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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SEONG HYEOG CHOI, JUN JIN KONG, JIN YEONG KIM,
HONG RAK SON, and YU HUN JEON¹

Appeal 2019-001228
Application 13/778,396
Technology Center 2100

Before ROBERT E. NAPPI, JOHNNY A. KUMAR, and SCOTT E. BAIN,
Administrative Patent Judges.

NAPPI, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1 through 13, 15, 16, and 18 through 20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). According to Appellant, Samsung Electronics is the real party in interest. Appeal Br. 2.

INVENTION

The invention is directed to a method for use with a memory controller which includes storing a plurality of random sequences. The method involves, selecting at least one random sequence among the plurality of random sequences according to a data pattern of a data block, and performing a conversion, using the selected at least one random sequence, to at least one of randomizing the data block and derandomizing the randomized data block using the selected at least one random sequence. Spec., Abstract. Claim 1 is reproduced below.

1. A memory controller comprising:
 - a memory configured to store a plurality of random sequences; and
 - a first converter configured to receive a data block including first data, second data, and third data separate from the second data, select random sequences according to a data pattern of the data block, the selected random sequences being a part of the plurality of random sequences and comprising a first random sequence, a second random sequence and a third random sequence, and perform at least one of randomizing the data block using the selected random sequences and derandomizing the randomized data block using the selected random sequences,
 - wherein the first converter is configured to select the first random sequence, the second random sequence, and the third random sequence, according to the data pattern of the data block, the data pattern indicating that the first data, on which a single logical operation is performed by using the first random sequence, is to be randomized, the second data, on which the single logical operation is performed, together with the single logical operation on the first random sequence, by using the second random sequence, is not to be randomized, and the third data, on which the single logical operation is performed, together with the single logical operation on the first random

sequence, by using the third random sequence, is not to be randomized.

EXAMINER'S REJECTIONS²

The Examiner rejected claims 1 through 13, 15, 16, and 18 through 20 under 35 U.S.C. § 101 for being directed to patent-ineligible subject matter. Final Act. 8–12.

The Examiner rejected claims 7 and 18 under 35 U.S.C. § 112(a) as lacking written description. Final Act. 4.³

The Examiner rejected claims 1 through 13, 15, 16, and 18 through 20 under 35 U.S.C. § 112(b) as being indefinite. Final Act. 6–8.

ANALYSIS

35 U.S.C. § 101 Rejection

We have reviewed Appellant's arguments in the Briefs, the Examiner's rejections, and the Examiner's response to Appellant's arguments. Appellant's arguments have not persuaded us of error in the Examiner's rejection for the claims under 35 U.S.C. § 101. Patent eligibility under § 101 is a question of law that may contain underlying issues of fact. *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1342 (Fed. Cir. 2018) (citing *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018)). "We

² Throughout this Decision we refer to the Appeal Brief filed July 20, 2018 ("Appeal Br."); Reply Brief filed November 5, 2018 ("Reply Br."); Final Office Action mailed February 9, 2018 ("Final Act."); and the Examiner's Answer mailed September 4, 2018 ("Ans.")

³ The Examiner withdrew the written description rejection of claims 1, 10 and 12. Answer 12.

review the district court’s ultimate conclusion on patent eligibility de novo.” *Id.*; *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.”)

PRINCIPLES OF LAW

Patent-eligible subject matter is defined in 35 U.S.C. § 101 of the Patent Act, which recites:

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

There are, however, three judicially created exceptions to the broad categories of patent-eligible subject matter in 35 U.S.C. § 101: “[l]aws of nature, natural phenomena, and abstract ideas.” *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70 (2012).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court’s two-step framework, described in *Mayo* and *Alice*. *Alice*, 573 U.S. at 217–18 (citing *Mayo*, 566 U.S. at 75–77). In accordance with that framework, we first determine what concept the claim is “directed to.” *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 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, 69 (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. 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 187; *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.”). Having said that, the Supreme Court also indicated 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 claim is “directed to” an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where “we must examine the elements of the claim to determine whether it contains an ‘inventive concept’ sufficient to ‘transform’ the claimed abstract idea into a patent-eligible application.” *Alice*, 573 U.S. at 221 (citation omitted). “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].’” *Id.* (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 United States Patent and Trademark Office “USPTO” published revised guidance on the application of § 101. USPTO’s *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Memorandum”). Under that guidance, we first determine whether the claim recites:

- (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* MANUAL OF PATENT EXAMINING PROCEDURE (“MPEP”) § 2106.05(a)–(c), (e)–(h) (9th Ed., Rev. 08.2017, Jan. 2018)).

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

See Memorandum.

DISCUSSION

The Judicial Exception

The Examiner determines the claims are not patent eligible because they are directed to a judicial exception without reciting significantly more. Final Act. 8–10. Specifically, the Examiner determines the claims recite “steps [that] correspond to the concept of encoding and decoding image data, which corresponds to concepts identified as an abstract idea[] by the Courts.” Final Act. 9 (citing *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, (Fed. Cir. 2017)).

Appellant argues the claims are directed to randomizing and/or derandomizing a data block which is not a mathematical relationship. Appeal Br. 8–9. Further, Appellant acknowledges that the Examiner has equated the concepts in the claims to those considered abstract in *RecogniCorp*, and states that the claims are different as they represent an improvement in existing memory controllers and methods. Appeal Br. 10, 16–19.

We are not persuaded of error in the Examiner’s rejection by these arguments, and we concur with the Examiner that representative claim 1 sets forth an abstract concept, a mathematical concept and a mental process.

Representative claim 1 recites “receive a data block” (a data gathering or observation element) and “select[ing a] random sequence[] according to a data pattern of the data block” (both a data gathering and data analysis/organization or evaluation element). These are steps of a mental process. The claim further recites “randomizing the data block” or “derandomizing the randomized data block.” Representative claim 1 recites “the first data, on which a single logical operation is performed by using the first random sequence, is to be randomized” and recites similar steps for derandomizing. Appellant’s Specifications identifies the logical operation as an XOR. Specification ¶ 14. We consider these steps to be similar to those considered by the courts to be abstract mathematical concepts. *See Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (which held that “a process of taking two data sets and combining them into a single data set” is “an ineligible abstract process of gathering and combining data.”). Thus we consider representative claim 1 to recite elements of two abstract ideas a mental process and a mathematical concept. Merely combining several abstract ideas does not render the combination any less abstract. *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (“Adding one abstract idea (math) to another abstract idea . . . does not render the claim non-abstract.”); *see also FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1093–94 (Fed. Cir. 2016) (determining the pending claims were directed to a combination of abstract ideas). Thus, we conclude representative claim 1 recites an abstract idea.

Integration of the Judicial Exception into a Practical Application

Appellant argues that the claim improves an existing technological problem as it solves a problem in conventional industry practice. Appeal Br. 10–12 (citing *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016) and *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016)). Appellant cites a published US patent application to Sharon as describing a technological problem with memory deriving from a specific source of error called “Program Disturb” or PD and randomizing the data suppresses errors in nonvolatile flash memory. Appeal Br. 12–13 (citing Sharon US 2008/0215798, ¶¶ 19, 20, 21, and 24), Reply Br. 3–4 (citing *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121 (Fed. Cir. 2018)). Appellant argues that the randomization of metadata can cause technical problems such as degradation in system performance. Appeal Br. 14, Reply Br. 6 –7. Thus, Appellant argues that the claimed invention in which metadata can be partially randomized, increases data reliability. Appeal Br. 14–15 (citing Specification ¶¶ 78, 79).

The Examiner finds that the additional claim limitations do not recite an improvement to a technical field or a technology. Ans. 13. The Examiner states:

In *Enfish*, the Federal Circuit noted that “the claims are directed to an improvement of an existing technology is bolstered by the specification’s teachings that the claimed invention achieves over conventional databases, such as increased flexibility, faster search times, and smaller memory requirements”. In contrast to *Enfish*, Appellant’s disclosure does not appear to disclose a technological problem in the conventional industry practice which is further evidenced by Appellant’s reliance on prior art Sharon to identify a technological problem in conventional industry.

Ans. 13 (emphasis omitted). Further, the Examiner identifies that the claims do not recite randomizing or derandomizing metadata and as such Appellant's arguments are not persuasive as they are not commensurate with the claims. Ans. 14 (citing *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138 (Fed. Cir. 2016)). Similarly, the Examiner identifies that Appellant's arguments directed to enhancing reliability by reducing errors due to phenomena such as Program Disturb, are not persuasive as Appellant's disclosure does not discuss this phenomena. Ans. 14–16.

We are not persuaded of error by Appellant's arguments. As discussed above, we concur with the Examiner that the claim recites an abstract idea. Further, we do not consider the claim to be drawn to a practical application of the abstract idea as we do not find that the claim recites an improvement to the functioning of the computer or other technology or otherwise tied to technology.

We are not persuaded of error by Appellant's argument that the claims recite an improvement to a technology. As identified by the Examiner representative claim 1 does not recite partially randomizing metadata or randomizing/derandomizing metadata separately, as discussed in paragraph 79 of Appellant's Specification. Rather, representative claim 1 just recites a data block including first, second and third data. Thus, Appellant's arguments are not commensurate with the scope of the claim. We are not persuaded that Sharon demonstrates that the claimed randomizing recites an improvement in technology. Sharon, discusses that the PD is a source of error in flash memory type devices, specifically, floating gate flash memory and reduces the probability of error by making sure that data written to the memory is pseudorandom. Sharon ¶¶ 9, 10, 11 and 63. As identified by the

Examiner, Appellant's Specification makes no mention of PD. Ans. 14–16. Further, we note that Appellant's Specification identifies that the invention may be implemented on any type of memory, i.e., it is not limited to flash memory, and thus we do not see a nexus with the teachings of Sharon. *See* Specification ¶ 38. Additionally, we note that Appellant's Specification identifies that a problem with randomization/derandomization being performed without consideration of a change in firmware in the data storage system.⁴ This problem is neither related to the teachings of Sharon (thus further supporting the lack of a nexus to Sharon), nor is it related to the claims (i.e., there is no discussion of firmware configuration change in representative claim 1).

As such, we do not consider representative claim 1, to recite an improvement to a technical field or a technology. But rather, when interpreted in light of the Specification, merely recites use of a computer as a tool to implement a mental process and mathematical concepts (an abstract idea). *See, e.g., RecogniCorp*, 855 F.3d at 1327 (“Unlike *Enfish*, [the claim] does not claim a software method that improves the functioning of a computer . . . [but] claims a ‘process that qualifies as an ‘abstract idea’ for which computers are invoked merely as a tool.’”) (Citation omitted). Thus, we conclude representative claim 1 does not recite a practical application of the judicial exception.

⁴ The Specification merely identifies this as a problem without identifying how the inventor addresses the problem.

Significantly More than the Abstract Idea

Under the Memorandum, only if a claim: (1) recites a judicial exception, and (2) does not integrate that exception into a practical application, do we then look to whether the claim adds a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); **or**, simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

Representative claim 1 recites the additional elements of a memory to store sequences, a converter to receive data, select data and perform a logical operation. The Examiner has found, that these elements do not amount to significantly more and are merely well-understood, routine and conventional activities. Final Act. 10–11.

Appellant contends that the “claimed memory controllers and method are not well-understood, routine, or conventional activity.” Appeal Br. 20 (citing *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018)).

We concur with the Examiner. As discussed above Appellant’s Specification does not identify a particular type of memory. Further, the Sharon reference, cited by Appellant, further demonstrates that it is known that memory stores data and that memory controllers can be used to randomize data stored. *See* Sharon paragraph 34. Thus, we find ample evidence to support the Examiner’s finding that the elements of the claim, in addition to the abstract concept, represent well-understood, routine and conventional activities.

In summary, Appellant’s arguments have not persuaded us of error in the Examiner’s determination that representative claim 1 is directed to an

abstract idea; both a mental process and a mathematical concept. Further, Appellant's arguments have not persuaded us that the Examiner erred in finding that the claim is not: directed to an improvement in the functioning of the computer or to other technology or other technical field; directed to a particular machine; directed to performing or affecting a transformation of an article to a different state or thing; directed to using a judicial exception in some meaningful way beyond linking the exception to a particular technological environment such that the claim as a whole is more than a drafting effort to monopolize the judicial exception. For these reasons, we are unpersuaded that the claim recites additional elements that integrate the judicial exception into a practical application. *See* Memorandum, 84 Fed. Reg. at 54. Accordingly, we sustain the Examiner's rejection, under 35 U.S.C. § 101, of representative claim 1 and claims 2 through 13, 15, 16, and 18 through 20 grouped with claim 1.

35 U.S.C. § 112(a) Rejection

The Examiner rejects claims 7 and 18 as the limitation of “randomizing the first attribute data using the selected random sequences and derandomizing the randomized first attribute data using the selected random sequences” is not supported in the Specification. Final Act. 4. The Examiner interprets the limitation as using the same selected random sequences for the first data, second data, third data and first attribute data. Final Act. 5.

Appellant argues that the rejection is in error as the Specification provides support for the limitation. Reply Br. 8, citing Fig. 4 and Spec. ¶ 59.

We concur with Appellant and are persuaded of error in the

Examiner's rejection based upon 35 U.S.C. § 112. The written-description requirement serves "to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material." *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). We have reviewed Appellant's originally filed Specification and note that the originally filed claims 7 and 18, include the disputed limitation. Thus, we find that the originally filed Specification demonstrates that Appellant possessed the invention as recited in claims 7 and 18 on the filing date of the application. Accordingly, we do not sustain the Examiner's rejection of claims 7 and 18 under 35 U.S.C. § 112(a) as lacking written description

35 U.S.C. § 112(b) Rejection

The Examiner rejects claims 1, 10 and 12 as the limitation of "at least one of randomizing the data block using the selected random sequences and derandomizing the randomized data block using the selected random sequences" as indefinite in the context of the claim. Final Act. 6. The Examiner states that this is interpreted as meaning the entire data block is randomized, and since the second and third data are part of the same data block it is unclear how the second a third data are both randomized and not randomized. Final Act. 6.

Appellant argues the Examiner's rejection is in error as it "is well-known in the art, and that one of ordinary skill in the art would understand that the term 'at least one of A and B' encompasses A, B, or both A and B. The Examiner improperly parsed the phrase and argues 'at least' modifies 'data block.'" Appeal Br. 28, Reply Br. 8.

We concur with the Examiner. Appellant's argument misses the point raised by the Examiner. The issue is not whether "at least one" of modifies the "data block." The Examiner's rejection is based upon the claims' recitation of randomizing the block, meaning the entire block is randomized. The claim recites that the data block includes first, second and third data. The claim further, recites that the first data is subjected to a logical operation to be randomized, but that the second and third data are subject to a logical operation but are not randomized. Thus, the claim recites that part of the data block (the first data) is randomized and other parts of the data block are not randomized (the second and third data). This is in direct contradiction to the limitation that the data block is at least one of randomized and derandomized. Accordingly, we sustain the Examiner's indefiniteness rejection of independent claims 1, 10, and 12 and the claims which depend thereupon.

The Examiner additionally rejects claims 2 and 13 as the limitation of selecting the random sequences based upon shifting the random sequences by bit size corresponding to a command execution unit, is indefinite. Final Act. 7. The Examiner notes that the claims from which claims 2 and 13 depend, claims 1 and 12, recite that the sequence is determined according to the data pattern of the data block and thus there are two competing methods to determine the random sequence. Final Act. 7.

Appellant argues that the claims 2 and 13, recitation of selecting the random sequences further modifies the selection of random sequences recited in independent claims 1 and 12. Reply Br. 9. Appellant states

claims 2 and 13 are intended to mean that the selected random sequences according to a data pattern of the consecutive data block are based on shifting the plurality of random sequences

by a bit size corresponding to a command execution unit of a command received from a processing unit.

Reply Br. 9.

We concur with the Appellant's proffered interpretation of the claims. The Examiner has not shown that the limitations of claims 2 and 13 conflict with claims 1 and 12. Accordingly, we do not sustain the Examiner's additional rejection of claims 2 and 13 based upon the reasoning set forth on page 7 of the Final Action.

The Examiner additionally rejects claims 5 and 19 as the limitation of a command according to which the random sequences are to be selected as indefinite. Final Act. 7–8. The Examiner notes that the claims from which claims 2 and 13 depend, claims 1 and 12, recite that the sequence is determined according to the data pattern of the data block and thus there are two competing methods to determine the random sequence. Final Act. 7–8.

Appellant argues:

There is no conflict between “a first command, received from a host, according to which the random sequences are selected” and “select random sequences according to a data pattern of the data block.” That is, the random sequences can be selected according to a data pattern of the data block and also according to a first command received from a host.

Reply Br. 9.

We concur with the Appellant's proffered interpretation of the claim. The Examiner has not shown that the limitations of claims 5 and 19 conflict with claims 1 and 12. Accordingly, we do not sustain the Examiner's additional rejection of claims 5 and 19 based upon the reasoning set forth on pages 7–8 of the Final Action.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1-13, 15, 16, 18-20	101	Eligibility	1-13, 15, 16, 18-20	
7, 18	112(a)	Written Description		7, 18
1-13, 15, 16, 18-20	112(b)	Indefiniteness	1-13, 15, 16, 18-20	
Overall Outcome			1-13, 15, 16, 18-20	

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