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Paper 39
Date: March 2, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTERNATIONAL SECURITIES EXCHANGE, LLC,
Petitioner,

v.

CHICAGO BOARD OPTIONS EXCHANGE, INC.,
Patent Owner.

Case IPR2014-00097
Patent 7,356,498 B2

Before JUSTIN T. ARBES, RAMA G. ELLURU, and JAMES B. ARPIN, *Administrative Patent Judges.*

ELLURU, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

Petitioner, International Securities Exchange, LLC, filed a Petition (Paper 1, "Pet.") requesting *inter partes* review of claims 1–28 of U.S. Patent No. 7,356,498 B2 (Ex. 1001; "the '498 patent"). Patent Owner, Chicago Board Options Exchange, Inc., filed a Preliminary Response opposing institution of review (Paper 9; "Prelim. Resp."). On May 22, 2014, we instituted an *inter partes* review of claims 1, 8, 9, 11, 14, 15, and 23 of the '498 patent (Paper 12; "Dec. on Inst.").

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 26; "PO Resp."), and Petitioner filed a Reply (Paper 31; "Pet. Reply").

We held an oral hearing on January 21, 2014, and a transcript of the hearing is included in the record (Paper 38; "Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons that follow, we determine that Petitioner has not shown by a preponderance of the evidence that claims 1, 8, 9, 11, 14, 15, and 23 of the '498 patent are unpatentable based on the instituted grounds in this *inter partes* review.

A. The '498 Patent

The '498 patent, titled "Automated Trading Exchange System Having Integrated Quote Risk Monitoring and Integrated Quote Modification Services," issued on April 8, 2008, based on U.S. Patent Application No. 09/475,534 ("the '534 application"),[1] filed on December 30, 1999.

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[1] U.S. Patent Application No. 12/035,996 is a continuation of the '534 application, and issued as U.S. Patent No. 7,980,457 B2 ("the '457 patent"). U.S. Patent Application No. 13/178,289 ("the '289 application") is a continuation of the '996 application and issued as U.S. Patent No. 8,266,044 B2 ("the '044 patent"). The '498 patent is the subject of CBM2013-00049. The '457 patent is also the subject of CBM2013-00050 and IPR2014-00098. The '044 patent is the subject of

The ’498 patent relates to automated trading systems for option contracts (“options”). Ex. 1001, 1:8–12, Abstract. Specifically, the claimed invention is directed to methods for managing the risk of a maker of an options market in an automated trading system. *Id*. at 1:8–12.

Options are traded publicly on exchanges. *Id*. at 1:17. Each option covers certain rights to buy or sell an underlying security at a fixed price for a specified period of time. *Id*. at 1:18–21. The potential loss to the buyer of an option is no greater than the initial premium paid for the option, regardless of the performance of the underlying security. *Id*. at 1:27–29. On the contrary, in exchange for the premium, the seller of the option (“the market-maker”) assumes the risk of being assigned the obligation to buy or sell the underlying security, according to the option terms, if the contract is exercised. *Id*. at 1:30–34. Thus, writing options may entail large risks to the market-maker. *Id*. at 1:34–35.

Many option trading systems utilize an “open outcry” method. *Id*. at 1:43–44. In such systems, market-makers are required to make a two-sided market by providing an order and an offer quote. *Id*. at 1:44–46. In a non-automated open outcry system, a market-maker communicates verbally with traders indicating their willingness to buy and sell various quantities of securities. *Id*. at 1:46–49. Because a market-maker in such systems has personal control over the types and number of options traded, the market-maker can manage risk associated with his or her options portfolio. *Id*. at 1:49–53. A market-maker manages risk by adjusting quotes for options to favor trades that tend to hedge against unwanted risk. *Id*. at 1:52–55.

The ’498 patent Specification states that an automated trading environment

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CBM2013-00051. Final Written Decisions also are entered in these cases concurrently with this Decision.

already was known in the art. *Id*. at 1:56–58, 61–65. An automated, computer-based trading system typically records quotes and automatically matches them with orders that enter the system. *Id*. at 1:58–61. One disadvantage of known automated trading systems is that the systems execute trades so rapidly that a market-maker may be unable to withdraw or modify his quotes in a timely manner. *Id*. at 1:61–2:5. Software tools that assess trading option portfolio risk and recommend quote modifications also were known. *Id*. at 2:6–12. An automated trading system, however, processes transactions in the order received. *Id*. at 2:16–19. Thus, even if a market-maker uses such software tools to modify quotes, those tools may be unable to act in time, given the speed at which the automated trading exchange system executes orders. *Id*. at 2:12–16. For example, an automated trading exchange may have a message queue containing additional orders that must be processed before the automated exchange receives and processes the market-maker's quote modification request. *Id*. at 2:19–23. These known, automated trading exchange systems, therefore, limit a market-maker's ability to manage risk. *Id*. at 2:24–32. The '498 patent Specification recognizes the need for a method that automatically modifies quotes under certain trading conditions in an automated trading exchange system. *Id*. at 2:33–35.

The invention of the '498 patent is directed to methods for modifying quotes in an automated exchange trading system, where the system provides integrated quote risk monitoring and quote modification services. *Id*. at 2:39–41. Thus, one aspect of the invention is an apparatus that implements the method using a computer, having memory, a processor, and a communication port. *Id*. at 2:41–44.

The computer receives orders and quotes, wherein a quote has associated trading parameters, such as a risk threshold. *Id*. at 2:44–47. The computer then may generate a trade by matching the received orders and quotes to previously

received orders and quotes. *Id*. at 2:54–56. If a trade is not generated, the computer stores each of the received orders and quotes. *Id*. at 2:56–57. The computer determines whether a market-maker's quote has been filled as a result of the generated trade, and, if so, determines a risk level and aggregate risk level associated with the trade. *Id*. at 2:57–61. The computer then compares the aggregate risk level with the market-maker's risk threshold for a quote; if the threshold is exceeded, the computer automatically modifies at least one of the market-maker's remaining quotes. *Id*. at 2:61–64.

B. Illustrative Claim

Of the challenged claims, claims 1 and 8 are independent claims. Claim 1 of the '498 patent, reproduced below, is illustrative of the challenged claims.

1. A method of modifying quotes in an automated exchange trading system comprising the steps of:

receiving orders and quotes, wherein specified ones of said quotes belong to a quote group, and wherein said specified ones of said quotes have associated trading parameters comprising a risk threshold;

generating a trade by matching said received orders and quotes to previously received orders and quotes;

storing each of said orders and quotes when a trade is not generated;

determining whether a quote having associated trading parameters has been filled as a result of the generated trade, and if so, determining a risk level and an aggregate risk level associated with said trade;

comparing said aggregate risk level with said risk threshold; and, automatically modifying at least one of the remaining said specified ones of said quotes in the quote group if said threshold is exceeded.

C. Prior Art

The pending grounds of unpatentability in this *inter partes* review are based on the following prior art.

Patent/Publication No.	Date of Issuance or Publication	Exhibit No.
U.S. Patent No. 6,405,180 B2 ("Tilfors")	June 11, 2002	Ex. 1002
Allen Jan Baird, *Option Market Making, Trading and Risk Analysis for the Financial and Commodity Options Markets*, (1993) ("Baird")	1993	Ex. 1003

Petitioner also relies upon the Declaration of Dr. Maureen O'Hara. Ex. 1004.

D. Pending Grounds of Unpatentability

We instituted an *inter partes* review of the '498 patent based on the following grounds:

1. Claims 1 and 8 as anticipated under 35 U.S.C. § 102(e) by Tilfors; and
2. Claims 9, 11, 14, 15, and 23 as unpatentable under 35 U.S.C. § 103(a) over Tilfors and Baird.

Dec. on Inst. 27.

II. ANALYSIS

A. Claim Construction

Consistent with the statute and the legislative history of the AIA,[2] the Board will interpret claims using the broadest reasonable construction in light of the specification of the challenged patent. *See Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012); 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, No. 2014-1301, 2015 WL 448667, at *5–8 (Fed. Cir. Feb. 4, 2015). There is a "'heavy presumption' that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (internal citation omitted).

[2] Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA").

In our Decision on Institution, we construed certain claim terms as follows:

Claim Term	Construction
"risk level . . . associated with said trade"	"a calculated, measured, or otherwise obtained value of exposure to the possibility of loss related to said trade"
"aggregate risk level associated with said trade"	"a calculated, measured, or otherwise obtained aggregate value (e.g., combination, sum, weighed sum, difference) of exposure to the possibility of loss related to such trade"
"automatically modifying at least one of the remaining said specified ones of said quotes in the quote group if said threshold is exceeded"	"automatically cancelling or revising a price or quantity of at least one of the received specified quotes still available for execution"

Dec. on Inst. 8–11. Petitioner does not challenge these constructions (Tr. 6:18–7:2), nor does Patent Owner (*id*. at 39:14–15, 40:1–3). We discern no reason to deviate from our constructions in our Decision on Institution for purposes of this Final Written Decision.

B. Anticipation of Claims 1 and 8 by Tilfors

With respect to Petitioner's contention that claims 1 and 8 are anticipated by Tilfors, we have reviewed Petitioner's arguments and the evidence relied upon by Petitioner, and conclude that Petitioner has not established by a preponderance of the evidence that claims 1 and 8 are anticipated by Tilfors. Specifically, Petitioner has not established by a preponderance of the evidence that Tilfors discloses "determining a risk level and an aggregate risk level associated with said trade," as recited by claims 1 and 8.

Petitioner refers predominantly to one passage in Tilfors as disclosing the limitations of claims 1 and 8. *See* Pet. 23, 25, 28–31, 35, 37–38 (citing Ex. 1002,

4:45–63); Pet. Reply 2 (citing Ex. 1002, 4:46–62); Tr. 8:4–22, 18:19–25. The relied-upon passage provides the following:

> However, in a preferred embodiment, the step 211 can be executed in the following manner (not shown). If the total volume is only a little smaller than the volume required by the exchange, the step up parameter is used to automatically generate more volume at the current price. If, on the other hand, a larger volume needs to be generated in order to obtain the volume X, the one tick worse parameter is used to generate the requested volume at a worse price. Also, if in the step 211, the step up parameter has been used to generate more volume a number of consecutive times at the same price, the one tick worse parameter can be used, even though the step-up parameter normally should have been used. This will prevent that a customer enters a large number of small orders and that the system then generates more volume at the current price instead of offering a worse price as would have been the case if the customer had entered one large order.

Ex. 1002, 4:46–62. Petitioner explains that Tilfors's "step up functionality allows a partially filled quote to be automatically modified by increasing the volume in the quote to a predetermined level set by the market maker or the exchange." Pet. 19–20. Petitioner provides the following example—if the market-maker's original quote was for 50 option contracts, and the market-maker trades against an order for 20 contracts, 30 contracts remain in the quote. *Id*. The step-up function automatically modifies the quote to increase the volume back up to the predetermined level ("X"), which could be, for example, 50 contracts. *Id*.; *see* Ex. 1002, 4:37–41 ("X is a parameter predefined by the exchange").

Petitioner maintains that when Tilfors executes trades, risk level and aggregate risk level are tracked. Pet. 23. According to Petitioner, "[e]ach trade against a quote, and implementation of the step up function, carries with it an inherent risk level as volume is added." *Id*. (citing Ex. 1004 ¶ 51). Petitioner further contends that "Tilfors counts the number of step ups applied against a

quote, thus determining an 'aggregate risk level.'" *Id*. (citing Ex. 1002, 4:45–63, 6:45–54). Petitioner argues that the recited "risk threshold" "reads directly on the programmed *number of times* the step up parameter is permitted to generate more volume at the same prices before invoking tick worse." *Id*. (citations omitted; emphasis added). With respect to the "modifying" limitation of claims 1 and 8, Petitioner asserts that "[w]hen the step up count threshold is exceeded, tick worse is invoked, which regenerates the quote at a worse price," which according to Petitioner, is "something the '498 patent makes clear is one of the ways a quote can be modified in response to exceeding a risk threshold." *Id*. (citations omitted).

In our Decision on Institution, based on the record then before us, we instituted a review based on the following determinations.

> [W]hether or not a trade triggers a step-up in volume is a calculation of the market maker's exposure to the possibility of loss related to a trade, i.e., the claimed "*risk level*." Ex. 1004 ¶ 51.

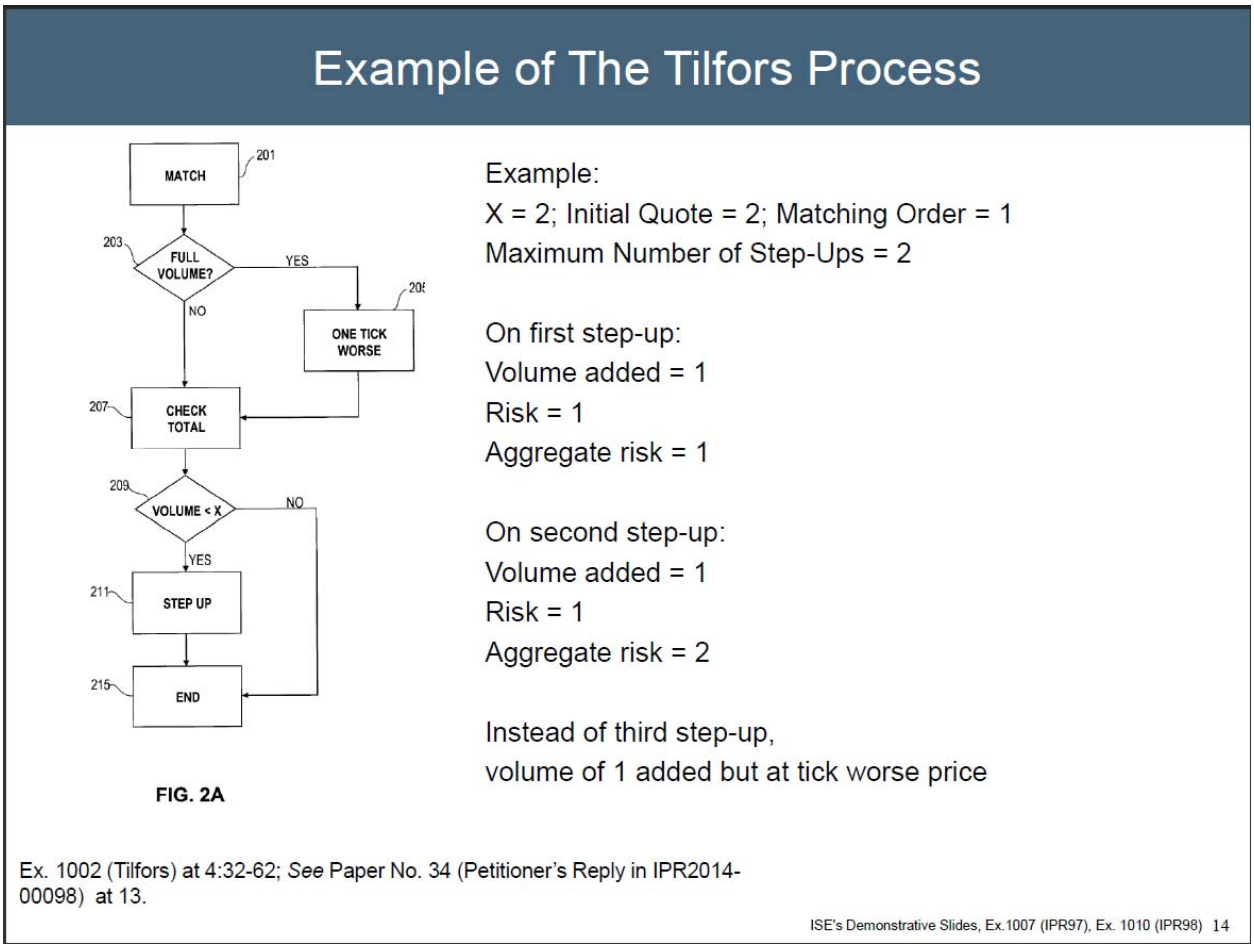
Dec. on Inst. 13. We further agreed with Petitioner that the number of step-ups, i.e., volume increases, applied against a quote, satisfies the recited "aggregate risk level." *Id*. at 13–14. We also determined that because a tick worse parameter is applied if a step-up has been triggered a pre-defined number of times, Petitioner had made a sufficient showing that Tilfors discloses "automatically modifying at least one of the remaining said specified ones of said quotes in the quote group if said threshold is exceeded," as recited by claim 1, and "automatically modifying at least one of the specified ones of received quotes if said threshold is exceeded," as recited by claim 8. *Id*. at 14.

Patent Owner disagrees that Tilfors discloses "determining a risk level . . . associated with said trade." PO Resp. 32–36. Specifically, Patent Owner argues that "whether or not a trade triggers a step-up" does not

satisfy the recited "risk level . . . associated with said trade," which we interpreted as "a calculated, measured, or otherwise obtained *value of exposure to the possibility of loss related to said trade*." *Id*. at 33 (emphasis added); *see* Dec. on Inst. 8–9. According to Patent Owner, whether or not a trade triggers a step-up is merely a decision to maintain the exchange-required minimum volume and "is clearly not a value of anything." PO Resp. 33. Patent Owner asserts that "whether or not a step-up is triggered is merely a yes-or-no question about exchange volume with only a yes-or-no answer." *Id*. Thus, argues Patent Owner, the decision to step-up is not "a calculated, measured, or otherwise obtained *value of exposure*, but rather a determination to fulfill an exchange requirement." *Id*. at 33–34 (emphasis in original).

In its Reply, with respect to the recited "risk level . . . associated with said trade," Petitioner argues that "[e]ach step-up represents the addition of volume to a quote, and volume is a risk level." Pet. Reply 7. Thus, according to Petitioner, because each step-up represents the addition of volume—volume which could be bought by a trade—the "risk level" is increased. Tr. 20:20–21, 21:14–17, 21:18–22, 22:3–8; *see* Pet. Reply 10–11 (Petitioner's hypothetical presented to Patent Owner's witness, Dr. Benn Steil). Petitioner states that "counting step-ups effectively counts risk levels and creates an aggregate risk level." Pet. Reply 11. Petitioner further argues that Tilfors discloses the recited "aggregate risk level" because it keeps track of the number of times volume is added in the step-up procedure. *Id*. at 7.

In support of its argument, at the oral hearing, Petitioner provided the following example of Tilfors's embodiment.



Ex. 1007, Slide 14 (citing Pet. Reply 13); *see* Tr. 19:6–20:21.[3]

Petitioner confirms that it is relying on the aspect of the embodiment illustrated in Figure 2A, in which less than the full volume of the market-maker's quote is traded consecutively (i.e., the answer is "no" at step 203 and "yes" at step 209) and more volume is generated in the market-maker's existing quote at the same price (step 211). Tr. 18:19–19:2, 26:11–16, 63:20–25; *see* Ex. 1002, 4:37–43. Thus, at least "1" contract remains in the

[3] For purposes of explaining the parties' positions, and ease of reference, we address herein the parties' arguments in the context of the examples discussed at the hearing. The parties' substantive arguments, on which those examples are based, however, are reflected in the parties' papers. *See, e.g.*, Pet. 18–38; PO Resp. 32–36; Pet. Reply 7–11.

market-maker's quote. The other aspect of Tilfors's embodiment provides that if the full volume in the market-maker's quote is traded at Tilfors's step 203 in Figure 2A, the next step is step 205. Petitioner, however, is not relying on this aspect of the embodiment. Tr. 63:17–64:6.

In the hypothetical presented by Petitioner, "X," the minimum volume required by the electronic exchange, is "2" contracts (*id*. at 19:24–25), the predefined number of step-ups (i.e., what we determined at institution is the claimed "risk threshold") is "2" (*id*. at 19:11–15), the market-maker's initial quote is for "2" contracts, and there is a matching order for "1" contract (*id*. at 19:16–17, 20:1–2). According to Petitioner, after the first trade, because the "full volume" of the market-maker's quote was not traded according to step 203 (i.e., one contract still remains in the market-maker's quote), the process proceeds to step 207. *Id*. at 20:5–10. At step 207, the process checks whether the total volume remaining in the market-maker's quote, "1" contract, is less than the "2" contract minimum required by the exchange. *Id*. at 20:10–12. Because the remaining volume in the market-maker's quote is less than X, the minimum required by the exchange, a step-up application is triggered (step 211), whereby volume ("1" contract) is added to the market-maker's quote to satisfy X, at the market-maker's current price. Ex. 1007, Slide 14; Tr. 19:20–20:2; Ex. 1002, 4:47–50. According to Petitioner, "one step-up equals a risk level of one," so the market-maker's risk level after the first trade in the hypothetical is "1" and the claimed "aggregate risk level" is "1." Tr. 20:13–21, 22:16–19. Petitioner further contends that the claimed "risk level" does not depend on the price of the contract traded. *Id*. at 21:18–22:8. Petitioner further argues that the "risk level" is "1" each time

a step-up is applied, and that after applying the step-up functionality twice, the "aggregate risk level" is "2." Ex. 1007, Slide 14.

Petitioner acknowledges that, based on the relied-upon Tilfors embodiment, the volume added to a market-maker's quote during a step-up can be more than "1" contract. Tr. 23:16–24. For example, Petitioner explains that if X is equal to "11," a market-maker knows that every time Tilfors's step-up is applied, the volume added to his quote could be "1" contract "up to 10 contracts." *Id*. at 27:5–10. Petitioner, however, maintains that although any time a trade triggers a step-up, the volume of contracts that can be added could be a range, the "risk level" is "1" "because that represents one increase in volume" and "[h]ow many times you've increased that volume is your aggregate risk value." *Id*. at 28:11–16, 29:6–25. Thus, according to Petitioner, Tilfors discloses that the "risk level" is "1" whenever an executed trade triggers a step-up, regardless of any other information, including the volume of the executed trade and the volume that is added when the step-up is applied to the market-maker's quote. *Id*. at 30:6–24.

> JUDGE ELLURU: So, you're saying the risk value is the same regardless of the number of contracts you're increasing?
>
> Mr. MURRAY: That's right. That's exactly right.

Id. at 31:1–3; 32:19–25, 34:12–16. Although Tilfors's step-up functionality may indicate an increase in risk because it is an indication that volume needs to be added to a market maker's quote, Petitioner has not persuaded us that Tilfors discloses the claimed "risk level"—which the parties do not contest means "a calculated, measured, or otherwise obtained value of exposure to the possibility of loss related to said trade." *See supra* Sec. II.A.

Foremost, Petitioner has not shown sufficiently that Tilfors expressly discloses "determining" a "risk level . . . associated with said trade." *See* Tr. 22:20–23:2. Based on our review of the record, Petitioner has not shown sufficiently that Tilfors describes determining a specific "risk level" value, "1," as asserted by Petitioner. Although Tilfors keeps track of the number of times a market-maker has stepped up (*id*.), we are not persuaded that that disclosure describes determining a "risk level" of "1" for each "such trade." Furthermore, we are not persuaded that under our construction, a "risk level" for a particular trade can be calculated without taking into account critical information, such as volume traded, volume remaining in the market-maker's quote, price of the trade, etc. *See id*. at 40:18–21. As Patent Owner contends, the recited "risk level" is for each "such trade," i.e., "[a] trade that has already taken place." *Id*. at 37:6–9; *see id*. at 40:4–5. Petitioner argues that any trade that triggers a step-up in the relied upon embodiment in Tilfors has a "risk level" of "1." A "risk level" of "1," however, does not take into account the volume that was traded in the executed trade, nor does "1" reflect the amount of volume that may be added by Tilfors's step-up function. Even accepting Petitioner's assertion that Tilfors's step-up is an "indication" of risk because it tells a market-maker that volume has been added to the quote (*id*. at 31:11–14, 65:18–23), and the market-maker is aware of the range of volume that has been added to his quote, (i.e., 1 to X, the minimum number of contracts that must be quoted by the market-maker), *that range*, calculated mentally by the market-maker, would not be represented by a "risk level" of "1." *See id*. at 31:3–14, 37:19–21, 65:13–24.

The absence of a correlation between whether a step-up has been triggered in the relied upon embodiment in Tilfors and our uncontested

interpretation of "risk level" of an executed trade is illustrated by specific examples. Applying the embodiment in Tilfors relied upon by Petitioner, if "X" is "100," and a market-maker has "101" contracts outstanding in the exchange's order book, and "2" contracts are traded, the market-maker's available quote drops to "99" contracts (step 209). *Id*. at 37:22–24. Pursuant to the embodiment described in Tilfors, a step-up function (step 211) would be applied to increase the market-maker's available quote by "1" contract to reach "X." *Id.* at 37:24–35:1; Ex. 1002, Fig. 2A (steps 209 and 211). According to Petitioner's argument, "2" contracts have been traded, and the "risk level" is "1" because one step-up has been triggered. Tr. 38:1–2.

In another example, if "X" is "100," and a market-maker has "200" contracts outstanding in the exchange's order book, and "101" contracts are traded, the market-maker's available quote drops to "99" contracts (step 209). As in the example above, a step-up function (step 211) would be applied to increase the market-maker's available quote by "1" contract to reach "X." Pursuant to Petitioner's argument, "101" contracts have been traded, and the "risk level" is "1" (the same "risk level" as in the preceding example in which "2" contracts were traded) because one step-up has been triggered. This example demonstrates that a "risk level" of "1" does not take into account the volume of the executed trade (i.e., the recited "said trade" in claims 1 and 8). In yet another example, if "X" remains "100," and a market-maker has "101" contracts outstanding in the exchange's order book, and "100" contracts are traded, the market-maker's available quote drops to "1" contract (step 209). Pursuant to the embodiment described in Tilfors, a step-up function (step 211) would be applied to increase the market-maker's

available quote by "99" contracts to reach "X." According to Petitioner's argument, "99" contracts have been added to the market-maker's quote and the "risk level" is "1" (the same "risk level" as in the first example in which "1" contract was added to the market-maker's quote) because one step-up has been triggered. This example demonstrates that a "risk level" of "1" does not take into account the volume added to a market-maker's quote when a step-up is triggered by an executed trade (i.e., the recited "said trade" in claims 1 and 8). In sum, these examples demonstrate to us the indefensible nature of Petitioner's argument.

We also do not find the testimony provided by Petitioner's witness, Dr. Maureen O'Hara, in support of Petitioner's argument to be persuasive. Dr. O'Hara states, for example, "Tilfors/Katz *examines* the risk level by looking at whether or not a trade triggers a step up." Ex. 1004 ¶ 51 (emphasis added); *see* Ex. 2012 at ¶ 60 (Patent Owner's witness testifies that "no risk level (i.e., value) is ever determined in Tilfors"). Dr. O'Hara also testified as follows:

> Q: So the risk level is the fact that we're stepping up?
>
> A: That is kind of strange; right?

Ex. 2013, 187:5–7. Dr. O'Hara did not provide a satisfactory explanation as to how Tilfors discloses the recited step of "determining a risk level . . . associated with said trade."

> Q: I'm just talking about the decision whether or not to step up.
>
> A: So the decision to step up is *related to the market maker's risk*.

Id. at 93:16–19 (emphasis added). In addition, Dr. O'Hara testified that not stepping-up, i.e., not increasing the volume in a market-maker's quote, also represents risk.

> Q: So the measure of risk was what?
>
> A: It was the fact that I had to step up, it was the trade.
>
> . . .
>
> Q: And the [market-maker's] risk is not being in the market?
>
> A: The risk is not having a quote that can be hit by people who want to trade.

Id. at 203:22–24, 93:21–23. As Patent Owner notes (PO Resp. 35–36 n.5), however, when a trade triggers a step-up in volume, which Petitioner contends has a risk level of "1," Tilfors does not keep track of the risk to which Dr. O'Hara refers, i.e., not increasing the volume in a market-maker's quote so that it "can be hit by people who want to trade." Ex. 2013 93:16–23. Thus, we are not persuaded that Dr. O'Hara's testimony supports Petitioner's position that whether an executed trade triggers the application of a step-up in volume in a market-maker's quote discloses the recited "determining a risk level . . . associated with said trade."

In sum, we determine that Petitioner has not demonstrated by a preponderance of the evidence that Tilfors discloses the recited step of "determining a risk level . . . associated with said trade."

Using the same reasoning, Patent Owner also argues that Tilfors fails to disclose the recited step of "determining . . . an aggregate risk level associated with said trade." PO Resp. 36–37. We construed "aggregate risk level associated with said trade" as "a calculated, measured, or otherwise obtained aggregate value (e.g., combination, sum, weighed sum, difference) of exposure to the possibility of loss related to such trade." *See supra* Sec. II.A. Specifically, Patent Owner contends that "[b]ecause Tilfors does not disclose determining a calculated, measured, or otherwise obtained *value of exposure* to the possibility of loss related to said trade, Tilfors . . . does not

disclose determining a calculated, measured, or otherwise obtained *aggregate value* of exposure to the possibility of loss related to such trade." PO Resp. 37 (citing Ex. 2012 ¶¶ 63–68) (emphasis in original). We agree that Petitioner has not shown sufficiently that Tilfors discloses the step of "determining . . . an aggregate risk level associated with said trade."

We further agree with Patent Owner (*id*.) that Dr. O'Hara, Petitioner's witness, does not provide persuasive testimony that Tilfors discloses the recited step of "determining . . . an aggregate risk level associated with said trade." For example, Dr. O'Hara testified as follows.

> Q: Where in Tilfors does it expressly describe the aggregate risk level?
>
> A: I'm not sure that it does. I could go through and see if it uses the word "aggregate," but I think Tilfors, Tilfors is just giving you a broad measure of risk, it just -- this is your -- a broad exposure to what's happening to you in your trading, it's -- like I said, it's a broad measure.

Ex. 2013, 162:11–19. Dr. O'Hara also testified as follows.

> Q: Has your opinion been based on your understanding that the risk level and the aggregate risk level can be the same?
>
> A: They can be. I don't know that they have to be, but they can be the same.

Id. at 179:13–17. Thus, we likewise determine that Petitioner has not demonstrated by a preponderance of the evidence that Tilfors discloses the recited step of "determining . . . an aggregate risk level associated with said trade."

III. DEPENDENT CLAIMS

Petitioner also cannot prevail with respect to its challenge to dependent claims 9, 11, 14, 15, and 23 as obvious over Tilfors and Baird.

Petitioner does not contend that Baird cures the deficiency discussed above with respect to Tilfors. Pet. 40–52. Thus, we determine that Petitioner has not established by a preponderance of the evidence that claims 9, 11, 14, 15, and 23 are unpatentable as obvious pursuant to 35 U.S.C. § 103(a) over Tilfors and Baird.

IV. CONCLUSION

Based on the foregoing, we determine that Petitioner has not established by a preponderance of the evidence that independent claims 1 and 8 are unpatentable as anticipated by Tilfors pursuant to 35 U.S.C. § 102(e), or that dependent claims 9, 11, 14, 15, and 23 are unpatentable as obvious over Tilfors and Baird pursuant to 35 U.S.C. § 103(a).

This Decision constitutes a Final Written Decision under 35 U.S.C. § 318(a).

V. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1, 8, 9, 11, 14, 15, and 23 of the ’498 patent have not been shown to be unpatentable based on the instituted grounds in this *inter partes* review; and

FURTHER ORDERED that either party to this proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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