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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* GHASSAN KARAME, JENS-MATTHIAS BOHLI,  
and SEBSTIAN GAJEK

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Appeal 2017-005221  
Application 14/402,176  
Technology Center 2400

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Before JUSTIN BUSCH, JAMES W. DEJMEK, and  
KARA L. SZPONDOWSKI, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1–11. Oral arguments were heard on February 13, 2019. A transcript of the hearing will be placed in the record in due course. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

## STATEMENT OF THE CASE

Appellants' invention is directed to a method for storing data in a relational database and a relational database server for storing data. Spec. 1. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method for storing data in a relational database, comprising:

a plurality of tables, wherein the data is stored in these tables, wherein each row of each table is provided with an original primary key for identification, and wherein foreign keys are provided for cross-referencing different tables of the relational database,

wherein the primary keys are encrypted, that the foreign keys are encrypted based on the encrypted primary keys and that for each table where a primary key is referenced as a foreign key an encrypted pointer is stored to link the corresponding encrypted foreign key to the encrypted primary key.

App. Br. 11 (Claims Appendix).

## REJECTIONS

Claims 1, 2, 10, and 11 stand rejected under 35 U.S.C. § 101 because the claimed invention is directed to a judicial exception (i.e. an abstract idea) without significantly more. Final Act. 11.

Claims 1–11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Chrysler et al. (US 2010/0142710 A1; published June 10, 2010) (“Chrysler”), Browning (US 8,504,844 B2; issued Aug. 6, 2013), and Banks et al. (US 7,797,342 B2; issued Sept. 14, 2010) (“Banks”). Final Act. 13–25.

## ANALYSIS

### *35 U.S.C. § 101 Rejections*

An invention is patent eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: “[l]aws of nature, natural phenomena, and abstract ideas” are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

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*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). 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)). However, claims “directed to a specific improvement to the way computers operate” have been found to be patent eligible. *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336–39 (Fed. Cir. 2016) (claims “specifically directed to a

self-referential table for a computer database” were not directed to an abstract idea.)

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 (quotation marks 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 PTO recently published revised guidance on the application of § 101. USPTO’s January 7, 2019 Memorandum, *2019 Revised Patent Subject Matter Eligibility Guidance* (“Memorandum”). 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, 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 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.

With respect to the first step in the *Alice/Mayo* framework, the Examiner determines claims 1, 2, 10, and 11 are directed to organizing data by assigning keys and encryption, which is an abstract idea. Final Act. 4–5, 11–12; Ans. 3. The Examiner determines the claims are not similar to those in *Enfish* because they are “not claiming any efficiency rather securing data with no reference to how this method of the security is noble [*sic*].” Ans. 2.

Appellants argue the claims are similar to the claims in *Enfish* in that they “describe a specific improvement in computer capabilities, namely a specific method for storing data in a relational database.” App. Br. 5. According to Appellants, “the claimed invention provides a method for storing data in a relational database and a relational database server which [is] efficient and at the same time secure to prevent an adversary from gaining any meaningful information of the data of the relational database.” *Id.* at 6 (citing Spec. 2, lines 14–20). Appellants argue “the use of the encrypted pointer provides a backward link from the foreign keys to the primary keys, which creates efficiencies for any querier of the relational database with respect to the search and decryption.” Reply Br. 2.

We are persuaded by Appellants’ arguments and do not agree with the Examiner’s determination that the claims are directed to the abstract idea of

“organizing data by assigning keys and encryption” (*see* Final Act. 4–5, 11–12; Ans. 3). Rather, we conclude the character of the claims as a whole is directed to an improved method for storing data in a relational database, and thus not directed to an abstract idea. *See Enfish*, 822 F.3d at 1335–36; *McRO, Inc. v. Bandai Namco Games America Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) (patent eligible method claims directed to an improvement in computer animation, not an abstract idea that merely invokes generic processes and machinery).

Our conclusion is supported by Appellants’ claims and Specification. In particular, Appellants extensively discuss the various improvements allegedly provided by the claimed invention. *See* Spec. 2–4, 7–8. For example, Appellants describe “an objective of the present invention [is] to provide a method for storing data in a relational database and a relational database server which are efficient and at the same time secure to prevent an adversary from gaining any meaningful information of the data of the relational database.” *Id.* at 2. Appellants further discuss various efficiencies provided by the claimed invention, such as “efficient query linking between primary keys and all corresponding foreign keys between tables” and “efficient query linking between each foreign key and its corresponding primary key.” *Id.* at 3. Appellants also state “foreign keys are encrypted differently from the remaining entries of the relational database” which “enables the use of lightweight encryption techniques to encrypt these entries while fully supporting existing functionality of the relational database.” *Id.* at 8. According to Appellants, this “provides significantly a boost in the performance of the encrypted relational databases without compromising a security against passive adversaries.” *Id.*

On this record, the Examiner has not sufficiently explained why the claims are not directed to an improvement in computer functionality, like the claims in *Enfish*. Because we find the claims are directed to eligible subject matter, we need not reach step two of the *Alice/Mayo* test. *Enfish*, 822 F.3d at 1339. Therefore, we do not sustain the Examiner’s 35 U.S.C. § 101 rejection of claims 1, 2, 10, and 11.

*35 U.S.C. § 103 Rejections*

*Dispositive Issue:* Did the Examiner err in finding the combination of Chrysler, Browning, and Banks teaches or suggests “the foreign keys are encrypted based on the encrypted primary keys,” as recited in independent claim 1 and commensurately recited in independent claim 10?

The Examiner relies on Chrysler to teach or suggest the disputed limitation. Final Act. 14 (citing Chrysler ¶¶ 5, 6). Specifically, the Examiner finds Chrysler’s first plurality of key field entries teaches or suggests the primary key and Chrysler’s second plurality of key field entries teaches or suggests the foreign key. *Id.*; Ans. 6. The Examiner finds “Chrysler discloses encrypting primary and foreign keys by encoding the first and second adjusted key fields.” Ans. 6.

Appellants argue “the encryption of Chrysler is based on one or more index keys.” App. Br. 8. Appellants argue “[n]owhere does Chrysler teach or suggest that its index keys are based on either the first or second plurality of adjusted key field entries.” *Id.* at 8; *see also* Reply Br. 4. Appellants further argue “[t]he table encrypter 205 does not show any encryption of a key field based on another encrypted key field.” App. Br. 8–9.

We are persuaded by Appellants' arguments. Chrysler is generally directed to enhancing relational database security. Chrysler ¶ 1. Chrysler describes "encoding the first and the second plurality of adjusted key field entries *based on one or more index keys* to generate an encrypted database." *Id.* ¶¶ 4, 5 (emphasis added). We do not see, and the Examiner has not explained, how this disclosure teaches or suggests that "the foreign keys are encrypted based on the encrypted primary keys," as claimed. Rather, Chrysler discloses that *both* the first and second plurality of key field entries (the primary and foreign keys) are encoded based on one or more index keys.

Accordingly, we are persuaded the Examiner erred. Because we agree with at least one of the arguments advanced by Appellants, we need not reach the merits of Appellants' other arguments. We, therefore, do not sustain the Examiner's 35 U.S.C. § 103(a) rejection of independent claims 1 and 10. For the same reasons, we do not sustain the Examiner's 35 U.S.C. § 103(a) rejection of dependent claims 2–9 and 11.

#### DECISION

We reverse the Examiner's 35 U.S.C. § 101 rejection of claims 1, 2, 10, and 11.

We reverse the Examiner's 35 U.S.C. § 103(a) rejection of claims 1–11.

REVERSED