but solves this problem in a different way by using clustering techniques. App. Br. 13. Appellants argue an ordinarily skilled artisan would not have been motivated to combine Erie and McMains because they are directed to achieving “completely different results.” *Id.*

We are not persuaded by Appellants’ argument. The Examiner finds, and we agree, Erie and McMains are both directed to optimizing packs and, therefore, are both directed to solving packaging problems. Ans. 20. Appellants’ argument that McMains solves this problem using clustering techniques instead of the knapsack problem is unpersuasive because the Examiner does not rely on McMains to teach solving the “multi-choice integer knapsack problem,” instead relying on Chandra for this limitation. *See* Final Act. 13.

Appellants further contend that the lack of prior art since Chandra’s publication in 1976 shows that impermissible hindsight is required to arrive at the claimed invention (*see* App. Br. 13–14) is also unpersuasive. We

agree with the Examiner that the relative age of Chandra does not reflect impermissible hindsight, but rather reflects that Appellants' approach to solving packaging problems was well known in the art. *See* Ans. 20–21.

For these reasons, Appellants have not persuaded us of Examiner error. We, therefore, sustain the rejection of claim 1 as unpatentable over Erie, McMains, and Chandra. We also sustain the obviousness rejections of independent claims 10 and 14, and dependent claims 2, 5, 6, 9, 11, 16, and 19–25, for which Appellants do not offer separate arguments. *See* App. Br. 10–14. We also sustain the rejection of claims 3, 12, and 17 as unpatentable over Erie, McMains, Chandra, and Pisinger, for which Appellants rely on the same arguments. *See id.*

DECISION

We affirm the decision of the Examiner rejecting claims 1–3, 5, 6, 9–12, 14, 16, 17, and 19–25.

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