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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/561,967	12/05/2014	Paul D. Adcock	NGI-14-1090R3D-D-D-CON2	3322

35811 7590 05/08/2019
IP GROUP OF DLA PIPER LLP (US)
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1650 MARKET ST, SUITE 4900
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EXAMINER

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ART UNIT	PAPER NUMBER
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3697

NOTIFICATION DATE	DELIVERY MODE
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05/08/2019

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PAUL D. ADCOCK, MICHAEL A. CORMACK,
AMY FARNSTROM, and ROBERT A. HILL¹

Appeal 2018-001762
Application 14/561,967
Technology Center 3600

Before WILLIAM V. SAINDON, JENNIFER L. McKEOWN, and
JOYCE CRAIG, *Administrative Patent Judges*.

Opinion for the Board filed by JENNIFER L. McKEOWN, *Administrative
Patent Judge*.

Opinion Concurring filed by JOYCE CRAIG, *Administrative Patent Judge*.

McKEOWN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's
decision to reject claims 12–20. Claims 1–11 are withdrawn. We have
jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ The real party of interest is identified as NYSE Group, Inc.

STATEMENT OF THE CASE

Appellants' claimed invention is directed to "[a]n enhanced system and method for handling, matching and executing a diverse group of limit-priced orders in an electronic options environment." Abstract.

Claim 12 is illustrative of the claimed invention and reads as follows:

12. A method for efficient storage and retrieval of trading data in an electronic options trading environment with market maker participation, comprising:

(a) generating, by a computing system having at least one processor and at least one memory, each of an order data structure and a market maker quote data structure in the memory, the order data structure being separate from the market maker quote data structure, the order data structure including an order book for each of a plurality of option series, each order book storing order data, the market maker quote data structure configured to include a separate market maker quote book for each of one or more of the plurality of option series, each market maker quote book including a respective option series indicator and configured to include a data table having first predefined fields for exclusively storing quote data received from one or more market makers associated with the respective option series and second predefined fields linked to the first predefined fields for storing associated market maker information including one or more lead market maker indications that indicates which of the received quote data is associated with a respective lead market maker;

(b)(i) receiving, by an order matching engine of the computing system, an incoming order having a price, (b)(ii) retrieving, by the order matching engine of the computing system, the side of the National Best Bid and Offer (NBBO) opposite the incoming order, and (b)(iii) determining, by the order matching engine of the computing system, whether the incoming order price is equal to or overlaps with the retrieved side of the NBBO;

(c)(i) searching, by the order matching engine of the computing system, the market maker quote data structure, without searching the order data structure, to (a) identify whether

the incoming order is for an option series that has a corresponding market maker quote book by determining whether a corresponding option series indicator exists in the market maker quote data structure and (b) identify whether the corresponding market maker quote book includes a lead market maker indication for a respective lead market maker by searching the second predefined fields of the data table corresponding to the identified option series indicator, and (c)(ii) determining, by the order matching engine of the computing system, whether the lead market maker has a quote at the NBBO, said (c)(i) and (c)(ii) being responsive to determining that the incoming order price is equal to or overlaps with the retrieved side of the NBBO; and

(d) activating, by the order matching engine, a too-executable order check routine, responsive to determining that the incoming order is for the option series that has the lead market maker and the lead market maker has a quote at the NBBO, which causes the too-executable order check routine to d(i) compute an allocation percentage for the lead market maker, (d)(ii) match the incoming order up to the lesser of the total size of the incoming order and the computed allocation percentage amount for the lead market maker, when the incoming order is automatically repriceable, and (d)(iii) cause the order matching engine to cancel the incoming order when the incoming order is not automatically repriceable,

wherein the too-executable order check routine and the order matching engine each comprise respective programmed instructions executed by the at least one processor.

App. Br. 24–26 (Claims Appendix).

THE REJECTION

The Examiner rejected claims 12–20 under 35 U.S.C. § 101 as directed to patent-ineligible subject matter. Final Act. 11–21.

ANALYSIS

THE REJECTION UNDER 35 U.S.C. § 101

Claims 12–20

Based on the record before us, we are persuaded that the Examiner erred in rejecting claims 12–20 as directed to patent-ineligible subject matter.

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: “[I]aws of nature, natural phenomena, and abstract ideas” are not patentable. *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (citation omitted).

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, 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. 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.”). 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 PTO recently published revised guidance on the application of section 101. USPTO’s 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (“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 MANUAL OF PATENT EXAMINING PROCEDURE (MPEP) § 2106.05(a)-(c), (e)-(h) (9th ed., Jan. 2019)).

See Memorandum at 52, 55–56. 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 are 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 at 56.

Examiner's Findings and Conclusion

Under step one of the *Alice* test, the Examiner determines that the claims are directed to a fundamental economic practice, namely “processing incoming orders for a plurality of options series.” Final Act. 11; *see also* Final Act. 12 (explaining that “processing orders in electronic options trading environment with market maker participation was a longstanding and fundamental economic practice.”). The Examiner further determines that the claimed invention is “an idea of itself” and “is similar to the concept of ‘obtaining and comparing intangible data.’” Final Act. 13.

The Examiner determines that the claimed invention “[is] not directed to solving a problem arising in the realm of electronic trading computer network architectures.” Final Act. 14. According to the Examiner, “it is not apparent how the claimed invention provides benefits of speed and efficiency to existing data storage and retrieval technology.” The Examiner points out that the Specification indicates that the claimed invention “may be implemented using any appropriate structure, data storage, or retrieval methodology” (Final Act. 14 (emphasis omitted)) and that the claimed concept is similar to “classifying and storing digital images in an organized manner,” which the Federal Circuit found to be ineligible in *In re TLI Communications*, 823 F.3d 607 (Fed. Cir. 2016). Final Act. 15.

With respect to step 2 of the *Alice* test, the Examiner determines that the claimed invention does not add significantly more than the abstract idea. Final Act. 16. The Examiner explains that the additional elements merely include a processor and memory that perform “receiving, processing and storing data,” “electronic recordkeeping,” “automating mental tasks,”

“performing repetitive calculations,” and “receiving or transmitting data over a network, e.g., using the Internet to gather data.” Final Act. 16–17. According to the Examiner, these steps “are considered well-understood, routine, and conventional functions of computer.” Final Act. 17. The Examiner adds that the claimed invention can be performed manually and that the Specification describes the claimed invention can be performed on a general purpose computer. Final Act. 17–18.

Appellants’ Contentions

Appellants, on the other hand, argue that the claimed invention improves the functioning of the computer and improves the technical field. App. Br. 4. For example, Appellants assert “that the separate and distinct order and market maker quote data structures improve upon prior art data structures and are patent eligible in view of *Enfish*.”² App. Br. 5 (emphasis omitted). Appellants also maintain that the claimed invention solves “a problem arising in the realm of electronic trading computer network architectures, namely, improving data storage and retrieval efficiency in automated electronic trading networks.” App. Br. 5. Appellants, in particular, highlight that “typical electronic trading networks receive and process tens of millions of orders/quotes per day.” *Id.* Thus, “having to store and process such large volumes of order/quote data certainly hampers the networks’ resources and reduces data throughput, thereby preventing the networks from optimal efficiency and processing speeds.” *Id.*

According to Appellants,

[the claimed invention’s] novel data structure in combination with the claimed specific data retrieval rules improve data

² *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016)

storage and retrieval, and in so doing, reduce computer data searching, increase data throughput and, thus, decrease quote data processing time and resource consumption of the computer network. Clearly, problems of data storage, data retrieval and latency are network architecture problems, not financial problems. Thus, the claimed invention, which solves network architecture problems must necessarily be a technical (and patent eligible) solution.

App. Br. 7; *see also id.* at 10 (emphasis omitted) (“because the claimed invention reduces latency, it is also able to retrieve the most up-to-date data and process this retrieved against incoming order data faster; thereby leading to more accurate executed data. As would [be] understood by the skilled person, these are all improvements to the functioning of the computer itself.”).

Analysis – Step 1

In step one we consider whether the claimed subject matter falls within the four statutory categories of patentable subject matter identified by 35 U.S.C. § 101: process, machine, manufacture, or composition of matter. The claimed invention here recites a process including a number of a steps. Accordingly, the claimed invention falls within the process category.

Analysis – Revised Step 2A

Under the Memorandum, in prong one of step 2A we look to whether the claim recites a judicial exception. The claims here recite the steps of

(b)(i) receiving . . . an incoming order having a price, (b)(ii) retrieving . . . the side of the [NBBO] opposite the incoming order, and (b)(iii) determining . . . whether the incoming order price is equal to or overlaps with the retrieved side of the NBBO;

(c)(i) searching . . . to (a) identify whether the incoming order is for an option series that has a corresponding market maker quote book . . . and (b) identify whether the corresponding

market maker quote book includes a lead market maker indication for a respective lead market maker. . .and (c)(ii) determining . . . whether the lead market maker has a quote at the NBBO, said (c)(i) and (c)(ii) being responsive to determining that the incoming order price is equal to or overlaps with the retrieved side of the NBBO; and

(d) activating . . . a too-executable order check routine, responsive to determining that the incoming order is for the option series that has the lead market maker and the lead market maker has a quote at the NBBO, which causes the too-executable order check routine to d(i) compute an allocation percentage for the lead market maker,

At a high level, these limitations receive an order, matches that order with a corresponding quote at NBBO by the lead market maker, and performs a check routine (including mathematical calculations). The process of receiving incoming orders and matching orders with corresponding quotes in a trading marketplace is a well-known fundamental economic practice. As such, we agree with the Examiner that these limitations generally recite the fundamental economic practice of “processing orders in electronic options trading environment with market maker participation.” Final Act. 12. The claimed invention, thus, recites certain methods of organizing human activity, which is an abstract idea.

Next, under prong two of step 2A, we determine whether the recited judicial exception is integrated into a practical application of that exception by: (a) identifying whether there are any additional elements recited in the claim beyond the judicial exception(s); and (b) evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application.

The claimed invention additionally recites

(a) generating. . . each of an order data structure and a market maker quote data structure in the memory, the order data structure being separate from the market maker quote data structure, the order data structure including an order book for each of a plurality of option series, each order book storing order data, the market maker quote data structure configured to include a separate market maker quote book for each of one or more of the plurality of option series, each market maker quote book including a respective option series indicator and configured to include a data table having first predefined fields for exclusively storing quote data received from one or more market makers associated with the respective option series and second predefined fields linked to the first predefined fields for storing associated market maker information including one or more lead market maker indications that indicates which of the received quote data is associated with a respective lead market maker;

(c)(i) searching the market maker quote data structure. . . without searching the order data structure, to (a) identify whether the incoming order is for an option series that has a corresponding market maker quote book by determining whether a corresponding option series indicator exists in the market maker quote data structure and (b) identify whether the corresponding market maker quote book includes a lead market maker indication for a respective lead market maker by searching the second predefined fields of the data table corresponding to the identified option series indicator . . .; and

(d)(ii) match[ing] the incoming order up to the lesser of the total size of the incoming order and the computed allocation percentage amount for the lead market maker, when the incoming order is automatically repriced, and (d)(iii) cause the order matching engine to cancel the incoming order when the incoming order is not automatically repriced.

At a high level, these limitations at least define a particular arrangement for the market maker quote data structure, which is separate from the order data structure and with option series and lead market maker indicators, and a particular method of retrieving information from the market maker quote data structure.

Based on the record before us, we agree with Appellants that the claimed invention provides a technological improvement. As Appellants point out, “typical electronic trading networks receive and process tens of millions of orders/quotes per day.” App. Br. 5. With “the high volume and rapidly changing order/quote data,” “[a]ny latency in the storage and retrieval of data can cause the retrieved data to be out-of-date and/or cause data to be processed with (now) inferior prices.” App. Br. 6; *see also* App. Br. 6 (noting that latency is a technical problem in electronic trading networks).

To address this problem arising in the realm of electronic trading computer network architectures, the claimed invention defines a particular market maker quote data structure and a specific process for searching and retrieving data to “improve[e] data storage and retrieval efficiency in automated electronic trading networks.” App. Br. 5 (emphasis omitted). Specifically, separating the market maker quote data structure from the order data structure and the quote data structure itself with option series and lead market maker indicators “eliminate[es] the need to search through larger, combined pools of order data and order books (which is done in conventional systems).” App. Br. 6. Additionally, the claimed “data retrieval rules using the option series indicators and lead market indications eliminates the need to search through all quote data, reduces the amount of data to search within the quote data structure, increases the speed of data retrieval and, ultimately, decreases the latency of the network to process quote and order data (to identify executability conditions for an incoming order).” App. Br. 6. Further, “the claimed order matching engine includes a novel and very specific set of data retrieval rules that improves overall

efficiency and performance by determining whether orders are to be executed and/or cancelled.” App. Br. 6. As such, contrary to the Examiner’s assertions, the claimed invention does not merely use the computer as a tool (*see* Ans. 3–4), but is directed to the combination of particular data structures and retrieval rules that provide “technical improvements (faster, more efficient searching and reduced latency) to the computer system.” App. Br. 15.

We also disagree with the Examiner that the claimed invention here is similar to merely classifying and storing data in an organized manner, which was found to be ineligible in *TLI Comms*. *See* Ans. 6; *TLI Comms*, 823 F.3d at 615. In *TLI Comms*, the Federal Circuit held

Although the claims recite that the abstract idea of classifying and storing digital images in an organized manner is carried out in a telephone system, the [] patent fails to provide the requisite details necessary to carry out that idea. Just as “[s]teps that do nothing more than spell out what it means to ‘apply it on a computer’ cannot confer patent-eligibility,” *Intellectual Ventures I*, 792 F.3d at 1371–72 (citing *Alice*, 134 S.Ct. at 2359), here, steps that generically spell out what it means to “apply it on a telephone network” also cannot confer patent eligibility.

TLI Comms, 823 F.3d at 615 (emphasis added). The claimed invention, here, is distinct as it provides specific data structures, namely separate order and market maker quote data structures and the quote data structure itself with option series and lead market maker indicators, as well as the specific set of data retrieval rules.

Moreover, we determine the claimed invention here is instead similar to *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1258–59 (Fed. Cir. 2014). Namely, the claimed invention is directed to “overcom[ing] a

problem specifically arising in the realm of computer networks.” *Id.* at 1257. In other words, the claimed invention directly addresses the problem arising from the large volume of data processed and received in automated electronic trading networks. As Appellants explain,

To be clear, because the claims receive and process rapidly changing high volume data, it is important that data is stored and retrieved in a fast and efficient manner. This way, the most up-to-date data can be retrieved from the data structure(s) and processed against incoming order data (ultimately for order execution or cancellation). Appellant’s novel data structure in combination with the claimed specific data retrieval rules improve data storage and retrieval, and in so doing, reduce computer data searching, increase data throughput and, thus, decrease quote data processing time and resource consumption of the computer network. Clearly, problems of data storage, data retrieval and latency are network architecture problems, not financial problems. Thus, the claimed invention, which solves network architecture problems must necessarily be a technical (and patent eligible) solution.

App. Br. 7. *See also Bascom Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016) (finding that the claimed “particular arrangement of elements is a technical improvement over prior art [systems]” and finding the claims eligible”). As such, we determine that the claimed invention integrates the abstract idea in a practical application and are persuaded that the Examiner erred in rejecting claims 12–20 as directed to an abstract idea,

Accordingly, we reverse the Examiner’s rejection of claims 12–20 as directed to patent ineligible subject matter.

Appeal 2018-001762
Application 14/561,967

DECISION

We reverse the Examiner's decision to reject claims 12–20.

REVERSED

Appeal 2018-001762
Application 14/561,967

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PAUL D. ADCOCK, MICHAEL A. CORMACK,
AMY FARNSTROM, and ROBERT A. HILL

Appeal 2018-001762
Application 14/561,967
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Before WILLIAM V. SAINDON, JENNIFER L. McKEOWN, and
JOYCE CRAIG, *Administrative Patent Judges*.

CRAIG, *Administrative Patent Judge*, concurring.

I concur with the majority's decision. However, I respectfully disagree with the majority's determination that the abstract idea is integrated into a practical application because at least one additional element improves the functioning of a computer or some other technology or technical field.

Instead, I agree with the Examiner that it is not apparent how the claimed invention provides benefits of speed and efficiency to existing data storage and retrieval technology. *See* Ans. 3. As the Examiner explained, independent claim 12 does not recite particular inventive features to address the inefficiency in storing and processing quotes and order data described by Appellants. *See id.* at 5. I also agree with the Examiner that there is no evidence that information in the present invention is stored differently than in conventional electronic trading platforms, aside from being stored in a

separate data structure for each option series. *See id.* at 8. I further agree with the Examiner that the information stored in the data structures is no different from conventional information stored in conventional electronic trading platforms. *See id.* Thus, I am not persuaded that the claimed invention provides a technological solution to a technological problem. *See* MPEP § 2106.05(a). Nor am I persuaded that the claimed invention here is similar to that in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1258–59 (Fed. Cir. 2014), as I do not agree the claimed invention is directed to “overcome[ing] a problem specifically arising in the realm of computer networks.” *Id.* at 1257.

I agree with the majority, however, that the abstract idea is integrated into a practical application in Prong 2 of Step 2A of the Memorandum. In particular, the claims describe a product or process that adds meaningful limitations beyond generally linking the use of the abstract idea to a particular technological environment to transform the abstract idea into patentable subject matter. *See* MPEP § 2106.05(e). In particular, as the majority determined, the “generating,” “searching,” “match[ing],” and “caus[ing]” steps at least define a particular arrangement for the market maker quote data structure, which is separate from the order data structure and with option series and lead market maker indicators, and a particular method of retrieving information from the market maker quote data structure. I conclude such limitations are sufficient to transform the abstract idea into a patent eligible application of the abstract idea under the Memorandum.

For these reasons, I would conclude Appellants’ claims 12–20 are patent-eligible under § 101 and reverse the Examiner’s rejection.