IN THE

Supreme Court of the United States

TRADING TECHNOLOGIES INTERNATIONAL, INC.,

Petitioner,

v.

IBG, LLC, and INTERACTIVE BROKERS, LLC,

Respondents.

**On Petition for a Writ of Certiorari to the
United States Court of Appeals
For the Federal Circuit**

PETITION APPENDIX

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App. i

TABLE OF APPENDICES

App. 1

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

TRADING TECHNOLOGIES INTERNATIONAL, INC.,
Appellant

v.

IBG LLC, INTERACTIVE BROKERS, LLC,
Appellees

UNITED STATES,
Intervenor

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2017-2257

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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. CBM2015-00179.

TRADING TECHNOLOGIES INTERNATIONAL, INC.,
Appellant

v.

IBG LLC, INTERACTIVE BROKERS LLC,
Appellees

UNITED STATES,
Intervenor

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2017-2621

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. CBM2016-00051.

**TRADING TECHNOLOGIES
INTERNATIONAL, INC.,**
Appellant

v.

IBG LLC, INTERACTIVE BROKERS LLC,
Appellees

UNITED STATES,
Intervenor

2018-1063

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. CBM2016-00032.

Decided: April 18, 2019

MICHAEL DAVID GANNON, Baker & Hostetler LLP, Chicago, IL, argued for appellant. Also represented by LEIF R. SIGMOND, JR., JENNIFER KURCZ; ALAINA J. LAKAWICZ, Philadelphia, PA; COLE BRADLEY RICHTER, McDonnell, Boehnen,

Hulbert & Berghoff, LLP, Chicago, IL; STEVEN BORSAND, JAY QUENTIN KNOBLOCH, Trading Technologies International, Inc., Chicago, IL. BYRON LEROY PICKARD, Sterne Kessler Goldstein & Fox, PLLC, Washington, DC, argued for appellees. Also represented by ROBERT EVAN SOKOHL, RICHARD M. BEMBEN, JON WRIGHT; MICHAEL T. ROSATO, Wilson, Sonsini, Goodrich & Rosati, PC, Seattle, WA. KATHERINE TWOMEY ALLEN, Appellate Staff, Civil Division, United States Department of Justice, Washington, DC, argued for intervenor. Also represented by MARK R. FREEMAN, SCOTT R. MCINTOSH, JOSEPH H. HUNT; THOMAS W. KRAUSE, JOSEPH MATAL, FARHEENA YASMEEN RASHEED, Office of the Solicitor, United States Patent and Trade-mark Office, Alexandria, VA.

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Before MOORE, MAYER, and LINN, Circuit Judges.

MOORE, Circuit Judge.

Trading Technologies International, Inc., ("TT") is the owner of U.S. Patent Nos. 7,533,056, 7,212,999, and 7,904,374. Each patent relates generally to a graphical user interface ("GUI") for electronic trading. The '056 and '999 patents, which share a specification, disclose "a user interface for an electronic trading system that allows a re-mote trader to view trends in the orders for an item, and provides the trading information in an easy to see and interpret graphical format." '999 patent at 1:3–6. The '374 patent, which is from a different patent family, discloses "a display

and trading method to ensure fast and accurate execution of trades by displaying market depth on a vertical or horizontal plane, which fluctuates logically up or down, left or right across the plane as the market prices fluctuate[]." '374 patent at 3:54–58.

IBG LLC and Interactive Brokers LLC (collectively, "Petitioners") petitioned for review of claims 1–15 of the '056 patent, claims 1–35 of the '999 patent, and claims 1–36 of the '374 patent pursuant to the Transitional Program for Covered Business Method Patents ("CBM review"). Leahy-Smith Am. Invents Act, Pub. L. No. 112-29, § 18(a) 125 Stat. 284, 329–31 (2011) ("AIA"). In each case, the Pa-tent Trial and Appeal Board instituted CBM review and issued final written decisions holding that the patents meet the criteria to be eligible for CBM review and the claims are ineligible under 35 U.S.C. § 101. The Board additionally held that the claims of the '056 patent would have been obvious.

TT appeals from each decision. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A). For the following reasons, we affirm.

DISCUSSION

I.   CBM Eligibility

Pursuant to § 18(a)(1)(E) of the AIA, the Board may only institute CBM review for a patent that is a CBM pa-tent. A CBM patent is "a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions." *Id.*

§ 18(d)(1) (emphasis added). Pursuant to its authority under § 18(d)(2), the Patent and Trademark Office ("PTO") promulgated 37 C.F.R. § 42.301(b), which requires the Board to consider the following on a case-by-case basis in determining whether a patent is for a technological invention: "whether the claimed subject matter as a whole recites a technological feature that is novel and unobvious over the prior art" and whether it "solves a technical problem using a technical solution." We review the Board's reasoning "under the arbitrary and capricious standard and its factual determinations under the substantial evidence standard." *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1315 (Fed. Cir. 2015).

The only issue of CBM eligibility that TT contests is whether its patents are for technological inventions.

A. The '999 and '056 Patents

The Board relied on claim 1 of the '999 patent and claim 1 of the '056 patent to determine that those patents are directed to a covered business method. Claim 1 of the '999 patent recites:

1. A computer based method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items in a system where orders comprise a bid type or an offer type, and an order is generated for a quantity of the item at a specific value, the method comprising:

> displaying a plurality of bid indicators, each corresponding to at least one bid

for a quantity of the item, each bid indicator at a location along a first scaled axis of prices corresponding to a price associated with the at least one bid;

displaying a plurality of offer indicators, each corresponding to at least one offer for a quantity of the item, each offer indicator at a location along the first scaled axis of prices corresponding to a price associated with the at least one offer;

receiving market information representing a new order to buy a quantity of the item for a specified price, and in response to the received market information, generating a bid indicator that corresponds to the quantity of the item bid for and placing the bid indicator along the first scaled axis of prices corresponding to the specified price of the bid;

receiving market information representing a new order to sell a quantity of the item for a specified price, and in response to the received market information, generating an offer indicator that corresponds to the Quantity of the item for which the offer is made and placing the offer indicator along the first scaled axis of prices corresponding to the specified price of the offer;

displaying an order icon associated with an order by the user for a particular quantity of the item;

selecting the order icon and moving the order icon with a pointer of a user input device to a location associated with a price along the first scaled axis of prices; and

sending an order associated with the order icon to an electronic trading exchange, wherein the order is of a bid type or an offer type and the order has a plurality of order parameters comprising the particular quantity of the item and the price corresponding to the location at which the order icon was moved.

Claim 1 of the '056 patent is similar. It recites:

1. A method of operation used by a computer for displaying transactional information and facilitating trading in a system where orders comprise a bid type or an offer type, the method comprising:

receiving bid and offer information for a product from an electronic exchange, the bid and offer information indicating a plurality of bid orders and a plurality of offer orders for the product;

displaying a plurality of bid indicators representing quantity associated with the plurality of bid orders, the plurality

of bid indicators being displayed at locations corresponding to prices of the plurality of bid orders along a price axis;

displaying a plurality of offer indicators representing quantity associated with the plurality of offer orders, the plurality of offer indicators being displayed at locations corresponding to prices of the plurality offer orders along the price axis;

receiving a user input indicating a default quantity to be used to determine a quantity for each of a plurality of orders to be placed by the user at one or more price levels;

receiving a user input indicating a desired price for an order to be placed by the user, the desired price being specified by selection of one of a plurality of locations corresponding to price levels along the price axis; and

sending the order for the default quantity at the desired price to the electronic exchange.

We agree with the Board that these claims are directed to a covered business method and thus CBM review was appropriate. These claims are directed to a financial trading method used by a computer. We see no technological invention in this software method for trading. The claims require receiving bid and offer information from an electronic exchange, displaying

such information ("bid indicators" and "offer indicators"), and sending an order to the electronic exchange based on a user input. The two claims differ mainly in the way the user places the order (clicking and dragging an "order icon" to a location on the price axis versus selecting a point on the price axis). In each case, the Board applied the considerations of § 42.301(b) and found that the claims do not recite a technological feature that is novel and unobvious over the prior art and do not solve a technical problem with a technical solution for essentially the same reasons.

TT argues the Board erred in applying the first consideration of § 42.301(b) based on our decision in *Versata Development Group Inc. v. SAP America, Inc.*, 793 F.3d 1306 (Fed. Cir. 2015). According to TT, *Versata* set aside the novelty and nonobviousness language of the regulation, leaving the definition of a technological invention as one having a technological feature that solves a technical problem using a technical solution. *E.g.*, Appellant Br. 24–25, No. 18-1063 (citing 793 F.3d at 1326). We need not decide this issue because we agree with the Board that the considered claims do not solve a technical problem using a technical solution. *See Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1240 (Fed. Cir. 2016) ("We need not address this argument regarding whether the first prong of 37 C.F.R. § 42.301(b) was met, as we affirm the Board's determination on the second prong of the regulation….").

TT argues the inventions addressed technical problems in the way prior art GUI tools were constructed and operated. It claims the '999 patent ad-

dressed problems related to speed, efficiency, and us-
ability, and the '056 patent addressed problems re-
lated to intuitiveness, visualization, and efficiency.
We agree with the Board that the patents relate to the
practice of a financial product, not a techno-logical in-
vention. The specification states that a successful
trader anticipates the market to gain an advantage,
'999 patent at 1:20–26, but doing so is difficult be-
cause it requires assembling data from various
sources and processing that data effectively, *id.* at
1:51–54. The invention solves this problem by dis-
playing trading information "in an easy to see and in-
terpret graphical format." *Id.* at 2:3–6. The specifica-
tion makes clear that the invention simply displays
information that allows a trader to process infor-
mation more quickly. *Id.* at 1:59–62 ("[A] system is
needed in which trend information of market demand
for an individual item is provided to traders in an in-
tuitive format which allows traders to quickly inter-
pret how market demand is changing to an item."); *id.*
at 2:39–41 ("The user interface of the present inven-
tion presents this information in an intuitive format,
allowing the trader to make in-formed decisions
quickly."); *id.* at 2:57–62 (noting that displaying the
user's trades in a different color "allows the trader to
quickly determine his or her relative position in the
marketplace"); *id.* at 3:37–44 (noting that "the trader
is able to make instantaneous decisions regarding an
item while receiving critical information about other
items or the past performance of the current item and
other indices," which "is a major advantage over con-
ventional methods of trading in which this infor-
mation is not provided concurrently, and if presented
at all, is difficult to process quickly"). This invention

makes the trader faster and more efficient, not the computer. This is not a technical solution to a technical problem.

TT argues that the Board erred in the CBM review of the '999 patent when it declined to consider the testimony of its expert Mr. Christopher Thomas. Even if TT was correct, the error would be harmless as Mr. Thomas' declaration acknowledges that conventional GUIs for electronic trading dynamically displayed trading information and permitted users to trade directly from the interface. J.A. 8610–12, No. 18-1063. Nothing in his declaration asserts that the claimed interface did anything other than present information in a new and more efficient way to traders. Even if the Board had considered this testimony, it could not have reached a different conclusion.

Accordingly, we agree that the '999 and '056 patents are not for a technological invention and thus are eligible for CBM review.

B. The '374 Patent

The Board relied on claim 1 of the '374 patent to determine that the patent is directed to a covered business method. Claim 1 of the '374 patent recites:

1. A method for facilitating trade order entry, the method comprising:

receiving, by a computing device, market data for a commodity, the market data comprising a current highest bid price and a current lowest ask price available for the commodity;

identifying, by the computing device, a plurality of sequential price levels for the commodity based on the market data, where the plurality of sequential price levels includes the current highest bid price and the current lowest ask price;

displaying, by the computing device, a plurality of graphical locations aligned along an axis, where each graphical location is configured to be selected by a single action of a user input device to send a trade order to the electronic exchange, where a price of the trade order is based on the selected graphical location;

mapping, by the computing device, the plurality of sequential price levels to the plurality of graphical locations, where each graphical location corresponds to one of the plurality of sequential price levels, where each price level corresponds to at least one of the plurality of graphical locations, and where mapping of the plurality of sequential price levels does not change at a time when at least one of the current highest bid price and the current lowest ask price changes; and

setting a price and sending the trade order to the electronic exchange in response to receiving by the computing device commands based on user actions

consisting of: (1) placing a cursor associated with the user input device over a desired graphical location of the plurality of graphical locations and (2) selecting the desired graphical location through a single action of the user input device.

The Board determined that claim 1 of the '374 patent does not recite a novel and unobvious technical feature and does not solve a technical problem with a technical solution. For purposes of our technological invention analysis, we see no meaningful difference between the '374 claims and the '999 and '056 claims.

TT argues the '374 invention solves a technical problem with the design of conventional electronic trading GUIs. According to TT, this GUI solves a problem that might cause the trader to submit an order at a price he did not intend.

We agree with the Board that claim 1 does not solve the alleged technical problem of missing an intended price. Claim 1 recites "displaying…a plurality of graphical locations aligned along an axis" and "mapping, by the computing device, the plurality of sequential price levels to the plurality of graphical locations." The only information required to be displayed are the plurality of graphical locations. The Board explained that its institution decision set forth its understanding that claim 1 "provide[s] no indication to a user of market information, such as price, order quantity, or order type[,] and the graphical locations simply could be 'black boxes' with price values associated with them, and no information provided to

the user indicating that price value, the order quantity, or the order type." J.A. 14–15, No. 17-2621 (internal quotation marks omitted). TT did not dispute this characterization of the claim. Even if the specification recites an embodiment that solves this problem, as TT alleges, claim 1 does not.

Claim 1 also recites that "mapping of the plurality of sequential price levels does not change at a time when at least one of the current highest bid price and the current lowest ask price changes." This limitation differs from what is stated in the specification when discussing Figures 3 and 4, where it explains that "[t]he values in the price column are static," i.e., "they do not normally change positions unless a re-centering command is received." '374 patent at 7:32–34. We are not convinced that maintaining the same mapping "at a time" when the price changes solves the purported problem, as it does not specify what happens immediately after the price changes.

TT also argues that the claimed invention improves speed, accuracy, and usability compared to prior art GUI tools, which are necessarily rooted in computer technology. As discussed, these purported improvements are not technological. The specification states that the invention "provide[s] the trader with improved efficiency and versatility in placing, and thus executing, trade orders for commodities in an electronic exchange." '374 patent at 3:21–24. This is focused on improving the trader, not the functioning of the computer. Indeed, the specification acknowledges that the invention "can be implemented on any existing or future terminal with the processing capability to perform the functions described," *id*. at 4:4–

6, and "is not limited by the method used to map the data to the screen display," which "can be done by any technique known to those skilled in the art," *id*. at 4:64–67.

We conclude that the Board's reasoning that claim 1 did not solve a technical problem with a technical solution was not arbitrary and capricious.

II. PATENT ELIGIBILITY

We review the Board's legal conclusions de novo and its factual findings for substantial evidence. *Ameranth*, 842 F.3d at 1236.

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof," may obtain a patent. 35 U.S.C. § 101. As a judicially created exception to this provision, "[l]aws of nature, natural phenomena, and abstract ideas are not patent eligible." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (quoting *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)). All inventions at some level "embody, use, reflect, rest upon, or apply" these concepts, but if an invention applies these concepts to a new and useful end, it is patent eligible. Id. at 217. The Supreme Court has established a two-step framework for "distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts. *Id*. "First, we determine whether the claims at issue are directed to" a patent-ineligible concept. *Id*. If so, "we consider the elements of each claim both individually and 'as an ordered combination' to determine whether

the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 78–79 (2012)).

A. The '999 Patent

At *Alice* step one, we must "determine whether the claims at issue are directed to a patent-ineligible concept." *Alice*, 573 U.S. at 218. Under this inquiry, we evaluate "the focus of the claimed advance over the prior art" to determine if the character of the claim as a whole, considered in light of the specification, is directed to excluded subject matter. *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017) (quoting *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016)).

The parties treat claim 1 of the '999 patent as representative. The Board determined claim 1 is directed to "the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order." J.A. 22, No. 18-1053. We agree. The claim's preamble states that it is a "computer based method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items." The method steps require "displaying" a plurality of bid and offer indicators along a "scaled axis of prices," "receiving market information," displaying that information along the axis, and "displaying" information pertaining to a user's order. This essentially describes receiving information, which the specification admits was already available to "market makers," '999 patent at 1:35–41, and displaying that information. "[W]e have treated

collecting information, including when limited to particular content (which does not change its character as information), as within the realm of abstract ideas." *Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016).

Claim 1 also recites sending an order by "selecting" and "moving" an order icon to a location along the price axis. This does not change our determination that the claims are directed to an abstract idea. As the Board determined, placing an order based on displayed market information is a fundamental economic practice. J.A. 23–24, No. 18-1063 (citing J.A. 3379–80, No. 18-1063). The fact that the claims add a degree of particularity as to how an order is placed in this case does not impact our analysis at step one. *See Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 715 (Fed. Cir. 2014) ("Although certain additional limitations, such as consulting an activity log, add a degree of particularity, the concept embodied by the majority of the limitations de-scribes only the abstract idea of showing an advertisement before delivering free content.").

The fact that this is a "computer-based method" does not render the claims non-abstract. The specification indicates the claimed GUI is displayed on any computing de-vice. '999 patent at 4:34–37, 6:6–8. As a general rule, "the collection, organization, and display of two sets of information on a generic display device is abstract." *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1345 (Fed. Cir. 2018). Relying principally on *Core Wireless Licensing S.A.R.L. v. LG Electronics, Inc.*, 880 F.3d 1356 (Fed. Cir. 2018), TT argues the claimed invention provides an improvement in the

way a computer operates. We do not agree. The claims of the '999 patent do not improve the functioning of the computer, make it operate more efficiently, or solve any technological problem. Instead, they recite a purportedly new arrangement of generic information that assists traders in processing information more quickly. *E.g.*, '999 patent at 2:39–41. We conclude that the claims are directed to the abstract idea of graphing bids and offers to assist a trader to make an order.

At step two, we "consider the elements of each claim both individually and 'as an ordered combination' to deter-mine whether the additional elements 'transform the nature of the claim' into a patent eligible application." *Alice*, 573 U.S. at 218 (quoting *Mayo*, 566 U.S. at 78–79). Step two "looks more precisely at what the claim elements add" to determine if "they identify an inventive concept in the application of the ineligible matter to which…the claim is directed." *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018) (internal quotation marks omitted). The abstract idea itself cannot supply the inventive concept, "no matter how groundbreaking the advance." *Id*. at 1171.

The Board held that the claims do not contain an inventive concept. It determined that receiving market information is simply routine data gathering, and displaying information as indicators along a scaled price axis is well-understood, routine, conventional activity that does not add something significantly more to the abstract idea. J.A. 28, No. 18-1063 (citing, *e.g.*, J.A. 2804, 3301, 3379–80, No. 18-1063). It likewise determined that selecting and moving an icon is

well-understood, routine, conventional activity. J.A. 28–29, No. 18-1063 (citing J.A. 3871–73, No. 18-1063). It considered the elements both individually and as an ordered combination and concluded they did not transform the claim into a patent eligible application of the abstract idea. We agree.

B. The '056 Patent

The parties treat claim 1 of the '056 patent as representative except as to dependent claims 5–7. Like the '999 patent, the Board at step one determined claim 1 is directed to "the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order." J.A. 20–21, No. 17-2257. We agree. In claim 1 of the '056 patent, the preamble states the claim is a "method of operation used by a computer for displaying transactional information and facilitating trading." The method steps require "receiving bid and offer information," "displaying" bid and offer indicators associated with the information, "receiving a user input indicating a default quantity," "receiving" a selection of a price along the price axis, and "sending" the order.

We see no meaningful difference between these limitations and the similar limitations of claim 1 in the '999 patent and thus reach the conclusion that it too is directed to an abstract idea. While the claims disclose different ways of submitting orders and use slightly different terminology, these differences have no effect on our eligibility determination at step one.

At step two, the Board held the elements, both individually and as an ordered combination, do not re-

cite an inventive concept. TT argues the claims improve computer functionality by improving on the intuitiveness and efficiency of prior GUI tools. The specification makes clear that this invention helps the trader process information more quickly. This is not an improvement to computer functionality, as alleged by TT. We see no merit to TT's argument and affirm the Board's conclusion that claims 1–4 and 8–15 are patent ineligible.

TT separately argues that the additional limitations of dependent claims 5–7 render the claims eligible. Claim 5 depends from claim 1 and further recites "displaying an or-der icon at a location that corresponds to the desired price level along the price axis, the order icon indicating the user's order at the electronic exchange." Claims 6 and 7 each depend from claim 5 and recite further details about the bid and offer indicators and the order icon. TT argues the "order icon" of claim 5 must be a distinct icon from the bid and offer indicators. These limitations do not change our analysis, as simply displaying all the bids and offers in the aggregate, including the user's bids and offers, is not enough.

We have considered TT's arguments and find them to be without merit.

C. The '374 Patent

At step one, the Board held that claim 1 of the '374 patent is directed to the abstract idea of receiving user input to send a trade order. It explained that "claim 1 only minimally requires collecting and analyzing information and includes no requirement that any of that information is displayed. J.A. 16, No. 17-2621.

This is because the claims require "displaying…graphical locations along an axis" but do not require the graphical locations to display the price levels that are mapped to them. Based on the Board's understanding, the graphical locations need not provide any information to the user. This understanding of claim 1 was laid out in the institution decision, and TT did not dispute it.

Much of TT's argument at step one is the same as its argument that the patent is for a technological invention. It argues claim 1 recites a specific, structured GUI that solves the price-flipping problem of prior art interfaces. It argues that such an improvement over prior art interfaces inherently improves the functioning of a computer. These arguments are unavailing.

TT had an opportunity to dispute the Board's characterization of the claims after institution but chose not to do so. We agree with the Board that claim 1 is directed to the abstract idea of receiving a user input to send a trade order.

At step two, the Board held the elements of claim 1, individually or as an ordered combination, do not add an inventive concept. It noted that the specification discloses that the invention can be implemented "on any existing or future terminal or device" and describes the programming as insignificant. J.A. 20, No. 17-2621 (citing '374 patent at 4:4–7, 4:60–67). It also noted that TT acknowledged that conventional GUIs for electronic trading permitted a trader to send an order electronically. J.A. 20, No. 17-2621 (citing J.A. 269, No. 17-2621).

TT repeats its argument that claim 1 improves computer functionality by solving technological problems with prior art electronic trading interfaces. But as previously explained, claim 1 does not solve any purported technological problem. We have considered TT's remaining arguments with regard to claim 1 and the dependent claims and find them to be without merit.

III. Prior Decisions

TT argues that because non-precedential decisions of this court held that other TT patents were for technological inventions or claimed eligible subject matter, we should too. We are not bound by non-precedential decisions at all, much less ones to different patents, different specifications, or different claims. Each panel must evaluate the claims presented to it. Eligibility depends on what is claimed, not all that is disclosed in the specification. *See Data Engine Techs. LLC v. Google LLC*, 906 F.3d 999, 1011–12 (Fed. Cir. 2018) (holding a claim from one patent ineligible and claims from other patents that shared a specification eligible).

IV. Constitutionality of CBM Review

TT argues the decisions should all be vacated because CBM review is unconstitutional. In a total of four sentences in each of its opening briefs, TT raises challenges based on a right to a jury under the Seventh Amendment, separation of powers under Article III, the Due Process Clause, and the Taking Clause. Such a conclusory assertion with no analysis to the underlying challenge is insufficient to preserve the issue for appeal. *See United States v. Great Am. Ins. Co.*

of N.Y., 738 F.3d 1320, 1328 (Fed. Cir. 2013) ("It is well established that arguments that are not appropriately developed in a party's briefing may be deemed waived."); *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1320 (Fed. Cir. 2006) (holding that "mere statements of disagreement…do not amount to a developed argument" sufficient to preserve the issue). We decline to address TT's constitutional challenges.

CONCLUSION

We have considered TT's other arguments and find them unpersuasive. For the foregoing reasons, we conclude that the patents at issue are CBM eligible and that claims 1–15 of the '056 patent, claims 1–35 of the '999 patent, and claims 1–36 of the '374 patent are ineligible. In light of this conclusion, we need not address Petitioners' separate ground that the claims of the '056 patent would have been obvious.

AFFIRMED

UNITED STATES PATENT AND
TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND
APPEAL BOARD

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IBG LLC, INTERACTIVE BROKERS LLC,
TRADESTATION GROUP, INC., TRADESTATION
SECURITIES, INC., TRADESTATION
TECHNOLOGIES, INC., and IBFX, INC.,
Petitioner,
v.

TRADING TECHNOLOGIES
INTERNATIONAL, INC.,
Patent Owner.

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CBM 2015-00179
Patent 7,533,056 B2

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Before SALLY C. MEDLEY, MEREDITH C. PETRA-
VICK, and JEREMY M. PLENZLER, Administrative
Patent Judges.

MEDLEY, Administrative Patent Judge.

FINAL WRITTEN DECISION
35 U.S.C. § 328(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

IBG LLC, Interactive Brokers LLC, TradeStation Group, Inc., TradeStation Securities, Inc., TradeStation Technologies, Inc., and IBFX, Inc. (collectively, "Petitioner") filed a Petition requesting a covered business method patent review of claims 1–15 of U.S. Patent No. 7,533,056 B2 (Ex. 1001, "the '056 patent"). Paper 9 ("Pet.").[1] In response, Trading Technologies International, Inc. ("Patent Owner") filed a Patent Owner Preliminary Response. Paper 21 ("Prelim. Resp."). Upon consideration of the Petition and Preliminary Response, we instituted trial as to claims 1–15 of the '056 patent. Paper 23 ("Dec.").

Subsequent to institution, Patent Owner filed a Corrected Patent Owner Response (Paper 81 ("PO Resp.")) and Petitioner filed a Reply (Paper 110 ("Pet. Reply")). Petitioner filed a Motion to Exclude (Paper 116 ("Pet. Mot. to Exclude")) Exhibits 2300, 2301, 2304–2316, 2318–2324, 2326–2330, 2030, and 2032. Patent Owner filed an Opposition to the Motion to Exclude (Paper 117 ("PO Exclude Opp.")), and Petitioner filed a Reply (Paper 120 ("Pet. Exclude Reply")).

Patent Owner filed a Motion to Exclude (Paper 114 ("PO Mot. to Exclude")) Exhibits 1003, 1007, and portions of Exhibits 1059 and 1060. Petitioner filed an Opposition to the Motion to Exclude (Paper 118 ("Pet. Exclude Opp.")), and Patent Owner filed a Reply (Paper 121 ("PO Exclude Reply")).

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[1] CQG, Inc. and CQGT, LLC, originally part of "Petitioner," settled with Patent Owner. The proceeding was terminated with respect to CQG, Inc. and CQGT, LLC. Paper 27.

An oral hearing was held on October 19, 2016, and a transcript of the hearing is included in the record (Paper 134 ("Tr.")).[2]

For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–15 of the '056 patent are unpatentable.

A. Related Matters

The '056 patent is involved in the following lawsuit: *TT v. BGC Partners, Inc., et al.*, No. 1:10-cv-00715 (N.D. Ill.). Pet. 3. In compliance with 37 C.F.R. § 42.302(a), Petitioner certifies that it has been sued for infringement of the '056 patent. *Id*. Patent Owner does not challenge Petitioner's certification that it has been sued for infringement of the '056 patent.

B. The '056 Patent

The Specification of the '056 patent describes a user interface for an electronic trading system that allows a remote trader to view trends for an item, which assists the trader to anticipate demand for an item. Ex. 1001, 2:8–26.

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[2] After oral hearing, the Federal Circuit issued a decision, *Trading Technologies International, Inc., v. CQG, INC.*, No. 2016-1616, 2017 WL 192716 (Fed. Cir. Jan. 18, 2017), determining that the subject matter claimed in two other tangentially related patents to the '056 patent are patent-eligible under § 101. Petitioner and Patent Owner, with authorization (Paper 137), each filed supplemental briefing addressing the impact of that decision on this proceeding. Paper 138 ("PO Br."); Paper 140 ("Pet. Br.").

C. Illustrative Claim

Claim 1 of the '056 patent is the only independent claim:

1. A method of operation used by a computer for displaying transactional information and facilitating trading in a system where orders comprise a bid type or an offer type, the method comprising:

>   receiving bid and offer information for a product from an electronic exchange, the bid and offer information indicating a plurality of bid orders and a plurality of offer orders for the product;

>   displaying a plurality of bid indicators representing quantity associated with the plurality of bid orders, the plurality of bid indicators being displayed at locations corresponding to prices of the plurality of bid orders along a price axis;

>   displaying a plurality of offer indicators representing quantity associated with the plurality of offer orders, the plurality of offer indicators being displayed at locations corresponding to prices of the plurality of offer orders along the price axis;

>   receiving a user input indicating a default quantity to be used to determine a quantity for each of a plurality of orders to be placed by the user at one or more price levels;

receiving a user input indicating a de-
sired price for an order to be placed by
the user, the desired price being speci-
fied by selection of one of a plurality of
locations corresponding to price levels
along the price axis; and

sending the order for the default quan-
tity at the desired price to the electronic
exchange.

D. Grounds of Unpatentability

We instituted review of claims 1–15 on the follow-
ing grounds:

References	Basis	Challenged Claims
n/a	§ 101	1-15
TSE[3], Togher[4], Schott[5], and Cooper[6]	§ 103	1-15
Silverman[7], Togher, Cooper, and Hogan[8]	§ 103	1-15

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[3] TOKYO STOCK EXCHANGE OPERATION SYSTEM DIVISION, FU-
TURES/OPTION PURCHASING SYSTEM TRADING TERMINAL OPERA-
TION GUIDE (1998) (Ex. 1004) ("TSE").

[4] U.S. Patent No. 5,375,055, issued Dec. 20, 1994 (Ex. 1008)
("Togher").

[5] U.S. Patent No. 5,619,631, issued Apr. 8, 1997 (Ex. 1009)
("Schott").

[6] Alan Cooper, ABOUT FACE: THE ESSENTIALS OF USER INTER-
FACE DESIGN, First Edition (1995) (Ex. 1015) ("Cooper").

[7] U.S. Patent No. 5,136,501, issued Aug. 4, 1992 (Ex. 1010) ("Sil-
verman").

[8] U.S. Patent No. 5,414,809, issued May 9, 1995 (Ex. 1011) ("Ho-
gan").

E. Covered Business Method Patent

A covered business method patent is "a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that the term does not include patents for technological inventions." Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284, 329 (2011) ("AIA") § 18(d)(1); *see* 37 C.F.R. § 42.302. To determine whether a patent is for a technological invention, we consider "whether the claimed subject matter as a whole recites a technological feature that is novel and unobvious over the prior art; and solves a technical problem using a technical solution." 37 C.F.R. § 42.301(b). For purposes of determining whether a patent is eligible for a covered business method patent review, the focus is on the claims. A patent need have only one claim directed to a covered business method to be eligible for review.

1. Financial Product or Service

Petitioner argues that the '056 patent is a patent that claims a method for performing data processing or other operations used in the practice, administration, or management of a financial product or service. Pet. 4–5. In particular, Petitioner argues that claim 1 requires receiving bid and offer information of a product from an electronic exchange, displaying the bid and offer information to a user, receiving a user input indicating a default quantity and price for an order(s), and sending the order(s) to an electronic exchange. *Id*. Petitioner asserts that each of these activities are inherently financial in nature, such as receiving bid and

offer information and displaying it to a trader. Displaying market information, Petitioner asserts, is a financial activity. *Id.* Receiving trader inputs for a trade and sending a trade order to an exchange, Petitioner asserts, involves trading on an exchange, a financial activity. Id. (citing Ex. 1044, 324–325).

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that the '056 patent is directed to a method for performing data processing or other operations used in the practice, administration, or management of a financial service. Here, Petitioner asserts, and we agree, that claim 1 is directed to a method for displaying (e.g., "other operations") market information to a trader, which is a financial activity. Petitioner further asserts, and we agree, that claim 1 also is directed to receiving trader inputs for a trade and sending a trade order to an exchange (e.g., trading on an exchange, which also lies under the "other operations" prong of CBM), which is a financial activity.

Patent Owner argues that neither the Petitioner nor this panel has proposed any definition of the CBM "data processing," and that the claims of the '056 patent are directed to a specific GUI tool, and not directed to data processing. PO Resp. 33. Patent Owner's argument is misplaced because the definition for a covered business method patent is "a patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service…." *See, e.g.*, 37 C.F.R.

§ 42.301(a), (emphasis added). It is clear to us that Petitioner relies on the "other operations" part of the definition to make its case. This is exemplified in showing that it is the displaying and trading on an exchange elements of claim 1 that Petitioner relies on as showing "other operations" which are used in the practice of a financial service (trading on an exchange). Patent Owner does not rebut this showing.

In any event, we are not persuaded by Patent Owner's argument that the claims are directed to a specific GUI tool that displays information on a computer in a specified manner, but not concerned with processing the information that is displayed. PO Resp. 33–34 (citing Ex. 2168 ¶¶ 25–28). Claim 1 is directed to "[a] method of operation used by a computer for displaying transactional information and facilitating trading in a system." Patent Owner has not explained why a method of operation used by a computer does not include data processing. Rather, the argument, and the testimony to which we are directed (*e.g.*, Ex. 2168 ¶¶ 25–28) are not commensurate in scope with the claims. Indeed, neither Patent Owner nor Eric Gould-Bear account for or discuss the specific claim language. For all of these reasons, we are not persuaded by Patent Owner's arguments. We determine that Petitioner has shown sufficiently that claim 1 claims a method for performing data processing or other operations used in the practice, administration, or management of a financial product or service.

2. Exclusion for Technological Inventions

As indicated above, even if a patent includes claims that would otherwise be eligible for treatment as a covered business method, review of the patent is

precluded if the claims cover only "technological invention[s]," as defined by 37 C.F.R. § 42.301(b). Petitioner asserts that the '056 patent claims fail to recite any technological feature that is novel and unobvious over the prior art, and do not solve a technical problem with a technical solution. Pet. 5–9. In particular, Petitioner argues that the claims recite trading software that is implemented using conventional computer hardware, servers, and networks, directing attention to a description in the '056 patent that generically refers to "personal computers, terminals as part of a network, or any other computing device" and no specific hardware to carry out the invention. *Id.* at 6–7 (citing Ex. 1001, 4:34–36). Petitioner also argues that electronic trading was well known as of the filing date. *Id.* (citing Ex. 1006, 1).

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that the claimed subject matter as a whole does not recite a technological feature that is novel and unobvious over the prior art. We agree with Petitioner that claim 1 is directed to well-understood, routine, and conventional steps of receiving market information and displaying it graphically to a trader, who uses the information to facilitate trading a commodity. *Id.*

For example, the "BACKGROUND OF THE INVENTION" section of the '056 patent explains that it was well known for an exchange to record all transactions for a particular item and to replay or post to the individual traders outstanding bids with the highest values and outstanding offers with the lowest value,

along with a quantity specified for each order, to facilitate trading a commodity. Ex. 1001, 1:37–41. There is no indication in the '056 patent that the inventors invented gathering market information, displaying it to a trader, and using the information to facilitate trading a commodity. The use of a computer to perform these functions also was known in the art at the time of the invention, and the '056 patent does not claim any improvement of a computing device.

Patent Owner argues that the '056 patent is for a technological invention because the claims, previously allowed by the Office, are directed to a novel and nonobvious GUI tool. PO Resp. 29–30. Patent Owner argues that it is irrelevant that the claimed invention can be implemented on a conventional computer and that use of known technologies does not render claims non-technical. *Id*. at 29–30, 31–32. Rather the inquiry, Patent Owner argues, relates to the claimed software solution (e.g., an improved GUI tool), which here is "technology that improves, even transforms, the computer so it performs functions it previously could not." *Id*. at 29–30. Patent Owner argues that Petitioner ignores the claimed GUI improvement. *Id*.

We disagree with Patent Owner that Petitioner ignored the claimed GUI improvement. Petitioner need not have addressed what is not present in the claims. As explained above, claim 1 is directed to gathering market information, displaying it to a trader, and the trader using the information to facilitate trading a commodity, features that were well known at the time of the invention. Moreover, there is no specific computer, program, or processing described in the '056 patent beyond what was known in the art at the time

of the invention. Conversely, Patent Owner does not explain how broad claim 1 recites a GUI improvement. Our reviewing court has held that "the presence of a general purpose computer to facilitate operations through uninventive steps" does not render a claim a technological invention within the meaning of the statute. *See Versata dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1327 (Fed. Cir. 2015); *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1315 (Fed. Cir. 2015). So it is here.

Petitioner also argues that the claimed subject matter does not solve a technical problem using a technical solution, because the problem is a financial one and the solution is to rearrange available market data on a display. Pet. 8–9. Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that the problem noted in the Specification of the '056 patent is not a technical one and no technical solution is used. The '056 patent Specification highlights the problem and importance of informing a trader of certain stock market events so that the trader may use such information to facilitate trading a commodity. Ex. 1001, 2:19–26. However, informing a trader of certain stock market trends or events is more of a financial problem than a technical problem to which there is not a technical solution.

Patent Owner argues that the problem solved was with existing computer-trader interfaces, which is a technical problem. PO Resp. 31. Patent Owner argues that the claims recite a new GUI design addressing the problem with the old GUI design and that the

claimed GUI improvement necessarily claims a technical solution to a technological problem. *Id*. We are not persuaded by Patent Owner's arguments that the claims are directed to solving a technical problem using a technical solution because Patent Owner's arguments are not commensurate in scope to the breadth of the claims.

For all of the foregoing reasons, the subject matter of at least claim 1 is not a "technological invention" under 37 C.F.R. § 42.301(b), and the '056 patent is eligible for a covered business method patent review.

II. ANALYSIS

A. Claim Construction

In a covered business method patent review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.300(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016). Under the broadest reasonable interpretation, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner proposes constructions for "(offer and bid) indicators representing quantity" and "indicators, icons, and tokens." Pet. 15–16, 18–20. In our Decision to Institute, we determined that Petitioner's proposed interpretations for these terms were consistent with the broadest reasonable construction, and, therefore, adopted Petitioner's proposed interpretations. Dec. 11. Neither party has indicated that our interpretations were improper and we do not perceive any reason or evidence that now compels any deviation from our initial determinations. Accordingly, the following constructions apply to this Decision:

Claim Term	Construction
(offer and bid) indicators representing quantity	includes alphanumeric and graphical indicators
indicators, icons, and tokens	a symbol such as an alphanumeric character or a graphic representation of an item

For purposes of this decision, we find it necessary to construe "price axis" (claim 1) and "order icon indicating the user's order" (claim 5).

Price Axis

Claim 1 recites a price axis in several instances. For example, claim 1 recites bid and offer indicators being displayed along a price axis. Ex. 1001, 14:1–10. Petitioner proposes that "price axis" be interpreted to mean "a reference line for plotting prices, including labeled, unlabeled, visible and invisible reference

lines." Pet. 14–15. Patent Owner does not disagree with Petitioner's proposed interpretation. Rather, Patent Owner argues that Petitioner's proposed interpretation requires clarification "that a price axis cannot be a mere ordered list of prices that omits prices when there are no orders at that price." PO Resp. 5.[9]

Patent Owner urges a "clarification" to Petitioner's proposed interpretation that would require a price axis to include intervening price levels even when there are no bids/asks at those price levels. PO Resp. 4–7. This clarification, Patent Owner argues, is supported by the Specification of the '056 patent and the prosecution history. *Id.* For the following reasons, we are not persuaded that Patent Owner's proposed "clarification" to Petitioner's proposed interpretation results in the broadest reasonable interpretation of the term "price axis."

We begin with the words of claim 1. Claim 1 recites a price axis, but does not otherwise further expand on what constitutes a price axis. At the outset, it appears to us that Patent Owner does not dispute that a price axis is a reference line for plotting prices, including labeled, unlabeled, visible and invisible reference lines. PO Resp. 7, n.1. We agree with Petitioner and Patent Owner that the broadest reasonable interpretation of "price axis" is a reference line for plotting

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[9] In our Decision to Institute, and upon taking into consideration the parties' arguments and supporting evidence, we interpreted "price axis" to mean "a reference line for plotting prices, including labeled, unlabeled, visible and invisible reference lines." Dec. 11. Petitioner agrees with that interpretation, while Patent Owner seeks to clarify the interpretation. Pet. Reply 1–12; PO Resp. 4–7.

prices, including labeled, unlabeled, visible and invisible reference lines for the reasons discussed in the Petition and supported by record evidence. Pet. 14–15; Ex. 1032 ¶ 71; Ex. 1016, 123–137. Patent Owner, however, would additionally add that a list of prices that do not contain gaps in between prices is not a price axis. *Id*. at 5. In support of its contentions, Patent Owner argues that the vertical axis (the "value axis") seen in Figures 3A, 3B, 3C, and 4 of the '056 patent describes that when there are no orders at a particular value or price, the value or price level remains displayed. *Id*. at 5–6 (citing Ex. 2169 ¶¶ 37–43).

We do not agree with Patent Owner that the term "price axis" requires reading into the claim the additional "clarification" that a list of prices that do not contain gaps in between prices is not a price axis. There is nothing in the claim language itself that describes gaps or how data is arranged along the price axis or what contains a price axis. The passages and figures of the '056 patent that Patent Owner (and Mr. Thomas) directs attention to are examples or embodiments of what is claimed, and do not indicate that Patent Owner disclaimed or limited price axis to consist of a list of prices that contains gaps in between prices. Moreover, Mr. Thomas' illustration of what constitutes a price axis is conclusory and not supported by record evidence. Ex. 2169 ¶¶ 41–42. He has not directed attention to any evidence in support of his testimony as to what does and does not constitute a price axis as illustrated in paragraph 41 of his declaration. As pointed out by Petitioner, an axis may be represented by scale breaks or logarithmic scales, and thus, need not retain an order of gaps as Patent Owner and

Mr. Thomas contend. Pet. Reply 11–12; Ex. 1058, 103–109.

We also have considered Patent Owner's arguments and evidence that remarks made by the then applicant during prosecution of the application that matured into the '056 patent amount to an express and clear disclaimer of the meaning for price axis. PO Resp. 6–7 (citing Ex. 1002, 178–179; Ex. 2169 ¶ 39). We are not persuaded by such arguments because the comments made during prosecution have not been shown to amount to a disclaimer of having a price axis without gaps in between prices. For example, Patent Owner directs attention to page 178 of Exhibit 1002 from the prosecution file in support of its disclaimer argument. On that page, however, is quoted language from several lines of the claim with an argument just prior stating that Silverman does not describe an axis of prices and all that is contained in the quoted language. Patent Owner has not explained sufficiently why we should construe such general remarks as a disclaimer. We also have reviewed the remarks made by the then applicant that the applied prior art displayed prices for which orders exist, but do not agree that Patent Owner has shown why such comments amount to a clear disclaimer or disavowal of the scope of the term "price axis." To disavow claim scope, "the specification or prosecution history [must] make clear that the invention does not include a particular feature." *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (internal citation, quotation, and alterations omitted).

For all of these reasons, we are not persuaded by Patent Owner's arguments regarding the claimed

price axis. Based on the record before us, the broadest reasonable interpretation in light of the specification of a "price axis" is a reference line for plotting prices, including labeled, unlabeled, visible and invisible reference lines.

Order Icon Indicating the User's Order

Claim 5 depends directly from claim 1 and recites "displaying an order icon at a location that corresponds to the desired price level along the price axis, the order icon indicating the user's order at the electronic exchange." (Emphasis added). Patent Owner argues that an "order icon indicating the user's order at the electronic exchange" should be interpreted to mean "an icon indicating to the user that the user has an order at a particular level along the price axis, distinct from other orders at the same level." PO Resp. 9. Petitioner argues that no construction of the phrase is necessary and that Patent Owner's construction is inconsistent with Figure 3A, which shows the user's order aggregated with other users. Pet. Reply 12. Petitioner further argues that any icon that indicates a user's order, whether aggregated with other orders or separate, meets the claim term. *Id.*

We agree with Petitioner. There is nothing in the language of claim 5 that requires indicating the specific user order (separating it out from all other orders) or indicating to the user that it is his order. If an order is placed by a user, resulting in the total quantity of orders placed at that same price to increase, the total number would indicate an increase, and thus, indicate the user's order. Patent Owner argues that because claim 1 recites bid indicators and

offer indicators, an order icon must represent something distinct from the bid/offer indicators. PO Resp. 7–8. But even Patent Owner does not explain why an order icon cannot be one of the offer or bid indicators. Indeed, for the embodiment that Patent Owner directs attention to there is no distinction between offer and bid indicators with order icons (an order icon is one of the indicators). *Id*. We agree with Petitioner that a person of ordinary skill in the art would have understood the '056 patent to use "icons" and "indicators" interchangeably. *See, e.g.*, Pet. 18–20. Thus, we disagree with Patent Owner that the "order icon" of claim 5 cannot be one of the offer or bid indicators.

For all of the above reasons, we decline to interpret an "order icon indicating the user's order at the electronic exchange" to mean "an icon indicating to the user that the user has an order at a particular level along the price axis, distinct from other orders at the same level."

B. The Level of Ordinary Skill in the Art

Notwithstanding the parties' submissions of the level of ordinary skill in the art[10], we find that the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d

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[10] The parties' submissions focus primarily on the degrees, occupations, and experience, as opposed to what the hypothetical person of ordinary skill in the art would have known at the time of the invention. As such, and as the triers of fact, based on the record before us, we do not find such information particularly helpful.

1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

C. 35 U.S.C. § 101 Asserted Ground of Unpatentability

Petitioner contends that claims 1–15 of the '056 patent are unpatentable under 35 U.S.C. § 101. Pet. 24–38. Patent Owner opposes. PO Resp. 11–28.

Section 101 of Title 35, United States Code, provides: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

The Supreme Court recognizes three exceptions to these statutory classes: laws of nature, natural phenomena, and abstract ideas. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012). Although an abstract idea by itself is not patentable, a practical application of an abstract idea may be deserving of patent protection. *Alice*, 134 S. Ct. at 2355. We must "consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id*. (citing *Mayo*, 132 S. Ct. at 1298, 1297). The claim must contain elements or a combination of elements that are "'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [abstract idea] itself.'" *Id*. (citing *Mayo*, 132 S. Ct. at 1294).

1. *Abstract Idea*

Petitioner argues that claim 1 encompasses the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order, which is a fundamental economic practice. Pet. 27. Petitioner further argues that "[n]ot only is the abstract concept a fundamental economic practice, but it is an abstract idea of itself because it can be performed using pen and paper, or even in a trader's mind." *Id*. (citing *CyberSource Corp. v. Retail Decisions*, 654 F.3d 1366, 1372 (Fed. Cir. 2011) (unpatentable mental process performed with aid of pen and paper); Ex. 1032 ¶¶ 91, 205; Ex. 1010, Silverman at FIG. 4 (prior-art plot of same); Ex. 1029, 44–46 (showing a page in a specialist's book that plots bids and asks along a price axis)). In further support of Petitioner's arguments that the claims are directed to an abstract idea because it can be performed in a trader's mind, Petitioner directs attention to a description in the background of the invention section of the '056 patent stating that "the successful trader anticipates the rise or fall of the value of an item and performs his or her own transaction before the rest of the market is aware of the item's potential gain or loss in value." Ex. 1001, 1:28–33.

Petitioner further argues that the abstract idea analysis does not change merely because the claims include details such as displaying bid and offer indicators at locations corresponding to prices of bid and offer orders along the price axis, because those limitations are equally abstract ideas or are irrelevant because they merely provide a degree of particularity.

Id. at 28 (citing *Ultramercial*, 772 F.3d at 715 (an abstract idea is not concrete merely because the claims include a degree of particularity.)). Lastly, Petitioner argues that the claims do not solve any technological problem but rather are directed to solving a business problem, i.e., anticipating market movement by providing a graphical representation of what a trader has done in his mind since trading began. *Id.* at 29 (citing Ex. 1001, 1:56–60).

"The 'abstract idea' step of the inquiry calls upon us to look at the 'focus of the claimed advance over the prior art' to determine if the claim's 'character as a whole' is directed to excluded subject matter.'" *Affinity Labs of Texas v. DirectTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (quoting *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); *see also Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016). There is no definitive rule to determine what constitutes an "abstract idea." Rather, the Federal Circuit has explained that "both [it] and the Supreme Court have found it sufficient to compare claims at issue to those claims already found to be directed to an abstract idea in previous cases." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016); *see also Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016) (explaining that, in determining whether claims are patent-eligible under § 101, "the decisional mechanism courts now apply is to examine earlier cases in which a similar or parallel descriptive nature can be seen—what prior cases were about, and which way they were decided").

Notwithstanding Patent Owner's arguments, which we address below, we determine that Petitioner has shown[11] that claim 1 is directed to the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order, which is a fundamental economic practice. Claim 1, the sole independent claim, recites in the preamble a method for displaying transactional information and facilitating trading in a system. The method steps include receiving bid and offer information of a product from an electronic exchange, displaying the bid and offer information, receiving a user input indicating a default quantity and price for an order, and sending the order to the electronic exchange. In essence, all that claim 1 requires was well known in the prior art many years before the claimed invention. We agree with Petitioner that claim 1 encompasses the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order, steps that can be performed using pen and paper, or even in a trader's mind. Pet. 27–28 (citing *CyberSource Corp. v. Retail Decisions*, 654 F.3d 1366, 1372 (Fed. Cir. 2011) (unpatentable mental process performed with aid of pen and paper); Ex. 1032 ¶¶ 91, 205; Ex. 1010, Silverman at FIG. 4 (prior-art plot of same); Ex. 1029, 44–46 (showing a page in a specialist's book that plots bids and asks along a price axis); Ex. 1001, 1:28–33. We further agree with Petitioner that the '056 patent claims simply provide a graphical

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[11] As explained above, determining whether a claim is directed to an abstract idea calls upon us to look at the focus of the claimed advance over the prior art. In order to do so, we must make findings of fact as to the prior art at the time of the invention. Those facts must be supported by a preponderance of the evidence. 35 U.S.C. § 326(e).

representation on a computer of what traders have done in their minds since trading began. Pet. 29. Such a system also was well known in the art at the time of the claimed invention. *See, e.g.*, Ex. 1010 (Silverman); see also infra, determining that Silverman in combination with other references render obvious the challenged claims.

When we compare claim 1 at issue to those claims already found to be directed to an abstract idea in previous cases, we are persuaded that claim 1 is more similar to those claims found to encompass an abstract idea than those determined not to encompass an abstract idea.[12] Claim 1 is similar to the claims in Electric Power, which did "not go beyond requiring the collection, analysis, and display of available information in a particular field, stating those functions in general terms, without limiting them to technical means for performing the functions that are arguably an advance over conventional computer and network technology." *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016).

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[12] The claims and specification before us are much broader than the patent specifications and claims involved in *Trading Technologies International, Inc., v. CQG, INC., CQG, LLC, FKA CQGT, LLC*, No. 2016-1616, 2017 WL 192716 (Fed. Cir. Jan. 18, 2017), where the court implied that even those narrower claims are on the line between patent eligibility and ineligibility (see id. at *4 (noting the "close question[] of eligibility")). The Specification of the '056 patent is different, and does not claim priority to the applications that matured into the patents involved in that decision. Thus, comparing the claims of the patents involved in Trading Technologies is not particularly helpful here, because the claims here are nothing more than "displaying, and selecting data or information that is visible on the [graphical user interface] device." *Trading Technologies*, 2017 WL 192716 at *2.

In comparison, claim 1 is unlike the claims at issue in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014) and *Enfish*. In *DDR Holdings*, the court determined that the claims did not embody a fundamental economic principle or a longstanding commercial practice. The claims at issue in *DDR Holdings* were directed to retaining website visitors, which the court determined was a problem "particular to the Internet." *DDR Holdings*, 773 F.3d at 1257. The court also determined that the invention was "necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks," and that the claimed invention did not simply use computers to serve a conventional business purpose. *Id*. In *Enfish*, the claim at issue was directed to a data storage and retrieval system for a computer memory. *Enfish*, 822 F.3d at 1336–37. The court determined that the claims were directed to an improvement in the functioning of a computer and were not simply adding conventional computer components to well-known business practices. *Id*. at 1338. Here, claim 1 is directed to a fundamental economic principle or a longstanding commercial practice and not directed to an improvement in the computer.

We have considered all of Patent Owner's arguments regarding why the claims are not directed to an abstract idea but are not persuaded by such arguments. PO Resp. 11–21. Patent Owner argues that Petitioner oversimplifies the claims and ignores the structure and functionality recited in the claims, such as the "bid indicators being displayed at locations corresponding to prices of the plurality of bid orders" and the "offer indicators being displayed at locations corresponding to prices of the plurality of offer orders

along the price axis," elements that Patent Owner deems to be "GUI elements." *Id.* at 11–12. Here, bid and offer indicators are broad terms, whereby an indicator can simply be an alphanumeric symbol. Moreover, none of the claims recite a "GUI" or graphical user interface. Arguably, the only claim 1 step that would be in the realm of requiring a GUI, would be the step of "receiving a user input indicating a desired price…the desired price being specified by selection of one of a plurality of locations corresponding to price levels along the price axis." (Emphasis added). We disagree that Petitioner has oversimplified the claims and ignores the structure and functionality recited in the claims. Petitioner's arguments are commensurate in scope with the breadth of the claims.

Nor are we persuaded by Patent Owner's arguments that the claimed GUI improves the computer because it allows the computer to be used in new and inventive ways. PO Resp. 13–16. Patent Owner's arguments are general and not specific to the claim language before us. In any event, to the extent that Patent Owner asserts that claims that require a GUI are automatically patent eligible, that assertion is not commensurate with our reviewing court's holdings on the issue of patent eligibility. For example, the claim at issue in *Affinity Labs* recited an application that enabled a cellular telephone to present a GUI displaying a list of media sources that included selectable items for selecting a regional broadcasting channel. *Affinity*, 838 F.3d at 1255–56. The claim also recited that the cellular telephone was enabled to transmit a request for the selected regional broadcasting channel. *Id.* at 1256. In *Ameranth*, the claim at issue recited a GUI that displayed menu items in a specific

arrangement, a hierarchical tree format. Menu items were selected to generate a second menu from a first menu. *Apple, Inc., v. Ameranth, Inc.*, 842 F.3d 1229, 1234 (Fed. Cir. 2016). In both *Affinity Labs* and *Ameranth*, the court determined that the claims were not directed to a particular way of programming or designing the software, but instead merely claim the resulting systems and determined that the claims are not directed to a specific improvement in the way computers operate. *Affinity Labs*, 838 F.3d at 1260–61, *Ameranth*, 842 F.3d at 1241. The same is true here in that the claims are not directed to any particular way of programming or designing software, but merely claim the resulting system and not any specific improvement in the way a computer operates.

Patent Owner argues that the claims are not to an abstract idea because they are not directed to a fundamental idea, longstanding commercial practice, a business method, or a generic GUI. PO Resp. 16–20. Patent Owner argues that in contrast to many other cited cases, the claims here are directed to the specific structure, make-up, and functionality of a particular GUI. *Id.* But the only specific feature that Patent Owner discusses is the claimed price axis and even then Patent Owner fails to explain why the recitation of a price axis takes the claim out of abstractness. A price axis is nothing more than a reference line for plotting prices. It can include labeled, unlabeled, visible, and invisible reference lines. There is nothing apparently special about an axis, even a price axis, and Patent Owner has failed to explain sufficiently why a price axis removes the abstractness from the claims. This is true even if Patent Owner's narrow proposed "clarification" were adopted.

We have considered Patent Owner's arguments regarding dependent claims 5–7, and why those claims "recite even more structure and function of the specific GUI tool and are even less directed to any abstract idea." PO Resp. 20–21. Patent Owner's arguments are premised on a narrow construction of claim 5 requiring "an additional indicator beyond the bid/offer indicators to indicate to a user something about that user's own order." *Id.* at 20. For reasons provided above, we decline to adopt Patent Owner's narrow construction. In any event, and even assuming the narrow construction is the correct construction, Patent Owner has not shown how a an indicator indicating to a user something about that user's own order makes claims 5–7 less abstract. Lastly, we disagree with Patent Owner that Petitioner did not address sufficiently the dependent claims in the Petition. Petitioner addressed all of the dependent claims. See, e.g., Pet. 37–38.

Inventive Concept

To be patent eligible, a claim to an otherwise abstract idea must recite additional elements that constitute an inventive concept. *Alice*, 134 S. Ct. at 2357. One looks to "[t]he elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Mayo*, 132 S. Ct. at 1297–98. The additional elements must be more than "well-understood, routine, conventional, activity." *Mayo*, 132 S. Ct. at 1298.

Petitioner argues that the claim 1 steps of receiving bid and offer information, receiving an order including a default quantity and a selected price, and

sending the order to an exchange to be executed were well-understood, routine, and conventional activity that adds nothing significant to the abstract idea. *Id.* 30–31. Petitioner further argues that the claims are not rooted in computer technology because they do not overcome a problem specifically arising in the realm of computers or computer networks. *Id.* at 33 (citing *DDR Holdings*, 773 F.3d at 1257). Petitioner argues that the '056 patent specification admits that the problem was business, financial or trader-related, and not arising in computers or otherwise dependent upon computer components, and to the extent that a computer is used it is used only for its basic function such as displaying data and accepting user inputs. *Id.* at 34–35; Ex. 1032 ¶ 205.

Lastly, Petitioner argues that dependent claims 2–15 add only well-understood, routine, conventional post-solution activity to the abstract idea of claim 1, such as displaying a sent order (claim 5), displaying bids, offers, and an order with different characteristics (claim 6), and displaying the quantity of an order (claim 7). PO Resp. 37–38.

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded that Petitioner has shown that none of the additional claim elements in claim 1 or dependent claims 2–15 transforms the nature of the claims into a patent-eligible application. Claim 1 recites "a method of operation used by a computer for displaying transactional information and facilitating trading in a system where orders comprise a bid type or an offer type." Ex. 1001, 13:60–62. The '056 patent specification does not describe any specific computer, program, or processing

beyond what was known in the art at the time of the invention for implementing the claimed system. Moreover, and to the extent that the claims require a GUI, a mere recitation of a GUI does not make the claim patent eligible. *See Affinity Labs*, 838 F.3d at 1257–58, *Ameranth*, 842 F.3d at 1236–1242, *Internet Patent Corp.*, 790 F.3d at 1348–1349. A recitation of a generic GUI merely limits the use of the abstract idea to a particular technological environment. "Limiting the field of use of the abstract idea to a particular existing technological environment does not render any claims less abstract." *Affinity Labs*, 838 F.3d at 1258 (citing *Alice*, 134 St. Ct. at 2358; *Mayo*, 132 S. Ct. at 1294).

Claim 1 also recites receiving bid and offer information for a product from an electronic exchange, but does not specify any particular method for doing so. The claim requires displaying a plurality of bid indicators and offer indicators along a price axis. Essentially, these limitations require plotting bids and offers for a product along a price axis. Plotting information along an axis was a well-understood, routine, conventional, activity. Claim 1 further recites receiving a user input indicating a quantity to be used for each of a plurality of orders to be placed, and indicating a desired price for an order to be placed by selecting one of the locations corresponding to the price along the price axis. Inputting data into a computer was also a well-understood, routine, conventional activity. Finally, the step of sending an order for the quantity and price to the electronic exchange was conventional and well known in the art. *See, e.g.*, Ex. 1010. The additional elements must be more than

"well-understood, routine, conventional, activity." *Mayo*, 132 S. Ct. at 1298.

We also agree with Petitioner that none of claims 2–15 transforms the nature of the claims into a patent-eligible application. For example, claims 2–4 recite the further steps of accepting and sending additional orders in the same manner as claim 1. We further agree that claims 5–15 relate to conventional pre-or post-solution activity such as displaying of data (claims 5–9 and 14), basic GUI techniques (claims 11–13 and 15), or conventional point and click technology as recited in claim 10. We agree that these claims recite well-understood, routine, conventional extra-solution activity that are not related to an inventive concept.

Patent Owner argues that the claims pass part two of Alice because they recite an inventive concept. PO Resp. 21–28. But in making such arguments, Patent Owner does not explain sufficiently what about the claims qualifies as an inventive concept. For example, Patent Owner describes the claims as reciting "structural details of a specific GUI that functions differently from prior art GUIs to solve GUI-centric problems." *Id.* at 24. Patent Owner goes on to argue that the "solution to these problems is not only rooted in computer technology, but is new computer technology itself; a new GUI with the claimed structure, make-up, and functionality." *Id.* (emphasis added). In making similar arguments regarding features and claims that are not before us in this proceeding (*see, e.g.*, PO Resp. 25–28), Patent Owner fails to focus on the claims before us or explain with respect to the ac-

tual elements of these claims why such elements constitute an inventive concept. We are not persuaded by Patent Owner's arguments.

The individual elements of the claims do not transform the nature of the claims into a patent-eligible application. They do not add significantly more to the abstract idea or fundamental economic practice. Contrary to Patent Owner's argument, the claims simply recite the use of a generic computer with routine and conventional functions. Further, considering all of the elements as an ordered combination, we determine that the combined elements also do not transform the nature of the claims into a patent-eligible application.

For all of the above reasons, Petitioner has shown sufficiently that claims 1–15 of the '056 patent are not directed to patent eligible subject matter under 35 U.S.C. § 101.

D. Obviousness of Claims 1–15 over TSE, Togher, Schott, and Cooper

Petitioner contends that claims 1–15 are unpatentable under 35 U.S.C. § 103 over TSE, Togher, Schott, and Cooper. To support its contentions, Petitioner provides explanations as to how the prior art meets each claim limitation. Pet. 38–60. Petitioner also cites the Declaration of Kendyl A. Román for support. *See* Ex. 1032 ¶¶ 114–120.

Patent Owner argues that Petitioner fails to establish that TSE was publically accessible, and, thus, prior art. PO Resp. 34–41. Patent Owner also argues that it conceived of the invention prior to the TSE date, and diligently reduced the invention to practice. *Id.* at 41–55. Patent Owner submits arguments and

objective evidence of nonobviousness. *Id.* at 55–64. Lastly, Patent Owner separately argues for the patentability of claims 5–7. *Id.* at 64–68.

TSE as prior art

Petitioner argues that TSE is prior art under 35 U.S.C. § 102(a). Pet. 21–22. In support of its showing that TSE qualifies as prior art, Petitioner relies on the November 21, 2005, deposition testimony of Atsushi Kawashima taken during litigation between Patent Owner and a third party, eSpeed, Inc. *Id.*; Ex. 1007.

Whether a document qualifies as a printed publication under 35 U.S.C. § 102(a) is a question of law based on underlying findings of fact. *In re Enhanced Sec. Research, LLC*, 739 F.3d 1347, 1354 (Fed. Cir. 2014) (citing *In re Hall*, 781 F.2d 897, 899 (Fed. Cir. 1986)). The Federal Circuit "has interpreted § 102 broadly, explaining that even relatively obscure documents qualify as prior art so long as the public has a means of accessing them." *Id.* (citing *Hall*, 781 F.2d at 899).

> Our leading case on public accessibility is *In re Hall*, 781 F.2d 897 (Fed. Cir. 1986). In *Hall* we concluded that "a single cataloged thesis in one university library" constitutes "sufficient accessibility to those interested in the art exercising reasonable diligence." *Id.* at 900. Thereafter, in *Constant v. Advanced Micro–Devices, Inc.*, we explained that "[a]ccessibility goes to the issue of whether interested members of the relevant public could obtain the information if they wanted to." 848 F.2d 1560, 1569 (Fed. Cir. 1988). Therefore, "[i]f accessibility is proved,

there is no requirement to show that particular members of the public actually received the information." *Id.*

Enhanced Sec. Research, LLC, 739 F.3d at 1354. The determination of whether a document is a "printed publication" under 35 U.S.C. § 102 involves a case-by-case inquiry into the facts and circumstances surrounding its disclosure to members of the public. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004).

TSE is entitled "Futures/Option Purchasing System Trading Terminal Operation Guide" of the "Tokyo Stock Exchange Operation System Division." Ex. 1004, 1.[13] In the middle of page 5 is the annotation "August, 1998" above the words "Tokyo Stock Exchange Operation System Division." *Id.* at 5. Petitioner argues that TSE is prior art under 35 U.S.C. § 102(a) because it was published in August of 1998 by giving two copies to each of the about 200 participants in the Tokyo Stock Exchange, who were free to do whatever they wanted with their copies of the publication. Pet. 21–22 (citing Ex. 1007, 0012–33).

In support of its arguments regarding TSE as prior art, Petitioner directs us to portions of Mr. Kawashima's testimony. At the time of his testimony, Mr. Kawashima testified that he was employed by the Tokyo Stock Exchange and was so at the time of the TSE manual, August 1998. Ex. 1007, 0005–0011. He further testified that TSE "is the current TSE futures options trading system terminal document, manual" that was prepared August of 1998 by the Tokyo Stock

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[13] References are to pages located at center bottom of the English translation of TSE (Ex. 1004).

Exchange and that he was in charge of preparing the document. Ex. 1007, 0010–0011. Mr. Kawashima also testified that the purpose of the manual was that "in 1998 we replaced the futures options trading system and so this new manual was prepared because there were changes to the way the trading terminals were operating." *Id*. at 0012. Kawashima further testified that the manual was distributed to "participants" in August of 1998, who were "securities companies for banks who are able to carry out futures options trading at the TSE" and that the "manual was given to explain those changes" made with respect to the operation of the TSE trading system and terminals. *Id*. at 0012, 0014. Mr. Kawashima testified that the manual was given to around 200 "participant" companies—all companies that conduct futures option trading on the Tokyo Stock Exchange. *Id*. at 0013.[14] According to Mr. Kawashima, two copies were distributed to each company, by having a person from each company come to the Tokyo Stock Exchange operating system section to pick up their copies of the manual, and that there was no restriction on what the participants could do with the 1998 manual once they received it. *Id*. at 0014–0015. Mr. Kawashima personally distributed the TSE manual to some of the participants. Ex. 2163, 60:13–24.

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that TSE qualifies as prior art under 35 U.S.C. § 102(a).

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[14] We understand the then "participants" included such companies as Goldman Sachs Securities, Merrill Lynch, and Morgan Stanley. Ex. 2163, 58:5–17; Ex. 2169 ¶ 22.

Petitioner asserts, with supporting evidence, that
TSE was distributed to *participants* in the Tokyo
Stock Exchange. Pet. 21; Ex. 1007, 0012, 0014. Based
on the evidence before us, the participants were secu-
rities companies for banks. The purpose of the distri-
bution of the manual was to alert the securities com-
panies of *changes to the way the trading terminals* of
the Tokyo Stock Exchange *operated*. Ex. 1007, 0012,
0014. Indeed, TSE is a user manual that includes for
example, in Chapter 2, instructions for terminal sys-
tem configuration to enable a participant, such as a
security company to connect to the Tokyo Stock Ex-
change. Ex. 1004, 10–25. Chapter 15, entitled "Re-
sponse To A Problem" provides detailed explanations
should a problem arise with terminal equipment,
communication circuit difficulties, central system re-
covery difficulties, etc., along with in-house procured
terminal problem handling instructions. *Id.* at 5.
Thus, TSE is more than a user manual for how to
trade on the Tokyo Stock Exchange, but also includes
how to connect electronically to the Tokyo Stock Ex-
change. The evidence that is before us, both circum-
stantial and direct, supports a finding that TSE was
made accessible to securities companies and all of the
personnel in such a company, who would have em-
ployed technical support personnel, such as computer
scientists or engineers, who would have needed a copy
of the TSE manual to configure their own system to
communicate electronically, and to continue to trade
securities, with the Tokyo Stock Exchange.[15] Thus,

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[15] We made a similar finding in our Decision to Institute (Dec.
19), thereby putting Patent Owner on notice of such finding in
support of our determination that TSE was publically accessible.

the securities companies would have included computer scientists or engineers, as well as traders. We find that all such persons who worked at the securities companies would have been interested members of the relevant public.

Patent Owner's Contentions[16]

Patent Owner argues that the evidence fails to prove TSE is prior art. PO Resp. 34–41. We begin by addressing Patent Owner's assertions that Mr. Kawashima's testimony should be given little or no weight because his testimony is not corroborated and he is an interested witness. *Id.* at 39–41. Patent Owner argues that Kawashima's employer—the Tokyo Stock Exchange—challenged Patent Owner's Japanese counterpart to U.S. Patent No. 6,766,304 by providing TSE to the Japanese Patent Office. *Id.* at 40. Patent Owner further argues that the Tokyo Stock Exchange wanted the Japanese Patent Office to rely on "these documents" to prevent TT from obtaining the Japanese patent. *Id.* at 40–41 (citing Ex. 2163, 39:23–40:20, 42:14–43:10; Ex. 1007, 0110:10–14). Patent Owner concludes that because Kawashima's employer tried to use TSE to prevent TT from obtaining the 6,766,304 patent, Kawashima is not disinterested. *Id.* at 41.

We are not persuaded that Kawashima is an interested witness and that his testimony should be given little weight. First, the patent involved here is not the

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Patent Owner does not address such finding or provide evidence to rebut our finding in that regard. *Cuozzo*, 136 S. Ct. at 2141.

[16] Patent Owner makes unpersuasive evidentiary arguments as well, which we address in connection with Patent Owner's Motion to Exclude TSE (Ex. 1003), *infra*.

same as the patent involved before the Japanese Patent Office and we do not understand what Patent Owner means by "these documents." In any event, Patent Owner has not shown that what occurred in a proceeding before the Japanese Patent Office involving a different patent is relevant to the facts of this proceeding. Patent Owner has not shown sufficiently that Mr. Kawashima had an interest, himself, regarding the outcome of the Japanese Patent Office proceeding. Even assuming that the Tokyo Stock Exchange had an interest in that earlier proceeding, it does not follow necessarily that Mr. Kawashima himself had an interest in it as well. We have considered the evidence to which we are directed, but do not find that evidence (passages from Mr. Kawashima's original and cross examination) to support Patent Owner's assertions that Mr. Kawashima is biased. Indeed, when asked if the Tokyo Stock Exchange preferred that vendors like Trading Technologies not have patents on trading screens, Mr. Kawashima testified, that that was "not something I would know." Ex. 2163, 41:6–12. Lastly, Patent Owner has not demonstrated sufficiently that Mr. Kawashima's meetings with Petitioners' attorneys prior to his cross examination is demonstrative of "bias." PO Resp. 41. Patent Owner has not shown why Mr. Kawashima's meeting with Petitioner's counsel prior to his deposition would make him biased. For these reasons, we are not persuaded that Mr. Kawashima is an interested witness.

We also are not persuaded by Patent Owner's argument that because Mr. Kawashima's testimony is uncorroborated we should give it little weight. PO Resp. 39–40. In support of the argument, Patent Owner cites to cases regarding an *interested witness*.

See, e.g., id. at 39. As explained above, Patent Owner
has not shown sufficiently that Mr. Kawashima is an
interested witness. The other arguments made, e.g.,
that there is no evidence of when the manuals were
picked up or by whom or what a person did with the
document once they received it, are factors to consider
when determining whether a document was publi-
cally accessible, which we address below.

For all of these reasons, we credit the testimony of
Mr. Kawashima. We find that the facts discussed
above regarding Mr. Kawashima's testimony (Ex.
1007) are supported by a preponderance of the evi-
dence and are undisputed.[17] Although Mr. Ka-
washima was cross-examined during this proceeding,
Patent Owner does not direct attention to portions of
his cross examination testimony, or any other evi-
dence, that would outweigh Mr. Kawashima's original
testimony (Ex. 1007) regarding what the TSE manual
was, why it was distributed, how it was distributed,
when it was distributed, and to whom it was distrib-
uted.

Patent Owner argues that Petitioner has not es-
tablished that TSE was publically available. In par-
ticular, Patent Owner argues that there is no evi-
dence that anyone actually received a copy of TSE or
whether the receivers of such document were persons
of ordinary skill in the art. *Id.* at 35–36 (quoting *Blue
Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1348

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[17] The burden of showing something by a preponderance of the
evidence simply requires the trier of fact to believe that the ex-
istence of a fact is more probable than its nonexistence. *Concrete
Pipe & Products of California, Inc. v. Construction Laborers Pen-
sion Trust for Southern California*, 508 U.S. 602, 622 (1993).

(Fed. Cir. 2016) (a reference will be considered publicly accessible if it was "disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.")).

Patent Owner's argument that there is no evidence that anyone actually received a copy of TSE is misplaced. The proponent of a document need not show that particular members of the interested public actually received the information. *See, e.g., In re Enhanced Sec. Research, LLC*, 739 F.3d 1347, 1354 (Fed. Cir. 2014); *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1569 (Fed. Cir. 1988); *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1348 (Fed. Cir. 2016). Rather, accessibility goes to the issue of whether persons interested in the subject matter could obtain the information if they wanted to. *Id.* Here, we have before us persuasive evidence that TSE was made publically accessible by providing two copies to each of the about 200 participants (securities companies for banks) in the Tokyo Stock Exchange, who were free to do whatever they wanted with their copies of the publication. Ex. 1007, 0012, 0014. For these same reasons, we are not persuaded by Patent Owner's implicit argument that Petitioner need show that the two copies of the TSE manual available for pick up by the 200 participant companies actually were picked up. In any event, Mr. Kawashima testified that he personally distributed the TSE manual to some of the participants. Ex. 2163, 60:13–24.

Patent Owner argues that the participants (securities companies for banks) who allegedly received copies of the TSE manual are not persons of ordinary

skill in the art, which Patent Owner submits would be GUI designers, and not traders at a stock exchange. PO Resp. 37. We are not persuaded by Patent Owner's argument.

The patent before us is a business method patent, the subject matter of which is represented by both the business and technical sides of the spectrum. Here, where the patent is directed to trading commodities on an exchange using a computer, we must consider all interested members of the public, which would include not only technical personnel, but traders as well.[18] Traders of commodities at securities companies for banks would be interested members of the public.

In any event, there is sufficient evidence for us to find that the securities companies for banks also would have employed technical personnel as well, and even a "GUI designer." As explained above, the purpose of the TSE manual was to alert the securities companies of changes to the way the trading terminals of the Tokyo Stock Exchange operated. Ex. 1007, 0012, 0014. The TSE manual includes information and instructions of how to connect electronically to the Tokyo Stock Exchange. TSE is not simply a "how to trade commodities" user manual as Patent Owner seems to suggest. The strong circumstantial evidence supports finding that TSE was made accessible to se-

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[18] We note that one of the inventors of the '056 patent has extensive experience as a broker or trader, while the other has a legal background, and some experience "developing game simulations" but neither are "GUI designers." Ex. 2167 ¶¶ 4–7; Ex. 2181 ¶¶ 4–6.

curities companies who would have employed technical support personnel, such as computer scientists or engineers, to configure their system to communicate electronically, and to continue to trade securities, with the Tokyo Stock Exchange, based on the changes in operation of the terminals explained in the TSE manual. Thus, the securities companies would have included computer scientists or engineers, as well as traders. Lastly, even assuming that a person of ordinary skill in the art is narrowly limited to a "GUI designer" as Patent Owner asserts, we find that securities companies for banks ("participants") provided their own front-end order entry software, and that such participants would have employed GUI designers to formulate the front-end order entry software to facilitate trading on the Tokyo Stock Exchange. Ex. 2169 ¶ 22; Ex. 1060, 136:17–138:1.

Patent Owner argues that because participants of the Tokyo Stock Exchange were contractually prohibited from modifying the terminals or software, there was no reason to provide the manual to GUI designers. PO Resp. 37. Patent Owner has not shown sufficiently that such a contractual provision would have prevented persons interested or even ordinarily skilled in the subject matter from receiving copies of TSE. For all of the above reasons, we are persuaded that TSE was publically accessible.

Patent Owner additionally argues that there is no evidence that a person having ordinary skill in the art could have located TSE using "reasonable diligence," because there is no evidence that such a person searching for TSE would find it, such as being placed in a library, indexed, or catalogued, or directions to

locate TSE. PO Resp. 38–39. We determine above, that the record evidence supports a determination that TSE was publically accessible to persons interested and even ordinarily skilled in the subject matter. Patent Owner's arguments are premised on the notion that none of the personnel at the securities banks are interested and ordinarily skilled in the subject matter, which we reject. Thus, Patent Owner's argument is moot. For all of the above reasons, we determine that TSE qualifies as prior art.

Patent Owner's Showing of Prior Invention

Patent Owner argues that if TSE qualifies as prior art, it nonetheless conceived of the invention before distribution of TSE, and diligently reduced the invention to practice thereafter. PO Resp. 41–55.

Patent Owner alleges that the invention was conceived no later than March 1998, actually reduced to practice no later than November 30, 1998, and constructively reduced to practice April 9, 1999, upon the filing of the priority patent application to which the involved patent claims benefit. PO Resp. 43 (citing Ex. 2167 ¶ 12).

Conception

"Conception must be proved by corroborating evidence which shows that the inventor disclosed to others his completed thought expressed in such clear terms as to enable those skilled in the art to make the invention." *Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985).

Patent Owner relies on the declarations of the two named inventors of the '056 patent (Exs. 2167 (Declaration of Richard Friesen) and 2181 (Declaration of

Peter C. Hart)), along with a "Trading Game Design Document" (Ex. 2301 "Design Document"). Patent Owner argues that the Design Document exhibited each element of claim 1. PO Resp. 45 (citing Ex. 2167 ¶ 18; Ex. 2181 ¶ 17). In support of that assertion, Patent Owner directs attention to an annotated version of the screen capture shown on page "PH00000004" of the Design Document, which is relied upon to corroborate the testimony of the inventors. Id. at 45–49. We are not persuaded by Patent Owner's showing for the following reasons.

First, it is difficult to discern what is shown on page "PH00000004" of the Design Document with respect to the screen shot. The screen shot from Exhibit 2301 is reproduced here:
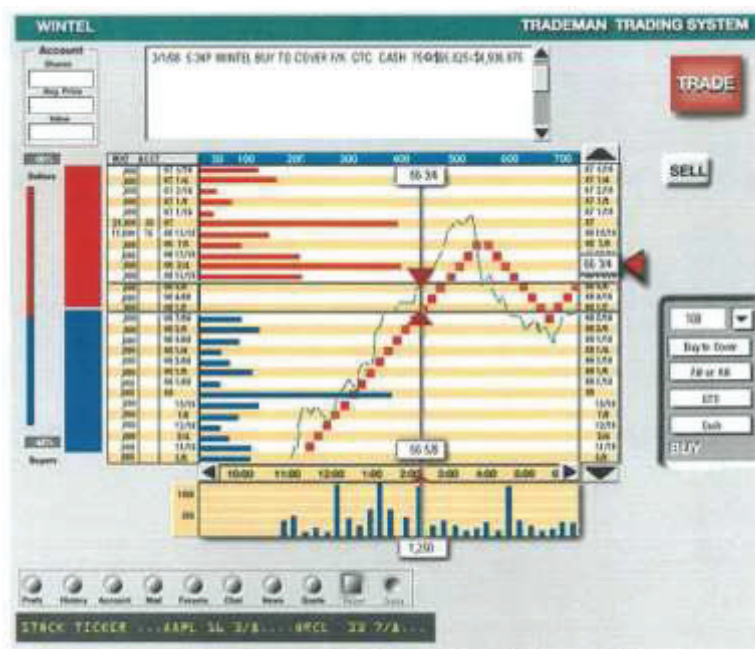
Screen capture of complete sample Trading System GUI [1]

As seen from above, the screen shot is blurry, and not easily readable. This is the evidence that Patent Owner relies on to corroborate the testimony of the named inventors of the '056 patent for certain claim 1 elements. For example, Patent Owner argues that for "displaying a plurality of bid indicators representing quantity associated with the plurality of bid orders" and "displaying a plurality of offer indicators representing quantity associated with the plurality of offer orders," the above screen shot corroborates inventor testimony that these elements are met. PO Resp. 46–48. Patent Owner annotates the above figure with three inserted boxes. *See, e.g., id.* at 47. The far right vertical listing of what appears to be numbers, is annotated with "this is a price axis." The red bars seen above have been annotated with "these red bars represent the quantity of pending offer orders at a particular price" and the blue bars have been annotated with "these blue bars represent the quantity of pending bid orders at a particular price."

We have reviewed the Patent Owner's arguments and evidence to which we are directed regarding conception. The testimony of the inventors is nearly the same as each other and to the Patent Owner Response at pages 45–50. Compare, Ex. 2167 ¶¶ 18–19 with Ex. 2181 ¶¶ 17–18. For the sheer fact that we cannot read the blurry screen shot, we do not find that such screen shot corroborates the testimony of the inventors. We will not simply take the inventor's words at face value for what the blurry screen shot shows. In any event, we agree with Petitioner that it has not been established sufficiently that the red and blue bars represent quantity associated with the plurality of bid [and

offer] orders. Pet. Reply 17–18. As pointed out by Petitioner, the red and blue bars could represent the number of orders in the market. *Id.*

Reduction to Practice and Diligence

Because Patent Owner has failed to show that it conceived of the invention, we need not consider Patent Owner's arguments with respect to its alleged reductions to practice (both actual and constructive), which occurred after August 1998, the date of TSE. Nonetheless, we make the following observations regarding Patent Owner's alleged reduction to practice and diligence.

In order to establish an actual reduction to practice, the inventor must establish that: (1) the inventor constructed an embodiment or performed a process that met all of the claim limitations; and (2) the invention would work for its intended purpose. *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). The inventor's testimony must be corroborated by independent evidence. *Id.* at 1330. A rule of reason applies to determine whether the inventor's testimony has been corroborated. *Price v. Symsek*, 988 F.2d 1187, 1194 (Fed. Cir. 1993). "The rule of reason, however, does not dispense with the requirement for some evidence of independent corroboration." *Coleman*, 754 F.2d at 360. The requirement of "independent" corroboration requires evidence other than the inventor's testimony. *In re NTP, Inc.* 654 F.3d 1279, 1291 (Fed. Cir. 2011).

It is well settled that "[t]here cannot be a reduction to practice of the invention…without a physical embodiment which includes all limitations of the claim."

UMC Elecs. Co. v. United States, 816 F.2d 647, 652 (Fed. Cir. 1987) (emphasis added). "It is equally well established that every limitation of the [claim] must exist in the embodiment and be shown to have performed as intended." *Newkirk v. Lulejian*, 825 F.2d 1581, 1582 (Fed. Cir. 1987) (emphasis added).

Patent Owner alleges that it reduced the invention to practice no later than November 30, 1998. PO Resp. 55. Based on the evidence before us, we are not persuaded that Patent Owner has demonstrated that the claimed system was actually reduced to practice. Claim 1 requires "receiving bid and offer information for a product from an electronic exchange" and "sending the order for the default quantity at the desired price to the electronic exchange." Patent Owner acknowledges that the GUI it relies on to show an actual reduction to practice was not connected to an electronic exchange. PO Resp. 54 ("Because this was a simulated market, real money was not at stake and live orders were not being transmitted to any exchange."). Thus, Patent Owner has failed to show that it reduced to practice all of the elements of claim 1, which would include "receiving bid and offer information for a product from an electronic exchange" and "sending the order for the default quantity at the desired price to the electronic exchange."

For similar reasons, Patent Owner has not demonstrated sufficiently that the simulated GUI worked for its intended purpose. *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). Patent Owner has not directed us to evidence to show that the GUI tested on November 24 and December 16, 1998, for example, worked for its intended purpose. Again, Patent Owner

acknowledges that "real money was not at stake and live orders were not being transmitted to any exchange." PO Resp. 54. Thus, having considered all of Patent Owner's arguments and evidence to which we are directed in support of the arguments, we are not persuaded that Patent Owner demonstrates sufficiently that it reduced the invention to practice no later than November 30, 1998.

Lastly, we address Patent Owner's contention that it was diligent from just prior to August 1998 until it filed U.S. Patent Application No. 09/289,550 ("'550 application") on April 9, 1999, from which the application that matured into the '056 patent claims priority. PO Resp. 55 (citing Ex. 2167 ¶ 37; Ex. 2181 ¶ 37). As provided above, Patent Owner has not shown that it conceived the invention prior to August 1998, but even if it had, Patent Owner has not established that it was reasonably diligent from a time just prior to August 1998 until April 9, 1999, e.g., "the critical period."

A party alleging diligence must account for the entire critical period. *Griffith*, 816 F.2d at 626. Even a short period of unexplained inactivity may be sufficient to defeat a claim of diligence. *Morway v. Bondi*, 203 F.2d 742, 749 (CCPA 1953); *Ireland v. Smith*, 97 F.2d 95, 99–100 (CCPA 1938). "A patent owner… must show there was reasonably continuous diligence." *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1009 (Fed. Cir. 2016) (citations omitted) (vacating and remanding the Board's decision finding Patent Owner had not proven the inventor was reasonably diligent in reducing his invention to practice). An inventor's testimony regarding

his reasonable diligence must be corroborated by evidence. *Brown v. Barbacid*, 436 F.3d 1376, 1380 (Fed. Cir. 2006).

Patent Owner argues that the invention was constructively reduced to practice with the filing of the '550 application on April 9, 1999, "a reasonable span of diligence." PO Resp. 55 (citing Ex. 2167 ¶ 37; Ex. 2181 ¶ 37). We focus our discussion on the period from around mid-December until April 9, 1999. Patent Owner has not directed us to sufficient evidence showing that it was diligent for that period. For example, Mr. Freisen testifies that no later than December 11, 1998, he met with Robert Sachs from Fenwick & West and that over the next three months, "Mr. Sachs and I exchanged several communications regarding patent application preparation and prosecution strategy." Ex. 2167 ¶ 37. The only corroborating evidence that we are directed to during the mid-December until April 9, 1999 time frame is an email from "Unspecified Sender." Ex. 2329. This exhibit is only referenced in Mr. Freisen's declaration. It is not explained in any way by Patent Owner or even in the context of Mr. Freisen's declaration. We decline the invitation to try to figure out what the email is all about. The email has not been shown to corroborate any acts of diligence by the inventors. For these additional reasons, Patent Owner has not accounted sufficiently for the critical period from a time just prior to August 1998 until April 9, 1999.

Analysis

TSE describes a trading system that facilitates trading with an electronic exchange by receiving bid

and offer information, displaying it to a user, and accepting and sending bid and offer orders. Ex. 1004, 6–13, 35. A trading terminal displays a GUI for depicting market information on a Board/Quotation Screen (see id. at 107). The Figure on page 107 of TSE is reproduced below.

Figure depicting the Board/Quotation Screen

The Board/Quotation Screen includes a central order price at column 11—a price axis. *Id*. at 111. To the left and right of order price column 11, at a location corresponding to price, are bid and offer indicators consisting of numbers representing the quantity of orders in respective columns 12, 13, and 14. *Id*. at 112. The Board/Quotation screen is automatically updated with new bid and offer information from a central system every three seconds. *Id*. at 91. TSE describes a user entering an order by double-clicking at a location along the price axis, which automatically displays a pop-up window displaying the selected price. *Id*. at 134, 137. Clicking a send button sends an order to the exchange. *Id*. at 143.

Petitioner identifies the difference between the claimed invention and TSE, explaining that TSE does not describe a default quantity, nor does TSE describe graphical displays. Pet. 38–39. Petitioner relies on Togher and Cooper to teach a default quantity and Schott to teach graphical displays. *Id*.

Togher describes a computer displaying transactional information and facilitating trading with bid and offer orders. Ex. 1008, Abs., Figs. 1–3. Togher describes receiving bid and offer information from an electronic exchange. *Id*. at 6:67–7:19. A user can enter a default quantity called a Normal Trade Size into the Trader Profile screen (Figure 4) and the quantity may be used for subsequent orders with the same quantity. *Id*. at 12:7–10.

Schott describes a computer system that displays graphical indicators representing quantities. Ex.

1009, Abs. In particular, Schott describes representing a given quantity by graphing data in the depiction of a pie chart or bar graph. *Id.* at Figs. 26C, 26D, 19A.

Cooper describes that for user interface designs, it was known to retain a user's last-entered quantity. Ex. 1015, 187–188.

We have reviewed the Petition and the supporting evidence to which we are directed as to how TSE meets all of the claim limitations with the exception of a default quantity and graphical displays. Pet. 39–60. We are persuaded by such showing, and adopt it as our own. We also have reviewed the Petition and the supporting evidence to which we are directed as to how Togher and Cooper teach a default quantity and Schott teaches graphical displays. *Id.* We are persuaded by such showing, and adopt it as our own.

Petitioner also has sufficiently shown why it would have been obvious to combine TSE, Togher, Schott and Cooper. For example, and with respect to claim 1, Petitioner argues that it would have been obvious to add Togher's user-modifiable default values to TSE's electronic trading system. Petitioner argues that the combination would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time needed to place an order and reducing the number of errors by reducing the number of operator actions (e.g., keystrokes). Pet. 45–46; Ex. 1032 ¶ 115. Petitioner argues that if the claims require retaining a user's last entered quantity to meet the "default quantity" limitation, then Cooper describes this feature. In particular, Petitioner argues that it would have been obvious to modify the combination of TSE

and Togher with Cooper by making the simple design choice to retain the user's last-entered quantity. Pet. 47 (citing Ex. 1032 ¶¶ 107–108). Petitioner additionally argues that it would have been obvious to add Schott's teaching of displaying graphical representations of data with the graphical interface teachings of TSE and Togher. Petitioner argues that the combination would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time and effort the user needs to expend to understand the displayed data. Pet. 42; Ex. 1032 ¶ 117. Lastly, Petitioner argues, with supporting evidence, that dependent claims 2–15 are obvious over TSE, Togher, Schott, and Cooper. Pet. 50–60.

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that claims 1–15 are unpatentable based on the combination of TSE, Togher, Schott, and Cooper for the reasons provided by Petitioner. If a feature has been used to improve one device, and a person of ordinary skill in the art would have recognized that it would improve a similar device in that field or another, implementing that feature on the similar device is likely obvious. *KSR*, 550 U.S. at 417. For a patent claim that claims a structure known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result. *Id.* at 416. Here, a person of ordinary skill in the art would have recognized that the addition of Togher's user-modifiable default values, for example, to TSE's electronic trading

system, would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time needed to place an order and reducing the number of errors by reducing the number of operator actions (e.g., keystrokes). Ex. 1032 ¶ 115.

Patent Owner's Contentions

Patent Owner does not dispute that TSE in combination with Togher, Cooper, and Shultz describe all of the elements of claims 1–4 and 8–15, and that the combination would have been obvious. PO Resp. 56–68. Patent Owner contends, however, that the failure of others to make the claimed combination demonstrates the non-obviousness of the invention. Id. at 56–64. Patent Owner also presents arguments with respect to claims 5–7. *Id.* at 64–68. We first address Patent Owner's arguments regarding claims 5–7.

Claim 5 depends directly from claim 1 and includes displaying an order icon at a location that corresponds to the desired price level along the price axis, and that the order icon indicates the user's order at the electronic exchange. Claims 6 and 7 each depend directly from claim 5. For claim 5, Petitioner relies on the description in TSE that after data is entered, a trader submits the order using the "send" function to send the order to the central system. Pet. 51 (citing Ex. 1004, 143). Petitioner explains that the order, along with all other orders, is displayed on the client terminals. *Id.* (citing Ex. 1004, 9–10; Ex. 1032 ¶ 123).

Patent Owner argues that the proper construction of "an order icon…indicating the user's order at the

electronic exchange," is an icon indicating to the user that the user has an order (distinguishes the traders own orders) at a particular level along the price axis. *Id.* at 64–65 (citing Ex. 2169 ¶¶ 62–66). Patent Owner's arguments are premised on a narrow construction of claim 5. Id. at 64–67. As indicated above, in the claim interpretation section of this opinion, we do not adopt Patent Owner's narrow interpretation.

Claim 6 depends from claim 5 and recites "displaying the plurality of bid indicators using a first visual characteristic; displaying the plurality of offer indicators using a second visual characteristic; and displaying the order icon using a third visual characteristic." Petitioner contends that the combination of TSE, Togher, Schott and Cooper render obvious claim 6 "because Schott teaches using different colors and textures for difference data sets, and a POSITA would have been motivated to add these teachings to the trading system described by TSE, Togher and Cooper." Pet. 52–53. Petitioner further contends that a person having ordinary skill in the art would have been motivated to apply Schott's technique of using different visual characteristics such as color and texture for three different data sets to the bids, offers, and the trader's own orders displayed in an electronic trading system disclosed in TSE and Togher to speed trader recognition of different data sets. *Id.* at 53; Ex. 1032 ¶ 140.

Patent Owner argues that Petitioner relies on the aggregate information to fulfill the offer indicators, bid indicators, and order icon. PO Resp. 67–68. Patent Owner further argues that Petitioner fails to explain how the aggregate quantity that is both the bid/offer

indicators, and the order icon, would be displayed with different visual characteristics. *Id.* We disagree. As explained above, the Petition relies on Schott's technique of using different visual characteristics for three different data sets to the bids, offers, and the trader's own orders displayed. Pet. 52–53. Petitioner also provides a motivation for using different visual characteristics for the three different sets. *Id.* It is implicit through Petitioner's showing that Petitioner proposes having three different sets, as opposed to an aggregate number as Patent Owner argues. Accordingly, we are not persuaded by Patent Owner's arguments.

E. Obviousness of Claims 1–15 over Silverman, Togher, Cooper, and Hogan

Petitioner contends that claims 1–15 are unpatentable under 35 U.S.C. § 103 over Silverman, Togher, Cooper, and Hogan. To support its contentions, Petitioner provides explanations as to how the prior art meets each claim limitation. Pet. 60–80. Petitioner also cites the Declaration of Kendyl A. Román for support. *See* Ex. 1032 ¶¶ 163–170.

Silverman describes a matching system for trading instruments in which bids are automatically matched against offers for given trading instruments. Ex. 1010, Abstract. Summary market information is displayed at participant's workstation or keystation at various client sites. *Id.* at 6:50–52. The system will display the best inside price for every instrument traded on the system, and preferably the prices are displayed together with the quantity bid or offered at the specified price so that the trader at the keystation can observe the market activity. *Id.* at 6:57–60.

Silverman describes, in connection with Figure 5, a keystation book located at client sites which maintain copies of the best bids and offers contained in the host book of Figure 4 and uses that information to generate displays at the keystations. *Id.* at 10:3–8. Figure 5, annotated by Petitioner with "price axis" is reproduced below.
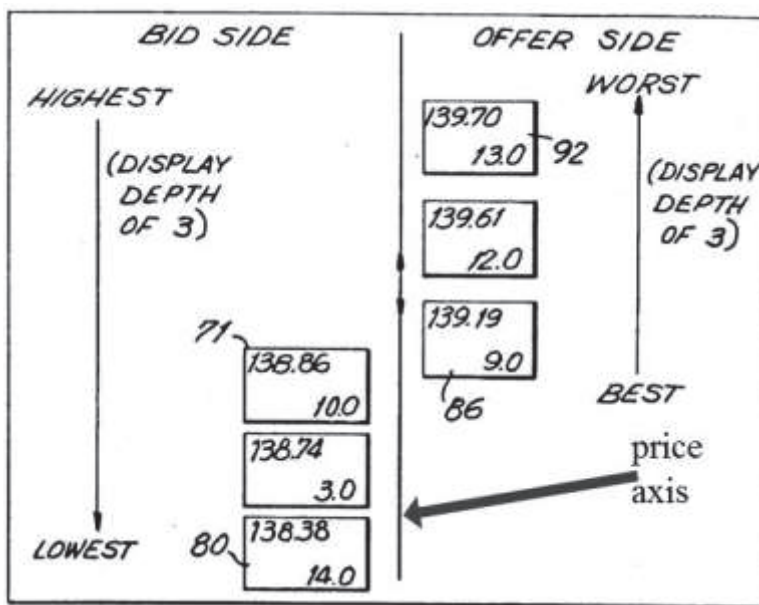
Figure 5 of Silverman, annotated by Petitioner, showing a keystation book Hogan describes displaying graphical indicators representing underlying quantities. Ex. 1011, 38:4–58, Fig. 17.

Petitioner identifies the differences between the claimed invention and Silverman, explaining that Silverman does not describe a default quantity, or entering data graphically. Pet. 60. Petitioner also addresses the inevitable argument from Patent Owner

that Silverman's price axis is not a price axis and submits that it would have been obvious to add labels to the Silverman price axis (Figure 5 labeled above) to help a user determine the scale of the graphed data. Pet. 62; Ex. 1032 ¶ 153. Petitioner also points out that Hogan describes selecting a value by selecting a position along an axis for a value. Pet. 69. Petitioner relies on Togher and Cooper to teach a default quantity (similar to the challenge based on TSE described above) and additionally relies on Hogan to teach entering data graphically. Pet. 60.

We have reviewed the Petition and the supporting evidence to which we are directed as to how Silverman meets all of the claim limitations with the exception of a default quantity and graphical displays. To the extent Silverman's "price axis" is not considered a price axis, Petitioner has shown sufficiently how it nonetheless would have been obvious to add labels to the graph described by Silverman, and further has shown sufficiently that Hogan too teaches selecting a position along an axis for a value. Pet. 60–80. We are persuaded by such showing, and adopt it as our own. We also have reviewed the Petition and the supporting evidence to which we are directed as to how Togher and Cooper teach a default quantity and Hogan teaches graphical displays, selecting a value by selecting a position along an axis for that value, and entering data graphically. *Id.* We are persuaded by such showing, and adopt it as our own.

Petitioner also has sufficiently shown why it would have been obvious to combine Silverman, Togher, Cooper, and Hogan. For example, and with respect to

claim 1, Petitioner argues that it would have been obvious to add Togher's user-modifiable default values and Cooper's teaching of retaining the user's last-entered quantity to Silverman's electronic trading system for similar reasons as it did with respect to the challenge based on TSE. Pet. 65–66; Ex. 1032 ¶¶ 157–158, 165.

Petitioner additionally argues that it would have been obvious to add Hogan's GUI teachings with Silverman, Togher, and Cooper. Petitioner argues that the combination would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time and effort the user expends to understand and enter data. Pet. 69–70; Ex. 1032 ¶¶ 168, 169. Lastly, Petitioner argues, with supporting evidence, that dependent claims 2–15 are obvious over Silverman, Togher, Cooper, and Hogan. Pet. 71–80.

Notwithstanding Patent Owner's arguments, which we address below, we are persuaded by Petitioner's showing, which we adopt as our own, that claims 1–15 are unpatentable based on the combination of Silverman, Togher, Cooper, and Hogan for the reasons provided by Petitioner. Here, and with respect to claim 1 in particular, a person of ordinary skill in the art would have recognized that the addition of Togher's user-modifiable default values, for example, to Silverman's electronic trading system, would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time needed to place an order and reducing the number of

errors by reducing the number of operator actions (e.g., keystrokes). Ex. 1032 ¶ 165. Further, a person of ordinary skill in the art would have recognized that adding Hogan's GUI teachings to the Silverman and Togher combination (e.g., selecting a value by selecting a position along an axis for that value) would have been obvious, as the combination would have been nothing more than combining prior art elements according to known methods to yield the predictable and desirable result of reducing the time and effort the user expends to understand and enter data. Ex. 1032 ¶¶ 168, 169.

Patent Owner's Contentions

Patent Owner argues that Silverman's Figures 4, 5, and 17 show logical models, not a GUI. PO Resp. 68–71. Patent Owner acknowledges that Silverman describes a display and a separate order entry tool. *Id.* at 70–71 (citing Ex. 2169 ¶ 75). As explained above, Silverman describes that the system will display the best inside price for every instrument traded on the system, and preferably the prices are displayed together with the quantity bid or offered at the specified price so that the trader at the keystation can observe the market activity. Ex. 1010, 6:57–60, 15:50–55. Order entry may be accomplished through conventional means, such as a keyboard or a mouse. *Id.* at 14:63–64.

Patent Owner argues, however, that such a conventional display and separate entry tool is not a GUI and that Silverman does not describe implementing its figures as a GUI (arguing specifically that nowhere does Silverman describe that data would be displayed in the manner shown in Fig. 5). PO Resp. 68–71.

Based on a similar line of reasoning, Patent Owner also argues that Mr. Román's testimony cannot be relied upon because Silverman's figures were not implemented as GUIs and Mr. Román's testimony is based on his understanding that Silverman's figures were implemented as GUIs. PO Resp. 74–75 (citing Ex. 2169 ¶¶ 71–89). Patent Owner's arguments are not persuasive.

None of the claims recite a "GUI" or graphical user interface. Arguably, the only claim 1 step that would be in the realm of requiring a GUI, would be the step of "receiving a user input indicating a desired price …the desired price being specified by selection of one of a plurality of locations corresponding to price levels along the price axis." But even assuming that the claims require a GUI, Patent Owner's arguments that Silverman alone fails to describe a GUI are misplaced. Petitioner does not assert that Silverman anticipates claims 1–15. Rather, the challenge is based on the combination of Silverman, Togher, Cooper, and Hogan. Hogan describes a GUI, and Petitioner relies on Hogan for the receiving a user input indicating a desired price step. Pet. 67–69. Mr. Roman testifies to this as well. Ex. 1032 ¶¶ 154–155, 159–160, 169. Accordingly, Patent Owner's arguments attacking Silverman alone are not persuasive. Lastly, we do not find that Mr. Román's testimony (see, e.g., Ex. 1032 ¶ 166) regarding what was implemented by Reuters as further support for combining Silverman, Togher, and Hogan discredits his other testimony (see, e.g., Ex. 1032 ¶¶ 154–155, 159–160, 169) regarding the obviousness of the claims before us. We credit his testimony regarding the obviousness of the claims, and moreover, give his testimony more weight than that

of Patent Owner's witness, Mr. Thomas, because his testimony (see, e.g., Ex. 2169 ¶¶ 80–89), like Patent Owner's arguments is focused narrowly on the teachings of Silverman alone.

We also have considered Patent Owner's argument that a person having ordinary skill in the art at the time of the invention would not have implemented Silverman as a GUI (PO Resp. 71–73), but are not persuaded by such argument. Patent Owner argues that implementing Silverman's figures as trading GUIs would not result in a useful product for a trader because the resulting display would result in a large amount of unused screen space. *Id.* (citing Ex. 2169 ¶¶ 90, 92). Patent Owner's argument is misplaced as the broad claims do not include any orientation limitations or limitations regarding screen space.

We next address Patent Owner's argument that Silverman does not disclose the claimed "price axis." PO Resp. 76–77. In essence, claim 1 requires displaying data (e.g., bid and offer indicators) along a price axis. The claim 1 method further requires receiving a user input indicating a desired price for an order by selecting one of a plurality of locations corresponding to price levels along the price axis. First, Patent Owner's arguments are based on a narrow interpretation of a "price axis" which we disagree with as discussed above in the claim construction section of this opinion. In any event, Petitioner accounts for Patent Owner's narrow interpretation of "price axis." While Petitioner characterizes the modified Silverman Figure 5 shown above as showing a "price axis," Petitioner also relies on Hogan and the knowledge of a

person of ordinary skill in the art to explain that displaying indicators along a price axis was known at the time of the invention. Pet. 61–63, 67–69; Ex. 1032 ¶¶ 153, 155, 160–161. Thus, Patent Owner's arguments regarding Silverman alone (*see, e.g.*, PO Resp. 76–77) are not sufficient to show fault in the Petitioner's reliance on Silverman, Hogan, and the knowledge of a person of ordinary skill in the art for the claimed price axis.

Patent Owner argues that the addition of Hogan to Silverman does not cure Silverman's defects or render the combination obvious. PO Resp. 77–79. In particular, Patent Owner argues that Silverman's figures are not displayed (are not GUIs). As discussed above, this argument is not persuasive. Patent Owner additionally argues that if Silverman's Fig. 5 bars were replaced with Hogan's teaching of bars representing quantity, the result would still not meet the limitation of a price axis. The argument is based on a narrow construction as explained above, and is without merit. In any event, Petitioner accounts for Patent Owner's argument that Silverman does not describe a price axis and explains that it would have been obvious to add labels to the Silverman price axis (Figure 5 labeled above) to help a user determine the scale of the graphed data. Pet. 62; Ex. 1032 ¶ 153. As discussed above, we adopt Petitioner's showing in that regard. Patent Owner, on the other hand, does not address Petitioner's showing that it would have been obvious to add labels to the Silverman price axis to assist a user to determine the scale of the graphed data—a showing we pointed out in our Decision to Institute as well, putting Patent Owner on plenty of notice that such a showing would be an issue for trial. Dec. 28. In

summary, we have considered all of Patent Owner's arguments with respect to claim 1, but determine them to be unpersuasive.

Patent Owner presents arguments with respect to claims 5–7. PO Resp. 79–81. Claim 5 depends directly from claim 1 and includes displaying an order icon at a location that corresponds to the desired price level along the price axis, and that the order icon indicates the user's order at the electronic exchange. Claims 6 and 7 each depend directly from claim 5.

Patent Owner argues that Silverman's Figs. 13 and 14 are not a graphical representation (GUI) provided to a user, similar to the arguments Patent Owner made with respect to Silverman's Figs. 4 and 5 above. For similar reasons provided above, we are not persuaded by this argument.

In addition, and for similar reasons discussed above, we do not agree with Patent Owner that claim 5 requires indicating the *specific* user order or indicating to the user that it is his order. *Id.* at 79–81. Patent Owner's arguments in that regard are not commensurate in scope with what is claimed. Patent Owner does not argue for the separate patentability of claims 6 and 7.

Secondary Considerations

In its brief, Patent Owner has a section titled "The Failure of Others to Make the Claimed Combination Demonstrates the Non-obviousness of the Invention." PO Resp. 56–64. That section, however, bears little resemblance to a typical showing of secondary consideration of a failure of others to make *the claimed in-*

vention and does not appear to be particularly relevant to this proceeding. For example, Patent Owner spends several pages (*see, e.g.*, PO Resp. 60–62) discussing U.S. Patent No. 6,772,132 without explaining how that discussion is relevant to the proceeding before us. Patent Owner's arguments as to why a person having ordinary skill in the art would have viewed TSE (and alternatively Silverman) as wasting screen real-estate and would have rejected its (or Silverman's) teachings is based on whether such teachings would have been commercially viable, which has not been shown to be relevant to the proceeding before us. In summary, we are not persuaded by any of Patent Owner's arguments spanning pages 56–64 of the Patent Owner Response.

F. Patent Owner's Motion to Exclude

Patent Owner moves to exclude Exhibit 1003 (TSE), Mr. Kawashima's deposition (Ex. 1007), and portions of Exhibits 1059 and 1060. PO Mot. to Exclude 1, 4, 6. Exhibit 1003 is the Japanese version of the TSE document. *See, e.g.*, Paper 131, 2. Patent Owner seeks to exclude Exhibit 1003 because it has not been authenticated per rule 901 of the Federal Rules of Evidence (FRE). Patent Owner recognizes that Petitioner relies on Mr. Kawashima's testimony (Ex. 1007) to authenticate TSE, but argues that his testimony is hearsay. PO Mot. to Exclude 2–6. Patent Owner, however, acquiesces that Mr. Kawashima's testimony is not hearsay because he was cross examined. Patent Owner also argues that Mr. Kawashima's testimony raises more doubt than it resolves. *Id.* at 6–7.

Patent Owner's motion with respect to the exclusion of TSE (Exhibit 1003) and Mr. Kawashima's deposition (Exhibit 1007) falls far short of what is required in a motion. The statement of the precise relief requested is lacking. For example, Patent Owner argues that TSE and Mr. Kawashima's deposition should be excluded, but also argues that Mr. Kawashima's deposition falls under the FRE 807 hearsay exception, and, therefore, is admissible. *See, e.g.*, PO Mot. to Exclude 2–6. We understand Patent Owner's position to be that if we exclude any of Patent Owner's evidence, then we also should exclude Exhibits 1003 and 1007. *Id.* at 6 ("To the extent the Board excludes any of Patent Owner's evidence from district court litigation, which it should not, the Board should likewise exclude the 2005 Kawashima deposition transcript.").

We are not persuaded by Patent Owner's arguments. Patent Owner has not met its burden to show that either Exhibit 1007 or Exhibit 1003 should be excluded from the record. In fact, Patent Owner appears to concede that Mr. Kawashima's testimony is not hearsay because it falls under an exception to the hearsay rule. Nor are we persuaded by Patent Owner's argument that the deposition testimony of Mr. Kawashima (Ex. 1003) raises more doubt than it resolves. PO Mot. to Exclude 6–8. In essence, Patent Owner's arguments go to the weight we should give Mr. Kawashima's testimony, which is not a proper argument for a motion to exclude. For all of these reasons, we are not persuaded that either Exhibit 1003 or 1007 should be excluded from the record and deny that portion of the motion seeking to exclude those exhibits.

Patent Owner also seeks to exclude pages 57–58 of Exhibit 1059 (the cross examination testimony of Mr. Olsen) and pages 248 and 263–269 of Exhibit 1060 (the cross examination testimony of Mr. Thomas). We did not and need not consider the specific pages objected to in Exhibits 1059 and 1060. We have determined that Petitioner has demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable, without considering the specific objected to pages or the portion of Petitioner's Reply that relies on such evidence and thus dismiss that portion of the motion seeking to exclude portions of Exhibits 1059 and 1060. Accordingly, we *deny-in-part* and *dismiss-in-part* Patent Owner's Motion to Exclude.

G. Petitioner's Motion to Exclude

Petitioner moves to exclude Exhibits 2300, 2301, 2304–2316, 2318–2324, 2326–2330, 2030, and 2032 in their entirety. Pet. Mot. to Exclude 1. Exhibit 2327 is a portion of a deposition of Thomas Biddulph from a district court case. Patent Owner's witnesses, inventors Mr. Friesen and Mr. Hart reference Exhibit 2327 in their respective declarations (Exs. 2167 and 2181) in support of their testimony regarding an actual reduction to practice of the claimed invention. We find it unnecessary to consider the specific objections to the admissibility of Exhibit 2327, since Patent Owner's arguments regarding an actual reduction to practice of the claimed invention are not persuasive for the reasons provided above, even assuming Exhibit 2327 to be admissible.

Exhibits 2030 and 2032 are a jury verdict and docket entry, respectively, associated with an earlier district court case involving Patent Owner and a third

party. Although Patent Owner relies on Exhibit 2030 in its Response, we do not find where it relies on Exhibit 2032. In any event, we understand Patent Owner to rely on at least Exhibit 2030 in support of its arguments that TSE is not prior art. PO Resp. 39, n. 5. Petitioner moves to exclude the exhibits as irrelevant and inadmissible. Pet. Mot. to Exclude 5. We find it unnecessary to consider the specific objections to the admissibility of Exhibits 2030 and 2032, since Patent Owner's arguments that TSE is not prior art are not persuasive for the reasons provided above, even assuming Exhibits 2030 and 2032 to be admissible.

Exhibit 2301 is a document Patent Owner relies on to support prior conception. Petitioner moves to exclude the document for lack of authenticity. *Id.* at 6. We find it unnecessary to consider the specific objections to the admissibility of Exhibit 2301, since Patent Owner's arguments that it conceived the invention prior to TSE are not persuasive for the reasons provided above, even assuming Exhibit 2301 to be admissible. Exhibits 2300, 2304–2316, 2318–2324, 2326, 2328, and 2329 are various third-party emails. Petitioner objects to the emails for lack of authenticity and hearsay to which no exception applies. *Id.* Patent Owner relies on the emails in support of its arguments regarding diligence. We find it unnecessary to consider the specific objections to the admissibility of Exhibits 2300, 2304–2316, 2318–2324, 2326, 2328, and 2329, since Patent Owner's arguments regarding diligence are not persuasive for the reasons provided above, even assuming Exhibits 2300, 2304–2316, 2318–2324, 2326, 2328, and 2329 to be admissible.

Accordingly, we dismiss Petitioner's Motion to Exclude.

III. CONCLUSION[19]

For all of the above reasons, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–15 of the '056 patent are unpatentable based on the following grounds:

claims 1–15 under 35 U.S.C. § 101 as being patent ineligible;

claims 1–15 under 35 U.S.C. § 103 as being unpatentable over TSE, Togher, and Schott; and

claims 1–15 under 35 U.S.C. § 103 as being unpatentable over Silverman, Togher, Cooper, and Hogan.

IV. ORDER

It is

ORDERED that claims 1–15 of the '056 patent are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence is *denied-in-part* and *dismissed-in-part*;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence is *dismissed*; and

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[19] In making the obviousness conclusions, we recognize that it is the subject matter of each claim, as a whole, that is evaluated, rather than just each individual limitation, separately. 35 U.S.C. § 103.

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

UNITED STATES PATENT AND
TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND
APPEAL BOARD

————————————

IBG LLC, INTERACTIVE BROKERS LLC,
TRADESTATION GROUP, INC., and
TRADESTATION SECURITIES, INC.,
Petitioner,

v.

TRADING TECHNOLOGIES INTERNATIONAL,
INC.,
Patent Owner.

————————————

Case CBM2016-00051
Patent 7,904,374 B2

————————————

Before SALLY C. MEDLEY, MEREDITH C. PETRA-
VICK, and JEREMY M. PLENZLER, *Administrative
Patent Judges.*

PLENZLER, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Covered Business Method Patent Review
35 U.S.C. § 328(a) and 37 C.F.R. § 42.73

INTRODUCTION

A. Background

IBG LLC, Interactive Brokers LLC, TradeStation Group, Inc., and TradeStation Securities, Inc. (collectively, "Petitioner") filed a Petition on March 29, 2016 requesting covered business method patent review of claims 1–36 (the "challenged claims") of U.S. Patent No. 7,904,374 B2 (Ex. 1001, "the '374 patent"). Paper 3 ("Pet."). On July 5, 2016, Trading Technologies International, Inc. ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp."). On August 17, 2016, we instituted a covered business method patent review (Paper 11, "Institution Decision" or "Inst. Dec.") based upon Petitioner's assertion that claims 1–36 are directed to patent ineligible subject matter under 35 U.S.C. § 101. Inst. Dec. 22. Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 18, "PO Resp.") and Petitioner filed a Reply (Paper 23, "Pet. Reply") to Patent Owner's Response. Pursuant to our authorization, Patent Owner filed an additional submission addressing the Federal Circuit's holding in *Technologies International, Inc., v. CQG, Inc.*, No. 2016-1616, 2017 WL 192716 (Fed. Cir. Jan. 18, 2017) ("CQG") (Paper 29, "PO Add'l Sub."), and Petitioner filed a reply to that submission (Paper 30). Petitioner filed a Motion to Exclude Evidence (Paper 31), and Patent Owner also filed a Motion to Exclude Evidence (Paper 34).

We held a joint hearing of this case and several other related cases on May 3, 2017. Paper 43 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C.

§ 328(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown sufficiently that claims 1–36 of the '374 patent are directed to patent ineligible subject matter under 35 U.S.C. § 101.

B. Related Proceedings

The parties indicate numerous related U.S. district court proceedings, including at least one proceeding specifically directed to the '374 patent. Pet. 2; Paper 6, 1–5. Numerous patents are related to the '374 patent and the related patents are or were the subject of numerous petitions for covered business method patent review and reexamination proceedings. As noted above, the Federal Circuit has issued a non-precedential decision, CQG, which addresses whether claims of U.S. Patent Nos. 6,766,304 ("the '304 patent") and 6,772,132 ("the '132 patent") are patent eligible under § 101. The '374 patent at issue in this case is related to the '132 and '304 patents via continuation and divisional filings.

C. Asserted Grounds

Petitioner contends that the challenged claims are unpatentable under 35 U.S.C. § 101. Pet. 27–50.

D. The '374 Patent

The '374 patent is titled "Click Based Trading with Intuitive Grid Display of Market Depth." Ex. 1001, (54). The '374 patent describes a display, named the "Mercury" display, and method of using the display to trade a commodity. *Id.* at Abstract, 3:5–10. The '374 patent explains that the Mercury display is a graphic user interface ("GUI") that dynamically displays the market depth of a commodity traded in a market and

allows a trader to place an order efficiently. *Id.* at 3:11–20. The Mercury display is depicted in Figure 3, which is reproduced below.

FIG. 3

Figure 3 of the '374 patent illustrates an example of the Mercury display with example values for trading a commodity, including prices, bid and ask quantities relative to price, and trade quantities.

The Mercury display includes a plurality of columns. Column 1005 is a static price axis, which includes a plurality of price values for the commodity. *See id.* at 7:23–25. The '374 patent explains that "[t]he column does not list the whole prices (e.g. 95.89), but

rather, just the last two digits (e.g. 89)." *Id.* at 7:25–26. Columns 1003 and 1004 are aligned with the static price axis and dynamically display bid and ask quantities, respectively, for the corresponding price values of the static price axis. *See id.* at 7:23–37. The '374 patent explains that "[t]he exchange sends the price, order and fill information to each trader on the exchange" and that "[t]he physical mapping of such information to a screen grid can be done by any technique known to those skilled in the art." *Id.* at 4:59–66.

Column 1002 contains various parameters and information used to execute trades, such as the default quantity displayed in cell 1016. *See id.* at 7:55–8:23. A trader executes trades using the Mercury display by first setting the desired commodity and default parameters, such as default quantity. *See id.* at 8:56–9:3; Fig. 6, step 1302. Then, a trader can send a buy order or sell order to the market with a single action, such as clicking on the appropriate cell in column 1003 or 1004. *See id.* at 8:60–9:48; Fig. 6, steps 1306–1315.

E. Illustrative Claim

As noted above, Petitioner challenges claims 1–36. Claims 1 and 36 are independent, with claims 2–35 depending from claim 1. Claim 1 is representative, and is reproduced below:

1. A method for facilitating trade order entry, the method comprising:

receiving, by a computing device, market data for a commodity, the market data comprising a current

highest bid price and a current lowest ask price available for the commodity;

identifying, by the computing device, a plurality of sequential price levels for the commodity based on the market data, where the plurality of sequential price levels includes the current highest bid price and the current lowest ask price;

displaying, by the computing device, a plurality of graphical locations aligned along an axis, where each graphical location is configured to be selected by a single action of a user input device to send a trade order to the electronic exchange, where a price of the trade order is based on the selected graphical location;

mapping, by the computing device, the plurality of sequential price levels to the plurality of graphical locations, where each graphical location corresponds to one of the plurality of sequential price levels, where each price level corresponds to at least one of the plurality of graphical locations, and where mapping of the plurality of sequential price levels does not change at a time when at least one of the current highest bid price and the current lowest ask price changes; and

setting a price and sending the trade order to the electronic exchange in response to receiving by the computing device commands based on user actions consisting of:

(l) placing a cursor associated with the user input device over a desired graphical location of the plurality of graphical locations and (2) selecting the desired graphical location through a single action of the user input device.

Ex. 1001, 11:39–12:5.

ANALYSIS

A. Claim Construction

In a covered business method patent review, claim terms are given their broadest reasonable interpretation in light of the specification in which they appear and the understanding of others skilled in the relevant art. *See* 37 C.F.R. § 42.300(b).

Applying that standard, we interpret the claim terms of the '374 patent according to their ordinary and customary meaning in the context of the patent's written description. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Petitioner proposes constructions for several terms (Pet. 24–27), and Patent Owner does not propose any explicit claim construction. We determine that no term requires explicit construction in order to conduct properly our analysis of the asserted challenge.

B. Covered Business Method Patent

Section 18 of the AIA[1] provides for the creation of a transitional program for reviewing covered business method patents. A "covered business method patent" is a patent that "claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service, except that

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[1] Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284, 329 (2011) ("AIA").

the term does not include patents for technological inventions." AIA § 18(d)(1); *see* 37 C.F.R. § 42.301(a). A patent need have only one claim directed to a covered business method to be eligible for review. *See* Transitional Program for Covered Business Method Patents—Definitions of Covered Business Method Patent and Technological Invention, 77 Fed. Reg. 48,734, 48,736 (Aug. 14, 2012) ("CBM Rules") (Comment 8).

Based on the record before us, we are apprised of no reason to change the determination in our Institution Decision that at least claim 1 of the '374 patent is directed to a covered business method. Inst. Dec. 11–16.

1. Data Processing or Other Operations used in a Financial Product or Service

Petitioner contends that "the '374 patent claims expressly require the performance of a financial transaction, e.g., by 'facilitating trade order entry' through steps including 'receiving market data for a commodity,' and 'setting a price and sending the trade order to the electronic exchange.'" Pet. 17 (citing claim 1 of the '374 patent). Based on this record, we agree with Petitioner that these activities are financial in nature.

Patent Owner does not dispute that the claims are directed to a financial product or service and, instead, contends that the claims are not directed to "data processing" or "other operations" of the financial product or service. PO Resp. 62–70. Patent Owner's contentions are unpersuasive.

Claim 1 encompasses processing financial data associated with a commodity and processing financial data for sending a trade order for a commodity to an exchange. *See* Ex. 1001, 4:60–64 ("The present invention processes this information and maps it…to a screen."); 10:52–54 ("[t]he process for placing trade orders using the Mercury display"). This processing of financial data is used in the practice, administration, or management of a commodity, which is a financial product, and in the practice, administration, or management of electronic trading with an exchange, which is a financial service or activity.

Even if there is some disagreement as to whether claim 1 includes "data processing," there appears to be no disagreement that at least the steps noted above are operations used in the practice, administration, or management of a commodity or trading a commodity on an electronic exchange. *See* PO Resp. 66–70 (discussing only whether the '374 patent claims "data processing"). The '374 patent, therefore, at least claims "other operations used in the practice, administration, or management of a financial product or financial service" (AIA § 18(d)(1)).

Patent Owner additionally contends that the Legislative History confirms that the claimed invention is not a covered business method. PO Resp. 74–77. We are not persuaded by Patent Owner's argument. The language of the AIA, as passed, does not include an exemption for all user interfaces for trading commodities from covered business method patent review. *See Unwired Planet, LLC v. Google Inc.*, 841 F.3d 1376, 1381–82 (Fed. Cir. 2016) (extra-statutory sources are not persuasive when the plain words of the statute do

not support such additional interpretive phrases). Each patent has to be evaluated individually to determine if it is eligible for a covered business method patent review. A determination of whether a patent is eligible for a covered business method patent review under the statute is made on a case-by-case basis on the facts of each case. 37 C.F.R. § 42.301(b).

For the reasons stated above, and based on the particular facts of this proceeding, we conclude that the '374 patent "claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service" and meets that requirement of § 18(d)(1) of the AIA.

2. Exclusion for Technological Inventions

To determine whether a patent is for a technological invention, we consider "whether the claimed subject matter as a whole recites a technological feature that is novel and unobvious over the prior art; and solves a technical problem using a technical solution." 37 C.F.R. § 42.301(b).

The following claim drafting techniques, for example, typically do not render a patent a "technological invention":

(a) Mere recitation of known technologies, such as computer hardware, communication or computer networks, software, memory, computer-readable storage medium, scanners, display devices or databases, or specialized machines, such as an ATM or point of sale device.

(b) Reciting the use of known prior art technology to accomplish a process or method, even if

that process or method is novel and non-obvious.

(c) Combining prior art structures to achieve the normal, expected, or predictable result of that combination.

Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,763–64 (Aug. 14, 2012).

Both prongs must be satisfied in order for the patent to be excluded as a technological invention. *See Versata Dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1326–27 (Fed. Cir. 2015).

Petitioner contends that rather than reciting a technical feature that is novel or unobvious over the prior art, the claims of the '374 patent generally recite trading software that is implemented on a conventional computer. Pet. 19–22. Petitioner additionally asserts that the claims of the '374 patent do not fall within § 18(d)(1)'s exclusion for "technological inventions" because the '374 patent does not solve a technical problem using a technical solution. Pet. 22–24. Patent Owner disagrees (PO Resp. 71–74), but fails to explain how the claimed subject matter recites a technological feature that is novel and unobvious over the prior art or solves a technical problem using a technical solution.

We are persuaded by Petitioner's contentions that at least claim 1 of the '374 patent does not recite a novel and non-obvious technological feature. The specification of the '374 patent treats as well-known all potentially technological aspects of the claims. For example, the '374 patent discloses that its system can be implemented "on any existing or future terminal or

device" (Ex. 1001, 4:4–7), each of which is known to include a display, and discloses that the input device can be a mouse (*id*. at 4:8–11), which is a known input device. The '374 patent further discloses that "[t]he scope of the present invention is not limited by the type of terminal or device used." *Id*. at 4:7–8. The '374 patent explains that the programming associated with the GUI is insignificant. *See, e.g.*, Ex. 1001, 4:60–67 (explaining that the "present invention processes [price, order, and fill] information and maps it through simple algorithms and mapping tables to positions in a theoretical grid program" and "[t]he physical mapping of such information to a screen grid can be done by any technique known to those skilled in the art").

Petitioner notes that the '374 patent "purports to minimize the risk of the market price changing before the trade is executed, such that the trader 'misses the price.'" Pet. 22 (citing Ex. 1001, 2:57–59; 3:2–4). Petitioner argues that "contending with price fluctuations in a market is not a technological problem." *Id*. Petitioner contends that "the '374 patent does not offer a technical solution" because "[i]t does not claim a more accurate mouse or a computer that responds faster." *Id*. at 23.

We are persuaded that the '374 patent does not solve a technical problem with a technical solution. As written, claim 1 requires the use of only known technology. Moreover, we do not see how claim 1, for example, even solves the problem alleged by Patent Owner (i.e., missing an intended price). *See, e.g.*, Ex. 2169 ¶ 77. Given this, we determine that at least claim 1 does not solve a technical problem using a

technical solution and at least claim 1 does not satisfy the second prong of 37 C.F.R. § 42.301(b).

3. Conclusion

In view of the foregoing, we conclude that the '374 patent is a covered business method patent under AIA § 18(d)(1) and is eligible for review using the transitional covered business method patent program.

C. Section 101 Patent-Eligible Subject Matter

Petitioner challenges claims 1–36 as directed to patent-ineligible subject matter under 35 U.S.C. § 101. Pet. 28–50. Patent Owner disagrees. PO Resp. 12–62.

Under 35 U.S.C. § 101, we must first identify whether an invention fits within one of the four statutorily provided categories of patent-eligibility: "processes, machines, manufactures, and compositions of matter." *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 713–14 (Fed. Cir. 2014).

There is no dispute that claims 1–35 fit within one of the categories of patent-eligibility. Petitioner asserts, however, that "claim 36 of the '374 patent is invalid because it encompasses subject matter that does not fall into any of the four statutory classes of § 101." Pet. 48. Claim 36 recites a "computer readable medium having stored therein instructions." Petitioner contends that "the BRI of 'medium,' as used in claim 36 of the '374 patent…is broad enough to cover substances 'such as wires, air, or a vacuum' through which transitory electrical signals can propagate." Pet. 49 (citing *In re Nuijten*, 550 F.3d 1346, 1352 (Fed. Cir. 2007)); Pet. Reply 24.

Patent Owner responds that there is no evidence to support Petitioner's contention that one skilled in the art would have understood "computer readable medium having stored therein instructions" to encompass a signal at the time of the invention. PO Resp. 61–62. Petitioner responds to Patent Owner's contentions by simply asserting that "the Board correctly found that the BRI of a 'computer readable medium' encompasses transitory media" and "[n]othing in the specification limits a broad application of this definition." Pet. Reply 24.

Petitioner's response is unhelpful. In our Institution Decision, we explicitly noted that our construction was preliminary and specifically indicated that "[t]he broadest reasonable interpretation, in light of the specification, of 'stored' is an issue that requires further development of the record." Inst. Dec. 9. In its Reply, Petitioner cites no evidence to rebut Patent Owner's contentions regarding how one skilled in the art would have understood the claim language at issue at the time of the invention. In fact, Petitioner does not even acknowledge those contentions. At oral hearing, when asked why no evidence was provided in this regard, Petitioner had no explanation other than "it would be difficult…because this is a term of art in the patent field" and "you can[not] go to an IEEE dictionary and find necessarily a dictionary definition that would be helpful here." Tr. 71:4–10.

Accordingly, on this record, which is absent any further evidence or meaningful argument from Petitioner, we are not persuaded that at the time of the invention one skilled in the art would have understood "computer readable medium having stored

therein instructions" as encompassing transitory, propagating signals.

Nevertheless, we are persuaded that claims 1–36 do not recite patent-eligible subject matter for the reasons that follow.

1. Abstract Idea

Section 101 "contains an important implicit exception [to subject matter eligibility]: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. Pty. Ltd. v. CLS Bank. Int'l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013)). In *Alice*, the Supreme Court reiterated the framework set forth previously in *Mayo Collaborative Services v. Prometheus Labs., Inc.*, 566 U.S. 66, 70–71 (2012), "for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts." *Alice*, 134 S. Ct. at 2355. The first step in the analysis is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts." *Id.*

Claim 1 is "[a] method for facilitating trade order entry" and recites "receiving…market data," "identifying…sequential price levels," "displaying…graphical locations along an axis," "mapping…the…sequential price levels to the…graphical locations," and "setting a price and sending the trade order."[2] In our In-

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[2] The following discussion addresses claim 1, with the understanding that the discussion applies equally to claim 36, which

stitution Decision, we specifically set forth our under-
standing of the limitations noted above, explaining
that claim 1 "do[es] not require that the graphical lo-
cations *display* the price levels that are mapped to
them, any other information, or even any indication
as to which of those graphical locations correspond to
bids and which correspond to asks." Inst. Dec. 10–11.
We further explained that, based on our understand-
ing of the claim language, the "claims provide [no] in-
dication to a user of market information, such as
price, order quantity, or order type" and "the graph-
ical locations simply could be 'black boxes' with price
values associated with them, and *no information pro-
vided to the user* indicating that price value, the order
quantity, or the order type." *Id.* Patent Owner does
not dispute our understanding of the claims, which,
as noted above, was set forth explicitly in our Institu-
tion Decision.

"The 'abstract idea' step of the inquiry calls upon
us to look at the 'focus of the claimed advance over the
prior art' to determine if the claim's 'character as a
whole' is directed to excluded subject matter.'" *Affin-
ity Labs of Texas v. DirectTV, LLC*, 838 F.3d 1253,
1257 (Fed. Cir. 2016) (citations omitted). There is no
definitive rule to determine what constitutes an "ab-
stract idea." Rather, the Federal Circuit has ex-
plained that "both [it] and the Supreme Court have
found it sufficient to compare claims at issue to those
claims already found to be directed to an abstract idea
in previous cases." *Enfish, LLC v. Microsoft Corp.*, 822

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recites a computer readable medium having instructions to exe-
cute a method substantially the same as the method of claim 1.

F.3d 1327, 1334 (Fed. Cir. 2016); *see also Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1294 (Fed. Cir. 2016) (explaining that, in determining whether claims are patent-eligible under § 101, "the decisional mechanism courts now apply is to examine earlier cases in which a similar or parallel descriptive nature can be seen—what prior cases were about, and which way they were decided"). As explained in our Institution Decision, "these claims are drafted at such a high level of abstraction that it is difficult to imagine the bounds of their application." Inst. Dec. 11.

Petitioner argues that the challenged claims "are directed to the abstract, fundamental economic practice of trading based on displayed market information and user input." Pet. 29. In our Institution Decision, we specifically indicated that "the concept embodied by the majority of the limitations appears to be even broader than that suggested by Petitioner," stating that independent claims 1 and 36 are directed to "the abstract idea of receiving user input and placing a trade order." Inst. Dec. 19. Patent Owner responds to our characterization of the claims by alleging, generally, and without meaningful explanation, that "the '374 patent does not simply claim its invention to be the concept of…'receiving user input and placing a trade order,' the PTAB's purported abstract idea." PO Resp. 2 (citing Inst. Dec. 19); *see also id.* at 51 ("Nor are the claims directed to 'receiving user input and placing a trade order,' the PTAB's purported abstract idea." (citing Inst. Dec. 19)).

As noted above, claim 1 only minimally requires collecting and analyzing information and includes no requirement that any of that information is displayed.

Even collecting, analyzing, and displaying infor-
mation, by itself, however, does not remove claims
from abstraction. *See, e.g., Elec. Power Grp., LLC v.
Alstom S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016).
To the extent claim 1 requires a GUI, it does so in the
most basic sense, only requiring generic graphical lo-
cations that are selectable by a user. Claims that re-
quire a GUI are not automatically patent eligible. *Af-
finity Labs*, 838 F.3d at 1255–56; *Apple, Inc., v.
Ameranth, Inc.*, 842 F.3d 1229, 1234 (Fed. Cir. 2016).
In both *Affinity Labs* and *Ameranth*, the court deter-
mined that the claims were not directed to a particu-
lar way of programming or designing the software,
but instead merely claim the resulting systems, and
determined that the claims are not directed to a spe-
cific improvement in the way computers operate. *Af-
finity Labs*, 838 F.3d at 1260–61; *Ameranth*, 842 F.3d
at 1241. The same is true here in that the claims are
not directed to any particular way of programming or
designing software, but merely claim the resulting
system and not any specific improvement in the way
a computer operates.

Patent Owner only discusses, generally, patent el-
igibility requirements under § 101, without explain-
ing how that discussion applies to the specific claim
limitations of the '374 patent. *See, e.g.*, PO Resp. 1–
17, 23–33. Patent Owner, instead, continually alleges
that the claims are directed to a specific graphical
user interface. *See, e.g.*, PO Resp. 1 ("The claims of the
'374 patent are patent eligible because they are not
directed to an "abstract idea," but are instead directed
to the specific structure, makeup, and functionality of
a technological graphical user interface ("GUI") tool
that can be used for electronic order entry."), 10 ("TT's

claims are directed to a specific implementation—
that is, a specific GUI."), 12 ("[T]he '374 patent claims
are patent eligible because they claim the construc-
tion of a specific GUI…."), 23 ("TT's claims set forth a
particular way to construct a specific GUI with spe-
cific structure, makeup, and functionality."), 27 ("The
claims here are directed to constructing a GUI with a
specific structure, makeup, and functionality that is
both a specific means or method and a particular,
practical implementation of an order entry inter-
face.").

The only reference to specific claim limitations in
the Patent Owner Response related to whether the
claim 1 is directed to an abstract idea is a reproduc-
tion of the claim language (PO Resp. 18–22), followed
by conclusory statements, such as "because of this
structure, makeup, and functionality, the mapping of
the plurality of sequential price levels does not change
at a time when at least one of the current highest bid
price and the current lowest ask price changes,
providing the benefits described in the specification"
(*id.* at 22). Patent Owner alleges that "[t]his specific
combination of display elements and features differed
from the conventional GUIs at the time of the inven-
tion and addressed a specific problem created by these
conventional GUIs, namely, improving accuracy with-
out sacrificing speed and improving usability." *Id.* at
28.

Although Patent Owner provides a table allegedly
illustrating how claim 1 "is constructed to display and
function," that characterization of the "structure,
makeup, and functionality" of the claims is conclusory
and inaccurate. PO Resp. 19–21 (citing Ex.1001,

11:39–12:5; Ex. 2168 ¶ 42). For example, Patent Owner contends that "[t]he structure of each graphical location is aligned along the price axis structure on the visual display" and "[e]ach graphical location functions such that it is selectable…to send a trade order…at the price aligned with the selected graphical location." *Id.* at 20 (emphasis added). The testimony from Mr. Gould Bear cited by Patent Owner is simply a reproduction of the table spanning pages 19–22 of the Patent Owner Response. Ex. 2168 ¶ 42. Claim 1, however, recites "an axis," not "a price axis," and does not require any display of price information or any other specific type of information.[3]

As for Patent Owner's arguments that we should follow the Federal Circuit's guidance in CQG (See PO Add'l Sub. 1–5), comparing the claims of the patents involved in CQG with those in the '374 patent is not particularly helpful here. Although the '374 patent shares a specification with the patents at issue in CQG, the claims at issue in the '374 patent are much broader. In its additional submission, Patent Owner contends that "the '374 patent claims are in some respects narrower than the claims of the '132 and '304 patents," which were at issue in CQG. PO Add'l Sub. 5. Patent Owner reproduces portions of claim 1 from the '374 patent that recite the features of "setting a price and sending the trade order to the electronic exchange" in that claim. *Id.* Patent Owner offers no explanation, however, as to how that claim language

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[3] Patent Owner clearly knew how to claim a price axis, but chose not to limit the claims in that manner in the '374 patent. *See* Ex. 2111, 12:44 (earlier filed patent claiming a "price axis" in the same chain of continuation filings that resulted in the '374 patent).

makes claim 1 of the '374 patent narrower, in a meaningful way, than what is recited in the '132 or '304 patent claims. The '304 patent, for example, recites a similar limitation ("setting a plurality of parameters for a trade order…and sending the trade order to the electronic exchange") as well as numerous other limitations not found in claim 1 of the '374 patent.

Accordingly, comparing the claims at issue in this proceeding with those addressed in CQG is not particularly helpful here, particularly when the court implied that even those narrower claims of the '132 and '304 patents are on the line between patent eligibility and ineligibility (see *CQG*, 2017 WL 192716, at *4 (noting the "close question[] of eligibility")).

As explained above, claim 1 is simply directed to receiving user input to send a trade order. There is no dispute that receiving user input and placing a trade order, a fundamental economic practice, is an abstract idea.

2. Inventive Concept

Next we turn to "the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 566 U.S. at 78–79). The additional elements must be more than "well-understood, routine, conventional activity." *Id.* at 1298. On this record, we are persuaded that the challenged claims of the '374 patent do not add an inventive concept sufficient to ensure that the patent in practice amounts to significantly more than a patent on the abstract idea itself. *See* Pet. 33–44.

As noted above, the specification of the '374 patent treats as well-known all potentially technological aspects of the claims. For example, the '374 patent discloses that its system can be implemented "on any existing or future terminal or device" (Ex. 1001, 4:4–7), each of which is known to include a display, and discloses that the input device can be a mouse (*id*. at 4:8–11), which is a known input device. The '374 patent further discloses that "[t]he scope of the present invention is not limited by the type of terminal or device used." *Id*. at 4:7–8. The '374 patent also describes the programming associated with the GUI as insignificant. *See, e.g., id*. at 4:60–67 (explaining that "present invention processes [price, order, and fill] information and maps it through simple algorithms and mapping tables to positions in a theoretical grid program" and "[t]he physical mapping of such information to a screen grid can be done by any technique known to those skilled in the art").

Patent Owner acknowledges that "prior art GUIs provided the ability to enter and send order messages to an electronic exchange using…order entry screens," and specifically references the Figure 2 "conventional GUI tool" described in the '374 patent. PO Resp. 13. Patent Owner does not appear to contend that anything in the claim is unconventional other than, perhaps, that the "mapping of the plurality of sequential price levels does not change at a time when at least one of the current highest bid price and the current lowest ask price changes."[4] *See, e.g.*, Ex. 2169

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[4] Patent Owner explicitly acknowledges that the combination of other features recited in the claim are conventional in related

¶¶ 43–69. That, however, does not add an inventive concept, as it simply maintains the previous association between a given graphical location and its price level. That limitation simply requires that nothing changes, other than the data that is received.

Patent Owner argues, however, that "[t]he claims recite an inventive concept (and thus pass prong II under Alice) at least because they are an unconventional and revolutionary combination of features" and "the claimed GUI tool is constructed to provide the claimed structure, function, and makeup for displaying, mapping, and order entry." PO Resp. 34. Again, we note that Patent Owner's arguments do not address the elements recited in the claim. Patent Owner discusses *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014), for example, but offers no specific explanation as to how the claims of the '374 patent are like those that were at issue in that case. PO Resp. 38–41. Unlike claim 1 of the '374 patent, the court in DDR Holdings determined those claims were not directed to "a fundamental economic or longstanding commercial practice" or "an invention that is…merely the routine or conventional use of the In-

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proceedings addressing patents in the same family of continuation filings that resulted in the '374 patent. For example, when discussing the Figure 2 "conventional GUI tool" referenced in the '374 patent, Patent Owner acknowledged that "these types of tools permitted 'single action' order entry that consisted of a trader presetting a default quantity and then clicking on a cell in the screen (i.e., pressing a button on the tool) to cause a trade order message to be sent to the exchange at the preset quantity and at the price value associated with that cell." CBM2014-00136, Paper 18, 7.

ternet." *DDR Holdings*, 773 F.3d at 1257, 1259. Rather, the claims in *DDR Holdings* were characterized as providing "a result that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink." Id. at 1258. As explained above, we see nothing other than routine and conventional features in claim 1.

Patent Owner fails to identify, and we are not apprised of, an inventive concept in the claims. Patent Owner does not allege that a specific claim limitation, or combination of limitations, provides an inventive concept. As explained above, we are persuaded that the claim does not include elements that "transform the nature of the claim" into a "patent-eligible application."

Given the above, we determine that the combination of elements of the claim does not transform the nature of the claim into a patent-eligible application of the abstract idea. They do not add significantly more to the abstract idea.

3. Dependent Claims

Petitioner contends that the additional elements recited by dependent claims 2–35 do not add significantly more to the abstract idea so as to render the claims patent-eligible. Pet. 39–44. Based on our review of the record before us, we are persuaded by Petitioner's contentions regarding claims 2–35. Those claims further define, for example, the information mapped to the graphical locations (claims 2–11), the orientation of the graphical locations on the screen (claims 12, 33, and 34), displaying additional information (claims 13–18), and features associated with

receiving and executing the user's command (claims 19, 20, 23–27, and 35). Nothing in those claims removes them from abstraction or provides an inventive concept sufficient to save the claims from ineligibility.

Patent Owner addresses only claims 13–15 specifically, noting that "dependent claims 13–15 recite, inter alia, a first indicator and second indicator that move relative to the graphical locations" and "[t]his relative movement provided a significant unexpected improvement over the preexisting technology." PO Resp. 29. Patent Owner fails to offer any persuasive explanation, however, as to why displaying this additional information makes the claims any less abstract or provides an inventive concept sufficient to save the claims from ineligibility.

4. Conclusion

Having considered the record before us, we are persuaded that Petitioner has shown sufficiently that claims 1–36 of the '374 patent are not directed to patent eligible subject matter under 35 U.S.C. § 101.

D. Motions to Exclude Evidence

Petitioner moves to exclude Exhibits 2211, 2220, 2222, 2287, and 2292–2296 (the eSpeed/CQG Transcripts); Exhibit 2223 (the Electronic Trader Declarants Exhibit); Exhibit 2214 (Animation); Exhibit 2169 ¶¶ 71, 79, 80, 83–86, 92–95, and 100–102 (Confidential Declaration of Christopher Thomas); and Exhibits 2206, 2207, 2415, 2416, 2250, and 2279–2282 (Documents from District Court Cases). Paper 31, 2–10. Patent Owner moves to exclude Exhibit 1003 (TSE) and Exhibit 1009 (the transcript of Mr. Kawashima's testimony). Paper 34, 1.

Petitioner's Motion to Exclude Evidence and Patent Owner's Motion to Exclude Evidence are dismissed because we do not rely on the Exhibits or portions of the Exhibits addressed by those motions in reaching our Decision.

ORDER

For the reasons given, it is:

ORDERED that claims 1–36 of the '374 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence is dismissed;

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence is dismissed; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

UNITED STATES PATENT AND
TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND
APPEAL BOARD

_____

IBG LLC, INTERACTIVE BROKERS LLC,
TRADESTATION GROUP, INC., and
TRADESTATION SECURITIES, INC.,
Petitioner,

v.

TRADING TECHNOLOGIES INTERNATIONAL,
INC.,
Patent Owner.

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CBM 2016-00032
Patent 7,212,999 B2

_____

Before SALLY C. MEDLEY, MEREDITH C. PETRA-
VICK, and JEREMY M. PLENZLER, *Administrative
Patent Judges.*

PETRAVICK, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 328(a) and 37 C.F.R. § 42.73

INTRODUCTION

A. Background

IBG LLC, Interactive Brokers LLC, TradeStation Group, Inc., and TradeStation Securities, Inc. (collectively, "Petitioner") filed a Petition requesting a covered business method patent review of claims 1–35 of U.S. Patent No. 7,212,999 B2 (Ex. 1001, "the '999 patent"). Paper 1 ("Pet."). Trading Technologies International, Inc. ("Patent Owner") filed a Preliminary Response. Paper 12 ("Prelim. Resp.").

On August 8, 2016, we instituted a covered business method patent review (Paper 16, "Institution Decision" or "Inst. Dec.") based upon Petitioner's assertion that claims 1–35 are directed to patent ineligible subject matter under 35 U.S.C. § 101. Inst. Dec. 28. Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 24, "PO Resp.") and Petitioner filed a Reply (Paper 29, "Pet. Reply") to Patent Owner's Response. Pursuant to our authorization, Patent Owner filed an additional submission addressing the Federal Circuit's holding in *Technologies International, Inc., v. CQG, Inc.,* 675 Fed.Appx. 1001 (Fed. Cir. 2017) ("CQG") (Paper 36) and Petitioner filed a reply to that submission (Paper 37). Petitioner filed a Motion to Exclude Evidence (Paper 39, "Pet. MTE"), and Patent Owner filed a Motion to Exclude Evidence (Paper 41, "PO MTE").

We held a joint hearing of this case and several other related cases on May 3, 2017. Paper 50 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 328(a) and 37 C.F.R. § 42.73. For the reasons that

follow, we determine that Petitioner has shown suffi-
ciently that claims 1–35 of the '999 patent are di-
rected to patent ineligible subject matter under 35
U.S.C. § 101.

B. Related Proceedings

The '999 patent is involved in the following law-
suits: *TT v. IBG LLC,* No. 1:10-cv-00721 (N.D. Ill.)
and *TT v. TradeStation Securities, Inc.,* 1:10-cv-884
(N.D. Ill.). Pet. 3.

Numerous patents are related to the '999 patent
and the related patents are or were the subject of nu-
merous petitions for covered business method patent
review and reexamination proceedings. As noted
above, the Federal Circuit has issued a non-preceden-
tial decision, *CQG,* which addresses whether claims
of U.S. Patent Nos. 6,766,304 ("the '304 patent") and
6,772,132 ("the '132 patent") are patent eligible under
§ 101. The '999 patent at issue in this case is not re-
lated to the '132 and '304 patents via continuation or
divisional filings.

C. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are
unpatentable under 35 U.S.C. § 101. Pet. 19–35.

D. The '999 Patent

The '999 patent describes a graphical user inter-
face ("GUI") for an electronic trading system that al-
lows a remote trader to view trends for an item, which
assists the trader to anticipate demand for an item.
Ex. 1001, 2:3–6. Figure 3A of the '999 patent is repro-
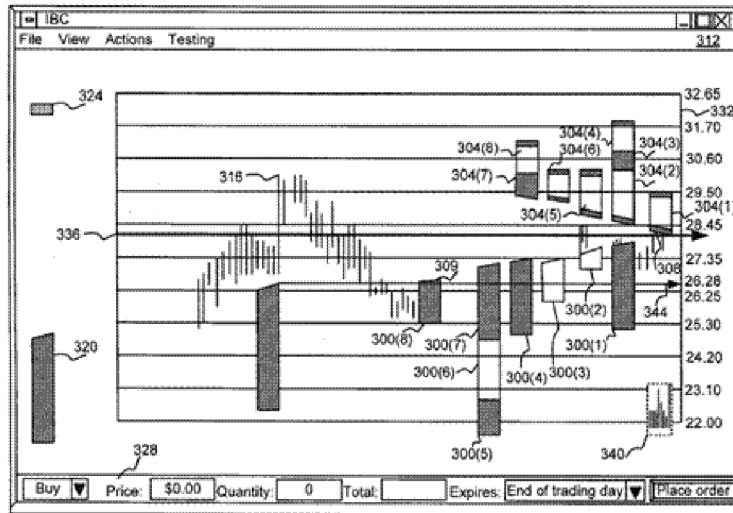duced below.

FIG. 3A

Figure 3A depicts a GUI that includes: 1) value axis 332, which indicates the value at which an item is being traded, 2) multiple offer icons 304(1)–304(8), and 3) multiple bid icons 300(1)–300(8). *Id.* at 6:13–15. The offer icons and the bid icons represent orders in the marketplace. *Id.*

A trader can place an order using the GUI in a variety of ways. *Id.* at 8:26–27. The trader can use task bar 328 to enter the required information and submit the order using the "Place Order" button. *Id.* at 8:27–33. Alternatively, the trader can select offer token 324 or bid token 320 using a pointing device, adjust the size of the token to match a desired quantity, and drag-and-drop the token to a location that corresponds to the desired value of the order. *Id.* at 8:38–58. Either a Buy pop-up window or a Sell pop-up window is displayed, which allows the trader to modify,

cancel, or submit the order. *Id.* at 8:54–65; Figs. 3d, 3e.

E. Illustrative Claim

Claims 1 and 35 are independent claims. Claims 2–34 directly or indirectly depend from claim 1. Claim 1 of the '999 patent is illustrative of the subject matter at issue.

1. A computer based method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items in a system where orders comprise a bid type or an offer type, and an order is generated for a quantity of the item at a specific value, the method comprising:

displaying a plurality of bid indicators, each corresponding to at least one bid for a quantity of the item, each bid indicator at a location along a first scaled axis of prices corresponding to a price associated with the at least one bid;

displaying a plurality of offer indicators, each corresponding to at least one offer for a quantity of the item, each offer indicator at a location along a first scaled axis of prices corresponding to a price associated with the at least one offer;

receiving market information representing a new order to buy a quantity of the item for a specified price, and in response to the received market information, generating a bid indicator that

corresponds to the quantity of the item bid for and placing the bid indicator along the first scaled axis of prices corresponding to the specified price of the bid;

receiving market information representing a new order to sell a quantity of the item for a specified price, and in response to the received market information, generating an offer indicator that corresponds to the [q]uantity of the item for which the offer is made and placing the offer indicator along the first scaled axis of prices corresponding to the specified price of the offer;

displaying an order icon associated with an order by the user for a particular quantity of the item;

selecting the order icon and moving the order icon with a pointer of a user input device to a location associated with a price along the first scaled axis of prices; and

sending an order associated with the order icon to an electronic trading exchange, wherein the order is of a bid type or an offer type and the order has a plurality of order parameters comprising the particular quantity of the item and the price corresponding to the location at which the order icon was moved.

App. 125

ANALYSIS

A. Claim Construction

In a covered business method patent review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.300(b); *Cuozzo Speed Techs., LLC v. Lee,* 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation approach). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.,* 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen,* 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. "axis of prices" and "indicators, icons, and tokens"

Petitioner proposes constructions for the following claim terms: "axis of prices" and "indicators, icons, and tokens," which are recited at least in claims 1, 9, and 35. Pet. 13–17. Patent Owner does not challenge Petitioner's proposed claim constructions. We have reviewed Petitioner's proposed constructions and determined that they are consistent with the broadest reasonable constructions for the reason discussed in the Petition. *Id*. We adopt the following claim constructions:

Claim Term	Construction
axis of prices	a reference line for plotting prices, including labeled, un-labeled, visible, and invisible reference lines
indicators, icons, and tokens	a symbol such as an alphanu-meric character or a graphic representation of an item

B. Covered Business Method Patent

Section 18 of the Leahy-Smith America Invents Act, Pub. L. No. 112– 29, 125 Stat. 284, 329 (2011) ("AIA") provides for the creation of a transitional pro-gram for reviewing covered business method patents. Section 18 limits review to persons or their privies who have been sued or charged with infringement of a "covered business method patent," which does not include patents for "technological inventions." AIA § 18(a)(1)(B), (d)(1); *see* 37 C.F.R. § 42.302. In compli-ance with 37 C.F.R. § 42.302(a), Petitioner certifies that it has been sued for infringement of the '999 pa-tent. Pet. 3.

Based on the record before us, we are apprised of no reason to change the determination in our Institu-tion Decision that at least claim 1 of the '999 patent is directed to a covered business method. Inst. Dec. 6– 13.

1. "Method or Corresponding Apparatus for Performing Data Processing or Other Operations Used in the Practice, Administration or Management of a Financial Product or Service"

The statute defines a "covered business method patent" as

> [a] patent that claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service.

AIA § 18(d)(1); *see* 37 C.F.R. § 42.301(a). A covered business method patent can be broadly interpreted to encompass patents claiming activities that are financial in nature. Transitional Program for Covered Business Method Patents—Definitions of Covered Business Method Patent and Technological Invention, 77 Fed. Reg. 48734, 48735 (Aug. 14, 2012); *Blue Calypso, LLC v. Groupon, Inc.,* 815 F.3d 1331, 1338–41 (Fed. Cir. 2016) (determining that a patent was a covered business method patent because it claimed activities that are financial in nature); *Unwired Planet, LLC v. Google, Inc.,* 841 F.3d 1376, n. 5 (Fed. Cir. 2016) (stating that "we endorsed the 'financial in nature' portion of the standard as consistent with the statutory definition of 'covered business method patent' in *Blue Calypso*"), *Versata Development Group, Inc. v. SAP America, Inc.,* 793 F.3d 1306, 1324–25 (Fed. Cir. 2015) ("[The statute] on its face covers a wide range of finance-related activities.").

A patent need have only one claim directed to a covered business method to be eligible for review. 77 Fed. Reg. at 48,736 (Response to Comment 8). We take claim 1 as representative.

Petitioner contends that the '999 patent is a covered business method patent because the claims recite receiving and displaying market information and sending a trade order to an electronic exchange, which are financial activities. Pet. 4–5 (citing claim 1 of the '999 patent); Pet. Reply 22–24. Patent Owner does not dispute that the claims are directed to a financial product or service and, instead, contends that the '999 patent is not a covered business method patent because the claims are not directed to data processing or other business method operations. *See* PO Resp. 52–55. Patent Owner contends that, regardless that some claims recite a method, the claims of the '999 patent are directed to a device, a GUI tool, and not a data processing or business method claim. *Id*. at 59–60.

Initially we note that a covered business method patent is not limited to only patents that claim a method, as opposed to a device. Covered business method patents include a patent that claims "a method or corresponding apparatus." AIA § 18(d)(1); *see* 37 C.F.R. § 42.301(a). Claim 1 of the '999 patent recites: "A computer based method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items . . . ." Ex. 1001, 14:7–10. As Petitioner points out, claim 1 recites steps of: 1) displaying market information, including indicators of

bids and offers in the market, 2) receiving and displaying market information, including new bids and new offers in the market, 3) displaying, selecting, and moving an order icon to a location along an axis of prices, and 4) sending a trade order to an electronic trading exchange. Pet. 4; Ex. 1001, 14:7–47.

Buying and selling items and sending a trade order to an electronic exchange are activities that are financial in nature. A method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items is a method for performing data processing or other operations used in the practice, administration, or management of a financial product or service.

Patent Owner disputes that the '999 patent claims data processing. PO Resp. 53–55. Patent Owner argues that the statute requires that the "data processing" cause a significant change in the data, and that data processing that merely displays the data, like the data processing disclosed in the '999 patent, is not significant. *Id*. Patent Owner's argument is based upon the assumption that "data processing" in the statute is interpreted according to the definition of "data processing" found in the glossary for class 705 of the United States Patent Classification System. *See id* at 53. Patent Owner, however, does not sufficiently explain why this definition is controlling, as opposed to the plain meaning of "data processing." *See* Ex. 1048 (dictionary definition of "data processing" as "the converting of raw data to machine readable form and its subsequent processing (as storing, updating, rearranging, or printing out) by a computer."), Ex.

1049 (dictionary definition of "data processing" as "the rapid handling of large amounts of information, as business data, by means of mechanical, or esp., computer equipment"). We, thus, are not persuaded that "data processing" as recited by the statute precludes data processing for the purpose of displaying the data. The '999 patent discloses processing market information for display on a client terminal and for sending an order to an exchange. *See e.g.,* Ex. 1001, 10:54–58 ("the order has been processed by the server 200") 11:2– 4("server 200 then processes the order information"), 11:42–44 ("the process is repeated"). We, thus, are not persuaded that the '999 patent does not claim "performing data processing…used in the practice, administration, or management of a financial product or service" (AIA § 18(d)(1)).

In any event, the statute does not limit covered business method patents to only those that claim methods for performing data processing used in the practice, administration, or management of a financial product or service. It includes methods for performing "other operations" used in the practice, administration, or management of a financial product or service. Patent Owner's arguments imply that "other operations" must be "business operations." *See e.g.*, PO Resp. 52. The statute states that the "other operations" are those that are "used in the practice, administration, or management of a financial product or financial service." AIA § 18(d)(1). There appears to be no disagreement that the claimed method steps are operations used in the practice, administration, or management of a commodity or trading a commodity on an electronic exchange, e.g., a financial service.

The '999 patent, therefore, at least claims "other operations used in the practice, administration, or management of a financial product or financial service" (AIA § 18(d)(1)).

Patent Owner additionally contends that the Legislative History confirms that the claimed invention is not a covered business method. PO Resp. 58–61. We are not persuaded by Patent Owner's argument. Although the legislative history includes certain statements that certain novel software tools and graphical user interfaces that are used by the electronic trading industry worker are not the target of § 18 of the AIA (*see* Ex. 2126, S5428, S5433), the language of the AIA, as passed, does not include an exemption for user interfaces for commodities trading from covered business method patent review. Indeed, "the legislative debate concerning the scope of a CBM review includes statements from more than a single senator. It includes inconsistent views...." *Unwired Planet*, 841 F.3d at 1381. For example, in contrast to the statements cited by Patent Owner, the legislative history also indicates that "selling and trading financial instruments and other securities" is intended to be within the scope of covered business method patent review. *See* Ex. 2126, S5432 (statements of Sen. Schumer). "[T]he legislative history cannot supplant the statutory definition actually adopted.... The authoritative statement of the Board's authority to conduct a CBM review is the text of the statute." *Unwired Planet*, 841 F.3d at 1381. Each claimed invention has to be evaluated individually to determine if it is eligible for a covered business method patent review. A

determination of whether a patent is eligible for a covered business method patent review under the statute is made on a case-by-case basis. 37 C.F.R. § 42.301(b).

For the reasons stated above, we are persuaded by Petitioner that the '999 patent "claims a method or corresponding apparatus for performing data processing or other operations used in the practice, administration, or management of a financial product or service" and meets that requirement of § 18(d)(1) of the AIA.

2. Exclusion for Technological Inventions

Even if a patent includes claims that would otherwise be eligible for treatment as a covered business method, review of the patent is precluded if the claims cover only "technological invention[s]," as defined by 37 C.F.R. §42.301(b). The definition of "covered business method patent" in § 18(d)(1) of the AIA does not include patents for "technological inventions."

To determine whether a patent is for a technological invention, we consider "whether the claimed subject matter as a whole [1] recites a technological feature that is novel and unobvious over the prior art; and [2] solves a technical problem using a technical solution." 37 C.F.R. § 42.301(b). The following claim drafting techniques, for example, typically do not render a patent a "technological invention":

> (a) Mere recitation of known technologies, such as computer hardware, communication or computer networks, software, memory, computer-readable storage medium, scanners, display devices

or databases, or specialized machines, such as an ATM or point of sale device.

(b) Reciting the use of known prior art technology to accomplish a process or method, even if that process or method is novel and non-obvious.

(c) Combining prior art structures to achieve the normal, expected, or predictable result of that combination.

Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,763–64 (Aug. 14, 2012).

Both prongs must be satisfied in order for the patent to be excluded as a technological invention. *See Versata*, 793 F.3d at 1326–7; *Apple Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1240 (Fed. Cir. 2016).

Petitioner contends that the '999 patent is not for a technological invention because the claims fail to recite any technological feature that is novel and unobvious over the prior art, and do not solve a technical problem with a technical solution. Pet. 3–9. In particular, Petitioner argues that the claims recite trading software that is implemented using conventional computer hardware, servers, and networks, directing attention to a description in the '999 patent that generically refers to "personal computers, terminals as part of a network, or any other computing device" and no specific hardware to carry out the invention. *Id*. at 6–7 (citing Ex. 1001, 4:34–36). Petitioner also argues that electronic trading was well known as of the filing date. *Id*. at 7.

Patent Owner disagrees (PO Resp. 56–58), but fails to explain sufficiently how the *claimed* subject

matter recites a technological feature that is novel and unobvious over the prior art or solves a technical problem using a technical solution.

We are persuaded by Petitioner's contentions that at least claim 1 of the '999 patent does not recite a novel and non-obvious technological feature. For example, the "BACKGROUND OF THE INVENTION" section of the '999 patent explains that it was well known for an exchange to record all transactions for a particular item and to replay or post to the individual traders outstanding bids with the highest values and outstanding offers with the lowest value, along with a quantity specified for each order, to facilitate trading a commodity. Ex. 1001, 1:31–41. There is no indication in the '999 patent that the inventors invented gathering market information, displaying it to a trader, and using the information to facilitate trading a commodity. *See* PO Resp. 57–58 ("This is correct."). The use of a computer to perform these functions also was known in the art at the time of the invention, and the '999 patent does not claim any improvement of a computing device.

Patent Owner argues that the '999 patent is for a technological invention because the claims are directed to a novel and nonobvious GUI tool that improves, and transforms, a computer so it can perform functions it previously could not. PO Resp. 56–58. We disagree that claim 1, for example, is directed to a novel and nonobvious GUI tool that improves, and transforms, a computer so it can perform functions it previously could not. Patent Owner's arguments in that regard are conclusory, and not directed to any

specific language from the claims themselves. As explained above, claim 1 is directed to a method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items, that requires receiving and displaying market information, including indicators of bids and offers in the market and displaying, selecting, and moving an order icon to a location along an axis of prices, and sending a trade order to an electronic trading exchange. Ex. 1001, 14:7–47. Moreover, there is no specific computer, program, or processing described in the '999 patent beyond what was known in the art at the time of the invention.

Given the above, we determine that claim 1 does not recite a technological feature that is novel and unobvious over the prior art. Because both prongs must be satisfied for a patent to be excluded from covered business method patent review for being a technological invention, we find that the '999 patent is eligible for a covered business method patent review for at least the reason that claim 1 fails to recite a technological feature that is novel and unobvious.

Notwithstanding our determination above, we also are persuaded by Petitioner that the '999 patent does not solve a technical problem with a technical solution.

Petitioner also argues that the claimed subject matter does not solve a technical problem using a technical solution, because the problem is a financial one and the solution is to rearrange available market data on a display. Pet. 8–9. In contrast, Patent Owner argues that the claimed subject matter recites a new GUI design (a new technology) that addressed the

problem with the old GUI design, and, thus, is directed to solving a technical problem using a technical solution. PO Resp. 56–58. Patent Owner states "GUI design is a technology, so new GUIs designed to improve conventional GUIs are necessarily technological solutions to technological problems." *Id*. at 56.

We are persuaded by Petitioner that the problem disclosed in the '999 patent is not a technical one. The '999 patent's specification highlights the problem and importance of informing a trader of certain stock market events so that the trader may use such information to facilitate trading a commodity. Ex. 1001, 2:19–26. The '999 patent states:

> The successful trader anticipates the rise or fall of the value of an item and performs his or her own transaction before[]the rest of the market is aware of the item's potential gain or loss in value. Thus, anticipation of the market is specifically of the future demand for an item of interest is critical to the success of a trader.

Ex. 1001, 1:20–26.

The '999 patent explains that traders use latest order information and other information, including historical transaction data, to anticipate the market and that "it is often difficult for a trader to quickly assemble this information from diverse and often unrelated sources or even effectively process all of this information in order to make an informed transaction decision." *Id*. at 1:51–54. Informing a trader of certain stock market trends or events is more of a financial

problem than a technical problem. The '999 patent solves this problem by "present[ing] this information in an intuitive format, allowing the trader to make informed decisions quickly." *Id*. at 2:39–41. We are persuaded by Petitioner that the '999 patent does not solve a technical problem with a technical solution. Further, as discussed above, claim 1 requires the use of only known technology.

Patent Owner proffers the testimony of Eric Gould-Bear and Dan Olsen to show that GUIs are technology and the claimed invention is a technical solution to a technical problem. *See, e.g.*, PO Resp. 19–21 (citing Ex. 2168 ¶¶ 23–38, Ex. 2174 ¶¶ 13–15, Ex. 2169 ¶¶ 16–18 testimony of Eric Gould-Bear, Dan Olsen, and Christopher Thomas, respectively). The testimony of Mr. Gould-Bear, Dr. Olsen, and Mr. Christopher Thomas is unpersuasive because, although their testimony addresses related patents, it does not specifically address the claimed invention of the '999 patent. For example, Mr. Gould-Bear's testimony is directed to U.S. Patent No 7,904,374. *See* Ex. 2168 ¶ 1. Likewise, Dr. Olsen's testimony is not directed to the claimed invention of the '999 patent. *See* Ex. 2174 ¶ 6, Ex. 2169 ¶ 2. The claims of U.S. Patent No 7,904,374 recite features not recited by the claims of the '999 patent.

Given this, we are persuaded that at least claim 1 does not solve a technical problem using a technical solution and does not satisfy the second prong of 37 C.F.R. § 42.301(b).

3. Conclusion

In view of the foregoing, we conclude that the '999 patent is a covered business method patent under AIA § 18(d)(1) and is eligible for review using the transitional covered business method patent program.

C. Section 101 Patent-Eligible Subject Matter

Petitioner challenges claims 1–35 of the '999 patent as directed to patent-ineligible subject matter under 35 U.S.C. § 101. Pet. 19–35. Patent Owner disagrees. PO Resp. 3–50

Under 35 U.S.C. § 101, we must first identify whether an invention fits within one of the four statutorily provided categories of patent-eligibility: "processes, machines, manufactures, and compositions of matter." *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 713–14 (Fed. Cir. 2014).

Initially, we note that Petitioner asserts that independent claim 35 of the '999 patent is invalid because it encompasses a transitory, propagating signal that is encoded, which is subject matter that does not fall into any of the four statutory classes of § 101. Pet. 25 (citing *In re Nuijten*, 550 F.3d 1346, 1352 (Fed. Cir. 2007)); Pet. Reply 18. In our Institution Decision, we determined that the broadest reasonable interpretation, in light of the specification of the '999 patent, encompasses transitory media, but we noted that our construction was preliminary and specifically indicated that "[t]he broadest reasonable interpretation, in light of the specification, of 'recorded' is an issue that requires further development of the record." Inst. Dec. 15.

Patent Owner responds that there is no evidence to support Petitioner's contention that one skilled in the art would have understood "computer readable medium having program code recorded thereon" to encompass a signal at the time of the invention. PO Resp. 48. Petitioner responds to Patent Owner's contentions by simply asserting that "the Board should apply the same BRI of 'computer readable medium' that the PTO has applied in thousands of matters." Pet. Reply 22–24 (citing Manual of Patent Examining Procedures § 2106, *Ex parte Mewherter*, 107 USPQ2d 1857(PTAB 2013) (precedential)).

Petitioner's response is unhelpful. Petitioner fails to offer sufficient evidence or persuasive argument as to how one skilled in the art would have understood the phrase "computer readable medium having program code recorded thereon" as it relates to the '999 patent. At oral hearing, when asked why no evidence was provided in this regard, Petitioner had no explanation other than "it would be difficult . . . because this is a term of art in the patent field" and "you can[not] go to an IEEE dictionary and find necessarily a dictionary definition that would be helpful here." Tr. 71:4–10.

Accordingly, on this record, we are not persuaded by Petitioner that at the time of the invention one skilled in the art would have understood "computer readable medium having program code recorded thereon" as encompassing transitory, propagating signals.

Even if claim 35 fits within one of the categories of patent-eligibility, we are persuaded that claims 1–35

do not recite patent-eligible subject matter for the reasons that follow.

1. Eligibility

Patent-eligible subject matter is defined in § 101 of the Patent Act, which recites:

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

There are, however, three judicially created exceptions to the broad categories of patent-eligible subject matter in § 101: laws of nature, natural phenomena, and abstract ideas. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012). Although an abstract idea, itself, is patent-ineligible, an application of the abstract idea may be patent-eligible. *Alice*, 134 S. Ct. at 2355. Thus, we must consider "the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* (citing *Mayo*, 132 S. Ct. at 1297–98). The claim must contain elements or a combination of elements that are "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [abstract idea] itself." *Id.* (citing *Mayo*, 132 S. Ct. at 1294).

2. Abstract Idea

"The 'abstract idea' step of the inquiry calls upon us to look at the 'focus of the claimed advance over the

prior art' to determine if the claim's 'character as a whole' is directed to excluded subject matter." *Affinity Labs of Texas v. DirectTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (quoting *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); *see also Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016). "The § 101 inquiry must focus on the language of the Asserted Claims themselves." *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1149 (Fed. Cir. 2016); *see also Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013) (admonishing that "the important inquiry for a § 101 analysis is to look to the claim"); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1346 (Fed. Cir. 2014) ("We focus here on whether the claims of the asserted patents fall within the excluded category of abstract ideas.").

According to Petitioner, the challenged claims are directed to the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order. Pet. 19–20. This is consistent with claim 1 of the '999 patent. Claim 1 is representative of independent claims 1 and 35. Claim 1 recites a "method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items." Claim 1 recites multiple steps of receiving and displaying market information, including indicators of bids and offers in the market, of new bids and offers in the market, and of an order by the user. Claim 1 also recites steps that require sending an order to an electronic trading exchange. The focus of the claim is on collecting and displaying market order information so that a user (i.e.,

a trader) can place an order. The disclosure of the purported problem solved by the '999 patent is consistent with this focus. The '999 patent discloses that the difference between its system and "conventional systems" is that its system displays all of the outstanding bid and offer orders and not just the highest bid and lowest offer to a trader. Ex. 1001, 2:15–19, 2:28–38. A trader having such information is at an advantage because the trader can better anticipate the market and future demand for an item when placing an order. *Id.* at 1:26–58. Collecting information and displaying the information, without more, is within the realm of abstract ideas. *Electric Power Group, LLC v. Alstom S.A.*, 830 F.2d 1350, 1352 (Fed. Cir. 2016).

Claim 1 does not recite any limitation that specifies how the computer implements the steps. *See* PO Resp. 57 ("the claims are to the functioning of GUI tool, not to the underlying computer by itself or to how instructions in software to provide a particular interface to an application are translated by the computer to control the individual pixels of a screen.") For example, claim 1 recites displaying an arrangement of the market information. Claim 1 requires displaying bid and offer indicators along a scaled axis of prices. *Id.* at 14:13–22. The '999 patent does not disclose an unconventional or improved method of mapping the bid indicators, offer indicators, or scaled price axis to the display. As Petitioner points out, numerous prior art references disclose that plotting bids and offers along a price axis was conventional in the electronic trading art. *See* Pet. Reply 4 (citing Ex. 1016, 0107, Ex. 1023, Fig. 2b, Ex. 1022, Figs. 4–5, Ex. 1050, Fig. 5A).

We agree with Petitioner that the abstract idea of graphing (or displaying) bids and offers to assist a trader to make an order is a fundamental economic practice or a process that can be performed using pen and paper. Pet. 23; *see also* Ex. 1012 ¶¶ 69–71, 81 (supporting testimony of Kendyl Roman). The '999 patent discloses that it was known for traders on an exchange to use information, such as highest bid, lowest offer, historical transaction data, etc., when making a trade. *See* Ex. 1001, 1:13–58. Exhibit 1027 discloses that long before the '999 patent, traders maintained books that plotted bids and asks (e.g., the market depth) along a price axis. *See* Ex. 1027, 44–46. Figure 4-2 of Exhibit 1027 is reproduced below.

FIGURE 4-2. *A page in the specialist's book.*

Figure 4-2 depicts a page of a book of a trader. *Id.* at 44–45. Orders to buy or sell a commodity are plotted along a prices axis. For example, Figure 4-2 shows the best bid at 22¼ and the best ask at 22 5/8. *Id.* at 44.

Given this, we determine that placing an order based on displayed market information, such as the inside market and a few other orders, as well as updating the market information is a fundamental economic and conventional business practice.

The claims at issue here are like the claims at issue in *Affinity Labs*. In *Affinity Labs*, the claim at issue recited an application that enabled a cellular telephone to present a GUI displaying a list of media sources that included selectable items for selecting a regional broadcasting channel. *Affinity Labs*, 838 F.3d at 1255–56. The claim also recited that the cellular telephone was enabled to transmit a request for the selected regional broadcasting channel. Id. at 1256. The claims at issue here are also like the claims at issue in *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229 (Fed. Cir. 2016). In *Ameranth*, the claim at issue recited a GUI that displayed menu items in a specific arrangement, a hierarchical tree format. Menu items were selected to generate a second menu from a first menu. *Ameranth* 842 F.3d at 1234. In both *Affinity Labs* and *Ameranth*, the court determined that the claims were not directed to a particular way of programming or designing the software, but instead merely claimed the resulting systems. The court thus determined that the claims were not directed to a specific improvement in the way computers operate. *Affinity Labs*, 838 F.3d at 1260–61; *Ameranth*, 842 F.3d

at 1241. Here, the claims also recite the resulting display and are not directed to specific improvements in the way the computers operate. "Though lengthy and numerous, the claims [that] do not go beyond requiring the collection, analysis, and display of available information in a particular field, stating those functions in general terms, without limiting them to technical means for performing the functions that are arguably an advance over conventional computer and network technology" are patent ineligible. *Elec. Power Group*, 830 F.3d at 1351. "Generally, a claim that merely describes an 'effect or result dissociated from any method by which [it] is accomplished' is not directed to patent-eligible subject matter." *Ameranth*, 842 F.3d at 1244 (quoting *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1348 (Fed. Cir. 2015)).

Claim 1 of the '999 patent is unlike the claims at issue in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245 (Fed. Cir. 2014) and *Enfish*. In *DDR Holdings*, the court determined that the claims did not embody a fundamental economic principle or a longstanding commercial practice. The claims at issue in *DDR Holdings* were directed to retaining website visitors, which the court determined was a problem "particular to the Internet." *DDR Holdings*, 773 F.3d at 1257. The court also determined that the invention was "necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks" and that the claimed invention did not simply use computers to serve a conventional business purpose. *Id*. In *Enfish*, the claim at issue was directed to a data storage and retrieval system for a computer memory. *Enfish*, 822 F.3d at

1336–37. The court determined that the claims were directed to an improvement in the functioning of a computer and were not simply adding conventional computer components to well-known business practices. *Id*. at 1338. Here, in contrast, claim 1 is directed to a fundamental economic principle or a longstanding commercial practice and not directed to an improvement in the computer: it is directed simply to the use of a display in a method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items.

Further, claim 1 of the '999 patent is unlike the claims at issue *in McRO, Inc. v. Bandai Namco Games America Inc*., 837 F.3d. 1299 (Fed. Cir. 2016). In *McRO*, the court held that claims that recited "a specific asserted improvement in computer animation" were not directed to an unpatentable abstract idea because they go "beyond merely organizing existing information into a new form or carrying out a fundamental economic practice." *McRO*, 837 F.3d at 135. Here, the claims merely organize existing market information along a price axis.

Patent Owner argues that the claims of the '999 patent are similar to those of the '304 patent and the '132 patent found to be eligible in *CQG*. Paper 36. The claims of the '999 patent are different from and are broader in some aspects than the claims of the '304 patent and '132 patent. *See* Paper 37, 1. For example, claim 1 of the '999 patent does not require a static price axis or single action order entry. *Id*. In *CQG*, the court indicated that even those narrower claims are on the line between patent eligibility and ineligibility

(*see id.* at *4 (noting the "close question[] of eligibility")). The specification of the '999 patent is different from those in the '304 patent and the '132 patent. Thus, comparing the claims of the patents involved in CQG is not particularly helpful here.

3. Inventive Concept

To be patent eligible, a claim directed to an abstract idea must recite additional elements that constitute an inventive concept. *Alice*, 134 S. Ct. at 2357. One looks to "[t]he elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Id.* at 2355 (quoting Mayo, 132 S. Ct. at 1297–98). The additional elements must be more than "well-understood, routine, conventional, activity." *Mayo*, 132 S. Ct. at 1298.

Petitioner contends that claim 1 does not recite an inventive concept. Pet. 25–28; Pet. Reply 15–18. Patent Owner disagrees. PO Resp. 24–26.

Claim 1 does not recite elements or a combination of elements that are "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [abstract idea] itself." *Alice*, 134 S. Ct. at 2355 (citing *Mayo*, 132 S. Ct. at 1294). Receiving market information is nothing more than a routine data gathering step. *See* Ex. 1001, 1:31–35. Routine data gathering does not transform the abstract idea into a patent-eligible invention. *See CyberSource Corp. v. Retail Decisions, Inc.,* 654 F.3d 1366, 1370 (Fed. Cir. 2011) (holding "[t]he mere collection and or-

ganization of data" patent-ineligible). Displaying information as indicators along a scaled price axis is well-understood, routine, conventional activity (*see* Ex. 1016, 0107, Ex. 1023, Fig. 2b, Ex. 1022, Figs. 4–5, Ex. 1027, Ex. 1050, Fig. 5A) that does not add significantly more to the abstract idea. *See Mayo*, 132 S. Ct. at 1298,

Patent Owner contends that combination of displaying market information and selecting and moving an icon to place an order is an inventive concept that transforms the abstract idea into a particular application. PO Resp. 24–26. Patent Owner relies upon the testimony of Mr. Christopher Thomas to show that "the claimed combination did not exist prior to the invention in either the physical world or as a GUI." *Id.* at 22 (citing Ex. 2169 ¶¶ 41, 46–53). Mr. Thomas's testimony is unpersuasive because, as discussed above, it does not specifically address the claimed invention of the '999 patent. *See* Ex. 2169 ¶¶ 1, 43 (discussing U.S. Patent No 7,904,374). Selecting and moving an icon is a well-understood, routine, conventional activity that does not add significantly more to the abstract idea. *See* Ex. 1029, 247–249 (disclosing that drag-and-drop (i.e., clicking and hold a button while moving some object across a screen) is old and well known). Conventional post-solution activity is not sufficient to transform the abstract idea into patent-eligible subject matter. *See Parker v. Flook*, 437 U.S. 584, 590–92 (1978). The claim requires nothing more than a generic computer to perform the method of claim 1.

The individual elements of the claim do not transform the nature of the claim into a patent-eligible application. They do not add significantly more to the abstract idea or fundamental economic practice. Contrary to Patent Owner's argument, the claim simply recites the use of a generic computer with routine and conventional functions. Even considering all of the elements as an ordered combination, the combined elements also do not transform the nature of the claim into a patent-eligible application.

For the reasons discussed above, claims 1 and 35 of the '999 patent are not directed to patent eligible subject matter under 35 U.S.C. § 101.

Petitioner contends that the additional elements recited by dependent claims 2–34 do not add significantly more to the abstract idea so as to render the claims patent-eligible. Pet. 33–35. Patent Owner makes no arguments specifically directed to the additional elements of these claims. We also have considered the other claims of the '999 patent and, for similar reasons, the claims 2–34 are not directed to patent eligible subject matter.

D. Motions to Exclude

Petitioner moves to exclude various ones of Patent Owner's Exhibits. Pet. MTE 2–10. Because the outcome of this trial does not change based on whether or not we exclude those exhibits, we *dismiss* Petitioner's Motion to Exclude as moot.

Patent Owner moves to exclude certain testimony of its declarant Mr. Christopher Thomas. PO MTE 1–8 (seeking to exclude Ex. 1047, 248, 263–269). Be-

cause we did not rely upon this testimony in our decision, we *dismiss* Patent Owner's Motion to Exclude as moot.

CONCLUSION

For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–35 of the '999 patent are patent-ineligible under 35 U.S.C. § 101.

ORDER

For the reasons given, it is:

ORDERED that claims 1–35 of the '999 patent are patent-ineligible under 35 U.S.C. § 101;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence and Patent Owner's Motion to Exclude Evidence are *dismissed*; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

RELEVANT STATUTORY PROVISIONS

35 U.S.C. § 100. Definitions

…

(b) The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

…

35 U.S.C. § 101. Inventions patentable

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

35 U.S.C. § 102. Conditions for patentability; novelty

(a) Novelty; Prior Art.—A person shall be entitled to a patent unless—

(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or

(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

(b) Exceptions.—

(1) Disclosures made 1 year or less before the effective filing date of the claimed invention.— A disclosure made 1 year or less before the effective filing date of a claimed invention shall not be prior art to the claimed invention under subsection (a)(1) if—

(A) the disclosure was made by the inventor or joint inventor or by another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(B) the subject matter disclosed had, before such disclosure, been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor.

(2) Disclosures appearing in applications and patents.—A disclosure shall not be prior art to a claimed invention under subsection (a)(2) if—

(A) the subject matter disclosed was obtained directly or indirectly from the inventor or a joint inventor;

(B) the subject matter disclosed had, before such subject matter was effectively filed under subsection (a)(2), been publicly disclosed by the inventor or a joint inventor or another who obtained the subject matter disclosed directly or indirectly from the inventor or a joint inventor; or

(C) the subject matter disclosed and the claimed invention, not later than the effective filing date of the claimed invention, were owned by the same person or subject to an obligation of assignment to the same person.

(c) Common Ownership Under Joint Research Agreements.—Subject matter disclosed and a claimed invention shall be deemed to have been owned by the same person or subject to an obligation of assignment to the same person in applying the provisions of subsection (b)(2)(C) if—

(1) the subject matter disclosed was developed and the claimed invention was made by, or on behalf of, 1 or more parties to a joint research agreement that was in effect on or before the effective filing date of the claimed invention;

(2) the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement; and

(3) the application for patent for the claimed invention discloses or is amended to disclose the names of the parties to the joint research agreement.

(d) Patents and Published Applications Effective as Prior Art.—For purposes of determining whether a patent or application for patent is prior art to a claimed invention under subsection (a)(2), such patent or application shall be considered to have been effectively filed, with respect to any subject matter described in the patent or application—

(1) if paragraph (2) does not apply, as of the actual filing date of the patent or the application for patent; or

(2) if the patent or application for patent is entitled to claim a right of priority under section 119, 365(a), 365(b), 386(a), or 386(b), or to claim the benefit of an earlier filing date under section 120, 121, 365(c), or 386(c), based upon 1 or more prior filed applications for patent, as of the filing date of the earliest such application that describes the subject matter.

35 U.S.C. § 103. Conditions for patentability; non-obvious subject matter

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 112. Specification

(a) In General.—

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

(b) Conclusion.—

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

(c) Form.—

A claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form.

(d) Reference in Dependent Forms.—

Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

(e) Reference in Multiple Dependent Form.—

A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple dependent claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.

(f) Element in Claim for a Combination.—

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

(10) **Patent No.:** **US 7,533,056 B2**

(12) **United States Patent Friesen et al.**

(45) **Date of Patent:** ***May 12, 2009**

(54) **USER INTERFACE FOR AN ELEC-TRONIC TRADING SYSTEM**

(75) Inventors: **Richard W. Friesen**, Fairfax, CA (US); **Peter C. Hart**, San Rafael, CA (US)

(73) Assignee: **Trading Technologies International, Inc.**, Chicago, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/417,544**

(22) Filed: **May 3, 2006**

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Related U.S. Application Data

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         Pat. No. 7,212,999.

(51)   **Int. Cl. *G06Q 40/00***   (2006.01)
(52)   **U.S. Cl.** 705/37; 705/35; 345/440.2
(58)   **Field of Classification**
         Search
          .... 705/35;
                               705/37; 345/440.2
     See application file for complete search history.

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(57) **ABSTRACT**

A user interface for an electronic trading exchange
is provided which allows a remote trader to view in
real time bid orders, offer orders, and trades for an
item, and optionally one or more sources of contextual
data. Individual traders place orders on remote client
terminals, and this information is routed to a trans-
action server. The transaction server receives order
information from the remote terminals, matches a bid
for an item to an offer for an item responsive to the
bid corresponding with the offer, and communicates
outstanding bid and offer information, and additional
information (such as trades and contextual data) back
to the client terminals. Each client terminal displays
all of the outstanding bids and offers for an item, al-
lowing the trader to view trends in orders for an item.
A priority view is provided in which orders are dis-
played as tokens at locations corresponding to the val-
ues of the orders. The size of the tokens reflects the
quantity of the orders. An alternate view positions or-
der icons at a location which reflects the value and
quantity of the order. Additionally, contextual data
for the item is also displayed to allow the trader to
consider as much information as possible while mak-
ing transaction decisions. A pit panel view is also pro-
vided in which traders connected to the pit are repre-
sented by icons, and are displayed corresponding to
an activity level of the trader.

15 Claims, 11 Drawing Sheets
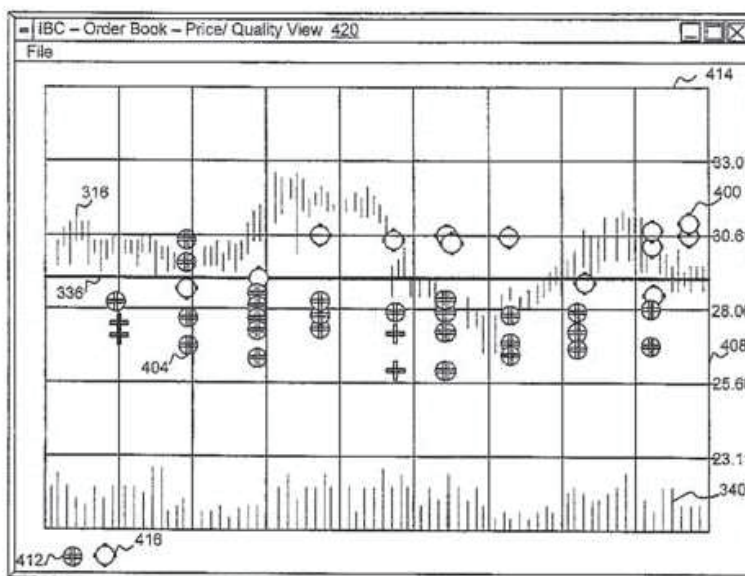
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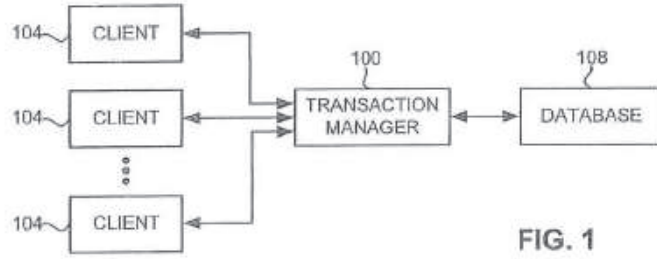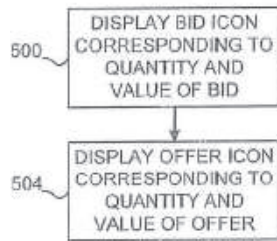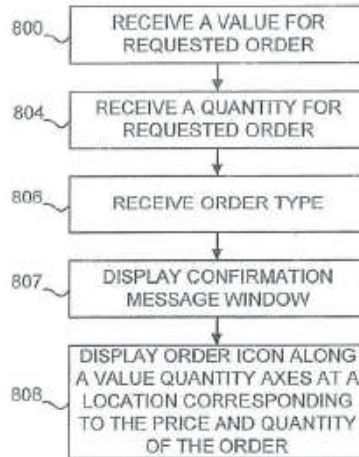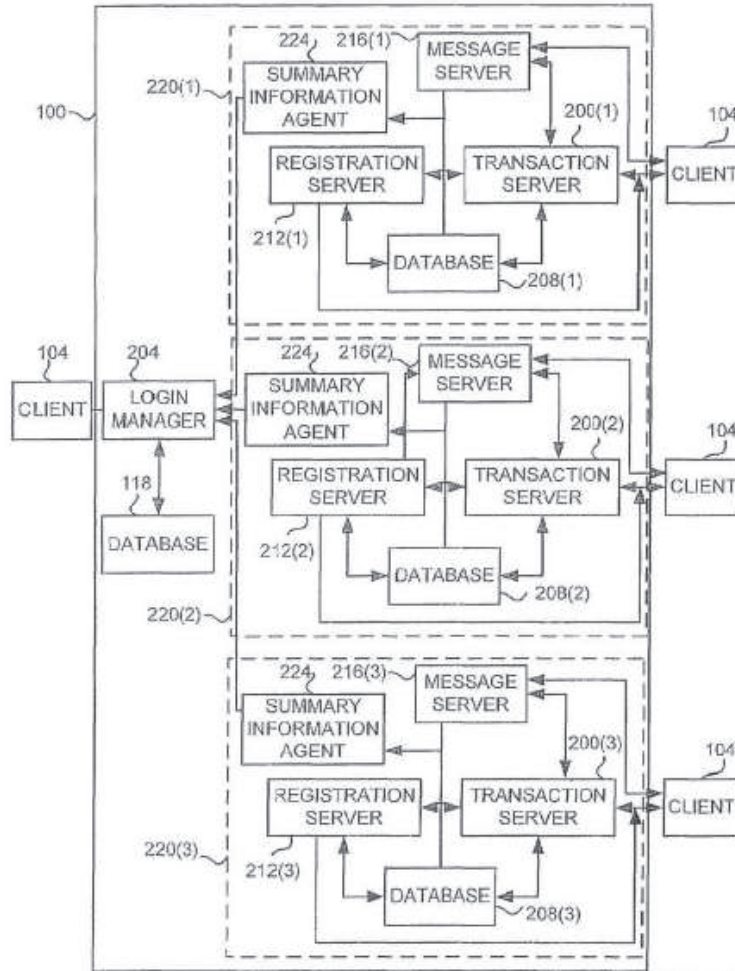* cited by examiner

FIG. 1

FIG. 5

FIG. 8

App. 167

FIG. 2

FIG. 3A

FIG. 3B

FIG. 3C

BUY

Price: $35.90

Quantity: 40

Value: $1436.00

Expires: End of trading day ▽

OK   Cancel

350

FIG. 3D

SELL

Price: $50.10

Quantity: 50

Value: $2505.00

Expires: 1 Week ▽

OK   Cancel

354

FIG. 3E

File

912(2)
913
912(3)
913

Portable
2nd nobo

bid

916
912(1)

904
Karen

908
Red

900

FIG. 9

FIG. 4

App. 173

RECEIVE AN ORDER TYPE `600`

RECEIVE A QUANTITY SPECIFIED FOR ORDER `604`

GENERATE AN ORDER ICON WHOSE VERTICAL SIZE MATCHES THE QUANTITY `608`

RECEIVE A PRICE FOR THE ORDER `612`

DISPLAY ORDER CONFIRMATION WINDOW `614`

TRANSMIT ORDER INFORMATION `616`

DOES SLOT CONTAIN AN EXISTING BID? `618` — NO → PLACE ICON AT DETERMINED SLOT `636`

YES ↓

DOES EXISTING BID HAVE A PRICE LESS THAN REQUESTED BID? `620` — YES → SHIFT ALL LOWER PRICED BIDS OVER ONE SLOT `640`

NO ↓

DOES EXISTING BID HAVE A PRICE EQUAL TO REQUESTED BID? `624` — YES → STACK REQUESTED BID BELOW EXISTING BID(S) `632`

NO ↓

DETERMINE NEW SLOT FOR REQUESTED BID `628`

FIG. 6

App. 174

FIG. 7

FIG. 10

COMMUNICATIONS WINDOW

1100

1112
VOICE

1104
INSTANT
MESSAGE

1108
EMAIL
MESSAGE

CONNECTION
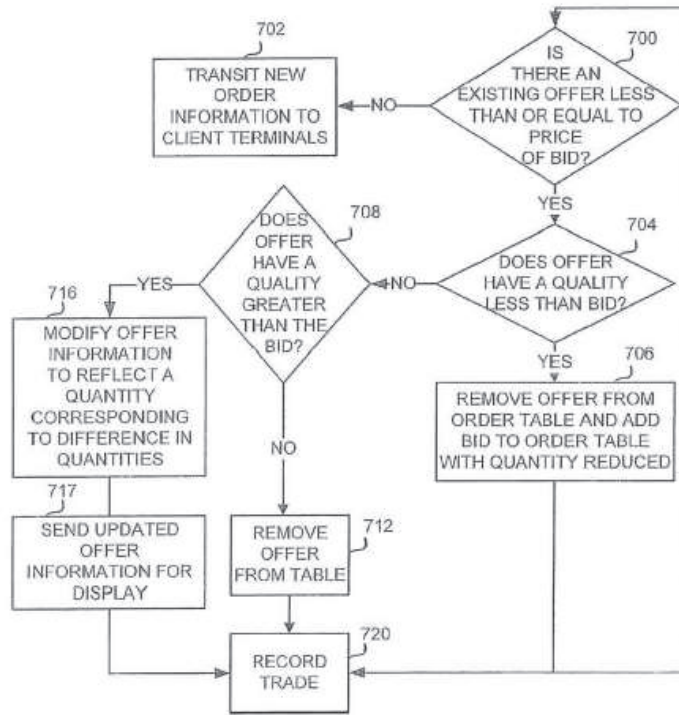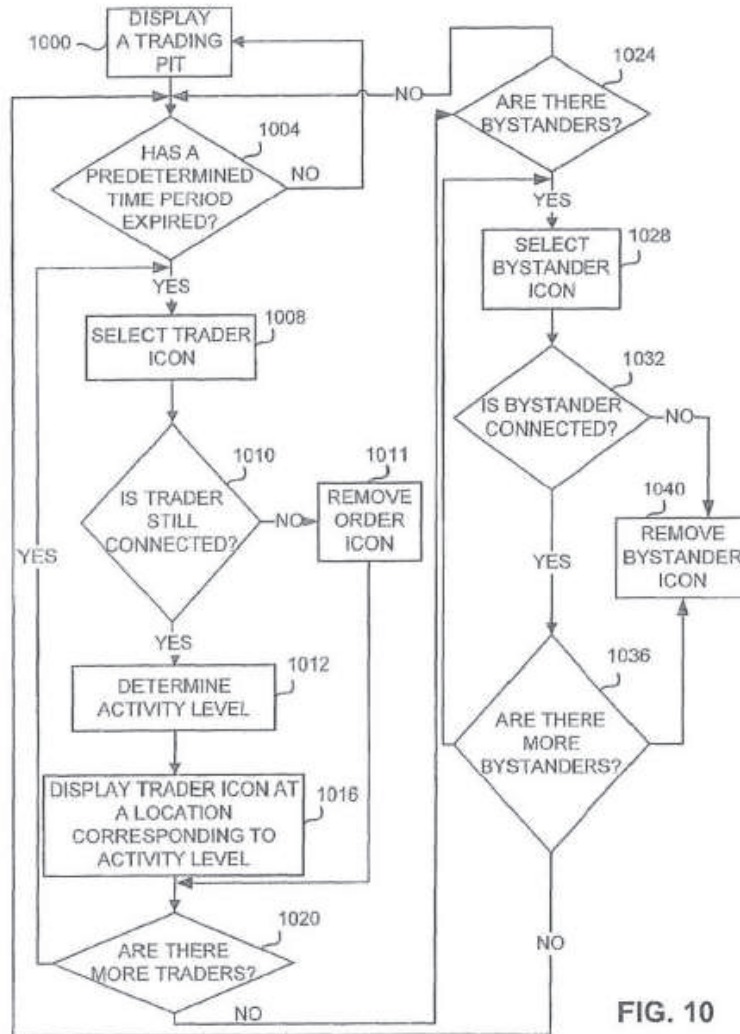
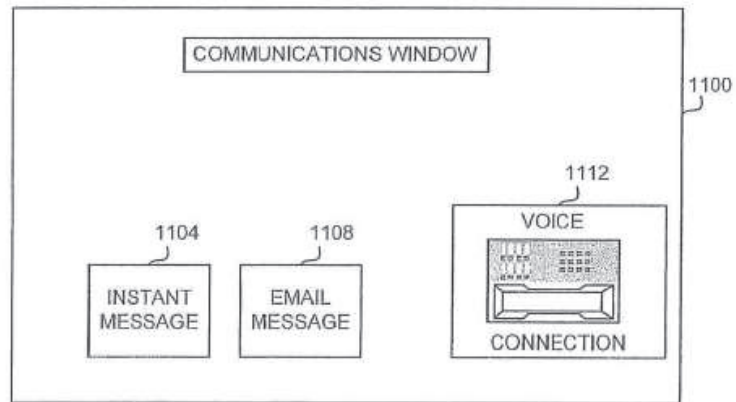FIG. 11

USER INTERFACE FOR AN ELECTRONIC TRADING SYSTEM

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. patent application Ser. No. 09/289,550 filed Apr. 9, 1999 now U.S. Pat. No. 7,212,999, entitled "User Interface for an Electronic Trading, system" the contents of which are fully incorporated herein, by reference.

TECHNICAL FIELD

The present invention relates generally to the field of graphical user interfaces and more particularly to the field of graphical user interfaces for electronic trading systems.

BACKGROUND OF THE INVENTION

Trading pits are the lifeblood of a market economy. Quantities of goods and shares in companies are bought and sold by millions of investors through trading pits on exchanges everyday. When a particular trading product or item is more valued, the value of the item is driven up as a result of more aggressive bidding by the buyers. When an item is less valued, the value of the item is driven down as a result of more aggressive offers to sell the item. The successful trader anticipates the rise or fall of the value of an item and performs his or her own transaction before the rest of the market is aware of the item's potential gain or loss in value. Thus, anticipation of the market and specifically of the future demand for an item of interest is critical to the success of a trader.

The transactions for each item occur in a trading pit for that item. The trading pit is a designated area in an exchange in which the customers submit their orders, either bids or offers, for the item to a broker in the pit. The exchange records all transactions and relays or posts to the individual traders the outstanding bid having the highest value and the outstanding offer having the lowest value for the item, along with the quantity specified in the order. The exchange does not release information on all outstanding offers and bids to the traders because, in part, this information is what gives the market makers an advantage over the traders and enables the market makers to change their own trading directions quickly, step in front of customer orders, and use customer limit orders to protect the market makers from losses. However, for an individual trader, having only the latest order information for an item complicates the trader's task of ascertaining trends in the orders for an item because the trader has very little information about the volume of offers and bids or the rate at which these volumes are changing.

Other information is also used by the trader to anticipate the market, including current exchange performances, historical transaction data for the item, the number of traders at the pit, and the trader's sense of the activity of the pit. However, it is often difficult for a trader to quickly assemble this information from diverse and often unrelated sources or even effectively process all of this information in order to make an informed transaction decision. From this information, and other external information, the trader must attempt to determine trends in the buying or

selling for the item in order to anticipate the market and the demand for a particular item.

Thus, a system is needed in which trend information of market demand for an individual item is provided to traders in an intuitive format which allows traders to quickly interpret how market demand is changing to an item. A system is also needed which provides contextual information about the item or the market to the trader while the trader is trading on a specific item in a manner which allows the trader to quickly interpret the information and then act accordingly.

SUMMARY OF INVENTION

The present invention is a user interface for an electronic trading system that allows a remote trader to view trends in the orders for an item, and provides the trading information in an easy to see and interpret graphical format. The user interface of the present invention operates in a system in which individual traders place orders including bids and offers, on remote client terminals, and this information is routed to a transaction server. The transaction server receives order information from the remote terminals, matches a bid for an item to an offer for an item responsive to the bid corresponding with the offer, and communicates outstanding bid and offer information back to the client terminals. Thus, in accordance with the present invention, each client terminal displays all of the outstanding bids and offers for an item, in contrast to the conventional systems and methods in which only the highest bid and lowest offer were known to the individual trader. This allows the trader

to view trends in orders for an item, and thus better enables the trader to anticipate demand for the item.

For example, in one embodiment, a graph is formed with a value axis. Bid icons and offer icons for all outstanding bids and offers are displayed on the graph at locations corresponding to the values of the bids and offers. When an item is being "bid up," i.e., the demand for the item is growing, all of the new bids are displayed to the remote trader. The trader immediately sees the increasing demand for the item as it occurs, and thus may infer that the item may rise in value, and can enter an order to buy for the item immediately while the value for the item still appears low. In contrast, in conventional systems, the trader only knew of the existence of the highest bid, and therefore would not know that demand for the item was increasing. However, by "opening the book," all of the outstanding orders are displayed to all of the remote traders and each trader is able to immediately see the growing demand and maximize his or her position in the market accordingly.

The user interface of the present invention presents this information in an intuitive format, allowing the trader to make informed decisions quickly. In a priority view embodiment, bid and offer icons are displayed corresponding to an axis of values. This results in the bid icons being displayed on the lower portion of the screen and the offer icons being displayed on the upper portion of the screen. The trader is able to discern immediately the number and volume of bids and offers outstanding for the item and their difference in value. The bids and offers are preferably displayed in different colors, shapes, or other visual

characteristics, further enhancing the trader's ability to quickly ascertain the current state of the market. The screen is updated frequently to display the most recent bids and offers. In one embodiment, the icons are formed having an edge which is angled toward the axis of values. When all outstanding offers and bids are displayed, the arrangement of icons naturally forms the edges of a triangle that points to the value differential at the axis of values. In yet another embodiment, the trader's own bids and offers are displayed in a first color or other visual characteristic, and the bids and offers of other traders are displayed in a second color or visual characteristic. This allows the trader to quickly determine his or her relative position in the marketplace. Finally, in a preferred embodiment, a size of the icons represents the quantity of the bid or offer, allowing an easy visual means of determining the relative quantities each bid and offer represent.

In a value/quantity view embodiment, an axis of values and an axis of quantities are used to determine the location of the bid and offer icons. The icons in this embodiment are markers or tokens and provide a different look and feel to the trader. Providing alternate views allow a trader to select a view with which the trader is most comfortable trading.

A value quantifying analytic is displayed in a further embodiment with respect to the value axis at a location corresponding to the current value which the analytic represents. The analytic is preferably displayed as a marker called an action line, in a color or other visual characteristic different from the other characteristics used to represent other objects being

displayed. The action line is selected by each individual trader and can reflect value-to-earning ratio, volatility, volume of sales, or any other metric the trader designs, or can be selected from a listed of predetermined metrics. The action line responds to changes in the data it measures, updating in essentially real time.

The action line allows the trader to immediately determine the current valuation of the item relative to the trader's own valuation of the item. As the offers or bids approach the action line, the trader is prepared to complete a transaction in accordance with the trader's own valuation.

In another aspect of the invention, market data and other contextual data is displayed while the trader is viewing one of the aforementioned user interfaces. A historical chart is displayed in the background of a user interface to provide additional information to the trader who is determining the state of the market and how it may affect the value of the item. For example, the historical chart may represent the various market indices, historical values of the item or others, and any other historical value, quantity, or volume trend. The historical chart can represent the average value of the item over a period of time, or may represent a value or values for any other item or group of items. The historical chart is displayed with respect to a vertical axis of values, and is displayed horizontally responsive to time. The historical chart is updated to provide the latest information to the trader while the trader is trading. Thus, in accordance with the present invention, the trader is able to make instantaneous decisions regarding an item

while receiving critical information about other items or the past performance of the current item and other indices. This is a major advantage over conventional methods of trading in which this information is not provided concurrently, and if presented at all, is difficult to process quickly.

An alternate embodiment provides a trading pit view that displays trader icons for each trader and positions the trader icons reflective of the activity level of the trader. Floor brokers and other bystanders are also displayed and identified to allow the trader to understand at a glance the respective positions and activity of all users currently connected to the transaction server for that trading pit. Selecting a trader icon provides information regarding the trader and can open up a window to allow the traders to communicate with each other using one or more methods including electronic mail, text chat or communication by voice over a network connection. The trading pit view allows the remote trader to immediately ascertain whom the trader is trading against, how active they are, and allows the trader to better anticipate the market.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a preferred embodiment of the electronic trading system of the present invention.

FIG. **2** is a block diagram of a preferred embodiment of the transaction manager of the present invention.

FIGS. **3***a*-**3***c* are screen shots illustrating an embodiment of a Priority View in accordance with the present invention.

FIG. **3***d* illustrates a buy order pop-up window.

FIG. **3***e* illustrates a sell order pop-up window.

FIG. **4** is a screen shot illustrating an embodiment of a Value/Quantity View in accordance with the present invention.

FIG. **5** is a flow chart illustrating a preferred embodiment of a method of displaying bid and offer icons in accordance with the present invention.

FIG. **6** is a flow chart illustrating a preferred embodiment of a method of generating a bid order icon in accordance with the present invention.

FIG. **7** is a flow chart illustrating a preferred embodiment of a method of generating a offer order icon in accordance with the present invention.

FIG. **8** is a flow chart illustrating an alternate embodiment of generating an order icon.

FIG. **9** is a screen shot illustrating a Pit Panel view in accordance with the present invention.

FIG. **10** is a flow chart illustrating a preferred embodiment of generating and placing a trader icon in accordance with the present invention.

FIG. **11** is a screen shot illustrating a communication window in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates the electronic trading system in accordance with the present invention. Client terminals **104** are coupled to a transaction manager **100**. The client terminals **104** are personal computers, terminals as part of a network, or any other computing device. Traders use the client terminals **104** to interact with trading pits that are managed by the transaction manager **100**. The transaction manager **100** manages transaction requests generated by the client terminals **104**, routes information to, from, and between the terminals **104** and the transaction manager **100**, and stores and retrieves information from a database **108** or databases **108**.

FIG. **2** illustrates a more specific embodiment of the transaction manager **100**. The clients **104** are coupled to log-in manager **204** to provide to each client access to the transaction manager **100**, and to allow each client **104** to designate one or more trading pits **220** to which to be connected. The transaction manager **100** hosts one or more transaction servers **200**. Each transaction server **200** is responsible for the trading of a specified item, essentially supporting a specific trading pit. The summary information agents **224** for each transaction server **200** provide a current status of the activity of each pit **220** to a trader connected to the log-in manager **204**. The trader can select a pit **220** to which to be connected based upon the summary information. Once the log-in process is complete, the clients **104** are coupled to a registration server **212** for the specified trading pit **220**. Registration for each pit **220** requires the client **104** to provide an access key that it received from the login manager **204** during log in.

After registering for a pit **220**, the trader is able to add, modify or delete orders for the item being traded in the trading pit **220**. One type of an order called a "bid" is an order to buy up to a specific quantity of an item at or below a specific value. Another type of an order called an "offer" is an order to sell up to a specific quantity of an item at or above a specific value. Other types of orders are possible depending on the type of item being traded in the trading pit **220**.

Each pit **220** includes a transaction server **200**. The transaction server **200** receives orders, matches bids and offers (when a bid and offer are matched it is called a trade or execution) and routes information to both the database **208** and the client terminals **104** connected to the trading pit **220**. The client terminals **104** generate icons for bid and offer orders (called bid and offer icons), historical charts and trader icons, and determine the placement of bid and offer icons and trader icons responsive to the information received from the transaction server **200**. The database **208** to which the transaction server **200** is coupled stores the information corresponding to each trader, information on every order submitted over a period (such as start of trading days), information on every trade over a period (such as last 180 days) and the information corresponding to the item being traded. Each trader may have information associated with the trader's account stored, including a name, e-mail account, address, phone number, personal value quantifying metric or analytic activity level history, and various other information which is unique to the individual trader and which may be used by the present invention to create a virtual trading environment.

The information corresponding to every order includes whether the order was a new order, modifications to an existing order or deletion of a previously submitted order, the type of order (for example, bid or offer), the value, the quantity, the time and date the order was submitted, and any other information specific to the order. The information corresponding to every trade includes the value, quantity, buyer and seller. The information corresponding to the item being traded includes the highest outstanding bid value and the lowest outstanding offer value for the item, as well as a list of the values of all open orders for the item. The item information is stored on the database **208** in a data structure such as an order table. The server **200** updates the information in the order table responsive to receiving information from the client terminals **104**. The updated information is then transmitted back to the client terminals **104**. Other information, such as information used in creating historical charts, may also be stored on database **208**. Information which may be global to more than one pit **220**, for example, trader personal information, is also stored on the system database **108**, to allow the information to be accessed by each trading pit **220**.

For traders registered to the same trading pit **220**, all of their orders (i.e. bids or offers specifying a value and quantity) are transmitted to the transaction server **200** for that pit **220**. The server **200** analyzes the orders for matches with outstanding, or open, orders. If there is a match between orders of different types, for example, between a bid and an offer, then a transaction is enacted and the client terminals **104** are notified to remove the matched icons. All out-

standing orders are transmitted to each client termi-
nal, allowing a trader to view all of the outstanding
orders from all traders for an item on a trading pit at
any given time. The client displays are updated con-
tinuously or at specific intervals to provide updated
information regarding which orders are outstanding
and the state of the market in the pit **220**. As shown
in FIG. **2**, multiple trading pits **220** are provided in
the electronic trading system, and a single trader may
be connected to as many pits **220** at the same time as
desired. The number of trading pits **220** which may be
maintained in accordance with the present invention
is scalable responsive to the number of servers which
are provided in the system. The items of trade include
any possible commodity, for example, minerals, fu-
tures, or shares in a corporation. Other network con-
figurations can be used to implement the electronic
trading system as is known to those of ordinary skill
in the art.

The client terminals **104** provide the interactive
link between the traders and the trading pits **220**, and
display the various user interfaces of the present in-
vention. FIG. **3***a* illustrates a priority view **312** which
is designed to allow traders to intuitively place orders
300, **304** and view markers **336** representing value
quantifying metrics, and contextual trend data **316** in
accordance with the present invention. In the priority
view embodiment, orders **300**, **304** are displayed at a
location corresponding to their value with respect to
the value axis **332**. Values may represent price, inter-
est rate, or any other metric by which an item may be
valued. For example, offer **304(1)** has a value of
$28.45, and the lowest point of the bottom edge **308** of
the icon **304(1)** is aligned with the value 28.45 on the

value axis **332**. In this embodiment, the top edges **309** of the bids and bottom edges **308** of the offer icons are angled. The rightmost bid is the bid having the highest value, and the rightmost offer is the offer having the lowest value. This allows the edges **308**, **309** of the icons **300**, **304** to form a triangle which points to the separation in value between the last lowest offer and the last highest bid. The quantity of each order is represented by a size of the icon such as its length or height. Icons having a larger size represent orders having a greater quantity. The specific quantity and other information of an order displayed on the screen may be known by selecting that order, which invokes a pop-up window to display the precise value and quantity of the selected order. In an alternate embodiment, the specific order information is displayed in the order task bar **328**, in response to a trader selecting a bid or offer icon provided the order was submitted by the trader selecting the order. Alternatively, if space permits, the quantity and value may displayed in the icon itself.

If there are several orders with equal value, the orders are stacked or placed adjacent to each other responsive to the time at which the order was placed. For example, bids **300(5)**, **300(6)**, **300(7)** have equal values at $29.50. Therefore, all three bid icons **300** are vertically stacked. A preferred method of stacking places the oldest orders closest to the horizontal space which naturally occurs and separates the bids and the offers. The horizontal separation between the bids and the offers occurs naturally because all of the bids displayed are always at a lower value then the displayed offers. If a bid is placed at a value equal to or exceeding an offer value, a transaction will be made

immediately and the icons removed. For example, in the stack containing orders **300(7)**, **300(6)**, and **300(5)** in FIG. **3***a*, the first and therefore the oldest bid in time was **300(7)**, and is placed at the top of the stack, closest to the horizontal separation between the displayed bids and offers. The other two stacked bids **300(6)**, **300(5)** are positioned below the oldest bid **300(7)**, corresponding to the time at which they were submitted, and sorted in order of oldest to newest. In the stack containing offers **304(2)**, **304(3)**, and **304(4)**, the oldest offer **304(2)** is positioned on the bottom of the stack closest to the horizontal separation, and the newest offer **304(4)** is positioned on the top of the stack. The above method of ordering bids and offers is a preferred method, however other ordering schemes could be used within the scope of the present invention.

The trader using the client terminal **104** in accordance with the present invention, is shown all of the outstanding orders **300**, **304** for the item being traded. This is one significant difference between the present invention and conventional systems because a trader using a system in accordance with the present invention is able to view trends in the bids and offers in addition to the buying and selling of the item being traded. For example, in FIG. 3A, a trader can quickly analyze the outstanding orders **300**, **304**, and determine that there are an almost equal number of bids **300(8)** as offers **304(8)**. Thus, the trader may infer that the market is stable, and the value for the item will not be dramatically driven up or down in the near future. Accordingly, the trader may decide to take no action. However, as shown in FIG. **3***b*, if demand builds through an increased number of bids being

made, as shown by the display of an increased number of bid icons **300**, or bids are being made for large quantities, as shown by the display of bid icons **300** having a greater size, and if supply recedes as indicated by the display of a reduced number of offers icons **304**, the trader can anticipate that the value for the item will increase. Consequently, the trader will place bids for the currently low valued offers **304**. Thus, by viewing all outstanding offer icons **304** and bid icons **300** as they are made on an item, the trader can anticipate the market and quickly adjust his or her trading plans to take advantage of the information. In contrast, in conventional systems, the trader only knows the last highest bid and the last lowest offer. In the example of FIG. 3A, the trader would only know the existence of bid **300(1)** and offer **304(1)**. Only the market maker would know of the existence of the other bids and offers. Individual traders would therefore be unaware of trends in bidding, and experience greater difficulty in anticipating the market.

The trader can also view the gap between offer icons **304** and bid icons **300** to determine at what value sales may be made and for what quantity. In the example of FIG. **3***a*, the trader can determine that there are several bids **300(5)**, **300(6)**, **300(7)**, at a value slightly less than $27.35. Therefore, if the trader has a number of items to sell, the trader can make offers at that value and be assured of a sale of all of his or her items. However, if this value is too low, the trader can choose to keep all of his items until the value of the item has risen, which would be reflected in the display of additional bid icons at a higher value position in the screen. In contrast, if a

trader was using a conventional system, the trader would have to offer his items incrementally, without knowing in advance when sales are likely to be made.

The value axis **332** indicates the value at which an item is being traded. This value may represent different qualitative measures for an item, such as the raw price for the item; for bonds, the value could be the cost for the bond or the implied interest rate for the bond, or the value be used as a measure for an implied volatility of the item, for example, a generic measurement of the relative expense of an option. Each trader can use their own value scale. For example, one trader may use a bond cost as an axis of values and another may use the implied interest rate of the bond. Regardless of a trader's choice of value, the different orders are displayed on the trader's screen in terms of the value the trader has chosen. Additionally, the value scales are completely customizable. For example, a gold arbitrageur could create a scale that measures the difference between the futures price of the metal less the spot cash price of the metal. The arbitrageur could then apply the cost of carry, including insurance and storage, to the future/cash price difference to generate an implied interest rate for the gold. Thus, the value axis for the arbitrageur would be an interest rate. In another example a trader who is interested in trading soybean oil could buy and sell soybeans, but, by using a value axis which accounts for the current cost of crushing soybeans, storage of soybeans, transport, etc, can be actually trading in soybean oil. Thus different traders in the same trading pit **220** would see the same bid and offers but organized with respect to their own specific value axis. Thus, the pre-

sent invention provides enormous flexibility in constructing a view of an item's value which is directly representative of the trader's own interest in the item.

The priority view **312** offers several other advantages to a trader. The offers **304** and the bids **300** are displayed in different colors, shapes, textures or sizes, or other distinguishing visual characteristics, to allow the trader to quickly ascertain the current state of the market for this item. Additionally, orders made by the trader are displayed having a different visual characteristic than the visual characteristic used to display orders of other traders. This allows the trader to easily distinguish between their own orders and the orders of other traders. For example, in FIG. **3***a*, the trader is able to immediately determine that offers **304(3)** and **304(7)** are the trader's own offers **304**, and therefore should be discounted from any market analysis. In FIG. **3***a*, the trader can also quickly determine that the trader himself is the trader with the most bids **300** in place, which suggests to the trader that the value for the item may be driven down if the trader removes his bids **300** from the pit **220**.

Orders can be placed by a trader using the user interface of the present invention in variety of ways. In one embodiment, as shown in FIG. **3***a*, the trader can directly submit an order by using the order task bar **328**. The options to specify value and quantity of either a bid or offer, and the expiration period are provided. After the information is entered, the trader selects Place Order, and the order is submitted to the transaction server **200** for the pit **220**, and an offer or bid icon **304**, **300** is generated and displayed at the

desired location at the desired size. The order information is communicated to the transaction server **200** and from there to the other client terminals, so that the new bid/offer appears in the displays of all other traders in this same pit. In a preferred embodiment, the trader submits an order by simply selecting either an offer token **324** or bid token **320** using a pointing device. After being selected, the trader adjusts the size of the offer or bid token **324**, **320** until the size of the token matches the desired quantity of the order. Preferably, a pop-up window or other screen indicator is displayed to show in numerical terms the quantity of the current size of the token, to ease the process of creating a properly sized order token. Next, the token is dragged to a location on the screen which corresponds to the desired value of the order. Again, a screen indicator displays the current value for the token at its current location as it is being dragged to allow precise placement of the token at the desired value.

In the embodiment of FIG. **3***a*, a value marker **344** follows bid token **320** as it is moved to a location in the display. The value marker **344** indicates the value of the new order as the order is being placed. This allows for the trader to easily and precisely move the token **320**, **324** to the desired value. After reaching the desired value, the trader releases the pointing device button and a Buy pop-up window **350**, as shown in FIG. **3***d*, is displayed with the bid order information. The Buy pop-up window **350** allows the trader to modify the order information (value, quantity, expiration), cancel the order or submit the order with the presently displayed information. If the order

is to sell an item, a Sell pop-up window **354** is displayed, as shown in FIG. **3***e*. After the order is submitted to the transaction server, it will be displayed on the screens of all traders in this trading pit connected to the transaction server **200**.

An additional feature of the user interface of the present invention is the provision of contextual data. Contextual data comprises historical trading data of the item, historical or current trading data of other items, historical or current trading data of an average of items. For example, the trader may wish to have the Dow Jones Average™ displayed on the screen, and updated in realtime. Viewing contextual data along with the outstanding offers and bids allows the trader to better anticipate the market. For example, if the Dow Jones™ average is used as the contextual data, and is falling sharply, the trader may decide to begin selling his items even though the value of the item in the pit **220** has been stable. This allows the trader to anticipate where the market is headed. Any type of data useful to the trader can be displayed as contextual data. The contextual data **316** is preferably displayed as a historical chart **316** along a vertical axis of values and against a horizontal axis of time. The historical chart **316** can be displayed against any time period, for example, hours, minutes, etc. The historical chart **316** is updated periodically as the data for the item is updated. If the historical chart **316** includes the current item, as shown in FIG. **3***a*, bar lines are displayed in the data to indicate the high and low values of the item for that time period. A volume graph **340** is displayed at the bottom edge of graph. The volume graph illustrates the volume of transactions in the pit **220**, and gives additional information

to the trader regarding the state of the market for the item.

Yet another feature of the user interface of the present invention is the display of a marker **336**. The marker **336** is representative of a value quantifying metric specified by the trader. The metric determines a current action value for the item which identifies the value at which the trader should act if the value of the item rises above the action value or falls beneath the action value. For example, in FIG. **3***b*, the value quantifying metric generates an action value of $68.57. The marker **336** is displayed at this value to indicate to the trader the location of the action value in relation to the current bids **300** and offers **304**. In the example of FIG. **3***b*, the marker is displayed as an action line **336**. As can be seen, the outstanding bids are below the action line **336** and the current offers are above the action line **336**. This indicates to the trader that no action should be taken.

The value quantifying metric can be an algorithm or formula based upon factors the trader believes are important in ascertaining the true worth of an item. This metric can be set to reflect value-to-earnings ratio, volatility, volume of orders, percent gain, or any simple or complex design. The trader can input a custom metric or can select a metric from a predesignated list of metrics. Metrics may also be purchased from 3rd parties and incorporated into the client terminal **104**. This allows new metrics to be added at any time. The action value displayed by metrics are dynamically determined either by the client terminal **104** or the server **200**, and updated whenever new data is received regarding a component of the metric. Thus, the

trader is given the latest information to update the trader's action line **336**, allowing the trader to make current, informed decisions regarding possible orders. For example, in FIG. **3**c, the metric has been updated from the time of FIG. **3**b. The action line **336** has moved corresponding to the new action value of $80.21. As can be seen, displaying the updated action line **336** allows the trader to immediately determine that the outstanding offers are now below his action line **336**, and therefore that these offers should be purchased despite the fact that the offers themselves remained at the same value from the time of FIG. **3**b to the time of FIG. **3**c.

As discussed above, a trader may be connected to several trading pits **220** at once. If a trader has multiple connections, the trader can view the different pits **220** simultaneously, or if the trader wishes to concentrate on a single item, the trader can have only one pit **220** displayed. Additionally, the trader can disable the different options for a view to suit the trader's preferences, and maximize visibility for a trader's particular terminal **104**.

FIG. **4** illustrates an alternate view of the user interface in accordance with the present invention. The value/quantity view **420** illustrates the market for the item using a first axis of values **408** and a second axis **412** for quantity. Thus, the location of each offer icon **400** and each bid icon **404** represents the value for the offer or bid and the quantity for which the offer or bid is made. Optionally, the action line **336** is also displayed, as well as the contextual data. The alternate view provides a different intuitive perspective on the state of the market. By providing alternate views, as

shown in FIG. 3C, the electronic trading system of the present invention allows the different preferences of different traders to be met. Orders in this view are placed by selecting an offer token **416** or a bid token **417** and moving the token to a location which corresponds to the desired quantity and value. If the trader wishes to purchase immediately, the trader can simply drag a bid token **417** to the location directly over any offer token, and a window pops up displaying a bid order with value and quantity equal to that of the offer token. If the trader wishes to sell immediately, the trader can simply drag an offer token **416** to the location directly over any bid token, and a window pops up displaying an offer order with value and quantity equal to that of the bid token. The trader can then execute the transaction.

FIG. **5** is a flow chart illustrating a preferred embodiment of the user interface in accordance with the present invention. The client terminal **104**, through data received from the transaction server **200**, displays **500** at least one outstanding bid icon corresponding to a quantity and value of the bid. The client terminal **104** also displays **504** at least one outstanding offer icon corresponding to a quantity and value of an offer. Thus, by displaying at least one outstanding bid and offer icon, the "book" is opened and traders viewing the client terminal can readily spot trends in supply and demand for an item and quickly anticipate the market.

FIG. **6** illustrates an embodiment of a method of generating an order icon in accordance with the priority view **312** of the present invention. First, the cli-

ent terminal **104** receives **600** the order type. The order can be either a bid or an offer. The trader specifies the type by selecting an offer or bid token to place the order, or by manually indicating the order type on the task bar. Second, the client terminal **104** receives **604** a quantity specified for the order. The quantity, as described above, is specified by the trader either by entering the number directly into the order task bar or by adjusting the size of the order token. In an embodiment where the order information is entered into the taskbar, an order icon will be generated **608** whose vertical size matches the quantity specified after the order has been processed by the server **200**. The client terminal **104** then receives **612** a value for the order. Again, the trader can specify the value by entering the information into the taskbar or can drag the order token to the location corresponding to the value. Finally, the client terminal **104** displays **614** an order confirmation window displaying the value, quantity, and expiration information. The trader can modify the order in this window and then must either cancel the order by closing the window or pressing the cancel button or submit it by pressing the OK button. The client terminal **104** which receives the value and quantity and order type information transmits **616** the information to the server **200**. The server **200** then processes the order information, and updates the order table.

Once the server **200** transmits updated order information to a client terminal **104**, the client terminal **104**, in the priority view, determines **618** whether a slot is open adjacent an existing order which has a lower value, if the order is a bid, or a higher value, if

the order is an offer. In the priority view **312**, the horizontal axis is divided into slots, each slot having a width equal to an order icon **300**, **304** and each slot separated by a standard set-off unit. Incoming orders are sorted by the value of the order. For offers, the offers with the lowest values are positioned closest to the axis of values **332**, and for bids, the bids with the highest values are positioned closest to the axis of values **332**. When a new order is received, the client terminal **104** re-sorts the outstanding orders and places the order icons **300**, **304** in the appropriate positions. If a new order is equal to an existing order of the same type, the order is stacked onto the existing order. FIG. **6** illustrates a more detailed methodology of the sorting mechanism, using the example of placing a new bid. However, the methodology is equally applicable to placing a new offer.

A new bid is designated for the slot adjacent an existing bid which has the least value of the set of existing bids having values greater than the value of the new bid. The client terminal **104** determines **618** whether this determined slot has an existing bid within it. If it does not, the icon is placed **636** at the determined slot. If the slot does contain an existing bid, the client terminal **104** determines **620** whether the existing bid has a value less than the requested bid. All existing bids that have values less than the requested bid are moved **640** to the adjacent slot positioned away from the axis of values **332**. In the example of FIG. **3***a*, the adjacent slot would be a slot positioned to the left. All other bids having values less than the requested bid are shifted **640** correspondingly. If the client terminal determines **624** that the existing bid has a value equal to the existing bid, the

requested bid is stacked **632** below the existing bid or bids, away from the horizontal separation between bids and offers as described above. If the client terminal **104** determines **628** that the existing bid is greater than the requested bid, a new slot is determined **628** for the requested bid, and the process is repeated.

As shown in FIG. **7**, upon receiving new bid information, the transaction server **200** determines **700** whether there is an existing offer in the order table having a value less than or equal to the requested bid. If there is not, the new bid is added to the table, and the information regarding the new bid is sent **702** to the client terminals **104** for display. If there is an existing offer whose value is less than or equal to the requested bid, i.e., if the new bid is the highest value bid outstanding, the server **200** determines **704** whether the existing offer has a quantity which is less than the quantity represented by the bid. If the offer does have a quantity less than the bid, the server removes **706** the offer from the order table and adds a new bid to the order table with the quantity reduced by the quantity of the offer removed.

The server **200** records **720** a trade between the trader submitting the new bid and the trader submitting the removed offer, at a value equal to the offer value and a quantity equal to the offer quantity. All of the outstanding client terminals **104** are sent the information regarding the trade. The client terminals **104** then remove the existing offer icon and add a bid icon which has a size corresponding to the difference in quantities between the existing offer icon and the

requested bid icon. The transaction server **200** determines **700** again whether there is another existing offer in the order table having a value less than or equal to the requested bid to determine if another transaction can be made with the quantity remaining in the bid.

The server **200** also determines **708** whether the offer has a quantity greater than the quantity of the requested bid. If it does, the quantity of the offer is reduced **716** by the quantity of the bid, and the updated offer information is sent **717** to the client terminals 104 for display. A trade is recorded **720** between the trader submitting the new bid and the trader who submitted the offer at a value equal to the offer value and a quantity equal to the bid quantity. All of the outstanding client terminals **104** are sent the information regarding the trade and update the user interface displays accordingly.

If the quantities of the bid and offer are equal, the offer is removed **712** from the table and the transaction is complete. A trade is recorded **720** between the trader submitting the new bid and the trader who submitted the offer at a value equal to the offer value and a quantity equal to the bid quantity. All of the outstanding client terminals **104** are sent the information regarding the trade, and update the user interface displays accordingly.

As shown in FIG. **8**, in the value/quantity view, the client terminal **104** receives **800** a value, receives **804** a quantity, and receives **806** an order type for a new order. A confirmation window is displayed **807**, and, upon confirmation of the order, the order information

is transmitted to the server **200**. Again, this may occur responsive to the trader entering in the information directly or dragging an order token to the proper location and after confirming the order. The server **200** receives the order information, updates the order table, and sends the updated information to the client terminals **104**. The client terminals **104** display a new order icon at a location corresponding to the value and quantity of the order with respect to the axis of quantities and axis of values. If the new order is an offer, and there is an existing bid for a value higher than or equal to the value of the offer, a transaction is completed, and a new offer or a modified bid token is displayed responsive to the quantities that the original offer and bid icons represented.

FIG. **9** illustrates a trading pit view **900** called the pit panel view **900**, in accordance with the present invention. The pit panel view **900** provides a visual interface to other members of the pit **220**. All users who are currently registered to the pit **220** are displayed in the pit panel **900**. This is critical information to a trader regarding the activity of the pit **220**. If the pit **220** is crowded, the trader can expect volatility in trading. If the pit **220** is empty, the trader can expect light trading and relatively stable values for the item.

The pit panel **900** displays trader icons **912**, observer icons **904**, and floor broker icons **908**. Observers are users who are registered to the pit **220** but who are not actively trading and floor brokers are individuals who have expertise on a pit's item and traders, and who assist traders in executing unusual trades, negotiating a deal with multiple traders, or providing history and information on traders to others. As the

observers do not trade for themselves, their icons **904** are placed on the outside of the pit icon **916**. Floor brokers who do not trade also have their icons **908** placed on the outside of the pit icon **916**.

The trader icons **912** are displayed on the pit icon **916**. The pit icon **916** is preferably displayed as a series of concentric polygons, where each polygon represents an activity level or levels. Traders who are more active are placed closer to the center of the pit icon **916**. The most active trader, in the example of FIG. **9**, trader **912(1)**, is placed in the center of the pit icon **916**. In a preferred embodiment, each polygon represents a range of activity levels. For example, the innermost polygon contains the traders with the second through ninth highest activity levels. The next polygon contains the traders having the tenth through twenty-sixth highest activity levels, and so forth. By grouping traders into activity ranges, and thus shifting a trader's icon out of a polygon only in response to the trader's activity level shifting out of the range represented by the polygon, icon changes and consequent flicker in the display of the pit icon **916** are minimized. However, a trader is able to easily ascertain who the active traders in a pit **220** are and how active the traders are by noting the relative locations of the trader icons **912** in the pit icon **916**.

Each trader icon **912** has order indicators **913** to show the quantity of orders a trader has outstanding. Preferably, there are separate indicators **913** for bids and offers, each showing the volume of outstanding bids or offers the trader currently has placed. Other order indicators **913** may be optionally displayed, for example, indicating the sum of all quantities of orders

or the volume of orders entered over a specified period of time. Selecting a trader's icon **912** will also highlight the trader's orders on the priority view, value/quantity view, and other views provided in the system that display orders and which can all be displayed concurrently. Double clicking on a trader icon **912** generates a communication window as shown in FIG. **11** which allows the trader to send an email message **1108**, send an instant message **1104** as part of a text chat session, communicate by voice over the network connection **1112**, or set up a later telephone call or other optional communication to the selected other trader. Thus, the pit panel **900** provides a sense of community in the pit **220** by visual representing useful information, and provides additional information to the trader which the trader can use in anticipating the market.

FIG. **10** is a flow chart illustrating a preferred embodiment of generating and placing a trader icon in accordance with the present invention. First, a trading pit icon **916** is displayed **1000**. Next, the client **104** determines **1004** whether a predetermined period of time has passed. The pit panel data is updated periodically, and the client **104** waits for that amount of time before re-generating the display with the new data. If the server **200** determines **1004** that the predetermined period has expired, a first trader icon is selected **1008**. The client **104** determines **1010** whether the trader is still connected to the server **200** from the data provided by the server **200**. If the trader is not, the trader icon **912** for the trader is removed **1011**, and the client **104** determines **1020** whether there are more traders. If the trader is still connected,

an activity level is determined **1012** for the trader. Activity levels are determined as a combination of the volume of outstanding orders, the value of outstanding orders, recent activity, or other measures which determine how active a trader has been. Once the activity level has been determined, the client **104** displays **1016** the icon **912** for the trader at the location corresponding to the activity level. In an embodiment where order indicators **913** are displayed, the order indicators **913** are updated to include the latest order data. In the preferred embodiment, as discussed above, the pit icon **916** is comprised of concentric polygons or rings, the traders are ordered by activity levels, and each polygon represents a range of activity level orders. After the activity level of a trader is determined, the traders are reordered responsive to their activity levels, and the trader icon **912** for each the trader is placed in the polygon designated for the order of the trader. The client **104** determines **1020** if there are more traders. If there are not, the client **104** determines **1024** if there are bystanders and, if there are, selects **1028** the first bystander icon **904**, **908** and determines **1032** whether the bystander is connected using data that is provided by the server **200**. If the bystander is not connected, the bystander icon is removed **1040**. If the bystander is connected, the client **104** determines **1036** whether there are more bystanders. If there are not, the client 104 returns to the step of determining **1004** whether a predetermined time period has ended, as the pit panel **900** view has been updated to reflect the current users and their current activity levels.

We claim:

1. A method of operation used by a computer for displaying transactional information and facilitating trading in a system where orders comprise a bid type or an offer type, the method comprising:

> receiving bid and offer information for a product from an electronic exchange, the bid and offer information indicating a plurality of bid orders and a plurality of offer orders for the product;
>
> displaying a plurality of bid indicators representing quantity associated with the plurality of bid orders, the plurality of bid indicators being displayed at locations corresponding to prices of the plurality of bid orders along a price axis;
>
> displaying a plurality of offer indicators representing quantity associated with the plurality of offer orders, the plurality of offer indicators being displayed at locations corresponding to prices of the plurality offer orders along the price axis;
>
> receiving a user input indicating a default quantity to be used to determine a quantity for each of a plurality of orders to be placed by the user at one or more price levels;
>
> receiving a user input indicating a desired price for an order to be placed by the user, the desired price being specified by selection of one of a plurality of locations corresponding to price levels along the price axis; and

sending the order for the default quantity at the desired price to the electronic exchange.

2. The method of claim **1**, further comprising:

receiving a user input indicating a second desired price for a second order to be placed by the user, the second desired price being specified by selection of one of the plurality of locations corresponding to price levels along the price axis; and

sending the second order for the default quantity at the second desired price to the electronic exchange.

3. The method of claim **1**, further comprising:

receiving a user input indicating a new default quantity, wherein the new default quantity is used to determine a quantity for each of a plurality of orders to be placed by the user at one or more price levels.

4. The method of claim **3**, further comprising:

sending the order for the new default quantity at the desired price to the electronic exchange.

5. The method of claim **1**, further comprising:

displaying an order icon at a location that corresponds to the desired price level

along the price axis, the order icon indicating the user's order at the electronic exchange.

6. The method of claim **5**, further comprising:

displaying the plurality of bid indicators using a first visual characteristic;

displaying the plurality of offer indicators using a second visual characteristic; and

displaying the order icon using a third visual characteristic.

7. The method of claim **5**, wherein the order icon indicates the default quantity working at the electronic exchange.

8. The method of claim **1**, wherein a size of each bid indicator of the plurality of bid indicators is determined based on the quantity associated with that bid indicator, and wherein a size of each offer indicator of the plurality of offer indicators is determined based on the quantity associated with that offer indicator.

9. The method of claim **1**, wherein each bid indicator of the plurality of bid indicators displays quantity associated with a price level, wherein each offer indicator of the plurality of offer indicators displays quantity associated with a price level along the price axis.

10. The method of claim **1**, wherein selecting one of the plurality of locations corresponding to price levels along the price axis comprises releasing a pointing device over one of the plurality of locations.

11. The method of claim **1**, further comprising:

upon receiving the user input indicating the desired price for the order, automatically displaying a pop-up window with the default quantity and the desired price.

12. The method of claim **11**, wherein the pop-up window allows the order to be sent to the electronic exchange.

13. The method of claim **1**, wherein the default quantity is a default quantity for orders of a bid type.

14. The method of claim **1**, wherein the default quantity is a default quantity for orders of an offer type.

15. The method of claim **1**, further comprising: adjusting a size of an order token to indicate the default quantity.

* * * * *

UNITED STATES PATENT AND TRADEMARK
OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.   : 7,533,056 B2
APPLICATION NO. : 11/417544
DATED   : May 12, 2009
INVENTOR(S)   : Richard W. Friesen et al.

It is certified that error appears in the above-identi-
fied patent and that said Letters Patent is hereby cor-
rected as shown below:

Column 14, line 9: please delete "plurality offer
orders" and insert -- plurality of offer orders --.

Signed and Sealed this

Ninth Day of February, 2010

David J. Kappos

*Director of the United States Patent and Trademark
Office*

UNITED STATES PATENT AND TRADEMARK
OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.   : 7,533,056 B2
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It is certified that error appears in the above-identi-
fied patent and that said Letters Patent is hereby cor-
rected as shown below:

 Delete drawing sheet, consisting of figs. 2, 3A,
3B, 3D, 3E, 9, 4, 6, 7 and 10 substitute therefor
the drawing sheets, consisting of figs. 2, 3A, 3B,
3D, 3E, 9, 4, 6, 7 and 10 as shown on the at-
tached pages.

 Column 6, line 35: please delete "$29.50" and
insert --slightly less than $27.35--.

Signed and Sealed this

Twenty-second Day of March, 2011

David J. Kappos

Director of the United States Patent and Trademark
Office

FIG. 2

FIG. 3A

FIG. 3B

BUY

Price: $35.9D

Quantity: 40

Value: $1436.00

Expires: End of trading day ▽

OK   Cancel

350

FIG. 3D

SELL

Price: $50.10

Quantity: 50

Value: $2505.00

Expires: 1 Week ▽

OK   Cancel

354

FIG. 3E

IBC-PitPlace

File

916

912(2)

913

Portable

912(3)

913

2ᵈ nobo

912(1)

bid

904

Karen

908

Red

900

FIG. 9

FIG. 4

RECEIVE AN ORDER TYPE 600

RECEIVE A QUANTITY SPECIFIED FOR ORDER 604

GENERATE AN ORDER ICON WHOSE VERTICAL SIZE MATCHES THE QUANTITY 608

RECEIVE A PRICE FOR THE ORDER 612

DISPLAY ORDER CONFIRMATION WINDOW 614

TRANSMIT ORDER INFORMATION 616

DOES SLOT CONTAIN AN EXISTING BID? 618

NO → PLACE ICON AT DETERMINED SLOT 636

YES

DOES EXISTING BID HAVE A PRICE LESS THAN REQUESTED BID? 620

YES → SHIFT ALL LOWER PRICED BIDS OVER ONE SLOT 640

NO

DOES EXISTING BID HAVE A PRICE EQUAL TO REQUESTED BID? 624

YES → STACK REQUESTED BID BELOW EXISTING BID(S) 632

NO

DETERMINE NEW SLOT FOR REQUESTED BID 628

FIG. 6

FIG. 7

FIG. 10

UNITED STATES PATENT AND TRADEMARK
OFFICE
CERTIFICATE OF CORRECTION

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It is certified that error appears in the above-identi-
fied patent and that said Letters Patent is hereby cor-
rected as shown below.

The Title Page, showing the illustrative figure,
should be deleted and substitute therefor the at-
tached title page.

Signed and Sealed this

Nineteenth Day of April, 2011

David J. Kappos

*Director of the United States Patent and Trademark
Office*

(10) **Patent No.:** **US 7,533,056 B2**

(12) **United States Patent Friesen et al.**

(45) **Date of Patent:** ***May. 12, 2009**

(54) **USER INTERFACE FOR AN ELEC-TRONIC TRADING SYSTEM**

(75) Inventors: **Richard W. Friesen**, Fairfax, CA (US); **Peter C. Hart**, San Rafael, CA (US)

(73) Assignee: **Trading Technologies International, Inc.**, Chicago, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **11/417,544**

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Related U.S. Application Data

(63) Continuation of application No. 09/289,550, filed on Apr. 9, 1999, now Pat. No. 7,212,999.

(51) **Int. Cl.**
G06Q 40/00 (2006.01)
(52) **U.S. Cl.** **705/37**;
.... 705/35;
345/440.2
(58) **Field of Classification** 705/35,
Search 705/37;
.... 345/440.2
See application file for complete search history.

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App. 224

(57)   **ABSTRACT**

A user interface for an electronic trading exchange is
provided which allows a remote trader to view in real
time bid orders, offer orders, and trades for an item.
and optionally one or more sources of contextual data.
Individual traders place orders on remote client ter-
minals, and this information is routed to a transaction
server. The transaction server receives order infor-
mation from the remote terminals, matches a bid for
an item to an offer for an item responsive to the bid
corresponding with the offer, and communicates out-
standing bid and offer information, and additional in-
formation (such as trades and contextual data) back
to the client terminals. Each client terminal displays
all of the outstanding bids and offers for an item, al-
lowing the trader to view trends in orders for an item.
A priority view is provided in which orders are dis-
played as tokens at locations corresponding to the val-
ues of the orders. The size of the tokens reflects the
quantity of the orders. An alternate view positions or-
der icons at a location which reflects the value and
quantity of the order. Addition-ally, contextual data
for the item is also displayed to allow the trader to
consider as much information as possible while mak-
ing transaction decisions. A pit panel view is also pro-
vided in which traders connected to the pit are repre-
sented by icons, and are displayed corresponding to
an activity level of the trader.

App. 225

15 Claims, 11 Drawing Sheets
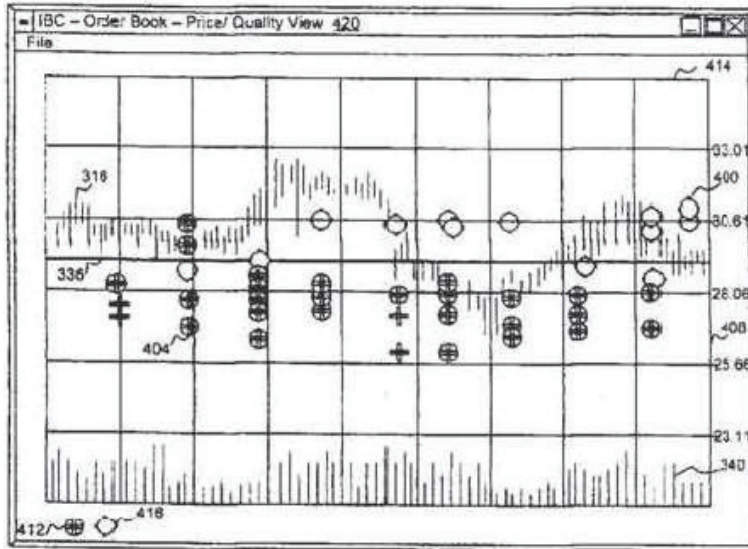
(10) **Patent No.:** **US 7,904,374 B2**

(12) **United States Patent Kemp, II et al.**

(45) **Date of Patent:** ***Mar. 8, 2011**

(54) **CLICK BASED TRADING WITH IN-TUITIVE GRID DISPLAY OF MAR-KET DEPTH**

(75) Inventors: **Gary Allan Kemp, II**, Winnetka, IL (US); **Jens-Uwe Schluetter**, Evanston, IL (US); **Harris Brumfield**, Chicago, IL (US)

(73) Assignee: **Trading Technologies International, Inc.**, Chicago, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 559 days.

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(65) **Prior Publication Data**

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Related U.S. Application Data

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        G06Q 40/00   (2006.01)
(52)   **U.S. Cl.** **705/37**
(58)   **Field of Classification**
        Search 705/35–45
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(57)   **ABSTRACT**

A method and system for reducing the time it takes
fora trader to place a trade when electronically trad-
ing on an exchange, thus increasing the likelihood
that the trader will have orders filled at desirable
prices and quantities. The "Mercury" display and
trading method of the present invention ensure fast
and accurate execution of trades by displaying market
depth on a vertical or horizontal plane, which fluctu-
ates logically up or down, left or right across the plane
as the market prices fluctuates. This allows the trader
to trade quickly and efficiently.

App. 229

36 Claims, 6 Drawing Sheets

CONNECTION TO MULTIPLE EXCHANGES
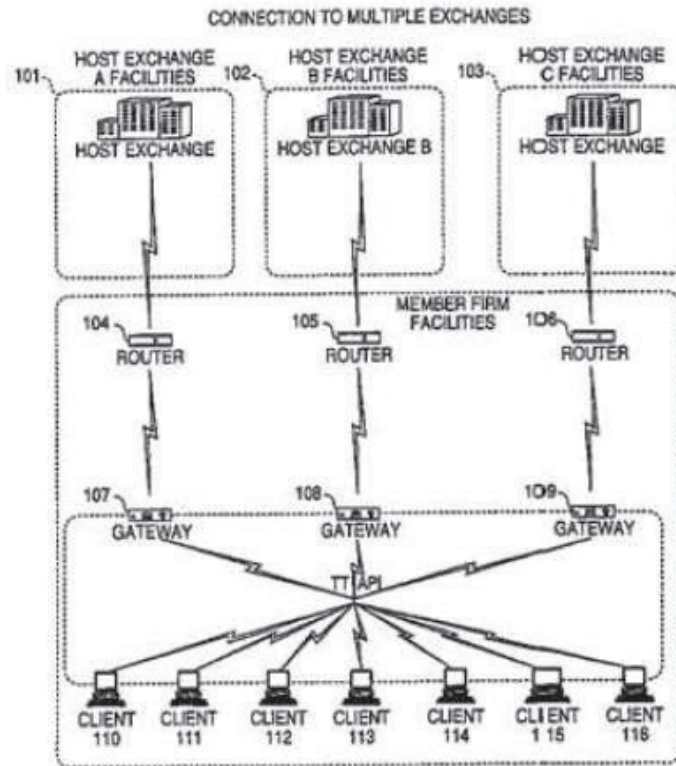
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FIG. 1

CONNECTION TO MULTIPLE EXCHANGES

HOST EXCHANGE A FACILITIES 101

HOST EXCHANGE B FACILITIES 102

HOST EXCHANGE C FACILITIES 103

HOST EXCHANGE

HOST EXCHANGE B

HOST EXCHANGE

MEMBER FIRM FACILITIES

104 ROUTER

105 ROUTER

106 ROUTER

107 GATEWAY

108 GATEWAY

109 GATEWAY

TT API

CLIENT 110

CLIENT 111

CLIENT 112

CLIENT 113

CLIENT 114

CLIENT 115

CLIENT 116

App. 254
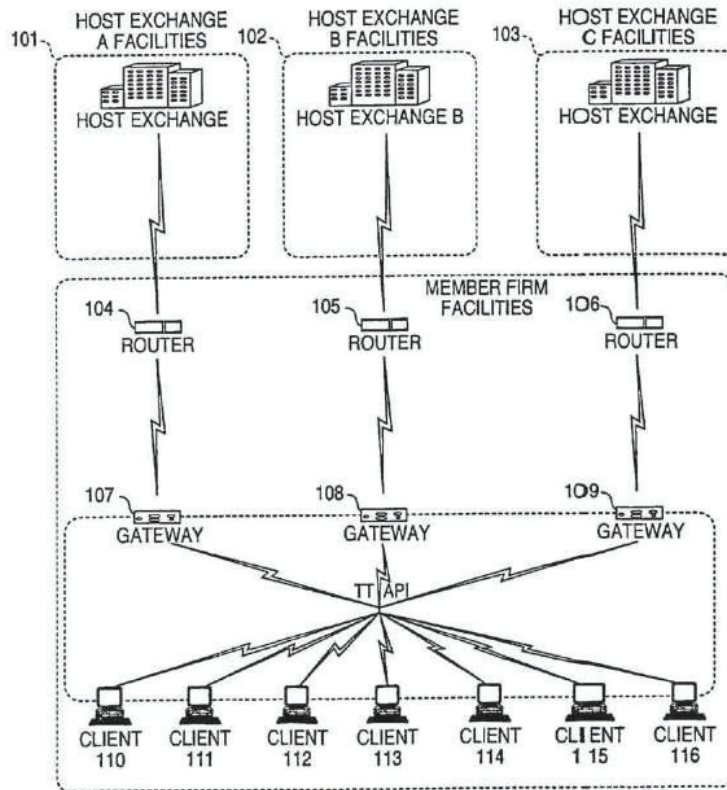
FIG. 2

Contract	Depth	BidQty	BidPrc	AskPrc	AskQty	LastPrc	LastQty	Total
CDHO	•	785	7626	7627	21	7627	489	8230
		626	7625	7629	815			
		500	7624	7630	600			
		500	7623	7631	2456			
		200	7622	7632	800			

201 202 203 204 205

FIG. 3

1009	E/W	10:48:44	BidQ	AskQ	Prc	LTQ
		L	3		104	99	
1010		R	5		24	98	
1011		720		33	97	
1012		×	10		115	96	
1013		0		32	95	
1014		10	1H		27	94	
		50	3H		63	93	
1007	S 0 W 24	1K	5H		45	92	
	S 0 W 7	CLR		28	91	
1015		×	10		20	90	10
1016		17	▽				
1008	B 0 W 15	CXL	18		89	
	B 0 W 13	+	-	97		88	
1017		NET 0	30		87	
1018	B 0 W 17		43		86	
		NET REAL	110		85	
1019			23		84	
			31		83	
1021			125		82	
			21		81	

1020

1001 1002 1003 1004 1005 1006

FIG. 4

SYCOM FGBL DEC99							
E/W	10:48:44		BidQ	AskQ	Prc	LTQ	
	L	3			104	99	
	R	5			24	98	
	720			33	97		
	×	10		115	96		
	0			32	95		
	10	1H		27	94		
	50	3H					
S 10 W 14	1K	5H		63	93	10	
	CLR		43		92		
	×	10	125		91		
	17	▽	97		90		
B 0 W 15	CXL		18		89		
B 0 W 13	+	−	97		88		
	NET 0		30		87		
B 0 W 17	NET REAL		43		86		
			110		85		
			23		84		
			31		83		
			125		82		
			21		81		

1101

FIG. 5

App. 258

FIG. 6

TRADING WITH MERCURY

START

TRADER HAS MARKET DISPLAYED ON HIS COMPUTER SCREEN 1301

SET QUANTITY VALUES IN APPROPRIATE FIELDS (R/L FIELDS, CURRENT QUANTITY FIELD, NetPos, OR OFFSET.) 1302

POSITION CURSOR OVER DESIRED CELL ON THE MERCURY DISPLAY 1303

IS THIS A TRADING CELL - I.E. THE BidQ OR AskQ COLUMN? 1304

NO → NO ORDER SENT (MAY ADJUST QUANTITIES OR OTHER RESTRICTIONS DEPENDING ON CELL SELECTED) 1305 → END

YES → IS LEFT OR RIGHT MOUSE BUTTON CLICKED? 1306

RIGHT → QUANTITY OF ORDER = VALUE IN R FIELD 1307

LEFT → QUANTITY DESCRIPTION CHOSEN? 1308

OFFSET → QUANTITY OF ORDER = VALUE IN L FIELD 1309

Plus → ALL QUANTITIES IN THE MARKET FOR PRICES BETTER THAN OR EQUAL TO THE PRICE IN THE ROW CLICKED 1310

THIS WILL ADD UP THE QUANTITIES FOR EACH ORDER IN THE MARKET THAT WOULD FILL THE ORDER BEING ENTERED BY THE TRADER - I.E. THE SUM OF ALL QUANTITIES THAT "BETTER" THE ORDER BEING ENTERED

NUMBER → QUANTITY OF ORDER= CURRENT QUANTITY 1311

NetPos → QUANTITY OF ORDER= CURRENT NetPos 1312

COLUMN CLICKED? 1313

BidQ → SEND BUY ORDER TO MARKET FOR PREDEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED 1315 → END

AskQ → SEND SELL ORDER TO MARKET FOR DEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED 1314 → END

CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET DEPTH

PRIORITY

The present application is a continuation of U.S. patent application Ser. No. 11/415,163, filed May 2, 2006, now issued as U.S. Pat. No. 7,813,996, which is a continuation of U.S. patent application Ser. No. 10/237,131, filed Sep. 9, 2002, now abandoned, which is a continuation of U.S. patent application Ser. No. 09/590,692, filed Jun. 9, 2000, now issued as U.S. Pat. No. 6,772,132, which claims priority to U.S. Provisional Patent Application Ser. No. 60/186,322, filed Mar. 2, 2000, the contents of which are incorporated herein by reference.

FIELD OF INVENTION

The present invention is directed to the electronic trading of commodities. Specifically, the invention provides a trader with a versatile and efficient tool for executing trades. It facilitates the display of and the rapid placement of trade orders within the market trading depth of a commodity, where a commodity includes anything that can be traded with quantities and/or prices.

BACKGROUND OF THE INVENTION

At least 60 exchanges throughout the world utilize electronic trading in varying degrees to trade stocks, bonds, futures, options and other products. These electronic exchanges are based on three components: mainframe computers (host), communications servers, and the exchange participants' computers (client). The host forms the electronic heart of the fully computerized electronic trading system. The system's

operations cover order-matching, maintaining order books and positions, price information, and managing and updating the database for the online trading day as well as nightly batch runs. The host is also equipped with external interfaces that maintain uninterrupted online contact to quote vendors and other price information systems.

Traders can link to the host through three types of structures: high speed data lines, highspeed communications servers and the Internet. High speed data lines establish direct connections between the client and the host. Another connection can be established by configuring high speed networks or communications servers at strategic access points worldwide in locations where traders physically are located. Data is transmitted in both directions between traders and exchanges via dedicated high speed communication lines. Most exchange participants install two lines between the exchange and the client site or between the communication server and the client site as a safety measure against potential failures. An exchange's internal computer system is also often installed with backups as a redundant measure to secure system availability. The third connection utilizes the Internet. Here, the exchange and the traders communicate back and forth through high speed data lines, which are connected to the Internet. This allows traders to be located anywhere they can establish a connection to the Internet.

Irrespective of the way in which a connection is established, the exchange participants' computers allow traders to participate in the market. They use software that creates specialized interactive trading

screens on the traders' desktops. The trading screens enable traders to enter and execute orders, obtain market quotes, and monitor positions. The range and quality of features available to traders on their screens varies according to the specific software application being run. The installation of open interfaces in the development of an exchange's electronic strategy means users can choose, depending on their trading style and internal requirements, the means by which they will access the exchange.

The world's stock, bond, futures and options exchanges have volatile products with prices that move rapidly. To profit in these markets, traders must be able to react quickly. A skilled trader with the quickest software, the fastest communications, and the most sophisticated analytics can significantly improve his own or his firm's bottom line. The slightest speed advantage can generate significant returns in a fast moving market. In today's securities markets, a trader lacking a technologically advanced interface is at a severe competitive disadvantage.

Irrespective of what interface a trader uses to enter orders in the market, each market supplies and requires the same information to and from every trader. The bids and asks in the market make up the market data and everyone logged on to trade can receive this information if the exchange provides it. Similarly, every exchange requires that certain information be included in each order. For example, traders must supply information like the name of the commodity, quantity, restrictions, price and multiple other variables. Without all of this information, the

market will not accept the order. This input and output of information is the same for every trader.

With these variables being constant, a competitive speed advantage must come from other aspects of the trading cycle. When analyzing the time it takes to place a trade order for a given commodity, various steps contribute in different amounts to the total time required. Approximately 8% of the total time it takes to enter an order elapses between the moment the host generates the price for the commodity and the moment the client receives the price. The time it takes for the client application to display the price to the trader amounts to approximately 4%. The time it takes for a trade order to be transmitted to the host amounts to approximately 8%. The remainder of the total time it takes to place an order, approximately 80%, is attributable to the time required for the trader to read the prices displayed and to enter a trade order. The present invention provides a significant advantage during the slowest portion of the trading cycle—while the trader manually enters his order. Traders recognize that the value of time savings in this portion may amount to millions of dollars annually.

In existing systems, multiple elements of an order must be entered prior to an order being sent to market, which is time consuming for the trader. Such elements include the commodity symbol, the desired price, the quantity and whether a buy or a sell order is desired. The more time a trader takes entering an order, the more likely the price on which he wanted to bid or offer will change or not be available in the market. The market is fluid as many traders are sending

orders to the market simultaneously. It fact, successful markets strive to have such a high volume of trading that any trader who wishes to enter an order will find a match and have the order filled quickly, if not immediately. In such liquid markets, the prices of the commodities fluctuate rapidly. On a trading screen, this results in rapid changes in the price and quantity fields within the market grid. If a trader intends to enter an order at a particular price, but misses the price because the market prices moved before he could enter the order, he may lose hundreds, thousands, even millions of dollars. The faster a trader can trade, the less likely it will be that he will miss his price and the more likely he will make money.

SUMMARY OF THE INVENTION

The inventors have developed the present invention which overcomes the drawbacks of the existing trading systems and dramatically reduces the time it takes for a trader to place a trade when electronically trading on an exchange. This, in turn, increases the likelihood that the trader will have orders filled at desirable prices and quantities.

The "Mercury" display and trading method of the present invention ensure fast and accurate execution of trades by displaying market depth on a vertical or horizontal plane, which fluctuates logically up or down, left or right across the plane as the market prices fluctuates. This allows the trader to trade quickly and efficiently.

Specifically, the present invention is directed to a graphical user interface for displaying the market depth of a commodity traded in a market, including a

dynamic display for a plurality of bids and for a plurality of asks in the market for the commodity and a static display of prices corresponding to the plurality of bids and asks. In this embodiment the pluralities of bids and asks are dynamically displayed in alignment with the prices corresponding thereto. Also described herein is a method and system for placing trade orders using such displays.

These embodiments, and others described in greater detail herein, provide the trader with improved efficiency and versatility in placing, and thus executing, trade orders for commodities in an electronic exchange. Other features and advantages of the present invention will become apparent to those skilled in the art from the following detailed description. It should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not limitation. Many changes and modifications within the scope of the present invention may be made with-out departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates the network connections between multiple exchanges and client sites;

FIG. **2** illustrates screen display showing the inside market and the market depth of a given commodity being traded:

FIG. **3** illustrates the Mercury display of the present invention;

FIG. **4** illustrates the Mercury display at a later time showing the movement of values when compared to FIG. **3**;

FIG. **5** illustrates a Mercury display with parameters set in order to exemplify the Mercury trading method; and

FIG. **6** is a flowchart illustrating the process for Mercury display and trading.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As described with reference to the accompanying figures, the present invention provides a display and trading method to ensure fast and accurate execution of trades by displaying market depth on a vertical or horizontal plane, which fluctuates logically up or down, left or right across the plane as the market prices fluctuates. This allows the trader to place trade orders quickly and efficiently. A commodity's market depth is the current bid and ask prices and quantities in the market. The display and trading method of the invention increase the likelihood that the trader will be able to execute orders at desirable prices and quantities.

In the preferred embodiment, the present invention is implemented on a computer or electronic terminal. The computer is able to communicate either directly or indirectly (using intermediate devices) with the exchange to receive and transmit market, commodity, and trading order information. It is able to interact with the trader and to generate contents and characteristics of a trade order to be sent to the exchange. It is envisioned that the system of the present

invention can be implemented on any existing or future terminal or device with the processing capability to perform the functions described herein. The scope of the present invention is not limited by the type of terminal or device used. Further, the specification refers to a single click o f a mouse as a means for user input and interaction with the terminal display as an example of a single action of the user. While this describes a preferred mode of interaction, the scope of the present invention is not limited to the use of a mouse as the input device or to the click of a mouse button as the user's single action. Rather, any action by a user within a short period of time, whether comprising one or more clicks of a mouse button or other input device, is considered a single action of the user for the purposes of the present invention.

The system can be configured to allow for trading in a single or in multiple exchanges simultaneously. Connection of the system of the present invention with multiple exchanges is illustrated in FIG. **1**. This figure shows multiple host exchanges **101-103** connected through routers **104-106** to gateways **107-109**. Multiple client terminals **110-116** for use as trading stations can then trade in the multiple exchanges through their connection to the gateways **107-109**. When the system is configured to receive data from multiple exchanges, then the preferred implementation is to translate the data from various exchanges into a simple format. This "translation" function is described below with reference to FIG. **1**. An applications program interface ("TT API" as depicted in the figure) translates the incoming data formats from the different exchanges to a simple preferred data for-

mat. This translation function may be disposed any-where in the network, for example, at the gateway server, at the individual workstations or at both. In addition, the storage at gateway servers and at the client workstations, and/or other external storage cache historical data such as order books which list the client's active orders in the market; that is, those orders that have neither been filled nor cancelled. Information from different exchanges can be displayed at one or in multiple windows at the client work-station. Accordingly, while reference is made through the remainder of the specification to a single exchange to which a trading terminal is connected, the scope of the invention includes the ability to trade, in accord-ance with the trading methods described herein, in multiple exchanges using a single trading terminal.

The preferred embodiments of the present inven-tion include the display of "Market Depth" and allow traders to view the market depth of a commodity and to execute trades within the market depth with a sin-gle click of a computer mouse button. Market Depth represents the order book with the current bid and ask prices and quantities in the market. In other words, Market Depth is each bid and ask that was en-tered into the market, subject to the limits noted be-low, in addition to the inside market. For a commodity being traded, the "inside market" is the highest bid price and the lowest ask price.

The exchange sends the price, order and fill infor-mation to each trader on the exchange. The present invention processes this information and maps it through simple algorithms and mapping tables to po-

sitions in a theoretical grid program or any other comparable mapping technique for mapping data to a screen. The physical mapping of such information to a screen grid can be done by any technique known to those skilled in the art. The present invention is not limited by the method used to map the data to the screen display.

How far into the market depth the present invention can display depends on how much of the market depth the exchange provides. Some exchanges supply an infinite market depth, while others provide no market depth or only a few orders away from the inside market. The user of the present invention can also chose how far into the market depth to display on his screen.

FIG. **2** illustrates a screen display of an invention described in a commonly owned co-pending application entitled "Click Based Trading with Market Depth Display" and having U.S. patent application Ser. No. 09/589,751, which was filed Jun. 9, 2000 and is now issued as U.S. Pat. No. 6,938,011, and the contents of which are incorporated herein by reference. This display shows the inside market and the market depth of a given commodity being traded. Row 1 represents the "inside market" for the commodity being traded which is the best (highest) bid price and quantity and the best (lowest) ask price and quantity. Rows **2-5** represent the "market depth" for the commodity being traded. In the preferred embodiment of the present invention, the display of market depth (rows **2-5**) lists: the available next-best bids, in column **203**, and asks, in column **204**. The working bid and ask quantity for each price level is also displayed in columns **202** and

205 respectively (inside market—row **1**). Prices and quantities for the inside market and market depth update dynamically on a real time : basis as such information is relayed from the market.

In the screen display shown in FIG. **2**, the commodity (contract) being traded is represented in row **1** by the character string "CDH0". The Depth column **208** will inform the trader of a status by displaying different colors. Yellow indicates that the program application is waiting for data. Red indicates that the Market Depth has failed to receive the data from the server and has "timed out." Green indicates that the data has just been updated. The other column headings in this and all of the other figures, are defined as follows. BidQty . (Bid Quantity): the quantity for each working bid, BidPrc (Bid Price): the price for each working bid, AskPrc (Ask Price): the price for each working ask, AskQty (Ask Quantity): the quantity for each working ask, LastPrc (Last Price): the price for the last bid and ask that were matched in the market and LastQty (Last Quantity): the quantity traded at the last price. Total represents the total quantity traded of the given commodity.

The configuration of the screen display itself informs the user in a more convenient and efficient manner than existing systems. Traders gain a significant advantage by seeing the market depth because they can see trends in the orders in the market. The market depth display shows the trader the interest the market has in a given commodity at different price levels. If a large amount of bids or asks are in the market near the : trader's position, he may feel he should sell or buy before the inside market reaches

the morass of orders. A lack of orders above or below the inside market might prompt a trader to enter orders near the inside market. Without seeing the market depth, no such strategies could be utilized. Having the : dynamic market depth, including the bid and ask quantities and prices of a traded commodity aligned with and displayed below the current inside market of the commodity conveys the information to the user in a more intuitive and easily understandable manner. Trends in the trading of the commodity and other relevant characteristics are more easily identifiable by the user through the use of the present invention.

Various abbreviations are used in the screen displays, and specifically, in the column headings of the screen displays reproduced herein. Some abbreviations have been discussed above. A list of common abbreviations and their meanings is provided in Table 1.

TABLE I

COLUMN	DESCRIPTION
Month	Expiration Month/Year
Bid Mbro)	Bid Member ID
WrkBuYs(2)	Working Buys for entire Group ID
BidQty	Bid Quantity
Thrshaid(6)	Threshold Bid Price
BidPrc	Bid Price
Bid Qty Accum	Accumulated Bid Quantity
BidPrc Avg	Bid Price Average
AskPrc Avg	Ask Price Average
AskQty Accum	Accumulated Ask Quantity
AskPrc	Ask Price
ThrshAsk$_{(5)}$	Threshold Ask Price

Abbreviations

AskQty	Ask Quantity
WrkSells$_{(2)}$	Working Sells for entire Group ID
Ask Mbr$_{(1)}$	Ask Member ID
NetPos	Net Position
FFNetPos	Fast Fill Net Position
LastPrc	Last Price
LastQty	Last Quantity
Total	Total Traded Quantity
High	High Price
Low	Low Price
Open	Opening Price
Close	Closing Price
Chng	Last Price-Last Close
TheoPrc	Theoretical Price
TheoBid	Theoretical Bid Price
TheoAsk	Theoretical Ask Price
QAct	Quote Action (Sends individual quotes)
BQQ	Test Bid Quote Quantity
BQP	Test Bid Quote Price
Mid BQQ	Market Bid Quote Quantity
Mkt BQP	Market Bid Quote Price
Quote	Checkbox activates/deactivates contract for quoting
Mlt AQQ	Market Ask Quote Quantity
Mkt AQP	Market Ask Quote Price
AQP	Ask Quote Price
AQQ	Ask Quote Quantity
Imp BidQty$_{(3)}$	Implied Bid Quantity
Imp BidPrc$_{(5)}$	Implied Bid Price
AskQty$_{(3)}$	Implied Ask Quantity
Imp AskPrc$_{(5)}$	Implied Ask Price
Gamma$_{(3)}$	Change in Delta given 1 pt change in underlying

Delta(3)	Change in price given 1 pt change in underlying
Vola(3)	Percent volatility
Vega(3)	Price change given 1% change in Vola
Rho(3)	Price change given 1% change in interest rate
Theta(3)	Price change for every day that elapses
Click Trd	Activate/deactivate clicks raring by contract
S (Status)	Auction, Closed, FastMkt, Not Tradable, Pre-trading, Tradable, S post-trading
Expiry	Expiration Month/Year

As described herein, the display and trading method of the present invention provide the user with certain advantages over systems in which a display of market depth, as shown in FIG. **2**, is used. The Mercury display and trading method of the present invention ensure fast and accurate execution of trades by displaying market depth on a vertical or horizontal plane, which fluctuates logically up or down, left or right across the plane as the market prices fluctuates. This allows the trader to trade quickly and efficiently. An example of such a Mercury display is illustrated in the screen display of FIG. **3**.

The display of market depth and the manner in which traders trade within the market depth can be effected in different manners, which many traders will find materially better, faster and more accurate. In addition, some traders may find the display of market depth to be difficult to follow. In the display shown

in FIG. **2**, the market depth is displayed vertically so that both Bid and Ask prices descend the grid. The Bid prices descend the market grid as the prices decrease. Ask prices also descend the market grid as these prices actually increase. This combination may be considered counterintuitive and difficult to follow by some traders.

The Mercury display overcomes this problem in an innovative and logical manner. Mercury also provides an order entry system, market grid, fill window and summary of market orders in one simple window. Such a condensed display materially simplifies the trading system by entering and tracking trades in an extremely efficient manner. Mercury displays market depth in a logical, vertical fashion or horizontally or at some other convenient angle or configuration. A vertical field is shown in the figures and described for convenience, but the field could be horizontal or at an angle. In turn, Mercury further increases the speed of trading and the likelihood of entering orders at desired prices with desired quantities. In the preferred embodiment of the invention, the Mercury display is a static vertical column of prices with the bid and ask quantities displayed in vertical columns to the side of the price column and aligned with the corresponding bid and ask prices. An example of this display is shown in FIG. **3**.

Bid quantities are in the column **1003** labeled BidQ and ask quantities are in column **1004** labeled AskQ. The representative ticks from prices for the given commodity are shown in column **1005**. The column does not list the whole prices (e.g. 95.89), but rather, just the last two digits (e.g. 89). In the example

shown, the inside market, cells **1020**, is 18 (best bid quantity) at 89 (best bid price) and 20 (best ask quantity) at 90 (best ask price). In the preferred embodiment of the invention, these three columns are shown in different colors so that the trader can quickly distinguish between them.

The values in the price column are static; that is, they do not normally change positions unless a re-centering command is received (discussed in detail later). The values in the Bid and Ask columns however, are dynamic; that is, they move up and down (in the vertical example) to reflect the market depth for the given commodity. The LTQ column **1006** shows the last traded quantity of the commodity. The relative position of the quantity value with respect to the Price values reflects the price at which that quantity was traded. Column **1001** labeled E/W (entered/working) displays the current status of the trader's orders. The status of each order is displayed in the price row where it was entered. For example, in cells **1007**, the number next to S indicates the number of the trader's ordered lots that have been sold at the price in the specific row. The number next to W indicates the number of the trader's ordered lots that are in the market, but have not been filled—i.e. the system is working on filling the order. Blanks in this column indicate that orders are entered or working at that price. In cells **1008**, the number next to B indicates the number of the trader's ordered lots that have been bought at the price in the specific row. The number next to W indicates the number of the trader's ordered lots that are in the market, but have not been filled—i.e. the system is working on filling the order.

Various parameters are set and information is provided in column **1002**. For example, "10:48:44" in cell **1009** shows the actual time of day. The L and R fields in cell **1010** indicate a quantity value, which may be added to the order quantity entered. This process is explained below with respect to trading under Mercury. Below the L and R fields, in cell **1011**, a number appears which represents the current market volume. This is the number of lots that have been traded for the chosen contract. Cell **1012**, "X 10", displays the Net Quantity, the current position of the trader on the chosen contract. The number "10" represents the trader's buys minus sells. Cell **1013** is the "Current Quantity"; this field represents the quantity for the next order that the trader will send to market. This can be adjusted with right and left clicks (up and down) or by clicking the buttons which appear below the Current Quantity in cells **1014**. These buttons increase the current quantity by the indicated amount; for example, "10" will increase it by 10; "1H" will increase it by 100; "1K" will increase it by 1000. Cell **1015** is the Clear button; clicking this button will clear the Current Quantity field. Cell **1016** is the Quantity Description; this is a pull down menu allowing the trader to chose from three Quantity Descriptions. The pull down menu is displayed when the arrow button in the window is clicked. The window includes NetPos, Offset and a field allowing the trader to enter numbers. Placing a number in this field will set a default buy or sell quantity. Choosing "Offset" in this field will enable the L/R buttons of cell **1010**. Choosing "NetPos" in this field will set the current Net Quantity (trader's net position) as the trader's quantity for his next trade. Cell **1017** are +/- buttons;

these buttons will alter the size of the screen—either larger (+) or smaller (-). Cell **1018** is used to invoke Net 0; clicking this button will reset the Net Quantity (cell **1011**) to zero. Cell **1019** is used to invoke Net Real; clicking this button will reset the Net Quantity (cell **1011**) to its actual position.

The inside market and market depth ascend and descend as prices in the market increase and decrease. For example, FIG. **4** shows a screen displaying the same market as that of FIG. **3** but at a later interval where the inside market, cells **1101**, has risen three ticks. Here, the inside market for the commodity is 43 (best bid quantity) at 92 (best bid price) and 63 (best ask quantity) at 93 (best ask price). In comparing FIGS. **3** and **4**, it can be seen that the price column remained static, but the corresponding bids and asks rose up the price column. Market Depth similarly ascends and descends the price column, leaving a vertical history of the market.

As the market ascends or descends the price column, the inside market might go above or below the price column displayed on a trader's screen. Usually a trader will want to be able to see the inside market to assess future trades. The system of the present invention addresses this problem with a one click centering feature. With a single click at any point within the gray area, **1021**, below the "Net Real" button, the system will re-center the inside market on the trader's screen. Also, when using a three-button mouse, a click of the middle mouse button, irrespective of the location of the mouse pointer, will re-center the inside market on the trader's screen.

The same information and features can be displayed and enabled in a horizontal fashion. Just as the market ascends and descends the vertical Mercury display shown in FIGS. **3** and **4**, the market will move left and right in the horizontal Mercury display. The same data and the same information gleaned from the dynamical display of the data is provided. It is envisioned that other orientations can be used to dynamically display the data and such orientations are intended to come within the scope of the present invention.

Next, trading commodities, and specifically, the placement of trade orders using the Mercury display is described. Using the Mercury display and trading method, a trader would first designate the desired commodity and, if applicable, the default quantities. Then he can trade with single clicks of the right or left mouse button. The following equations are used by the system to generate trade orders and to determine the quantity and price to be associated with the trade order. The following abbreviations are used in these formulas: P=Price value of row clicked, R=Value in R field, L=Value in L field, Qurrent Quantity, Q,=Total of all quantities in AskQ column at an equal or better price than P, Qb=Total of all quantities in BidQ column at an equal or better price than P. Nurrent Net Position, Bo=Buy order sent to market and So=Sell order sent to market.

Any order Entered Using Right Mouse Button

$$Bo = (Q_a + R)P \qquad\qquad \text{(Eq. 1)}$$

If BidQ field clicked.

$$So = (Q_b + R)P \qquad\qquad \text{(Eq. 2)}$$

If AskQ field clicked.

Orders Entered Using the Left Mouse Button

If "Offset" mode chosen in Quantity Description field then:

$$Bo = (Q_a + L)P \qquad\qquad \text{(Eq. 3)}$$

If BidQ field clicked.

$$So = (Q_b + L)P \qquad\qquad \text{(Eq. 4)}$$

If AskQ field clicked.

If "number" mode chosen in Quantity Description field then:

$$Bo = QP \qquad\qquad \text{(Eq. 5)}$$

$$So = QP \qquad\qquad \text{(Eq. 6)}$$

If "NetPos" mode chosen in Quantity Description field then:

$$Bo = NP \qquad\qquad \text{(Eq. 7)}$$

$$So = NP \qquad\qquad \text{(Eq. 8)}$$

Orders can also be sent to market for quantities that vary according to the quantities available in the market; quantities preset by the trader; and which mouse button the trader clicks. Using this feature, a trader can buy or sell all of the bids or asks in the market at or better than a chosen price with one click. The trader could also add or subtract a preset quantity from the quantities outstanding in the market. If the trader clicks in a trading cell—i.e. in the BidQ or AskQ column, he will enter an order in the market. The parameters of the order depend on which mouse button he clicks and what preset values he set.

Using the screen display and values from FIG. **5**, the placement of trade orders using the Mercury display and trading method is now described using examples. A left click on the 18 in the BidQ column **1201** will send an order to market to sell 17 lots (quantity # chosen on the Quantity Description pull down menu cell **1204**) of the commodity at a price of 89 (the corresponding price in the Prc column **1203**). Similarly, a left click on the 20 in the AskQ column **1202** will send an order to market to buy 17 lots at a price of 90.

Using the right mouse button, an order would be sent to market at the price that corresponds to the row clicked for the total quantity of orders in the market that equal or better the price in that row plus the quantity in the R field **1205**. Thus, a right click in the AskQ column **1202** in the 87 price row will send a sell order to market at a price of 87 and a quantity of 150. 150 is the sum of all the quantities 30, 97, 18 and 5.30, 97 and 18 are all of the quantities in the market that would meet or better the trader's sell order price of 87. These quantities are displayed in the BidQ column

1201 because this column represents the orders outstanding in the market to purchase the commodity at each corresponding price. The quantity 5 is the quantity pre-set in the R field **1205**.

Similarly, a right click in the BidQ column **1201** at the same price level of 87 would send a buy limit order to market for a quantity of 5 at a price of 87. The quantity is determined in the same manner as above. In this example, though, there are no orders in the market that equal or better the chosen price there are no quantities in the AskQ column **1202** that equal or better this price. Therefore, the sum of the equal or better quantities is zero ("0"). The total order entered by the trader will be the value in the R field, which is 5.

An order entered with the left mouse button and the "Off-set" option chosen in the quantity description field **1204** will be calculated in the same way as above, but the quantity in the L field **1206** will be added instead of the quantity in the R field **1205**. Thus, a left click in the BidQ column **1201** in the 92 price row will send a buy order to market at a price of 92 and a quantity of 96.96 is the sum of all the quantities 45, 28, 20 and 3.45, 28 and 20 are all quantities in the market that would meet or better the trader's buy order price of 92. These quantities are displayed in the AskQ column **1202** because this column represents the orders outstanding in the market to sell the commodity at each corresponding price. The quantity 3 is the quantity pre-set in the L field **1206**.

The values in the L or R fields may be negative numbers. This would effectively decrease the total

quantity sent to market. In other words, in the example of a right click in the AskQ column **1202** in the 87 price row, if the R field was -5, the total quantity sent to market would be 140 (30+97+18+(-5)).

If a trader chose the "NetPos" option in the quantity description field **1204**, a right click would still work as explained above. A left click would enter an order with a price corresponding to the price row clicked and a quantity equal to the current Net position of the trader. The Net position of the trader is the trader's current position on the chosen contract. In other words, if the trader has bought 10 more contracts than he has sold, this value would be 10. Net-Pos would not affect the quantity of an order sent with a right click.

If the trader chose a number value in the quantity description, a left click would send an order to market for the current quantity chosen by the trader. The default value of the current quantity will be the number entered in the quantity description field, but it could be changed by adjusting the figure in the current quantity field **1204**.

This embodiment of the invention also allows a trader to delete all of his working trades with a single click of either the right or left mouse button anywhere in the last traded quantity (LTQ) column **1207**. This allows a trader to exit the market immediately. Traders will use this feature when they are losing money and want to stop the losses from pilling up. Traders may also use this feature to quickly exit the market upon making a desired profit. The invention also allows a trader to delete all of his orders from the market at a particular price level. A click with either

mouse button in the Entered/Working (E/W) column **1208** will delete all working orders in the cell that was clicked. Thus, if a trader believes that previously sent orders at a particular price that have not been filled would be poor trades, he can delete these orders with a single click.

The process for placing trade orders using the Mercury display and trading method of the present invention as described above is shown in the flowchart of FIG. **6**. First, in step **1301**, the trader has the Mercury display on the trading terminal screen showing the market for a given commodity. In step **1302**, the parameters are set in the appropriate fields, such as the L and R fields and the Current Quantity, NetPos or Offset fields from the pull down menu. In step **1303**, the mouse pointer is positioned and clicked over a cell in the Mercury display by the trader. In step **1304**, the system determines whether the cell clicked is a tradeable cell (i.e. in the AskQ column or BidQ column). If not, then in step **1305**, no trade order is created or sent and, rather, other quantities are adjusted or functions are performed based upon the cell selected. Otherwise, in step **1306**, the system determines whether it was the left or the right button of the mouse that was clicked. If it was the right, then in step **1307**, the system will use the quantity in the R field when it determines the total quantity of the order in step **1310**. If the left button was clicked, then in step **1308**, the system determines which quantity description was chosen: Offset, NetPos or an actual number.

If Offset was chosen, then the system, in step **1309**, will use the quantity in the L field when it determines the total quantity of the order in step **1310**. If NetPos was chosen, then the system, in step **1312**, will determine that the total quantity for the trade order will be current NetPos value, i.e. the net position of the trader in the given commodity. If an actual number was used as the quantity description, then, in step **1311**, the system will determine that the total quantity for the trade order will be the current quantity entered. In step **1310**, the system will determine that the total quantity for the trade order will be the value of the R field (if step **1307** was taken) or the value of the L field (if step **1309** was taken) plus all quantities in the market for prices better than or equal to the price in the row clicked. This will add up the quantities for each order in the market that will fill the order being entered by the trader (plus the L or R value).

After either steps **1310**, **1311** or **1312**, the system, in step **1313**, determines which column was clicked, BidQ or AskQ. If AskQ was clicked, then, in step **1314**, the system sends a sell limit order to the market at the price corresponding to the row for the total quantity as already determined. If BidQ was clicked, then, in step **1315**, the system sends a buy limit order to the market at the price corresponding to the row for the total quantity as already determined.

It should be understood that the above description of the invention and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not limitation. Many changes and modifications within the scope of

the present invention may be made without departing from the spirit thereof, and the present invention includes all such changes and modifications.

We claim:

1. A method for facilitating trade order entry, the method comprising:

> receiving, by a computing device, market data for a commodity, the market data comprising a current highest bid price and a current lowest ask price available for the commodity;

> identifying, by the computing device, a plurality of sequential price levels for the commodity based on the market data, where the plurality of sequential price levels includes the current highest bid price and the current lowest ask price;

> displaying, by the computing device, a plurality of graphical locations aligned along an axis, where each graphical location is configured to be selected by a single action of a user input device to send a trade order to the electronic exchange, where a price of the trade order is based on the selected graphical location;

> mapping, by the computing device, the plurality of sequential price levels to the plurality of graphical locations, where each graphical location corresponds to one of the plurality of sequential price levels, where each price level corresponds to at least one of the plurality of graphical locations, and where mapping of the plurality of sequential price levels

does not change at a time when at least one of the current highest bid price and the current lowest ask price changes; and

setting a price and sending the trade order to the electronic exchange in response to receiving by the computing device commands based on user actions consisting of:

(1) placing a cursor associated with the user input device over a desired graphical location of the plurality of graphical locations and (2) selecting the desired graphical location through a single action of the user input device.

2. The method of claim **1**, where the plurality of sequential price levels no longer includes at least one of the current highest bid price and the current lowest ask price.

3. The method of claim **2**, further comprising:

changing the mapping of the plurality of sequential price levels to the plurality of graphical locations so that one of the plurality of graphical locations corresponds to the current highest bid price and one of the plurality of graphical locations corresponds to the current lowest ask price.

4. The method of claim **1**, where the plurality of sequential price levels no longer includes the current highest bid price and the current lowest ask price.

5. The method of claim **4**, further comprising:

changing the mapping of the plurality of sequential price levels to the plurality of graphical locations so that the at least

one of the plurality of graphical locations corresponds to the current highest bid price or the current lowest ask price.

6. The method of claim **1**, further comprising:

changing the mapping of the plurality of sequential price levels to the plurality of graphical locations in response to receiving by the computing device a manual re-centering command.

7. The method of claim **1**, further comprising:

never changing the mapping of the plurality of sequential price levels to the plurality of graphical locations unless in response to receiving by the computing device a manual re-centering command.

8. The method of claim **1**, further comprising:

changing the mapping of the plurality of sequential price levels to the plurality of graphical locations in response to receiving by the computing device a re-centering command.

9. The method of claim **8**, where the re-centering command consists of a manual re-centering command.

10. The method of claim **1**, further comprising:

maintaining the mapping of the plurality of sequential price levels to the plurality of graphical locations for a period of time.

11. The method of claim **1**, further comprising:

maintaining the mapping of the plurality of sequential price levels to the plurality of graphical locations unless in response to receiving by the computing device a manual re-centering command.

12. The method of claim **1**, further comprising:
  orienting the axis vertically so that the plurality of graphical locations is displayed vertically.

13. The method of claim **1**, further comprising:
  displaying, by the computing device, a first indicator in one of the plurality of graphical locations, the first indicator representing quantity associated with at least one order to buy the commodity at the current highest bid price; and
  displaying, by the computing device, a second indicator in one of the plurality of graphical locations, the second indicator representing quantity associated with at least one order to sell the commodity at the current lowest ask price.

14. The method of claim **13**, further comprising:
  moving the first indicator relative to the plurality of sequential price levels to a different graphical location of the plurality of graphical locations, the different graphical location corresponding to a new highest bid price.

15. The method of claim **13**, further comprising:
  moving the second indicator relative to the plurality of sequential price levels to a different graphical location of the plurality of graphical locations, the different graphical location corresponding to a new lowest ask price.

16. The method of claim **1**, further comprising:

displaying, by the computing device, an indicator in one of the plurality of graphical locations, the indicator representing quantity associated with at least one order to buy the commodity at the current highest bid price.

17. The method of claim **1**, further comprising:

displaying, by the computing device, an indicator in one of the plurality of graphical locations, the indicator representing quantity associated with at least one order to sell the commodity at the current lowest ask price.

18. The method of claim **1**, further comprising:

displaying a first number of the plurality of graphical locations in a bid display region, wherein the trade order is a buy trade order when the desired graphical location is selected in the bid display region; and

displaying a second number of the plurality of graphical locations in an ask display region, wherein the trade order is a sell trade order when the desired graphical location is selected in the ask display region.

19. The method of claim 1, where the single action consists of a single click of the user input device.

20. The method of claim 1, where the single action consists of a double click of the user input device.

21. The method of claim 1, further comprising:

sending a trade order to buy or sell the commodity to the electronic exchange; and

    displaying a working order indicator, where the working order indicator represents the trade order to buy or sell the commodity pending at the electronic exchange.

22. The method of claim **21**, further comprising:

    displaying and mapping the plurality of sequential price levels to a plurality of graphical locations in a working order display region;

    displaying the working order indicator in one of the plurality of graphical locations in the working order display region that corresponds to a price of the trade order to buy or sell the commodity.

23. The method of claim **22**, further comprising:

    receiving a command to delete the trade order pending at the electronic exchange responsive to selecting the working order indicator through a single action of the user input device with a pointer of the user input device positioned over the working order indicator.

24. The method of claim **23**, wherein the single action that selects the working order indicator consists of a single click of the user input device.

25. The method of claim **23**, wherein the single action that selects the working order indicator consists of a double click of the user input device.

26. The method of claim **1**, further comprising:

    receiving a default quantity parameter, where the trade order is for a quantity based on the default quantity parameter.

27. The method of claim **26**, where the default quantity parameter is received prior to setting the price and sending the trade order to the electronic exchange.

28. The method of claim **1**, where identifying the plurality of sequential price levels further comprises generating the price levels based on the market data.

29. The method of claim **1**, where identifying the plurality of sequential price levels further comprises generating the price levels based on the market data and a tick value.

30. The method of claim **1**, where the plurality of sequential price levels comprises at least one price level for which no trade orders are currently pending at the electronic exchange.

31. The method of claim **1**, where each price level of the plurality of sequential price levels comprises at least one trade order currently pending at the electronic exchange.

32. The method of claim **1**, further comprising:
  displaying, by the computing device, the plurality of sequential price levels in alignment with the plurality of graphical locations.

33. The method of claim **1**, where each graphical location of the plurality of graphical locations comprises a graphical cell of a grid.

34. The method of claim **1**, wherein the plurality of graphical locations comprises a first plurality of graphical locations displayed in a first column and a second plurality of graphical locations displayed in a second column.

35. The method of claim **1**, wherein the commands comprise one or more instructions.

36. A computer readable medium having stored therein instructions to execute a method for facilitating trade order entry, the method comprising:

receiving, by a computing device, market data for a commodity, the market data comprising a current highest bid price and a current lowest ask price available for the commodity,

identifying, by the computing device, a plurality of sequential price levels for the commodity based on the market data, where the plurality of sequential price levels includes the current highest bid price and the current lowest ask price;

displaying, by the computing device, a plurality of graphical locations aligned along an axis, where each graphical location is configured to be selected by a single action of a user input device to send a trade order to the electronic exchange, where a price of the trade order is based on the selected graphical location;

mapping, by the computing device, the plurality of sequential price levels to the plurality of graphical locations, where each graphical location corresponds to one of the plurality of sequential price levels, where each price level corresponds to at least one of the plurality of graphical locations, and where mapping of the plurality of sequential price levels does not change at a time when at least one of the current highest bid price and

the current lowest ask price changes; and

setting a price and sending the trade order to the electronic exchange in response to receiving by the computing device commands based on user actions consisting of: (1) placing a cursor associated with the user input device over a desired graphical location of the plurality of graphical locations and (2) selecting the desired graphical location through a single action of the user input device.

* * * * *

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(54)   **USER INTERFACE FOR AN ELEC-
         TRONIC TRADING SYSTEM**

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(58)   **Field of Classification Search.**   705/37
         See application file for complete search history.

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(57)   **ABSTRACT**

A user interface for an electronic trading exchange is provided which allows a remote trader to view in real time bid orders, offer orders, and trades for an item,

and optionally one or more sources of contextual data. Individual traders place orders on remote client terminals, and this information is routed to a transaction server. The transaction server receives order information from the remote terminals, matches a bid for an item to an offer for an item responsive to the bid corresponding with the offer, and communicates outstanding bid and offer information, and additional information (such as trades and contextual data) back to the client terminals. Each client terminal displays all of the outstanding bids and offers for an item, allowing the trader to view trends in orders for an item. A priority view is provided in which orders are displayed as tokens at locations corresponding to the values of the orders. The size of the tokens reflects the quantity of the orders. An alternate view positions order icons at a location which reflects the value and quantity of the order. Additionally, contextual data for the item is also displayed to allow the trader to consider as much information as possible while making transaction decisions. A pit panel view is also provided in which traders connected to the pit are represented by icons, and are displayed corresponding to an activity level of the trader.

35 Claims, 11 Drawing Sheets

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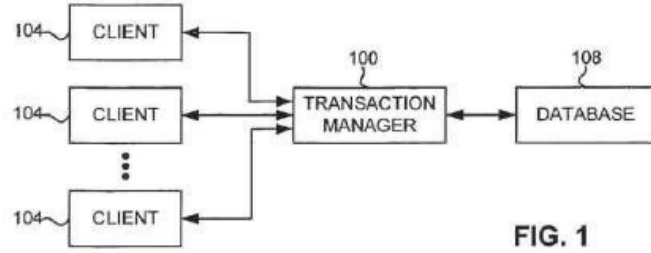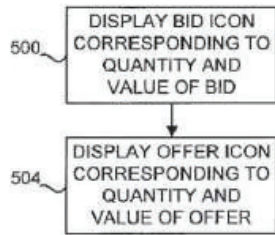
FIG. 1

FIG. 5
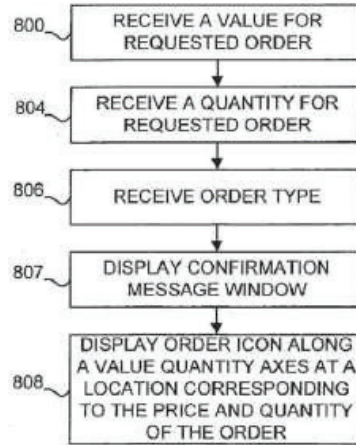
FIG. 8

FIG. 2

FIG. 3A

FIG. 3B

App. 305
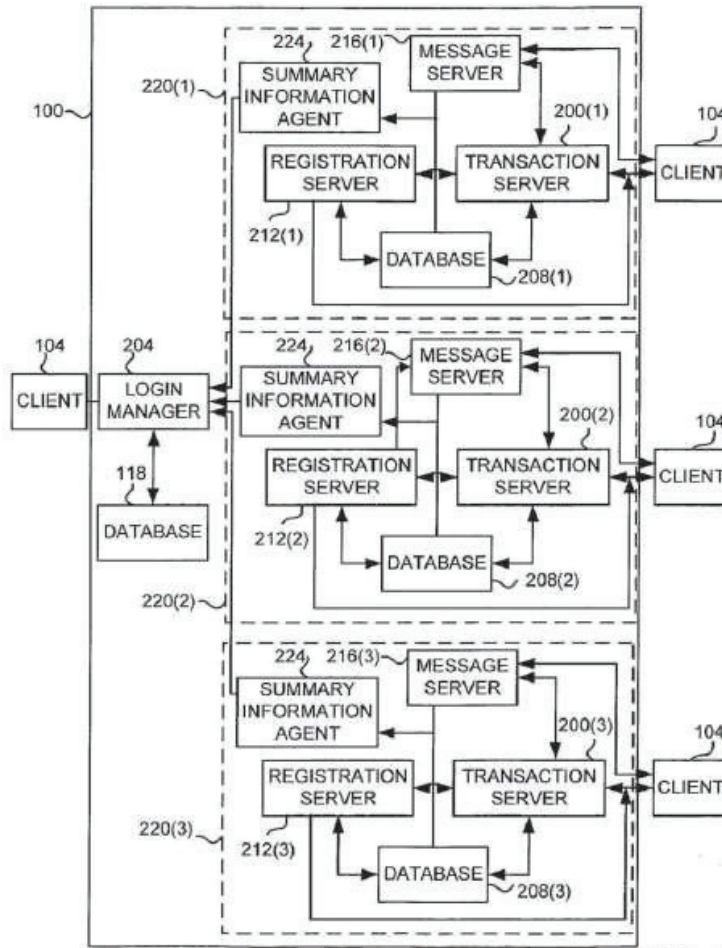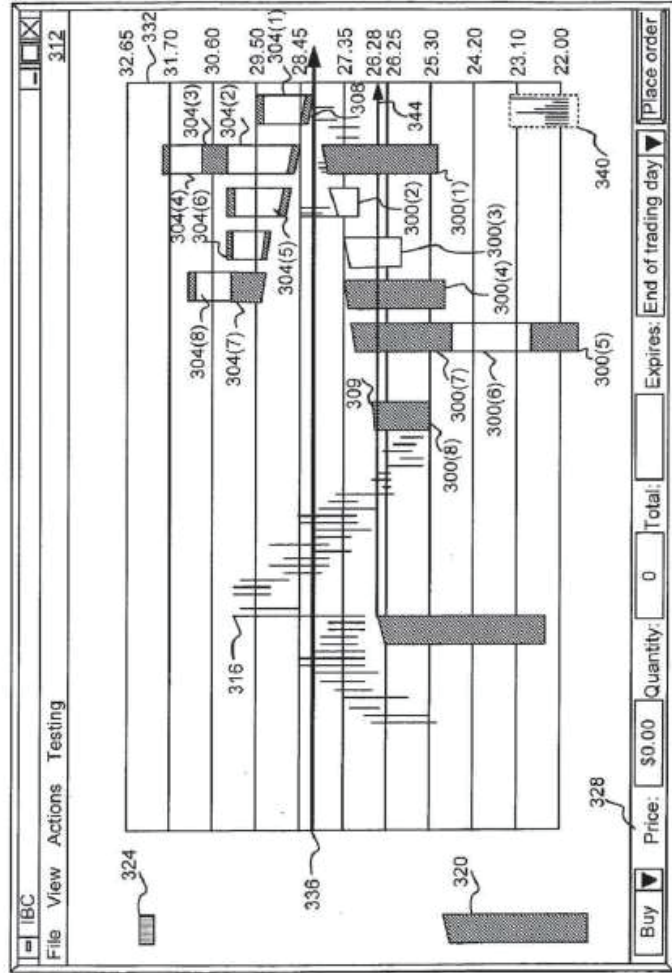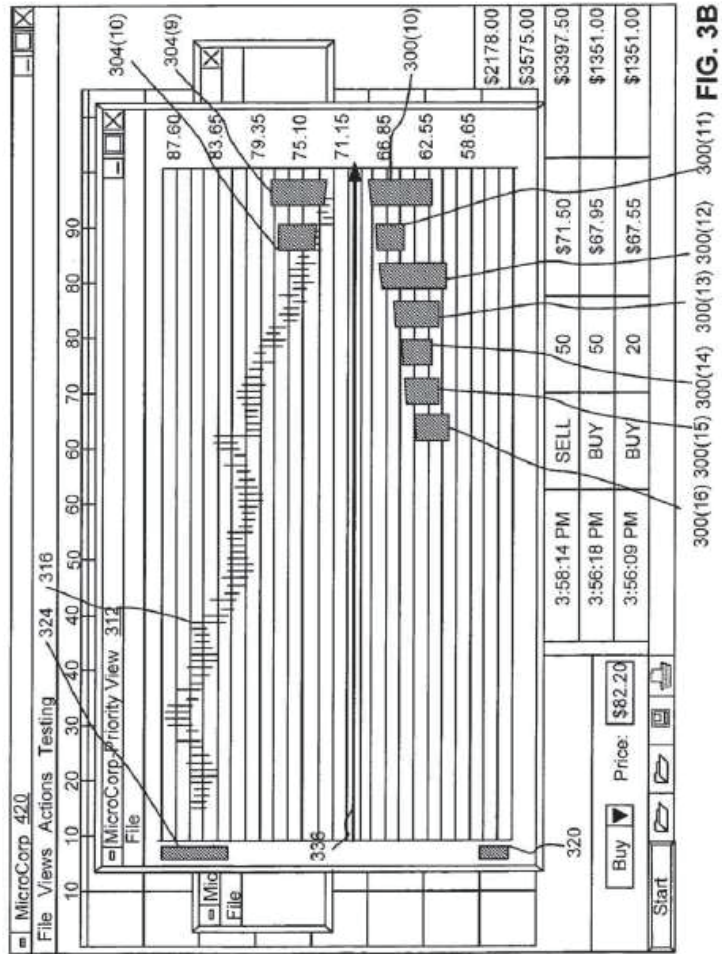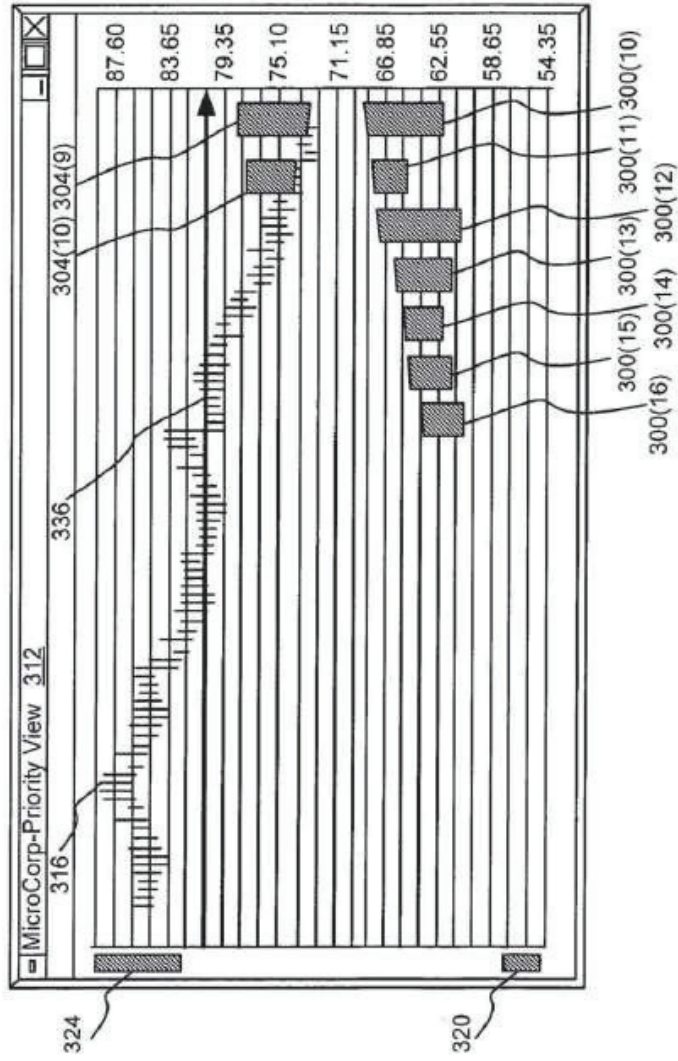
FIG. 3C
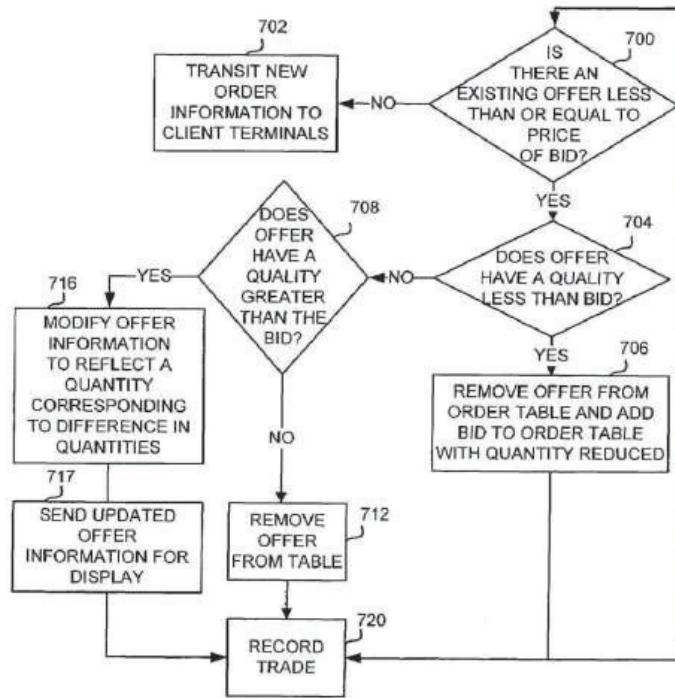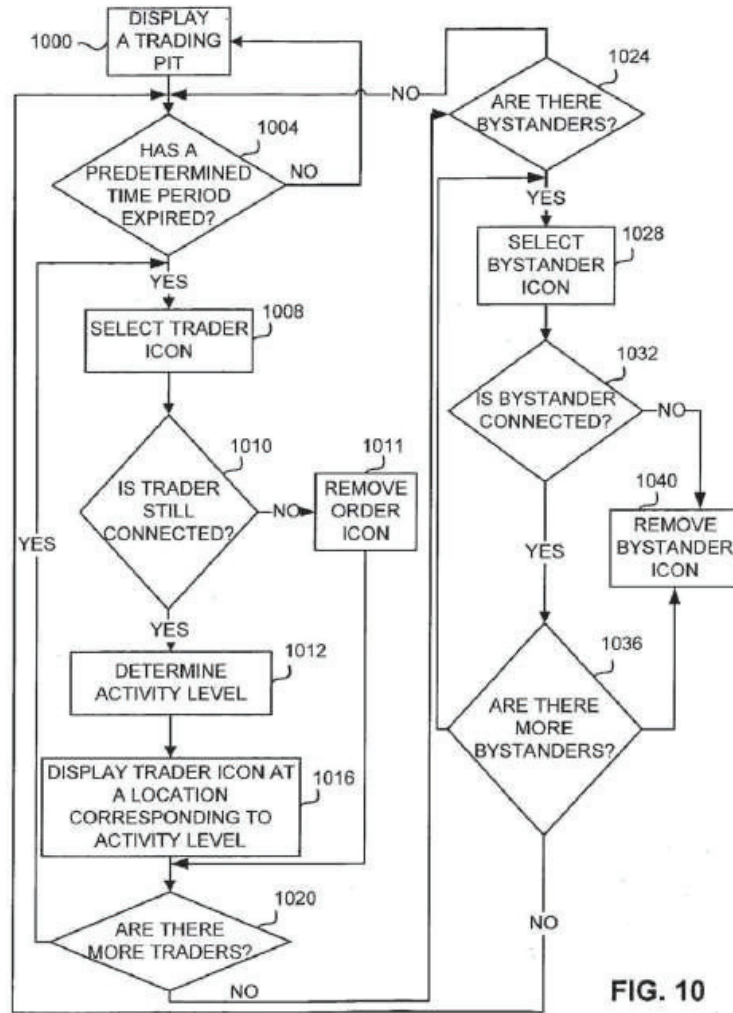
FIG. 3D
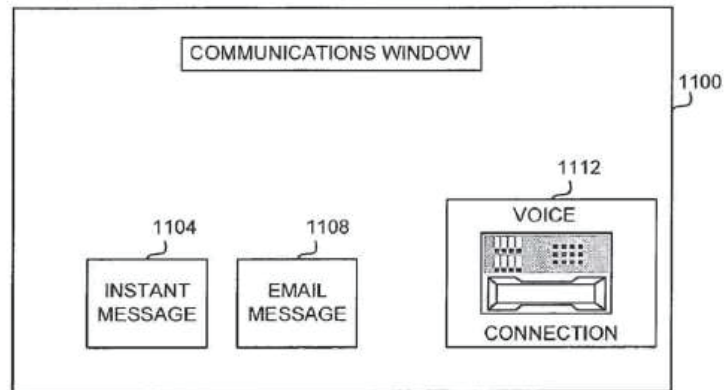
FIG. 3E
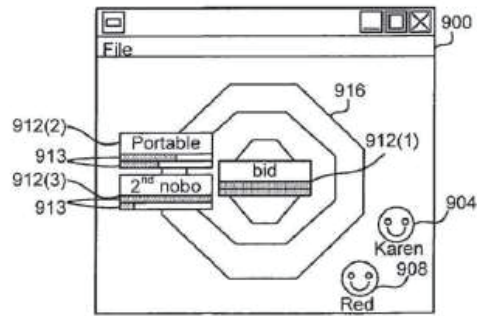
FIG. 9
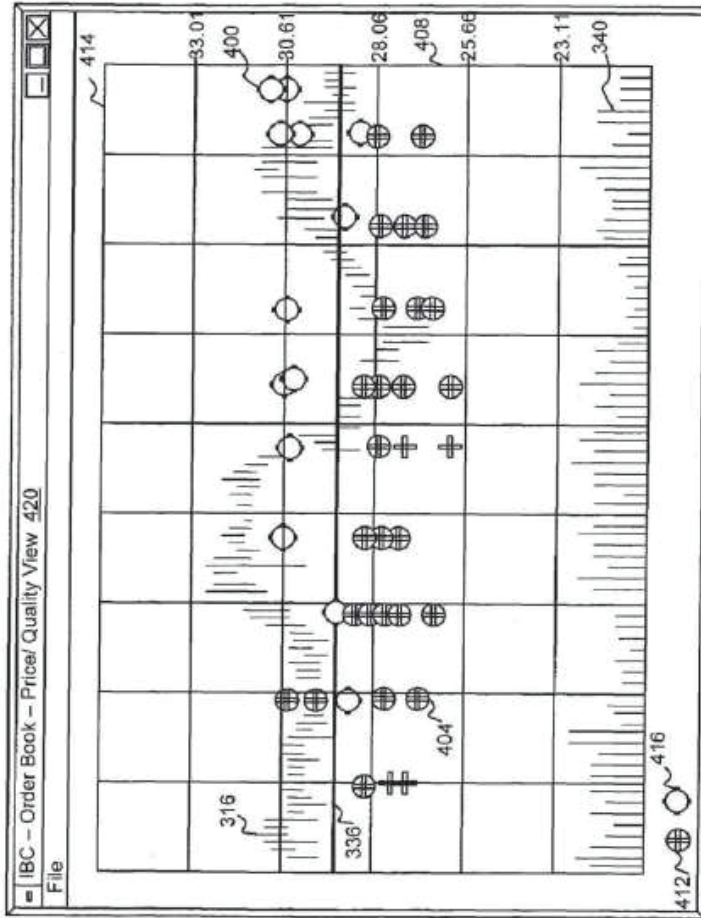
FIG. 4
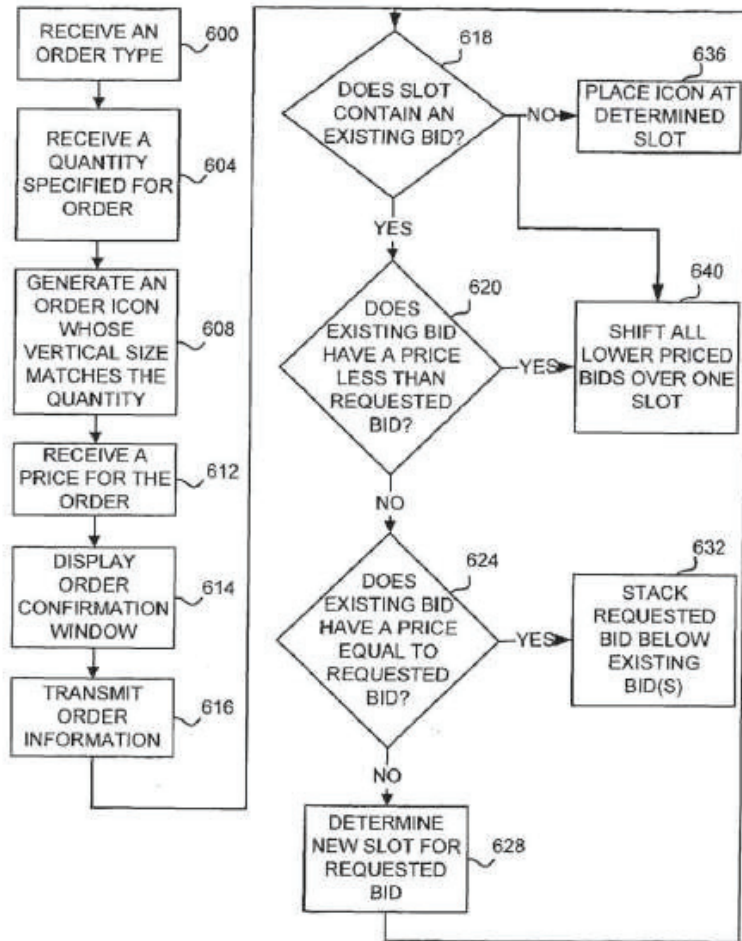
FIG. 6

FIG. 7

FIG. 10

FIG. 11

USER INTERFACE FOR AN ELECTRONIC TRADING SYSTEM

TECHNICAL FIELD

The present invention relates generally to the field of graphical user interfaces and more particularly to the field of graphical user interfaces for electronic trading systems.

BACKGROUND OF THE INVENTION

Trading pits are the lifeblood of a market economy. Quantities of goods and shares in companies are bought and sold by millions of investors through trading pits on exchanges everyday. When a particular trading product or item is more valued, the value of the item is driven up as a result of more aggressive bidding by the buyers. When an item is less valued, the value of the item is driven down as a result of more aggressive offers to sell the item. The successful trader anticipates the rise or fall of the value of an item and performs his or her own transaction before the rest of the market is aware of the item's potential gain or loss in value. Thus, anticipation of the market and specifically of the future demand for an item of interest is critical to the success of a trader.

The transactions for each item occur in a trading pit for that item. The trading pit is a designated area in an exchange in which the customers submit their orders, either bids or offers, for the item to a broker in the pit. The exchange records all transactions and relays or posts to the individual traders the outstanding bid having the highest value and the outstanding offer having the lowest value for the item, along with the quantity specified in the order. The exchange does

not release information on all outstanding offers and bids to the traders because, in part, this information is what gives the market makers an advantage over the traders and enables the market makers to change their own trading directions quickly, step in front of customer orders, and use customer limit orders to protect the market makers from losses. However, for an individual trader, having only the latest order information for an item complicates the trader's task of ascertaining trends in the orders for an item because the trader has very little information about the volume of offers and bids or the rate at which these volumes are changing.

Other information is also used by the trader to anticipate the market, including current exchange performances, historical transaction data for the item, the number of traders at the pit, and the trader's sense of the activity of the pit. However, it is often difficult for a trader to quickly assemble this information from diverse and often unrelated sources or even effectively process all of this information in order to make an informed transaction decision. From this information, and other external information, the trader must attempt to determine trends in the buying or selling for the item in order to anticipate the market and the demand for a particular item.

Thus, a system is needed in which trend information of market demand for an individual item is provided to traders in an intuitive format which allows traders to quickly interpret how market demand is changing to an item. A system is also needed which provides contextual information about the item or the market to the trader while the trader is trading on a

specific item in a manner which allows the trader to quickly interpret the information and then act accordingly.

SUMMARY OF THE INVENTION

The present invention is a user interface for an electronic trading system that allows a remote trader to view trends in the orders for an item, and provides the trading information in an easy to see and interpret graphical format. The user interface of the present invention operates in a system in which individual traders place orders including bids and offers, on remote client terminals, and this information is muted to a transaction server. The transaction server receives order information from the remote terminals, matches a bid for an item to an offer for an item responsive to the bid corresponding with the offer, and communicates outstanding bid and offer information back to the client terminals. Thus, in accordance with the present invention, each client terminal displays all of the outstanding bids and offers for an item, in contrast to the conventional systems and methods in which only the highest bid and lowest offer were known to the individual trader. This allows the trader to view trends in orders for an item, and thus better enables the trader to anticipate demand for the item.

For example, in one embodiment, a graph is formed with a value axis. Bid icons and offer icons for all outstanding bids and offers are displayed on the graph at locations corresponding to the values of the bids and offers. When an item is being "bid up," i.e., the demand for the item is growing, all of the new bids are displayed to the remote trader. The trader immediately sees the increasing demand for the item as it

occurs, and thus may infer that the item may rise in value, and can enter an order to buy for the item immediately while the value for the item still appears low. In contrast, in conventional systems, the trader only knew of the existence of the highest bid, and therefore would not know that demand for the item was increasing. However, by "opening the book," all of the outstanding orders are dis-played to all of the remote traders and each trader is able to immediately see the growing demand and maximize his or her position in the market accordingly.

The user interface of the present invention presents this information in an intuitive format, allowing the trader to make informed decisions quickly. In a priority view embodiment, bid and offer icons are displayed corresponding to an axis of values. This results in the bid icons being displayed on the lower portion of the screen and the offer icons being displayed on the upper portion of the screen. The trader is able to discern immediately the number and volume of bids and offers outstanding for the item and their difference in value. The bids and offers are preferably displayed in different colors, shapes, or other visual characteristics, further enhancing the trader's ability to quickly ascertain the current state of the market. The screen is updated frequently to display the most recent bids and offers. In one embodiment, the icons are formed having an edge which is angled toward the axis of values. When all outstanding offers and bids are displayed, the arrangement of icons naturally forms the edges of a triangle that points to the value differential at the axis of values. In yet another embodiment, the trader's own bids and offers are displayed in a first color or other visual characteristic,

and the bids and offers of other traders are displayed in a second color or visual characteristic. This allows the trader to quickly determine his or her relative position in the marketplace. Finally, in a preferred embodiment, a size of the icons represents the quantity of the bid or offer, allowing an easy visual means of determining the relative quantities each bid and offer represent.

In a value/quantity view embodiment, an axis of values and an axis of quantities are used to determine the location of the bid and offer icons. The icons in this embodiment are markers or tokens and provide a different look and feel to the trader. Providing alternate views allow a trader to select a view with which the trader is most comfortable trading.

A value quantifying analytic is displayed in a further embodiment with respect to the value axis at a location corresponding to the current value which the analytic rep-resents. The analytic is preferably displayed as a marker called an action line, in a color or other visual characteristic different from the other characteristics used to represent other objects being displayed. The action line is selected by each individual trader and can reflect value-to-earning ratio, volatility, volume of sales, or any other metric the trader designs, or can be selected from a listed of predetermined metrics. The action line responds to changes in the data it measures, updating in essentially real time. The action line allows the trader to immediately determine the current valuation of the item relative to the trader's own valuation of the item. As the offers

or bids approach the action line, the trader is prepared to complete a transaction in accordance with the trader's own valuation.

In another aspect of the invention, market data and other contextual data is displayed while the trader is viewing one of the aforementioned user interfaces. A historical chart is displayed in the background of a user interface to provide additional information to the trader who is determining the state of the market and how it may affect the value of the item. For example, the historical chart may represent the various market indices, historical values of the item or others, and any other historical value, quantity, or volume trend. The historical chart can represent the average value of the item over a period of time, or may represent a value or values for any other item or group of items. The historical chart is displayed with respect to a vertical axis of values, and is displayed horizontally responsive to time. The historical chart is updated to provide the latest information to the trader while the trader is trading. Thus, in accordance with the present invention, the trader is able to make instantaneous decisions regarding an item while receiving critical information about other items or the past performance of the current item and other indices. This is a major advantage over conventional methods of trading in which this information is not provided concurrently, and if presented at all, is difficult to process quickly.

An alternate embodiment provides a trading pit view that displays trader icons for each trader and positions the trader icons reflective of the activity level of the trader. Floor brokers and other bystanders are

also displayed and identified to allow the trader to understand at a glance the respective positions and activity of all users currently connected to the transaction server for that trading pit. Selecting a trader icon provides information regarding the trader and can open up a window to allow the traders to communicate with each other using one or more methods including electronic mail, text chat or communication by voice over a network connection. The trading pit view allows the remote trader to immediately ascertain whom the trader is trading against, how active they are, and allows the trader to better anticipate the market.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a preferred embodiment of the electronic trading system of the present invention.

FIG. **2** is a block diagram of a preferred embodiment of the transaction manager of the present invention.

FIGS. **3***a*-**3***c* are screen shots illustrating an embodiment of a Priority View in accordance with the present invention.

FIG. **3***d* illustrates a buy order pop-up window.

FIG. **3***e* illustrates a sell order pop-up window.

FIG. **4** is a screen shot illustrating an embodiment of a Value/Quantity View in accordance with the present invention.

FIG. **5** is a flow chart illustrating a preferred embodiment of a method of displaying bid and offer icons in accordance with the present invention.

FIG. **6** is a flow chart illustrating a preferred embodiment of a method of generating a bid order icon in accordance with the present invention.

FIG. **7** is a flow chart illustrating a preferred embodiment of a method of generating a offer order icon in accordance with the present invention.

FIG. **8** is a flow chart illustrating an alternate embodiment of generating an order icon.

FIG. **9** is a screen shot illustrating a Pit Panel view in accordance with the present invention.

FIG. **10** is a flow chart illustrating a preferred embodiment of generating and placing a trader icon in accordance with the present invention.

FIG. **11** is a screen shot illustrating a communication window in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates the electronic trading system in accordance with the present invention. Client terminals **104** are coupled to a transaction manager **100**. The client terminals **104** are personal computers, terminals as part of a network, or any other computing device. Traders use the client terminals **104** to interact with trading pits that are managed by the transaction manager **100**. The transaction manager **100** manages transaction requests generated by the client terminals **104**, routes information to, from, and between the terminals **104** and the transaction manager **100**, and stores and retrieves information from a database **108** or databases **108**.

FIG. **2** illustrates a more specific embodiment of the transaction manager **100**. The clients **104** are coupled to log-in manager **204** to provide to each client access to the transaction manager **100**, and to allow each client **104** to designate one or more trading pit **220** to which to be connected. The transaction manager **100** hosts one or more transaction servers **200**. Each transaction server **200** is responsible for the trading of a specified item, essentially supporting a specific trading pit. The summary information agents **224** for each transaction server **200** provide a current status of the activity of each pit **220** to a trader connected to the log-in manager **204**. The trader can select a pit **220** to which to be connected based upon the summary information. Once the log-in process is complete, the clients **104** are coupled to a registration server **212** for the specified trading pit **220**. Registration for each pit **220** requires the client **104** to provide an access key that it received from the login manager **204** during log in.

After registering for a pit **220**, the trader is able to add, modify or delete orders for the item being traded in the trading pit **220**. One type of an order called a "bid" is an order to buy up to a specific quantity of an item at or below a specific value. Another type of an order called an "offer" is an order to sell up to a specific quantity of an item at or above a specific value. Other types of orders are possible depending on the type of item being traded in the trading pit 220.

Each pit **220** includes a transaction server **200**. The transaction server **200** receives orders, matches bids and offers (when a bid and offer are matched it is called a trade or execution) and routes information to

both the database **208** and the client terminals **104**
connected to the trading pit **220**. The client terminals
104 generate icons for bid and offer orders (called bid
and offer icons), historical charts and trader icons,
and determine the placement of bid and offer icons
and trader icons responsive to the information re-
ceived from the transaction server **200**. The database
208 to which the transaction server **200** is coupled
stores the information corresponding to each trader,
information on every order submitted over a period
(such as start of trading days), information on every
trade over a period (such as last 180 days) and the
information corresponding to the item being traded.
Each trader may have information associated with
the trader's account stored, including a name, e-mail
account, address, phone number, personal value
quantifying metric or analytic activity level history,
and various other information which is unique to the
individual trader and which may be used by the pre-
sent invention to create a virtual trading environ-
ment.

The information corresponding to every order in-
cludes whether the order was a new order, modifica-
tions to an existing order or deletion of a previously
submitted order, the type of order (for example, bid or
offer), the value, the quantity, the time and date the
order was submitted, and any other information spe-
cific to the order. The information corresponding to
every trade includes the value, quantity, buyer and
seller. The information corresponding to the item be-
ing traded includes the highest outstanding bid value
and the lowest outstanding offer value for the item, as
well as a list of the values of all open orders for the
item. The item information is stored on the database

208 in a data structure such as an order table. The server **200** updates the information in the order table responsive to receiving information from the client terminals **104**. The updated information is then transmitted back to the client terminals **104**. Other information, such as information used in creating historical charts, may also be stored on database **208**. Information which may be global to more than one pit **220**, for example, trader personal information, is also stored on the system database **108**, to allow the information to be accessed by each trading pit **220**.

For traders registered to the same trading pit **220**, all of their orders (i.e. bids or offers specifying a value and quantity) are transmitted to the transaction server **200** for that pit **220**. The server **200** analyzes the orders for matches with outstanding, or open, orders. If them is a match between orders of different types, for example, between a bid and an offer. then a transaction is enacted and the client terminals **104** are notified to remove the matched icons. All outstanding orders are transmitted to each client terminal, allowing a trader to view all of the outstanding orders from all traders for an item on a trading pit at any given time. The client displays are updated continuously or at specific intervals to provide updated information regarding which orders are outstanding and the state of the market in the pit **220**. As shown in FIG. **2**, multiple trading pits **220** are provided in the electronic trading system, and a single trader may be connected to as many pits **220** at the same time as desired. The number of trading pits **220** which may be maintained in accordance with the present invention is scalable responsive to the number of servers which are provided in the system. The items of trade include

any possible commodity, for example, minerals, futures, or shares in a corporation. Other network configurations can be used to implement the electronic trading system as is known to those of ordinary skill in the art.

The client terminals **104** provide the interactive link between the traders and the trading pits **220**, and display the various user interfaces of the present invention. FIG. **3***a* illustrates a priority view **312** which is designed to allow traders to intuitively place orders **300**, **304** and view markers **336** representing value quantifying metrics, and contextual trend data **316** in accordance with the present invention. In the priority view embodiment, orders **300**, **304** are displayed at a location corresponding to their value with respect to the value axis **332**. Values may represent price, interest rate, or any other metric by which an item may be valued. For example, offer **304(1)** has a value of $28.45, and the lowest point of the bottom edge **308** of the icon **304(1)** is aligned with the value $28.45 on the value axis **332**. In this embodiment, the top edges **309** of the bids and bottom edges **308** of the offer icons are angled. The rightmost bid is the bid having the highest value, and the rightmost offer is the offer having the lowest value. This allows the edges **308**, **309** of the icons **300**, **304** to form a triangle which points to the separation in value between the last lowest offer and the last highest bid. The quantity of each order is represented by a size of the icon such as its length or height. Icons having a larger size represent orders having a greater quantity. The specific quantity and other information of an order displayed on the screen may be known by selecting that order, which invokes a pop-up window to display the precise value and

quantity of the selected order. In an alternate embodiment, the specific order information is displayed in the order task bar **328**, in response to a trader selecting a bid or offer icon provided the order was submitted by the trader selecting the order. Alternatively, if space permits, the quantity and value may displayed in the icon itself.

If there are several orders with equal value, the orders are stacked or placed adjacent to each other responsive to the time at which the order was placed. For example, bids **300(5)**, **300(6)**, **300(7)** have equal values at $29.50. Therefore, all three bid icons **300** are vertically stacked. A preferred method of stacking places the oldest orders closest to the horizontal space which naturally occurs and separates the bids and the offers. The horizontal separation between the bids and the offers occurs naturally because all of the bids displayed are always at a lower value then the displayed offers. If a bid is placed at a value equal to or exceeding an offer value, a transaction will be made immediately and the icons removed. For example, in the stack containing orders **300(7)**,**300(6)**, and **300(5)** in FIG. **3***a*, the first and therefore the oldest bid in time was **300(7)**, and is placed at the top of the stack, closest to the horizontal separation between the displayed bids and offers. The other two stacked bids **300(6)**, **300(5)** are positioned below the oldest bid **300(7)**, corresponding to the time at which they were submitted, and sorted in order of oldest to newest. In the stack containing offers **304(2)**, **304(3)**, and **304(4)**, the oldest offer **304(2)** is positioned on the bottom of the stack closest to the horizontal separation, and the newest offer **304(4)** is positioned on the top of the stack. The above method of ordering bids and offers is

a preferred method, however other ordering schemes could be used within the scope of the present invention.

The trader using the client terminal **104** in accordance with the present invention, is shown all of the outstanding orders **300**, **304** for the item being traded. This is one significant difference between the present invention and conventional systems because a trader using a system in accordance with the present invention is able to view trends in the bids and offers in addition to the buying and selling of the item being traded. For example, in FIG. **3***a*, a trader can quickly analyze the outstanding orders **300**, **304**, and determine that there are an almost equal number of bids **300(8)** as offers **304(8)**. Thus, the trader may infer that the market is stable, and the value for the item will not be dramatically driven up or down in the near future. Accordingly, the trader may decide to take no action. However, as shown in FIG. **3***b*, if demand builds through an increased number of bids being made, as shown by the display of an increased number of bid icons **300**, or bids are being made for large quantities, as shown by the display of bid icons **300** having a greater size, and if supply recedes as indicated by the display of a reduced number of offers icons **304**, the trader can anticipate that the value for the item will increase. Consequently, the trader will place bids for the currently low valued offer **304**. Thus, by viewing all outstanding offer icons **304** and bid icons **300** as they are made on an item, the trader can anticipate the market and quickly adjust his or her trading plans to take advantage of the information. In contrast, in conventional systems, the trader only knows the last highest bid and the last

lowest offer. In the example of FIG. **3***a*, the trader would only know the existence of bid **300(1)** and offer **304(1)**. Only the market maker would know of the existence of the other bide and offer. Individual traders would therefore be unaware of trends in bidding, and experience greater difficulty in anticipating the market.

The trader can also view the gap between offer icons **304** and bid icons **300** to determine at what value sales may be made and for what quantity. In the example of FIG. **3***a*, the trader can determine that there are several bids **300(5)**, **300(6)**, **300(7)**, at a value slightly less than $27.35. Therefore, if the trader has a number of items to sell, the trader can make offers at that value and be assured of a sale of all of his or her items. However, if this value is too low, the trader can choose to keep all of his items until the value of the item has risen, which would be reflected in the display of additional bid icons at a higher value position in the screen. In contrast, if a trader was using a conventional system, the trader would have to offer his items incrementally, without knowing in advance when sales are likely to be made.

The value axis **332** indicates the value at which an item is being traded. This value may represent different qualitative measures for an item, such as the raw price for the item; for bonds, the value could be the cost for the bond or the implied interest rate for the bond, or the value be used as a measure for an implied volatility of the item, for example, a generic measurement of the relative expense of an option. Each trader can use his own value scale. For example, one trader may use a bond cost as an axis of values and another

may use the implied interest rate of the bond. Regardless of a trader's choice of value, the different orders are displayed on the trader's screen in terms of the value the trader has chosen. Additionally, the value scales are completely customizable. For example, a gold arbitrageur could create a scale that measures the difference between the futures price of the metal less the spot cash price of the metal. The arbitrageur could then apply the cost of carry, including insurance and storage, to the future/cash price difference to generate an implied interest rate for the gold. Thus, the value axis for the arbitrageur would be an interest rate. In another example a trader who is interested in trading soybean oil could buy and sell soybeans, but, by using a value axis which accounts for the current cost of crushing soybeans, storage of soybeans, transport, etc, can be actually trading in soybean oil. Thus different traders in the same trading pit **220** would see the same bid and offers but organized with respect to their own specific value axis. Thus, the present invention provides enormous flexibility in constructing a view of an item's value which is directly representative of the trader's own interest in the item.

The priority view **312** offers several other advantages to a trader. The offers **304** and the bids **300** are displayed in different colors, shapes, textures or sizes, or other distinguishing visual characteristics, to allow the trader to quickly ascertain the current state of the market for this item. Additionally, orders made by the trader are displayed having a different visual characteristic than the visual characteristic used to display orders of other traders. This allows the trader to easily distinguish between their own orders and the orders of other traders. For example, in FIG. **3***a*, the

trader is able to immediately determine that offers **304(3)** and **304(7)** are the trader's own offers **304**, and therefore should be discounted from any market analysis. In FIG. **3***a*, the trader can also quickly determine that the trader himself is the trader with the most bids **300** in place, which suggests to the trader that the value for the item may be driven down if the trader removes his bids **300** from the pit **220**.

Orders can be placed by a trader using the user interface of the present invention in variety of ways. In one embodiment, as shown in FIG. **3***a*, the trader can directly submit an order by using the order task bar **328**. The options to specify value and quantity of either a bid or offer, and the expiration period are provided. After the information is entered, the trader selects Place Order, and the order is submitted to the transaction server **200** for the pit **220**, and an offer or bid icon **304**, **300** is generated and displayed at the desired location at the desired size. The order information is communicated to the transaction server **200** and from there to the other client terminals, so that the new bid/offer appears in the displays of all other traders in this same pit. In a preferred embodiment, the trader submits an order by simply selecting either an offer token **324** or bid token **320** using a pointing device. After being selected, the trader adjusts the size of the offer or bid token **324**, **320** until the size of the token matches the desired quantity of the order. Preferably, a pop-up window or other screen indicator is displayed to show in numerical terms the quantity of the current size of the token, to ease the process of creating a properly sized order token. Next, the token is dragged to a location on the screen which corresponds to the desired value of the order. Again, a

screen indicator displays the current value for the to-
ken at its current location as it is being dragged to
allow precise placement of the token at the desired
value.

In the embodiment of FIG. **3***a*, a value marker **344**
follows bid token **320** as it is moved to a location in
the display. The value marker **344** indicates the value
of the new order as the order is being placed. This al-
lows for the trader to easily and precisely move the
token **320**, **324** to the desired value. After reaching
the desired value, the trader releases the pointing de-
vice button and a Buy pop-up window **350**, as shown
in FIG. **3***d*, is displayed with the bid order infor-
mation. The Buy pop-up window **350** allows the
trader to modify the order information (value, quan-
tity, expiration), cancel the order or submit the order
with the presently displayed information. If the order
is to sell an item, a Sell pop-up window **354** is dis-
played, as shown in FIG. **3***e*. After the order is submit-
ted to the transaction server, it will be displayed on
the screens of all traders in this trading pit connected
to the transaction server **200**.

An additional feature of the user interface of the
present invention is the provision of contextual data.
Contextual data comprises historical trading data of
the item, historical or current trading data of other
items, historical or current trading data of an average
of items. For example, the trader may wish to have
the Dow Jones Average™ displayed on the screen,
and updated in realtime. Viewing contextual data
along with the outstanding offers and bids allows the
trader to better anticipate the market. For example,
if the Dow Jones™ average is used as the contextual

data, and is falling sharply, the trader may decide to begin selling his items even though the value of the item in the pit **220** has been stable. This allows the trader to anticipate where the market is headed. Any type of data useful to the trader can be displayed as contextual data. The contextual data **316** is preferably displayed as a historical chart **316** along a vertical axis of values and against a horizontal axis of time. The historical chart **316** can be displayed against any time period, for example, hours, minutes, etc. The historical chart **316** is updated periodically as the data for the item is updated. If the historical chart **316** includes the current item, as shown in FIG. **3***a*, bar lines are displayed in the data to indicate the high and low values of the item for that time period. A volume graph **340** is displayed at the bottom edge of graph. The volume graph illustrates the volume of transactions in the pit **220**, and gives additional information to the trader regarding the state of the market for the item.

Yet another feature of the user interface of the present invention is the display of a marker **336**. The marker **336** is representative of a value quantifying metric specified by the trader. The metric determines a current action value for the item which identifies the value at which the trader should act if the value of the item rises above the action value or falls beneath the action value. For example, in FIG. **3***b*, the value quantifying metric generates an action value of $68.57. The marker **336** is displayed at this value to indicate to the trader the location of the action value in relation to the current bids **300** and offers **304**. In the example of FIG. **3***b*, the marker is displayed as an action line **336**. As can be seen, the outstanding bids

are below the action line **336** and the current offers are above the action line **336**. This indicates to the trader that no action should be taken.

The value quantifying metric can be an algorithm or formula based upon factors the trader believes are important in ascertaining the true worth of an item. This metric can be set to reflect value-to-earnings ratio, volatility, volume of orders, per cent gain, or any simple or complex design. The trader can input a custom metric or can select a metric from a predesignated list of metrics. Metrics may also be purchased from rt parties and incorporated into the client terminal **104**. This allows new metrics to be added at any time. The action value displayed by metrics are dynamically determined either by the client terminal **104** or the server **200**, and updated whenever new data is received regarding a component of the metric. Thus, the trader is given the latest information to update the trader's action line **336**, allowing the trader to make current, informed decisions regarding possible orders. For example, in FIG. **3***c*, the metric has been updated from the time of FIG. **3***b*. The action line **336** has moved corresponding to the new action value of $80.21. As can be seen, displaying the updated action line **336** allows the trader to immediately determine that the outstanding offers are now below his action line **336**, and therefore that these offers should be purchased despite the fact that the offers themselves remained at the same value from the time of FIG. **3***b* to the time of FIG. **3***c*.

As discussed above, a trader may be connected to several trading pits **220** at once. If a trader has multiple connections, the trader can view the different

pits **220** simultaneously, or if the trader wishes to concentrate on a single item, the trader can have only one pit **220** displayed. Additionally, the trader can disable the different options for a view to suit the trader's preferences, and maximize visibility for a trader's particular terminal **104**.

FIG. **4** illustrates an alternative view of the user interface) in accordance with the present invention. The value/quality view **420** illustrates the market for the item using a first axis of values **408** and a second axis **412** for quality. Thus, the location of each offer icon **400** and each bid icon **404** represents the value for the offer or bid and the quantity for which the offer or bid is made. Optionally, the action line **336** is also displayed, as well as the contextual data. The alternate view provides a different intuitive perspective on the state of the market. By providing alternate views, as shown in FIG. **3**_c_, the electronic trading system of the present invention allows the different preferences of different traders to be met. Orders in this view are placed by selecting an offer token **416** or a bid token **417** and moving the token to a location which corresponds to the desired quantity and value. If the trader wishes to purchase immediately, the trader can simply drag a bid token **417** to the location directly over any offer token, and a window pops up displaying a bid order with value and quantity equal to that of the offer token. If the trader wishes to sell immediately, the trader can simply drag an offer token **416** to the location) directly over any bid token, and a window pops up displaying an offer order with value and quantity equal to that of the bid token. The trader can then execute the transaction.

FIG. **5** is a flow chart illustrating a preferred embodiment of the user interface in accordance with the present invention. The client terminal **104**, through data received from the transaction server **200**, displays **500** at least one outstanding bid icon corresponding to a quantity and value of the bid. The client terminal **104** also displays **504** at least one outstanding offer icon corresponding to a quantity and value) of an offer. Thus, by displaying at least one outstanding bid and offer icon, the "book" is opened and traders viewing the client terminal can readily spot trends in supply and demand for an item and quickly anticipate the market.

FIG. **6** illustrates an embodiment of a method of generating an order icon in accordance with the priority view **312** of the present invention. First, the client terminal **104** receives **600** the order type. The order can be either a bid or an offer. The trader specifies the type by selecting an offer or bid token to place the order, or by manually indicating the) order type on the task bar. Second, the client terminal **104** receives **604** a quantity specified for the order. The quantity, as described above, is specified by the trader either by entering the number directly into the order task bar or by adjusting the size of the order token. In an embodiment; where the order information is entered into the taskbar, an order icon will be generated **608** whose vertical size matches the quantity specified after the order has been processed by the server **200**. The client terminal **104** then receives **612** a value for the order. Again, the trader can specify the value by entering the information into the taskbar or can drag the order token to the location corresponding to the value. Finally, the client terminal **104** displays **614** an

order confirmation window displaying the value, quantity, and expiration information. The trader can modify the order in this ; window and then must either cancel the order by closing the window or pressing the cancel button or submit it by pressing the OK button. The client terminal **104** which receives the value and quantity and order type information transmits **616** the information to the server **200**. The server **200** then processes the order information, and updates the order table.

Once the server **200** transmits updated order information to a client terminal **104**, the client terminal **104**, in the priority view, determines **618** whether a slot is open adjacent an existing order which has a lower value, if the order is a bid, or a higher value, if the order is an offer. In the priority view **312**, the horizontal axis is divided into slots, each slot having a width equal to an order icon **300**, **304** and each slot separated by a standard set-off unit. Incoming orders are sorted by the value of the order. For offers, the offers with the lowest values are positioned closest to the axis of values **332**, and for bids, the bids with the highest values are positioned closest to the axis of values **332**. When a new order is received, the client terminal **104** re-sorts the out-standing orders and places the order icons **300**, **304** in the appropriate positions. If a new order is equal to an existing order of the same type, the order is stacked onto the existing order. FIG. **6** illustrates a more detailed methodology of the sorting mechanism, using the example of placing a new bid. However, the methodology is equally applicable to placing a new offer.

A new bid is designated for the slot adjacent an existing bid which has the least value of the set of existing bids having values greater than the value of the new bid. The client terminal **104** determines **618** whether this determined slot has an existing bid within it. If it does not, the icon is placed **636** at the determined slot. If the slot does contain an existing bid, the client terminal **104** determines **620** whether the existing bid has a value less than the requested bid. All existing bids that have values less than the requested bid are moved **640** to the adjacent slot positioned away from the axis of values **332**. In the example of FIG. **3**a, the adjacent slot would be a slot positioned to the left. All other bids having values less than the requested bid are shifted **640** correspondingly. If the client terminal determines **624** that the existing bid has a value equal to the existing bid, the requested bid is stacked **632** below the existing bid or bids, away from the horizontal separation between bids and offers as described above. If the client terminal **104** determines **628** that the existing bid is greater than the requested bid, a new slot is determined **628** for the requested bid, and the process is repeated.

As shown in FIG. **7**, upon receiving new bid information, the transaction server **200** determines **700** whether there is an existing offer in the order table having a value less than or equal to the requested bid. If there is not, the new bid is added to the table, and the information regarding the new bid is sent **702** to the client terminals **104** for display. If there is an existing offer whose value is less than or equal to the requested bid, i.e., if the new bid is the highest value bid outstanding, the server **200** determines **704**

whether the existing offer has a quantity which is less than the quantity represented by the bid. If the offer does have a quantity less than the bid, the server removes **706** the offer from the order table and adds a new bid to the order table with the quantity reduced by the quantity of the offer removed.

The server **200** records **720** a trade between the trader submitting the new bid and the trader submitting the removed offer, at a value equal to the offer value and a quantity equal to the offer quantity. All of the outstanding client terminals **104** are sent the information regarding the trade. The client terminals **104** then remove the existing offer icon and add a bid icon which has a size corresponding to the difference in quantities between the existing offer icon and the requested bid icon. The transaction server **200** determines **700** again whether there is another existing offer in the order table having a value less than or equal to the requested bid to determine if another transaction can be made with the quantity remaining in the bid.

The server **200** also determines **708** whether the offer has a quantity greater than the quantity of the requested bid. If it does, the quantity of the offer is reduced **716** by the quantity of the bid, and the updated offer information is sent **717** to the client terminals **104** for display. A trade is recorded **720** between the trader submitting the new bid and the trader who submitted the offer at a value equal to the offer value and a quantity equal to the bid quantity. All of the outstanding client terminals **104** are sent the information regarding the trade and update the user interface displays accordingly.

If the quantities of the bid and offer are equal, the offer is removed **712** from the table and the transaction is complete. A trade is recorded **720** between the trader submitting the new bid and the trader who submitted the offer at a value equal to the offer value and a quantity equal to the bid quantity. All of the outstanding client terminals **104** are sent the information regarding the trade, and update the user interface displays accordingly.

As shown in FIG. **8**, in the value/quantity view, the client terminal **104** receives **800** a value, receives **804** a quantity, and receives **806** an order type for a new order. A confirmation window is displayed **807**, and, upon confirmation of the order, the order information is transmitted to the server **200**. Again, this may occur responsive to the trader entering in the information directly or dragging an order token to the proper location and after confirming the order. The server **200** receives the order information, updates the order table, and sends the updated information to the client terminals **104**. The client terminals **104** display a new order icon at a location corresponding to the value and quantity of the order with respect to the axis of quantities and axis of values. If the new order is an offer, and there is an existing bid for a value higher than or equal to the value of the offer, a transaction is completed, and a new offer or a modified bid token is displayed responsive to the quantities that the original offer and bid icons represented.

FIG. 9 illustrates a trading pit view **900** called the pit panel view **900**, in accordance with the present invention. The pit panel view **900** provides a visual interface to other members of the pit **220**. All users who

are currently registered to the pit **220** are displayed in the pit panel **900**. This is critical information to a trader regarding the activity of the pit **220**. If the pit **220** is crowded, the trader can expect volatility in trading. If the pit **220** is empty, the trader can expect light trading and relatively stable values for the item.

The pit panel **900** displays trader icons **912**, observer icons **904**, and floor broker icons **908**. Observers are users who are registered to the pit **220** but who are not actively trading and floor brokers are individuals who have expertise on a pit's item and traders, and who assist traders in executing unusual trades, negotiating a deal with multiple traders, or providing history and information on traders to others. As the observers do not trade for themselves, their icons **904** are placed on the outside of the pit icon **916**. Floor brokers who do not trade also have their icons **908** placed on the outside of the pit icon **916**.

The trader icons **912** are displayed on the pit icon **916**. The pit icon **916** is preferably displayed as a series of concentric polygons, where each polygon represents an activity level or levels. Traders who are more active are placed closer to the center of the pit icon **916**. The most active trader, in the example of FIG. **9**, trader **912(1)**, is placed in the center of the pit icon **916**. In a preferred embodiment, each polygon represents a range of activity levels. For example, the innermost polygon contains the traders with the second through ninth highest activity levels. The next polygon contains the traders having the tenth through twenty-sixth highest activity levels, and so forth. By grouping traders into activity ranges, and thus shilling a trader's icon out of a polygon only in response

to the trader's activity level shifting out of the range represented by the polygon, icon changes and consequent flicker in the display of the pit icon **916** are minimized. However, a trader is able to easily ascertain who the active traders in a pit **220** are and how active the traders are by noting the relative locations of the trader icons **912** in the pit icon **916**.

Each trader icon **912** has order indicators **913** to show the quantity of orders a trader has outstanding. Preferably, there are separate indicators **913** for bids and offers, each showing the volume of outstanding bids or offers the trader currently has placed. Other order indicators **913** may be optionally displayed, for example, indicating the sum of all quantities of orders or the volume of orders entered over a specified period of time. Selecting a trader's icon **912** will also highlight the trader's orders on the priority view, value/ quantity view, and other views provided in the system that display orders and which can all be displayed concurrently. Double clicking on a trader icon **912** generates a communication window as shown in FIG. **11** which allows the trader to send an email message **1108**, send an instant message **1104** as part of a text chat session, communicate by voice over the network connection **1112**, or set up a later telephone call or other optional communication to the selected other trader. Thus, the pit panel **900** provides a sense of community in the pit **220** by visual representing useful information, and provides additional information to the trader which the trader can use in anticipating the market.

FIG. **10** is a flow chart illustrating a preferred embodiment of generating and placing a trader icon in

accordance with the present invention. First, a trading pit icon **916** is displayed **1000**. Next, the client **104** determines **1004** whether a predetermined period of time has passed. The pit panel data is updated periodically, and the client **104** waits for that amount of time before re-generating the display with the new data. If the server **200** determines **1004** that the predetermined period has expired, a first trader icon is selected **1008**. The client **104** determines **1010** whether the trader is still connected to the server **200** from the data provided by the server **200**. If the trader is not, the trader icon **912** for the trader is removed **1011**, and the client **104** determines **1020** whether there are more traders. If the trader is still connected, an activity level is determined **1012** for the trader. Activity levels are determined as a combination of the volume of outstanding orders, the value of outstanding orders, recent activity, or other measures which determine how active a trader has been. Once the activity level has been determined, the client **104** displays **1016** the icon **912** for the trader at the location corresponding to the activity level. In an embodiment where order indicators **913** are displayed, the order indicators **913** are updated to include the latest order data. In the preferred embodiment, as discussed above, the pit icon **916** is comprised of concentric polygons or rings, the traders are ordered by activity levels, and each, polygon represents a range of activity level orders. After the activity level of a trader is determined, the traders are reordered responsive to their activity levels, and the trader icon **912** for each the trader is placed in the polygon designated for the order of the trader. The client 104 determines **1020** if there are more traders. If there are not, the client **104**

determines **1024** if there are bystanders and, if there are, selects **1028** the first bystander icon **904**, **908** and determines **1032** whether the bystander is connected using data that is provided by the server **200**. If the bystander is not connected, the bystander icon is removed **1040**. If the bystander is connected, the client **104** determines **1036** whether there are more bystanders. If there are not, the client **104** returns to the step of determining **1004** whether a predetermined time period has ended, as the pit panel **900** view has been updated to reflect the current users and their current activity levels.

We claim:

1. A computer based method for facilitating the placement of an order for an item and for displaying transactional information to a user regarding the buying and selling of items in a system where orders comprise a bid type or an offer type, and an order is generated for a quantity of the item at a specific value, the method comprising:

> displaying a plurality of bid indicators, each corresponding to at least one bid for a quantity of the item, each bid indicator at a location along a first scaled axis of prices corresponding to a price associated with the at least one bid;

> displaying a plurality of offer indicators, each corresponding to at least one offer for a quantity of the item, each offer indicator at a location along the first scaled axis of prices corresponding to a price associated with the at least one offer;

> receiving market information representing a new order to buy a quantity of the item

for a specified price, and in response to the received market information, generating a bid indicator that corresponds to the quantity of the item bid for and placing the bid indicator along the first scaled axis of prices corresponding to the specified price of the bid;

receiving market information representing a new order to sell a quantity of the item for a specified price, and in response to the received market information, generating an offer indicator that corresponds to the Quantity of the item for which the offer is made and placing the offer indicator along the first scaled axis of prices corresponding to the specified price of the offer;

displaying an order icon associated with an order by the user for a particular quantity of the item;

selecting the order icon and moving the order icon with a pointer of a user input device to a location associated with a price along the first scaled axis of prices; and

sending an order associated with the order icon to an electronic trading exchange, wherein the order is of a bid type or an offer type and the order has a plurality of order parameters comprising the particular quantity of the item and the price corresponding to the location at which the order icon was moved.

2. The method of claim **1** wherein the order icon is adjustable by the user to reflect the quantity of the order.

3. The method of claim **1** further comprising:

receiving a request for an order responsive to a user action specifying a quantity of the item and price for the order.

4. The method of claim **1** further comprising:

displaying the order icon placed by the user with a first visual characteristic; and

displaying the bid and offer indicators corresponding to orders placed by other users with a second visual characteristic.

5. The method of claim **1** further comprising:

displaying each of the plurality of bid and offer indicators having an edge which is angled toward the first scaled axis of values.

6. The method of claim **1**

wherein the bid indicator is generated such that a size of the bid indicator corresponds to the quantity of the item bid for.

7. The method of claim **1**

wherein the offer indicator is generated such that a size of the offer indicator corresponds to the quantity of the item for which the offer is made.

8. The method of claim **1** further comprising:

generating a second axis, perpendicular to the first scaled axis of prices, representing time;

generating a third axis, perpendicular to the second axis, representing value; and displaying a historical chart representing

values of the item responsive to time and value with respect to the second and third axes.

9. The method of claim 1 further comprising:

displaying a plurality of order tokens having different values;

receiving a selection for an order token; and moving the order token to a user specified location with respect to the first scaled axis of prices which corresponds to the desired price;

thereby enabling placing of the order in accordance with the desired price.

10. The method of claim 1 further comprising visually distinguishing bid indicators from offer indicators.

11. The method of claim 1 further comprising visually distinguishing the order icon from the plurality of bid and offer indicators.

12. The method of claim 1 further comprising displaying a marker representing a value of interest at a location associated with a price on the first scaled axis of prices.

13. The method of claim 12 wherein the location at which the marker is displayed is updated dynamically.

14. The method of claim 12 wherein the marker comprises a line.

15. The method of claim 1 wherein the user initiated command comprises selecting the order icon using a pointer device and dragging the order icon to the location.

16. The method of claim 1 further comprising modifying the order icon based on a transaction.

17. The method of claim **1** wherein the size of the order icon is associated with the quantity of the order.

18. The method of claim **1** wherein the prices on the first scaled axis of prices are based on a price for the item.

19. The method of claim **1** wherein the item comprises a commodity.

20. The method of claim **1** wherein the prices on the first scaled axis of prices represent a qualitative measure.

21. The method of claim **20** wherein the qualitative measure represents a derivative of price.

22. The method of claim **21** wherein the derivative of price is an interest rate, a bond cost, an implied interest rate, or implied volatility of the item.

23. The method of claim **20** wherein the qualitative measure represents any metric by which an item can be valued.

24. The method of claim **20** wherein different qualitative measures can be chosen by the user.

25. The method of claim **20** further comprising receiving a command to select a new qualitative measure and updating the display of the plurality of bid indicators and the plurality of offer indicators to locations along the first scaled axis of prices corresponding to prices associated with the new qualitative measure.

26. The method of claim **1** wherein the bid indicator displays the quantity of the item associated with the bid and the offer indicator displays the quantity of the item associated with the offer.

27. The method of claim **1** wherein the order icon displays the quantity of the order placed by the user.

28. The method of claim **1** further comprising displaying contextual data along with the plurality of bid and offer indicators.

29. The method of claim **28** wherein the contextual data is displayed as a historical chart along the first scaled axis of prices.

30. The method of claim **28** wherein the contextual data is displayed as a volume graph.

31. The method of claim **28** wherein the contextual data indicates the high and low values of the item for a period of time.

32. The method of claim **1** wherein the first scaled axis of prices is graduated in intervals such that each interval represents a particular price.

33. The method of claim **1** further comprising the step of displaying the prices along the first scaled axis of prices.

34. The method of claim **1** wherein the each of plurality of bid and offer indicators are graphically represented to the user as icons.

35. A computer readable medium having program code recorded thereon for execution on a computer for displaying transactional information to a user regarding the buying and selling of items in a system where orders comprise a bid type or an offer type, and an order is generated for a quantity of an item at a specific value, comprising:

a first program code for displaying a plurality of bid indicators, each corresponding to at least one bid for a quantity of the item, each bid indicator at a location along a first scaled axis of prices corresponding to a price associated with the at least one bid;

a second program code for displaying a plu-
rality of offer indicators, each corre-
sponding to at least one offer for a quan-
tity of the item, each offer indicator at a
location along the first scaled axis of
prices corresponding to a price associ-
ated with the at least one offer;

a third program code for receiving market
information representing a new order to
buy a quantity of the item for a specified
price, and in response to the received
market information, generating a bid in-
dicator that corresponds to the quantity
of the item bid for and placing the bid in-
dicator along the first scaled axis of
prices corresponding to the specified
price of the bid;

a fourth program code for receiving market
information representing a new order to
sell a quantity of the item for a specified
price, and in response to the received
market information, generating an offer
indicator that corresponds to the quan-
tity of the item for which the offer is
made and placing the offer indicator
along the first scaled axis of prices corre-
sponding to the specified price of the of-
fer;

a fifth program code for displaying an order
icon associated with an order by the user
for a particular quantity of the item;

a sixth program code for selecting the order
icon and moving the order icon with a

pointer of a user input device to a location associated with a price along the first scaled axis of prices; and

a seventh program code for sending an order associated with the order icon to an electronic trading exchange, wherein the order is of a bid type or an offer type and the order has a plurality of order parameters comprising the particular quantity of the item and the price corresponding to the location at which the order icon was moved.

* * * * *

UNITED STATES PATENT AND TRADEMARK
OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.: 7,212,999 B2
APPLICATION NO.: 09/289550
DATED: May 1, 2007
INVENTOR(S): Friesen et al.

It is certified that error appears in the above-identi-
fied patent and that said Letters Patent is hereby cor-
rected as shown below:

Column 1, line 22, **replace** "before-the rest" with --
before the rest--

Column 7, line 28, **replace** "bide and offer" with --bids
and offers--

Column 11, line 21, **replace** "onto the existing order
with --onto the existing order--

Signed and Sealed this

Eleventh Day of December, 2007

Jon W. Dudas
*Director of the United States Patent and Trademark
Office*

UNITED STATES PATENT AND TRADEMARK
OFFICE
CERTIFICATE OF CORRECTION

PATENT NO.:   7,212,999 B2
APPLICATION NO.:09/289550
DATED: May 1, 2007
INVENTOR(S):   Richard W. Friesen et al.

It is certified that error appears in the above-identi-
fied patent and that said Letters Patent is hereby cor-
rected as shown below:

The Title Page, showing the illustrative Figure,
should be deleted and substitute therefor the at-
tached title page.

Delete Figs. 2, 3A, 3B, 3D, 3E, 9, 4, 6, 7, 10 and
substitute therefor the drawing sheets, consisting
of Figs. 2, 3A, 3B, 3D, 3E, 9, 4, 6, 7 and 10 as shown
on the attached pages.

Column 6, line 41: please delete "$29.50" and in-
sert --slightly less than $27.35--.

Column 10, line 10: please delete "value/quality"
and insert --value/quantity--.

Column 10, line 12: please delete "quality" and in-
sert --quantity--.

Claim 34, column 16, lines 17-18: please delete "of
plurality of and insert --of the plurality of--.

Signed and Sealed this
Nineteenth Day of April, 2011

App. 351

David J. Kappos
Director of the United States Patent and Trademark
Office

(10) **Patent No.:**   **US 7,212,999 B2**

(12) **United States Patent Friesen et al.**

(45) **Date of Patent:**   **May 1, 2007**

(54) **USER INTERFACE FOR AN ELECTRONIC TRADING SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(52) **U.S. Cl.** **705/37**; 705/35; 345/440.2
(58) **Field of Classification Search**.   705/37
See application file for complete search history.

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(57) **ABSTRACT**

A user interface for an electronic trading exchange is provided which allows a remote trader to view in real time bid orders, offer orders, and trades for an item,

and optionally one or more sources of contextual data. Individual traders place orders on remote client terminals, and this information is routed to a transaction server. The transaction server receives order information from the remote terminals, matches a bid for an item to an offer for an item responsive to the bid corresponding with the offer, and communicates outstanding bid and offer information, and additional information (such as trades and contextual data) back to the client terminals. Each client terminal displays all of the outstanding bids and offers for an item, allowing the trader to view trends in orders for an item. A priority view is provided in which orders are displayed as tokens at locations corresponding to the values of the orders. The size of the tokens reflects the quantity of the orders. An alternate view positions order icons at a location which reflects the value and quantity of the order. Additionally, contextual data for the item is also displayed to allow the trader to consider as much information as possible while making transaction decisions. A pit panel view is also provided in which traders connected to the pit are represented by icons, and are displayed corresponding to an activity level of the trader.
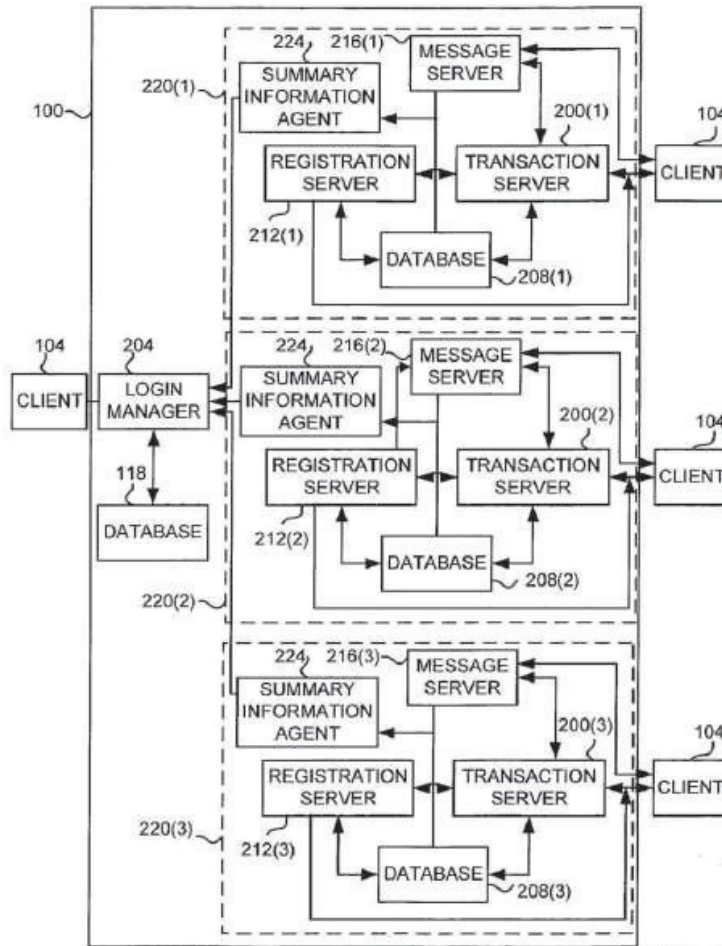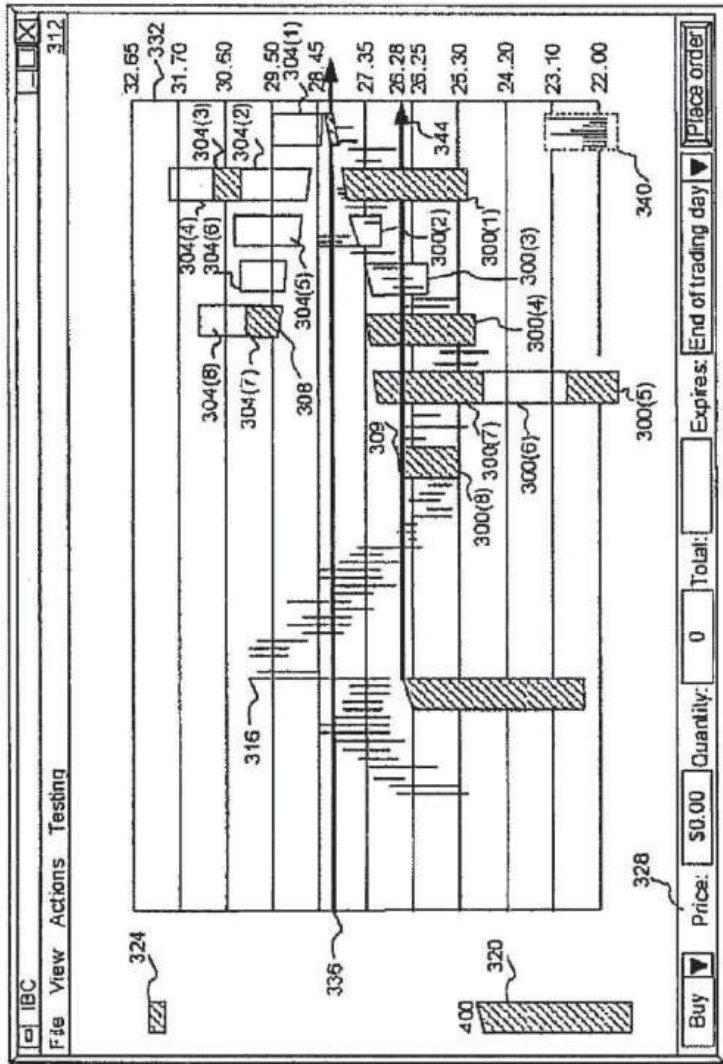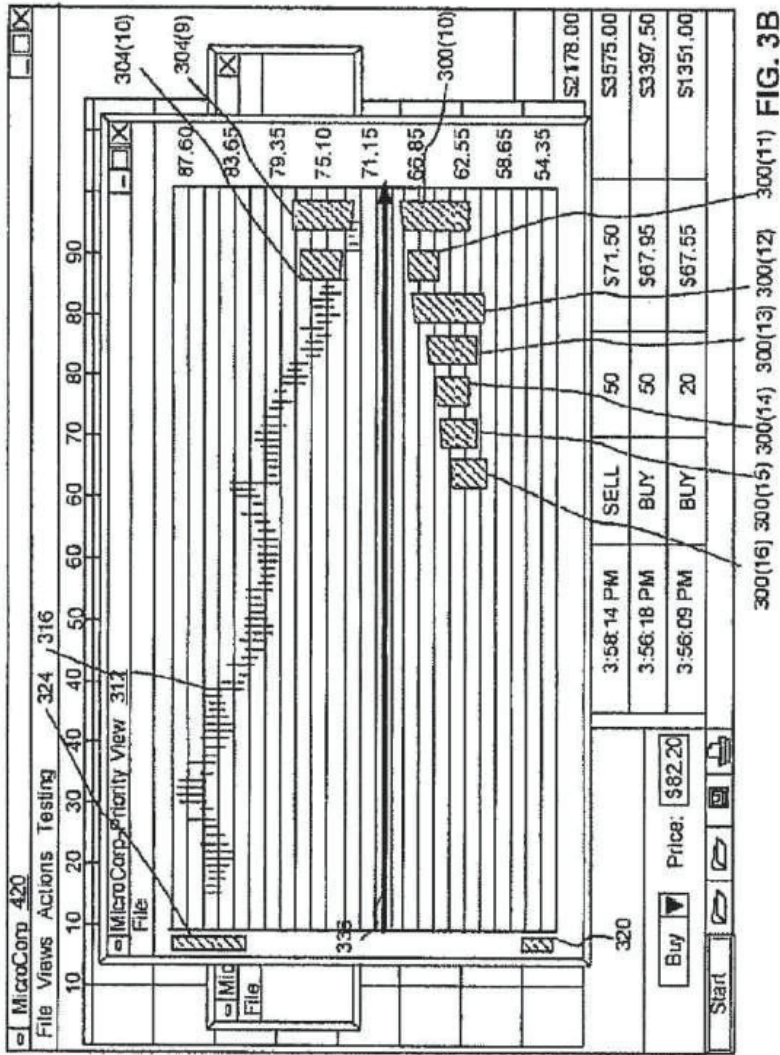
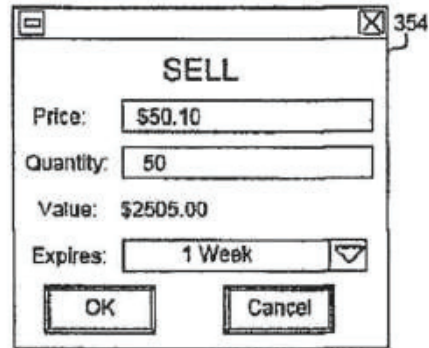**35 Claims, 11 Drawing Sheets**

App. 355
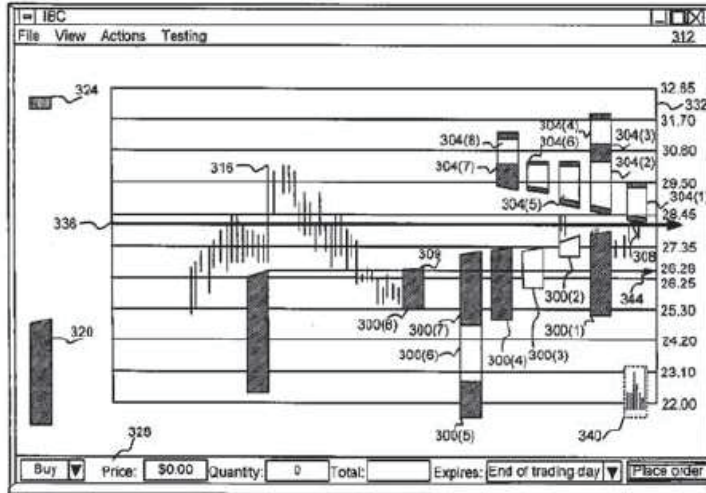
App. 356

FIG. 2

FIG. 3A

FIG. 3B

FIG. 3D

BUY

Price: $35.90
Quantity: 40
Value: $1435.00
Expires: End of trading day

OK   Cancel

350

FIG. 3E

SELL

Price: $50.10
Quantity: 50
Value: $2505.00
Expires: 1 Week

OK   Cancel

354

FIG. 9

IBC-PitPlace
File

Portable
2ⁿᵈ nobo
bid

Karen
Red

900
916
912(2)
913
912(3)
913
912(1)
904
908

App. 360

FIG. 4

RECEIVE AN ORDER TYPE — 600

RECEIVE A QUANTITY SPECIFIED FOR ORDER — 604

GENERATE AN ORDER ICON WHOSE VERTICAL SIZE MATCHES THE QUANTITY — 608

RECEIVE A PRICE FOR THE ORDER — 612

DISPLAY ORDER CONFIRMATION WINDOW — 614

TRANSMIT ORDER INFORMATION — 616

618 — DOES SLOT CONTAIN AN EXISTING BID? — NO → PLACE ICON AT DETERMINED SLOT — 636

YES

620 — DOES EXISTING BID HAVE A PRICE LESS THAN REQUESTED BID? — YES → SHIFT ALL LOWER PRICED BIDS OVER ONE SLOT — 640

NO

624 — DOES EXISTING BID HAVE A PRICE EQUAL TO REQUESTED BID? — YES → STACK REQUESTED BID BELOW EXISTING BID(S) — 632

NO

DETERMINE NEW SLOT FOR REQUESTED BID — 628

FIG. 6

FIG. 7

FIG. 10