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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DOUGLAS LAWRENCE BORDEN, OLIVER HANSCH,
YOUXUN SHEN, and XIAOLIN XIE

Appeal 2016-008456
Application 12/705,270¹
Technology Center 3600

Before HUNG H. BUI, BETH Z. SHAW, and MELISSA HAAPALA,
Administrative Patent Judges.

BUI, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellants seek our review under 35 U.S.C. § 134(a) of the Examiner's Final Rejection of claims 1, 3–10, and 12–19. Claims 2, 11, and 20 are cancelled. App. Br. 2. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.²

¹ According to Appellants, the real party in interest is Goldman, Sachs & Co. App. Br. 2.

² Our Decision refers to Appellants' Appeal Brief ("App. Br.") filed Dec. 28, 2015; Reply Brief ("Reply Br.") filed Aug. 21, 2016; Examiner's Answer ("Ans.") mailed June 30, 2016; Final Office Action ("Final Act.") mailed May 1, 2015; and original Specification ("Spec.") filed Feb. 12, 2010.

STATEMENT OF THE CASE

Appellants' invention relates to "trading of financial instruments [e.g., stocks, bonds, derivatives, commodities] by facilitating an optimization framework that optimizes order-placement." Spec. ¶¶ 4–5; Abstract.

Claims 1, 10, and 19 are independent. Claim 1 illustrates the subject matter at issue, as reproduced below with disputed limitations in italics:

1. A processor-implemented method for trading a financial instrument using a trading platform communicably coupled to an exchange, comprising:

receiving, at the trading platform, an order request that includes a total quantity of shares and a time horizon within which to execute a transaction;

retrieving, from the exchange or a database communicably coupled to the trading platform via a communication network, order parameters, security parameters, and market parameters associated with the transaction;

evaluating analytically, using a processor under control of the trading platform, a future implementation cost as a function of future number of shares to trade after a current time interval based on at least some of the retrieved parameters;

evaluating numerically, using the processor under control of the trading platform, a current implementation cost as a function of current number of shares to trade during the current time interval based on at least some of the retrieved parameters;

optimizing, using the processor under control of the trading platform, a total implementation cost to determine an optimal current number of shares from the total quantity to trade during the current time interval, wherein the total implementation cost is a sum of the future implementation cost and the current implementation cost;

executing, via the trading platform, an order for the optimal current number of shares of the financial instrument; and

iteratively re-optimizing and re-executing until the total quantity of shares is traded within the time horizon.

App. Br. 30 (Claims App'x.).

REJECTIONS & REFERENCES

(1) Claims 1, 3–10, and 12–19 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Final Act. 2–7.

(2) Claims 1, 3, 5, 9, 10, 12, 14, 18, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Madhavan et al. (US 2003/0233306 A1; published Dec. 18, 2003) and Borkovec et al. (US 2009/0125448 A1; published May 14, 2009). Final Act. 17–24.

(3) Claims 4 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Madhavan, Borkovec, Bertsimas (“Optimal Control of Execution Costs,” *Journal of Financial Markets*, MIT, Cambridge, MA, 1998), and Rust (US 2006/0271469 A1; published Nov. 30, 2006). Final Act. 24–25.

(4) Claims 6–8 and 15–17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Madhavan, Borkovec, and Rust. Final Act. 25–26.

ANALYSIS

35 U.S.C. § 101: Claims 1, 3–10, and 12–19

In *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014), the Supreme Court reiterates an analytical two-step framework, previously set forth in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 79 (2012), “for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Id.* at 2355. In the

first step of the *Alice/Mayo* analysis, we determine whether the claims at issue are “directed to” a judicial exception, such as an abstract idea. *Id.* If not, the inquiry ends. *Thales Visionix Inc. v. U.S.*, 850 F.3d 1343, 1346 (Fed. Cir. 2017); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016). If the claims are determined to be directed to an abstract idea, then we consider under the second step of the *Alice/Mayo* analysis the elements of the claims “individually and ‘as an ordered combination’” to determine whether there are additional elements that “‘transform the nature of the claim’ into a patent-eligible application.” *Alice*, 134 S. Ct. at 2355 (citing *Mayo*, 566 U.S. at 79, 78). In other words, the second step is to “search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Id.* (citing *Mayo*, 566 U.S. at 72–73).

In rejecting independent claims 1, 10, and 19, and their dependent claims 3–9 and 12–18, the Examiner determines (1) the claims are directed to an abstract idea of calculating a total trading cost associated with trading of a financial instrument” (e.g., stocks, bonds, derivatives, commodities etc.), which is a fundamental economic practice; and that (2) the additional elements in the claims, taken individually and as an ordered combination, do not amount to significantly more than the abstract idea because (i) “the computing system is recited at a high level of generality . . . performing generic computer functions that are well-understood, routine and conventional” and (ii) “[t]here is no indication that the combination of elements improves the functioning of the computer or improves any other technology.” Ans. 3–5.

Alice/Mayo—Step 1

Turning now to the first step of the *Alice* inquiry, Appellants argue the claims are not directed to “an abstract idea” because these claims do not recite “the mere concept of calculating such a total trading cost”; rather, “a specific implementation that performs specific operation using specific data related to specific hardware, software, platforms, networks, and time horizons” and “[t]hese operations represent more than just an abstract idea.” App. Br. 11–12; Reply Br. 4–5. According to Appellants, “these types of operations represent a modern technology that is necessary dependent on computer systems and an idea that did not exist before the time of computers.” App. Br. 12.

Appellants’ arguments are not persuasive. Appellants’ Specification provides the invention is directed to “apparatuses, methods and systems for a marginal contribution to performance platform” to optimize trading of financial instruments, such as stocks, bonds, derivatives, commodities, and/or the like, within the context of a market exchange. Spec. ¶¶ 3–4. The Specification further provides embodiments for evaluating an instantaneous implementation (trading) cost and optimizing a total implementation (trading) cost to determine an optimal current number of shares to trade. *See* Fig. 2. Thus, we agree with the Examiner that the claims are directed to “an abstract idea of calculating a total trading cost associated with trading of a financial instrument,” which is a fundamental economic practice. Ans. 10. Such activities are squarely within the realm of abstract ideas. Calculating the cost of trading a financial instrument (e.g., stocks, bonds, derivatives, commodities etc.) is a fundamental business practice, like (1) risk hedging in *Bilski v. Kappos*, 561 U.S. 593 (2010), (2) intermediated settlement in *Alice*,

134 S. Ct. at 2356–57, (3) verifying credit card transactions in *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1370 (Fed. Cir. 2011), (4) collecting and analyzing information to detect and notify of misuses in *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1093–94 (Fed. Cir. 2016), and (5) guaranteeing transactions in *buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1354 (Fed. Cir. 2014). Trading a financial instrument (e.g., stocks, bonds, derivatives, commodities etc.) is also a building block of a market economy. Thus, trading of a financial instrument, like risk hedging, intermediated settlement, and verifying credit card transactions, is an “abstract idea” beyond the scope of § 101. *See Alice*, 134 S. Ct. at 2356.

As also recognized by the Examiner (Ans. 3), calculating the cost of trading a financial instrument (e.g., stocks, bonds, derivatives, commodities etc.) could be performed in the human mind, or could be performed manually using, at most, a pen and paper, without need of any computer or other machine. *See CyberSource*, 654 F.3d at 1372–73 (“[A] method that can be performed by human thought alone is merely an abstract idea and is not patent-eligible under § 101.”); *see also In re Comiskey*, 554 F.3d 967, 979 (Fed. Cir. 2009) (“[M]ental processes—or processes of human thinking—standing alone are not patentable even if they have practical application.”); *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (“Phenomena of nature . . . , *mental processes*, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work” (emphasis added)). Additionally, mental processes remain unpatentable even when automated to reduce the burden on the user of what once could have been done with pen and paper. *CyberSource*, 654 F.3d at 1375 (“That purely mental processes can be unpatentable, even when performed by a computer,

was precisely the holding of the Supreme Court in *Gottschalk v. Benson*.”). All the steps recited in Appellants’ claim 1 can be performed in the human mind, or by a human (i.e., trader) using pen and paper. For example, step (c) and step (d)—which require “evaluating . . . a future implementation (trading) cost as a function of future number of shares to trade after a current time interval” and “a current implementation (trading) cost as a function of current number of shares to trade”—can be performed by a human (trader) who evaluates information available on the trading floor of a market exchange (e.g. New York Stock Exchange or NASDAG). Step (e) and step (f)—which require “optimizing . . . a total implementation (trading) cost to determine an optimal current number of shares from the total quantity to trade during the current time frame” and “executing . . . an order for the optimal current number of shares of the financial instrument” —can be performed by a human (trader) who adds the total trading cost and buys or sells the financial instrument on the trading floor of the market exchange.

Accordingly, we agree with the Examiner that claims 1, 10, and 19, are directed to calculating the cost of trading a financial instrument, which is both (1) “a fundamental economic practice” identified as an “abstract idea” by the Supreme Court in *Bilski* and *Alice*, and (2) “mental processes” identified as an abstract idea by the Supreme Court in its earlier trilogy of *Gottschalk v. Benson*, 409 U.S. 63 (1972), *Parker v. Flook*, 437 U.S. 584 (1978), and *Diamond v. Diehr*, 450 U.S. 175 (1981).

Alice/Mayo—Step 2

In the second step of the *Alice* inquiry, Appellants argue the claims recite “additional elements that add significantly more to any alleged abstract concept” because these claims include “various limitations related to specific data and specific operation” and such limitations are “substantially more” than any alleged abstract concept. App. Br. 14; Reply Br. 5–8. According to Appellants, “the operations recited in Claim 1 combine to create an ordered combination that is not well-understood, routine, or conventional and that is not previously known to the industry.” App. Br. 15; Reply Br. 8.

We are not persuaded by Appellants’ arguments. Rather, we agree with the Examiner that (1) the steps of receiving an order request, retrieving, evaluating, optimizing, and executing recited in Appellants’ independent claim 1 and, similarly recited in claims 10 and 19 are implemented on generic computer components (e.g., processor, memory, and database); and (2) these additional elements (generic computer components), whether taken individually or as an ordered combination, do not add significantly more than the abstract idea because these additional elements (generic computer components) are well-understood, routine and conventional. Ans. 4–5. As described by the Supreme Court, the second step of the *Alice* inquiry is to “search for an ‘inventive concept’—*i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Id.* (citing *Mayo*, 566 U.S. at 72–73). As discussed *supra*, we are not persuaded the added computer elements such as the processor, memory, and database transform the abstract idea into a patent eligible invention. Rather, claims 1,

10, and 19 simply incorporate a general-purpose computer and generic components to perform the abstract concept of “calculating a total trading cost associated with trading of a financial instrument.” Spec. ¶¶ 3–4, Fig. 2. Appellants have not directed our attention to anything in the record that shows specialized computer hardware is required, nor have Appellants shown how the claims are performed such that they are not routine, conventional functions of a generic computer. *See Alice*, 134 S. Ct. 2358 (“the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.”)

In fact, none of the steps and elements recited in Appellants’ claims provide, and nowhere in Appellants’ Specification can we find, any description or explanation as to how the claimed calculating the cost of trading a financial instrument (e.g., stocks, bonds, derivatives, commodities etc.) is intended to provide: (1) a “solution . . . necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks,” as explained by the Federal Circuit in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed. Cir. 2014); (2) “a specific improvement to the way computers operate,” as explained in *Enfish*, 822 F.3d at 1336; or (3) an “unconventional technological solution . . . to a technological problem” that “improve[s] the performance of the system itself,” as explained in *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1300, 1302 (Fed. Cir. 2016).

Accordingly, claims 1, 10, and 19, when considered “both individually and ‘as an ordered combination,’” amount to nothing more than an attempt to patent the abstract idea embodied in the steps of the claims (*see Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 566 U.S. at 78)).

Additional Arguments

Appellants argue that the claims do not seek to tie up or preempt “the idea of calculating a total trading cost associated with trading of a financial instrument.” App. Br. 13–14. However, this argument is not persuasive because, although “preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility.” *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015). “Where a patent’s claims are deemed only to disclose patent ineligible subject matter” under the *Alice/Mayo* framework, “preemption concerns are fully addressed and made moot.” *Id.*

Appellants also argue the Examiner “cannot over-generalize the claims” to support the § 101 rejection, citing two recent PTAB’s decisions, including (1) *Ex Parte Wegman III*, 2015 WL 557868 (PTAB Sep. 18, 2015), U.S. Patent Application No. 12/765,954; and (2) *Ex Parte Fuller et al.*, 2015 WL 3467122 (PTAB May 28, 2015), U.S. Patent Application No. 11/864,531. This argument is also unpersuasive. First, earlier Board decisions in *Ex Parte Wegman III* and *Ex Parte Wegman III* are not binding and, as correctly recognized by the Examiner (Ans. 19), those decisions are highly fact-specific to those cases. Second, we are required under *Alice* to review the claims at some level of generalization and determine whether those claims are directed to an abstract idea. However, we are mindful that “too broad an interpretation of this exclusionary principle could eviscerate patent law,” as “all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.” *Alice*, 134 S. Ct. at 2355 and *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012).

Lastly, Appellants argue claims 6 and 15 further recite “calculating an implementation shortfall based on a benchmark cost” and, when viewed in combination with claims 1 and 10, “create an ordered combination that is not well-understood, routine, or conventional and that is not previously known to the industry.” App. Br. 18. We are not persuaded for the same reasons discussed *supra*.

Because we agree with the Examiner’s analysis and find Appellants’ arguments insufficient to show error, we sustain the rejection of claims 1, 3–10, and 12–19 under 35 U.S.C. § 101.

35 U.S.C. § 103(a): Claims 1, 3, 5, 9, 10, 12, 14, 18, and 19

In support of the obviousness rejection of independent claim 1 and, similarly claims 10 and 19, the Examiner finds the combination of Madhavan and Borkovec teaches all the claim limitations. Final Act. 17–24 (citing Madhavan ¶¶ 7, 20, 22–28, 60, Fig. 2; Borkovec ¶¶ 71, 117, 121, claim 1). In particular, the Examiner relies on paragraph 71 of Borkovec for disclosing the disputed limitation:

optimizing, using the processor under control of the trading platform, a total implementation cost to determine an optimal current number of shares from the total quantity to trade during the current time interval, wherein the total implementation cost is a sum of the future implementation cost and the current implementation cost.

Final Act. 18 (citing Borkovec ¶ 71) (emphasis added).

Appellants dispute the Examiner’s factual findings regarding Borkovec. In particular, Borkovec teaches forecasting a total transaction cost of trading a financial instrument (stocks) in accordance with a trading strategy. Borkovec Abstract. Appellants acknowledge paragraph 71 of

Borkovec teaches the formula used to determine a total transaction cost of trading a particular stock, as reproduced below with annotations (in red) for illustration:

[0071] The total realized transaction costs C can be defined as:

$$C = \sum_{i=1}^T [C_i(n_i) + (\alpha + \epsilon_i \sigma + T_i(n_i))x_i] \quad (1)$$

where n_i = total number of shares traded on day i

c_i = cost on day i for trading n_i shares

α = expected daily price change

ϵ_i = random price disturbance for day i

σ = standard deviation of daily price change

T_i = linear coefficient for price impact persistence after trade on day i

x_i = residual at the end of day i .

Depicted above is an annotated illustration of the formula described in paragraph 71 of Borkovec.

However, Appellants argue “nothing in paragraph [0071] of Borkovec discloses or suggests” and “the Examiner has offered no explanation or reasoning as to what element or elements of Borkovec discloses or suggests [1] ‘**optimizing** . . . a total implementation cost’ or [2] ‘determine an **optimal** current number of shares . . . to trade during the current time interval.’” App. Br. 23–24; Reply Br. 12–13.

In response, the Examiner takes the position that (1) the variable C_i of the formula represents Appellants’ claimed “current implementation cost” and (2) the variable T_i , which is the linear coefficient for price persistence after trade on day (i), represents Appellants claimed “future implementation cost.” Ans. 23–25.

We agree with the Examiner that the variable C_i represents Appellants' claimed "current implementation cost." However, we do not agree with the Examiner that Borkovec's linear coefficient for price persistence (T_i) represents Appellants' claimed "future implementation cost." Moreover, Appellants' claims require (1) "**optimizing** . . . a total implementation cost" and (2) "determine an **optimal** current number of shares . . . to trade during the current time interval." As correctly recognized by Appellants, the Examiner has not addressed these limitations and "nothing in paragraph [0071] of *Borkovec* discloses or suggests optimizing a total implementation cost or determining an optimal current number of shares to trade during a current time interval" as recited in claim 1 and, similarly recited in claims 10 and 19. Reply Br. 12–13.

Because the Examiner has not accounted for these two different types of actions and has not shown the combination of Madhavan and Borkovec teaches or suggests all the claim limitations, we do not sustain the Examiner's obviousness rejection of independent claims 1, 10, and 19, and their respective dependent claims 3, 5, 9, 12, 14, and 18, which Appellants do not argue separately. App. Br. 27.

For the same reasons discussed, we also do not sustain the Examiner's remaining obviousness rejections, which include: (1) dependent claims 4 and 13 as being obvious over Madhavan, Borkovec, Bertsimas, and Rust; and (2) dependent claims 6–8 and 15–17 as obvious over Madhavan, Borkovec, and Rust.

CONCLUSION

On the record before us, we conclude Appellants have not demonstrated the Examiner erred in rejecting claims 1, 3–10, and 12–19 under 35 U.S.C. § 101. However, we conclude Appellants have demonstrated the Examiner erred in rejecting claims 1, 3–10, and 12–19 under 35 U.S.C. § 103(a).

DECISION

As such, we AFFIRM the Examiner’s final rejection of claims 1, 3–10, and 12–19 under 35 U.S.C. § 101. However, we REVERSE the Examiner’s final rejection of claims 1, 3–10, and 12–19 under 35 U.S.C. § 103(a).

Because we have affirmed at least one ground of rejection with respect to each claim on appeal, we affirm the Examiner’s decision rejecting claims 1, 3–10, and 12–19. *See* 37 C.F.R. § 41.50(a)(1).

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).

AFFIRMED