EXHIBIT 1

CQG EXHIBIT 1029

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Kemp, II et al.

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(45) **Date of Patent: Jul. 20, 2004**

(54) **CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET DEPTH**

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(60) Provisional application No. 60/186,322, filed on Mar. 2, 2000.

(51) **Int. Cl.**[7] **G06F 17/60**
(52) **U.S. Cl.** **705/37**; 705/36; 705/35
(58) **Field of Search** 705/35, 36, 37; 345/814

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Primary Examiner—Richard Weisberger
(74) *Attorney, Agent, or Firm*—Foley & Lardner

(57) **ABSTRACT**

A method and system for reducing the time it takes for a trader to place a trade when electronically trading 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 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.

40 Claims, 6 Drawing Sheets

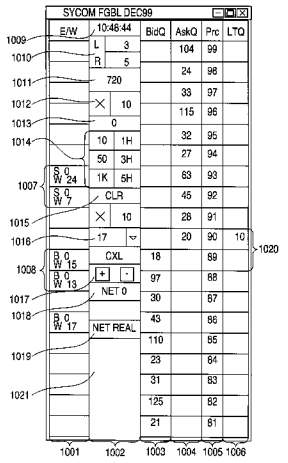

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FIG. 1

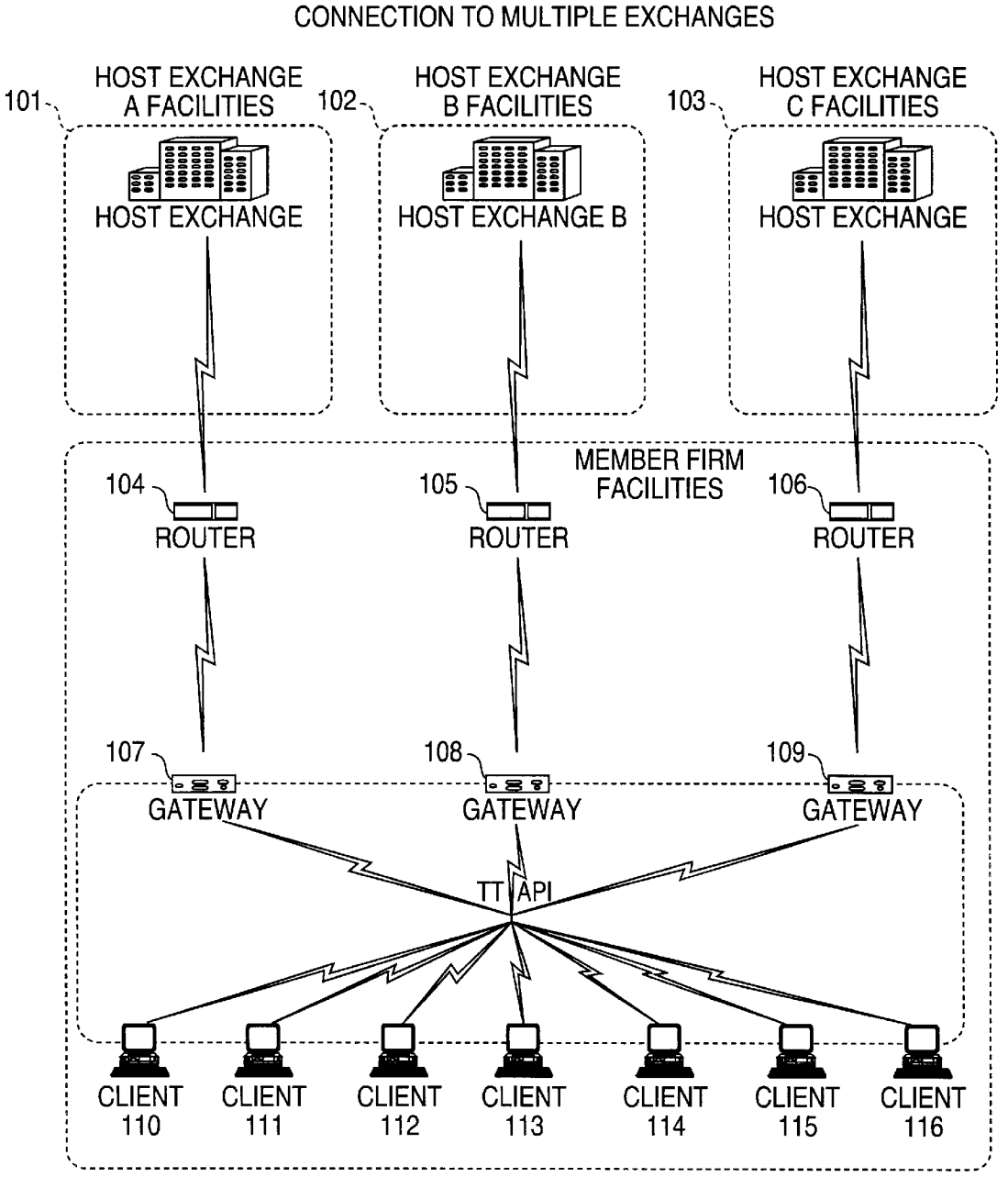

CONNECTION TO MULTIPLE EXCHANGES
101
HOST EXCHANGE A FACILITIES
102
HOST EXCHANGE B FACILITIES
103
HOST EXCHANGE C FACILITIES
HOST EXCHANGE
HOST EXCHANGE B
HOST EXCHANGE
MEMBER FIRM FACILITIES
104
ROUTER
105
ROUTER
106
ROUTER
107
GATEWAY
108
GATEWAY
109
GATEWAY
TT API
CLIENT 110
CLIENT 111
CLIENT 112
CLIENT 113
CLIENT 114
CLIENT 115
CLIENT 116

FIG. 2

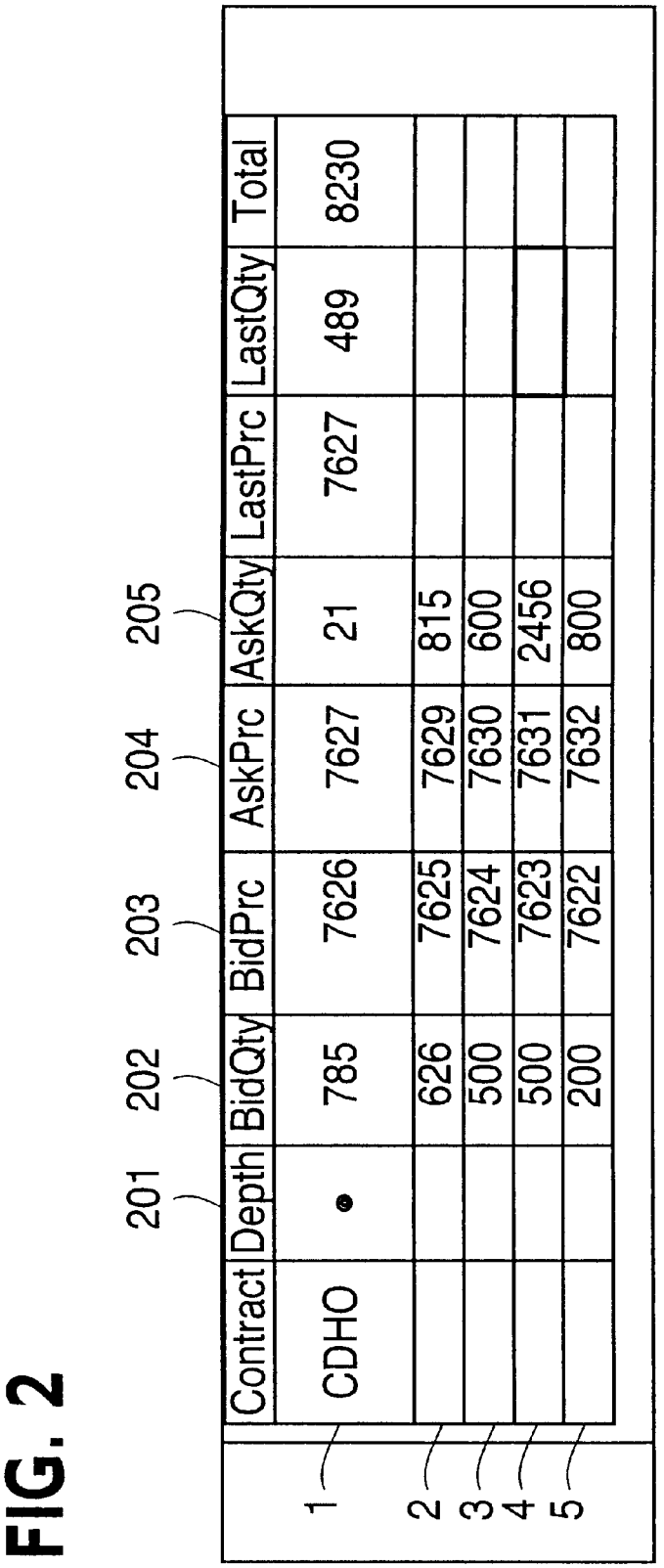
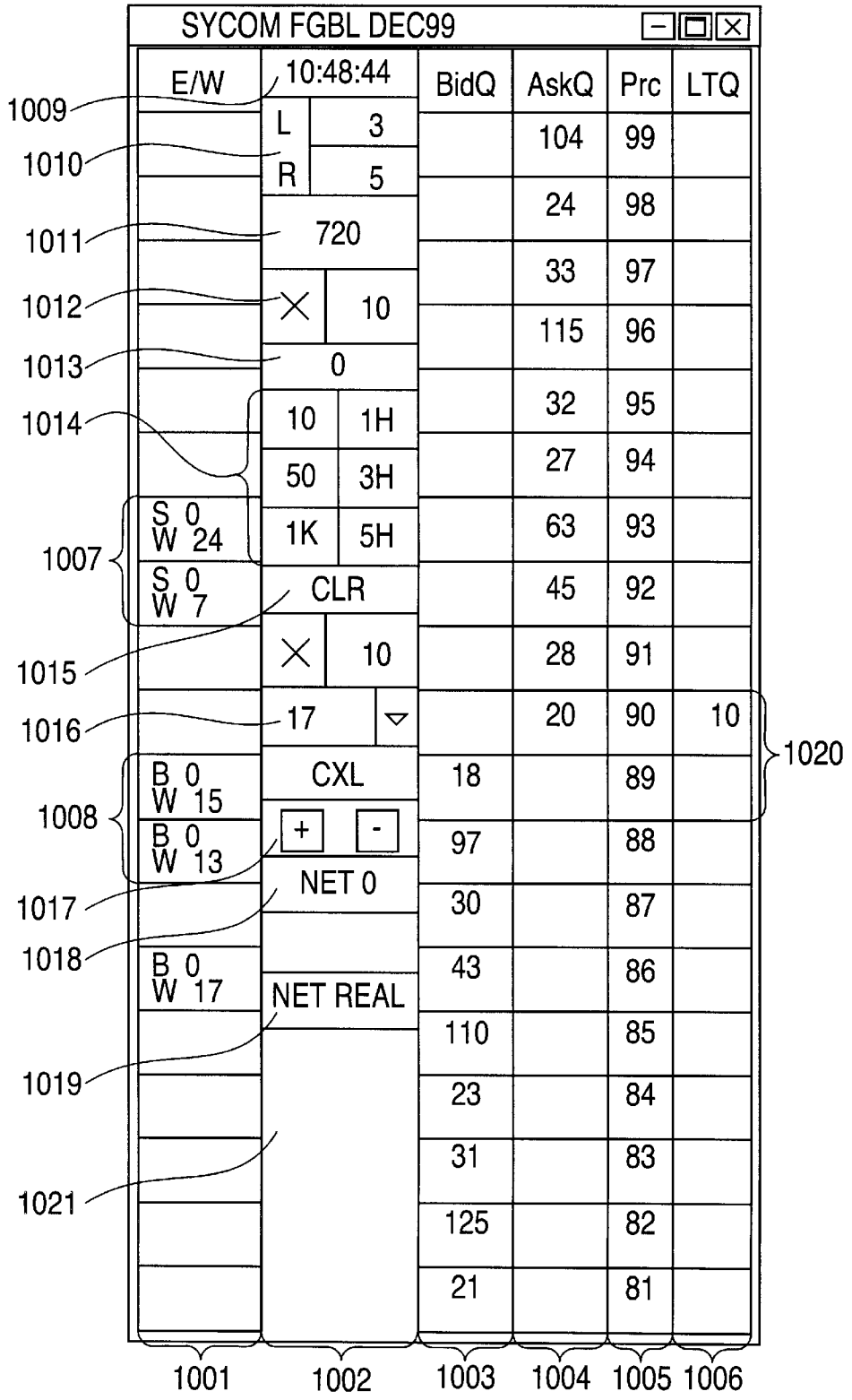

201
202
203
204
205
Contract
Depth
BidQty
BidPrc
AskPrc
AskQty
LastPrc
LastQty
Total
CDHO
785
7626
7627
21
7627
489
8230
626
7625
7629
815
500
7624
7630
600
500
7623
7631
2456
200
7622
7632
800
1
2
3
4
5

FIG. 3


SYCOM FGBL DEC99
E/W
10:48:44
BidQ
AskQ
Prc
LTQ
L 3
R 5
720
10
0
10 1H
50 3H
1K 5H
CLR
10
17
CXL
+ -
NET 0
NET REAL
S 0 W 24
S 0 W 7
B 0 W 15
B 0 W 13
B 0 W 17
104 99
24 98
33 97
115 96
32 95
27 94
63 93
45 92
28 91
20 90 10
18 89
97 88
30 87
43 86
110 85
23 84
31 83
125 82
21 81
1009
1010
1011
1012
1013
1014
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1021
1020
1001
1002
1003
1004
1005
1006

FIG. 4

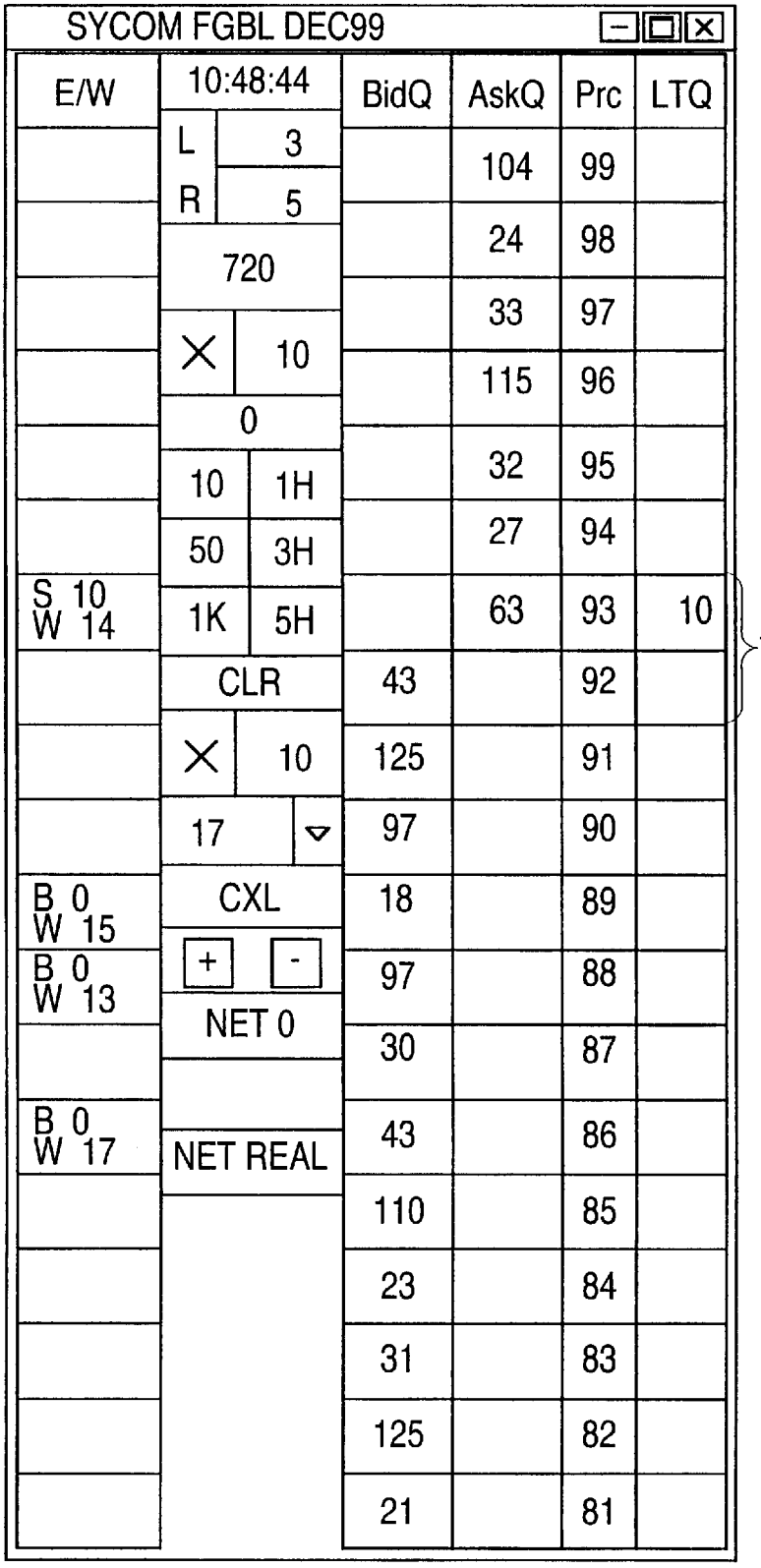
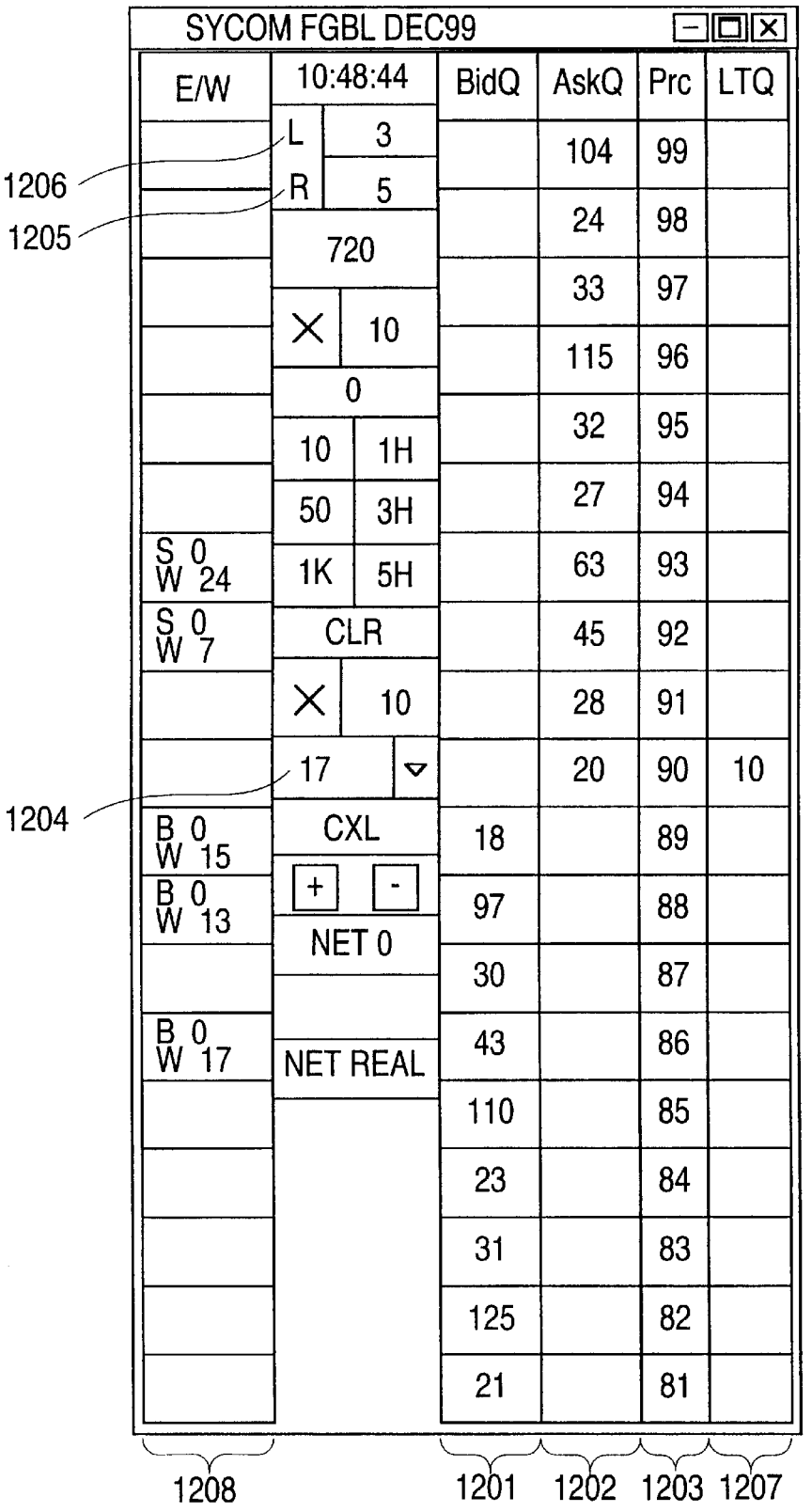

SYCOM FGBL DEC99
E/W
10:48:44
BidQ
AskQ
Prc
LTQ
L 3
R 5
720
10
0
10 1H
50 3H
1K 5H
CLR
10
17
CXL
+ -
NET 0
NET REAL
S 10
W 14
B 0
W 15
B 0
W 13
B 0
W 17
104 99
24 98
33 97
115 96
32 95
27 94
63 93 10
43 92
125 91
97 90
18 89
97 88
30 87
43 86
110 85
23 84
31 83
125 82
21 81
1101

FIG. 5


SYCOM FGBL DEC99
E/W
10:48:44
BidQ
AskQ
Prc
LTQ
L
3
R
5
720
10
0
10
1H
50
3H
1K
5H
CLR
10
17
CXL
+
-
NET 0
NET REAL
S 0
W 24
S 0
W 7
B 0
W 15
B 0
W 13
B 0
W 17
104
99
24
98
33
97
115
96
32
95
27
94
63
93
45
92
28
91
20
90
10
18
89
97
88
30
87
43
86
110
85
23
84
31
83
125
82
21
81
1206
1205
1204
1208
1201
1202
1203
1207

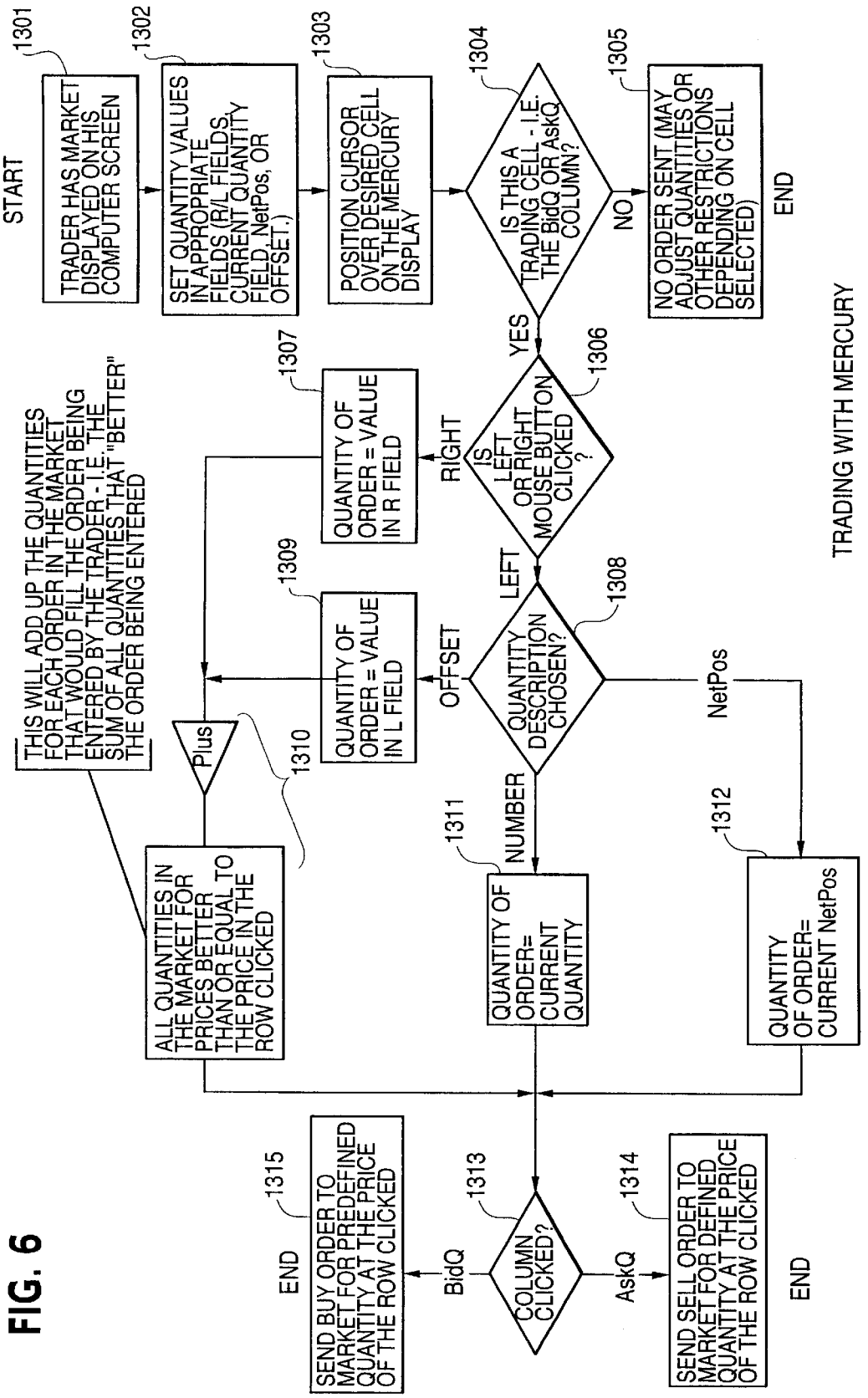

START
1301
TRADER HAS MARKET DISPLAYED ON HIS COMPUTER SCREEN
1302
SET QUANTITY VALUES IN APPROPRIATE FIELDS (R/L FIELDS, CURRENT QUANTITY FIELD, NetPos, OR OFFSET.)
1303
POSITION CURSOR OVER DESIRED CELL ON THE MERCURY DISPLAY
1304
IS THIS A TRADING CELL - I.E. THE BidQ OR AskQ COLUMN?
NO
1305
NO ORDER SENT (MAY ADJUST QUANTITIES OR OTHER RESTRICTIONS DEPENDING ON CELL SELECTED)
END
YES
1306
IS LEFT OR RIGHT MOUSE BUTTON CLICKED ?
RIGHT
1307
QUANTITY OF ORDER = VALUE IN R FIELD
LEFT
1308
QUANTITY DESCRIPTION CHOSEN?
OFFSET
1309
QUANTITY OF ORDER = VALUE IN L FIELD
NetPos
1310
Plus
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
ALL QUANTITIES IN THE MARKET FOR PRICES BETTER THAN OR EQUAL TO THE PRICE IN THE ROW CLICKED
NUMBER
1311
QUANTITY OF ORDER= CURRENT QUANTITY
1312
QUANTITY OF ORDER= CURRENT NetPos
1313
COLUMN CLICKED?
BidQ
1315
SEND BUY ORDER TO MARKET FOR PREDEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED
END
AskQ
1314
SEND SELL ORDER TO MARKET FOR DEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED
END
TRADING WITH MERCURY

FIG. 6

CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET DEPTH

This application is a divisional application of Ser. No. 09/590,692 filed Jun. 09, 2000 which claims benefit of 60/186,322, filed Mar. 2, 2000.

PRIORITY

The present application claims priority to a U.S. Provisional Patent Application entitled "Market Depth Display Click Based Trading and Mercury Display" 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, high speed 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 4 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 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 without 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 of 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 format. This translation function may be disposed anywhere 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 workstation. 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 accordance with the trading methods described herein, in multiple exchanges using a single trading terminal.

The preferred embodiments of the present invention include the display of "Market Depth" and allow trader to view the market depth of a commodity and to execute trades within the market depth with a single 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 entered into the market, subject to the limits noted below, 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 information to each trader on the exchange. The present invention processes this information and maps it through simple

algorithms and mapping tables to positions 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" Ser. No. 09/589,751, filed on Jun. 9, 2000, 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 "CDHO". 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 added 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

Abbreviations.

COLUMN	DESCRIPTION	COLUMN	DESCRIPTION
Month	Expiration Month/Year	TheoBid	Theoretical Bid Price
Bid Mbr(1)	Bid Member ID	TheoAsk	Theoretical Ask Price
WrkBuys(2)	Working Buys for entire Group ID	Qact	Quote Action (Sends individual quotes)
BidQty	Bid Quantity	BQQ	Test Bid Quote Quantity
ThrshBid(6)	Threshold Bid Price	BQP	Test Bid Quote Price
BidPrc	Bid Price	Mkt BQQ	Market Bid Quote Quantity
Bid Qty Accurn	Accumulated Bid Quantity	Mkt BQP	Market Bid Quote Price
BidPrc Avg	Bid Price Average	Quote	Checkbox activates/ deactivates contract for quoting
AskPrc Avg	Ask Price Average	Mkt AQQ	Market Ask Quote Quantity
AskQty Accurn	Accumulated Ask Quantity	Mkt AQP	Market Ask Quote Price
AskPrc	Ask Price	AQP	Ask Quote Price
ThrshAsk(6)	Threshold Ask Price	AQQ	Ask Quote Quantity
AskQty	Ask Quantity	Imp BidQty(5)	Implied Bid Quantity
WrkSells(2)	Working Sells for entire Group ID	Imp BidPrc(5)	Implied Bid Price
Ask Mbr(1)	Ask Member ID	Imp AskQty(5)	Implied Ask Quantity
NetPos	Net Position	Imp AskPrc(5)	Implied Ask Price
FFNetPos	Fast Fill Net Position	Gamma(3)	Change in Delta given 1 pt change in underlying
LastPrc	Last Price	Delta (3)	Change in price given 1 pt change in underlying
LastQty	Last Quantity	Vola (3)	Percent volatility
Total	Total Traded Quantity	Vega (3)	Price change given I% change in Vola
High	High Price	Rhop (3)	Price change given I% change in interest rate

TABLE I-continued

Abbreviations.

COLUMN	DESCRIPTION	COLUMN	DESCRIPTION
Low	Low Price	Theta(3)	Price change for every day that elapses
Open	Opening Price	Click Trd	Activate/deactivate click trading by contract
Close	Closing Price	S (Status)	Auction, Closed, FastMkt, Not Tradable, Pre-trading, Tradable, S = post-trading
Chng	Last Price-Last Close	Expiry	Expiration Month/Year
TheoPrc	Theoretical Price		

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 no 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 **10 11**) 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, Q=Current Quantity, Q_a=Total of all quantities in AskQ column at an equal or better price than P, Q_b=Total of all quantities in BidQ column at an equal or better price than P, N=Current Net Position, Bo=Buy order sent to market and So=Sell order—sent to market.

Apy order entered using right mouse button

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

If BidQ field clicked.

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

If AskQ field clicked.

Orders entered using the left mouse button

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

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

If BidQ field clicked.

$$SO=(Q_b+L)P \quad \text{(Eq. 4)}$$

If AskQ field clicked.

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

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

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

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

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

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

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 buy **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 sell **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 game 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 "Offset" 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. NetPos 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 tradable 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 displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;

displaying an order entry region comprising a plurality of locations for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and

in response to a selection of a particular location of the order entry region by a single action of a user input

device, setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange.

2. The method of claim **1** wherein the bid and ask display regions and the order entry region comprise columns with a plurality of cells that are displayed as a grid such that the cells of each column are aligned.

3. The method of claim **1** wherein the bid and ask display regions and the order entry region are oriented vertically.

4. The method of claim **1** wherein the bid and ask display regions and the order entry region are oriented horizontally.

5. The method of claim **1** wherein one of the plurality of locations of bid display region comprises a blank region in which there is no first indicator displayed.

6. The method of claim **1** wherein one of the plurality of locations of the ask display region comprises a blank region in which there is no first indicator displayed.

7. The method of claim **1** comprising the step of displaying at least a portion of the common static price axis in a price display region.

8. The method of claim **7** wherein the bid display region, the ask display region, the order entry region and the price display region comprise columns with a plurality of cells that are displayed as a grid such that the cells of each column are aligned.

9. The method of claim **7** wherein the bid display region, the ask display region, the order entry region and the price display region are oriented vertically.

10. The method of claim **7** wherein the bid display region, the ask display region, the order entry region and the price display region are oriented horizontally.

11. The method of claim **1** further comprising the steps of:

dynamically displaying a third indicator at one of the plurality of locations in the bid display region, the third indicator representing quantity associated with at least one order to buy the commodity at a price different than the highest bid price currently available in the market; and

dynamically displaying a fourth indicator at one of the plurality of locations in the ask display region, the fourth indicator representing quantity associated with at least one order to sell the commodity at a price different than the lowest ask price currently available in the market.

12. The method of claim **11** wherein a location of the plurality of locations of the bid display region comprises a blank region in which there is no first or third indicator displayed.

13. The method of claim **1** wherein a location of the plurality of locations of the ask display region comprises a blank region in which there is no second or fourth indicator displayed.

14. The method of claim **1** wherein the order entry region comprises:

a bid order entry region comprising a plurality of locations for receiving commands to send buy orders, each location corresponding to a price level along the common static price axis; and

an ask order entry region comprising a plurality of locations for receiving commands to send sell orders, each location corresponding to a price level along the common static price axis.

15. The method of claim **14** wherein the bid order entry region overlaps with the bid display region and the ask order entry region overlaps with the ask display region.

16. The method of claim **1** further comprising dynamically displaying an entered order indicator in association with the price levels arranged along the common static price axis.

17. The method of claim **16** wherein the entered order indicator is displayed in an entered order region.

18. The method of claim **1** further comprising dynamically displaying a last trade indicator in association with the common static price axis.

19. The method of claim **18** wherein the last trade indicator is displayed in a last trade region.

20. The method of claim **1** further comprising the steps of:

displaying the first indicator at a first location associated with a first price level on the common static price axis at a first time; and

displaying the first indicator at a second location associated with a different price level on the common static price axis at a second time subsequent to the first time.

21. The method of claim **1** further comprising the steps of:

displaying the second indicator at a first location associated with a first price level on the common static price axis at a first time; and

displaying the second indicator at a second location associated with a different price level on the common static price axis at a second time subsequent to the first time.

22. The method of claim **1** further comprising the steps of:

displaying the first indicator at a first location associated with a particular price level on the common static price axis; and

repositioning the common static price axis such that the first indicator is displayed at a second location associated with the particular price level on the common static price axis.

23. The method of claim **1** further comprising the steps of:

displaying the second indicator at a first location associated with a particular price level on the common static price axis; and

repositioning the common static price axis such that the second indicator is displayed at a second location associated with the particular price level on the common static price axis.

24. The method of claim **1** wherein the bid and ask display regions are displayed in different colors.

25. The method of claim **1** wherein the first and second indicators are displayed in different colors.

26. The method of claim **1** wherein the bid and ask display regions are displayed in a window further comprising centering the display of the first and second indicators in the window upon receipt of a centering instruction.

27. A computer readable medium having program code recorded thereon for execution on a computer for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the program code causing a machine to perform the following method steps:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a the price level along the common Static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;

displaying an order entry region comprising a plurality of locations for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and

in response to a selection of a particular location of the order entry region by a single action of a user input device, setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange.

28. The method of claim **11** wherein the first and third indicators are displayed in locations of the bid display region that are arranged along an axis which is parallel to the common static price axis.

29. The method of claim **11** wherein the second and fourth indicators are displayed in locations of the ask display region that are arranged along an axis which is parallel to the common static price axis.

30. The method of claim **11** comprising the steps of:

displaying the first indicator at a first location associated with a first price level on the common static price axis at a first time; and

displaying the first indicator at a second location associated with a different price level on the common static price axis at a second time subsequent to the first time.

31. The method of claim **30** wherein the third and fourth indicators remain in the same location in the bid and ask display regions, respectively, before and after the first indicator is displayed at the second location.

32. The method of claim **31** wherein each location of the bid display region corresponds to a different price level along the common static price axis and each location of the ask display region corresponds to a different price level along the common static price.

33. The method of claim **11** comprising the steps of:

displaying the second indicator at a first location associated with a first price level on the common static price axis at a first time; and

displaying the second indicator at a second location associated with a different price level on the common static price axis at a second time subsequent to the first time.

34. The method of claim **33** wherein the third and fourth indicators remain in the same location in the bid an ask display regions, respectively, before and after the second indicator is displayed at the second location.

35. The method of claim **34** wherein each location of the bid display region corresponds to a different price level along the common static price axis and each location of the ask display region corresponds to a different price level along the common static price.

36. The method of claim **1** wherein the bid and ask display regions are displayed separately.

37. The method of claim **1** wherein the first and second indicators are based on an exchange order book and wherein the price levels along the common static price axis do not move in response to the addition of a price to the exchange order book, the additional price comprising a price for which there is a corresponding displayed location in at least one of the bid and ask display regions.

38. The method of claim **37** wherein the price levels along the common static price axis do not move in response to the removal of a price from the exchange order book, the removed price comprising a price for which there is a corresponding displayed location in at least one of the bid and ask display regions.

39. The method of claim **1** wherein the first and second indicators are based on an exchange order book and the price levels along the common static price axis never move in response to a price change in the exchange order book relating to a price which corresponds to a displayed location in at least one of the bid and ask display regions.

40. The method of claim **1** the plurality of parameters comprises a price and type of order.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,766,304 B2
DATED : July 20, 2004
INVENTOR(S) : Gary Allan Kemp II, Jens-Uwe Schluetter and Harris Brumfield

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
Item [56], **References Cited**, U.S. PATENT DOCUMENTS, add the following:

-- 4,903,201	A	2/1990	Wagner
5,101,353	A	3/1992	Lupien et al.
5,946,667	A	8/1999	Tull, Jr., et al.
6,035,287	A	3/2000	Stallaert et al.
2002/0138401	A1	9/2002	Allen et al. --

FOREIGN PATENT DOCUMENTS, add the following:

-- WO	WO 95/35005	9/1995 --

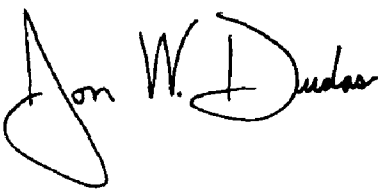
Column 14,
Line 64, the word "Static" should be -- static --.

Column 15,
Line 26, after "claim 11" add the word -- further --.

Column 16,
Line 1, after "claim 11" add the word -- further --.
Line 10, the word "an" should be -- and --.
Line 40, after "claim 1" add -- wherein --.

Signed and Sealed this

Sixteenth Day of November, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office

US006766304C1

(12) EX PARTE REEXAMINATION CERTIFICATE (6739th)

United States Patent
Kemp, II et al.

(10) Number: US 6,766,304 C1
(45) Certificate Issued: Mar. 31, 2009

(54) **CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET 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.**, Evanston, IL (US)

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Related U.S. Application Data

(62) Division of application No. 09/590,692, filed on Jun. 9, 2000, now Pat. No. 6,772,132.
(60) Provisional application No. 60/186,322, filed on Mar. 2, 2000.

(51) **Int. Cl.**
G06Q 40/00 (2006.01)
G06F 3/048 (2006.01)

(52) **U.S. Cl.** ..... **705/36 R**; 705/35; 715/814
(58) **Field of Classification Search** ..... None
See application file for complete search history.

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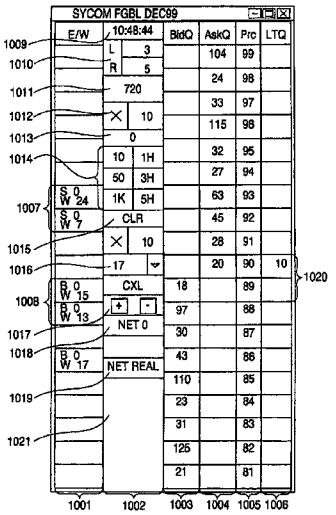
Primary Examiner—Jeanne M. Clark

(57) **ABSTRACT**

A method and system for reducing the time it takes for a trader to place a trade when electronically trading 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 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.



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EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–40** is confirmed.

* * * * *

EXHIBIT 2

US006772132B1

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

(10) **Patent No.: US 6,772,132 B1**
(45) **Date of Patent: Aug. 3, 2004**

(54) **CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET 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 245 days.

(21) Appl. No.: **09/590,692**

(22) Filed: **Jun. 9, 2000**

Related U.S. Application Data

(60) Provisional application No. 60/186,322, filed on Mar. 2, 2000.

(51) **Int. Cl.**[7] **G06F 17/60**

(52) **U.S. Cl.** **705/37**; 705/35; 705/36; 705/37; 705/10; 705/14; 345/814

(58) **Field of Search** 705/35, 36, 37, 705/10, 14; 345/814

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Primary Examiner—Richard Weisberger
(74) *Attorney, Agent, or Firm*—Foley & Lardner

(57) **ABSTRACT**

A method and system for reducing the time it takes for a trader to place a trade when electronically trading 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 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.

56 Claims, 6 Drawing Sheets

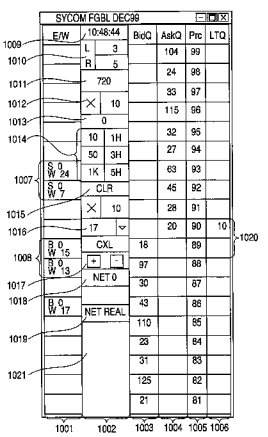

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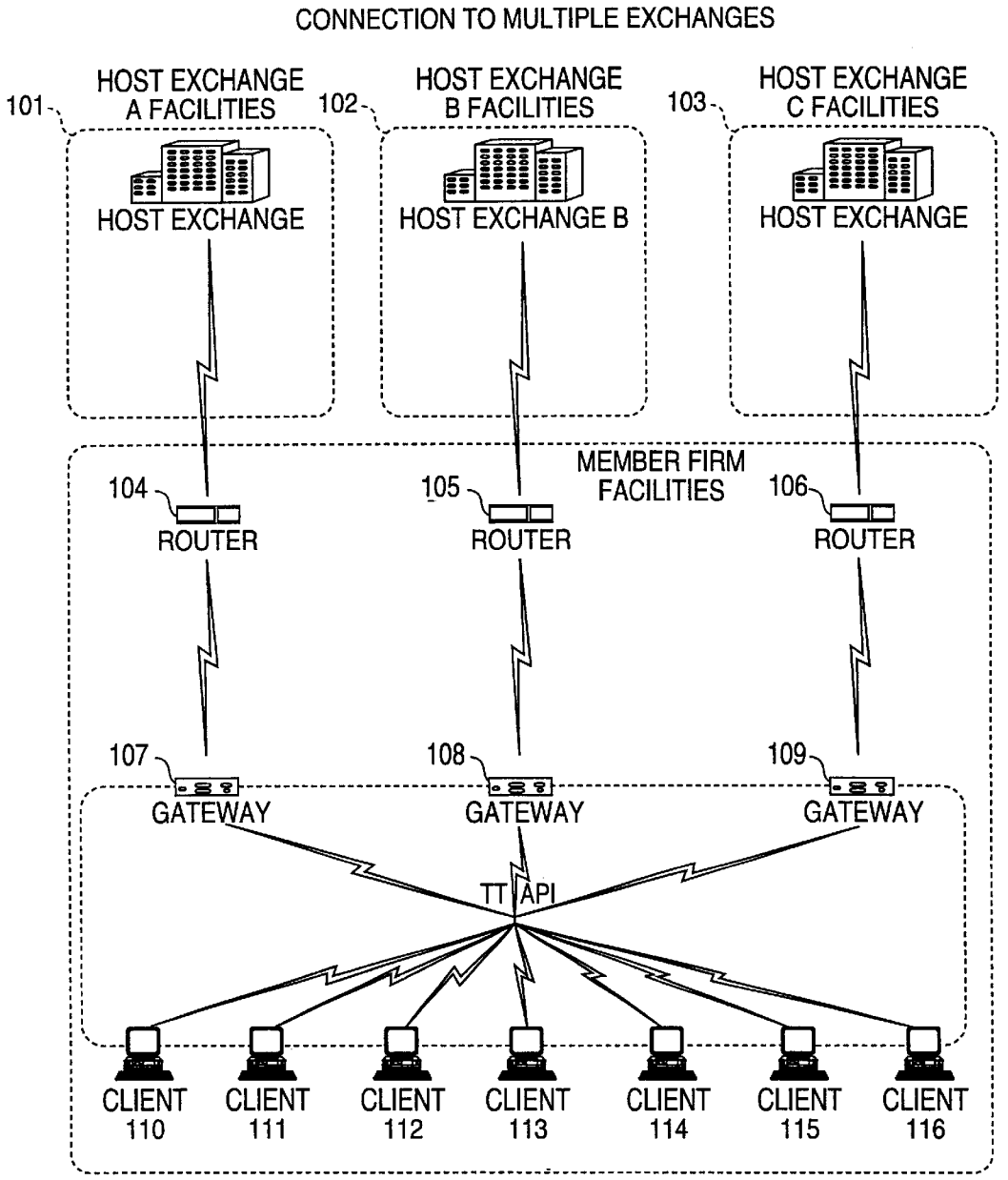
FIG. 1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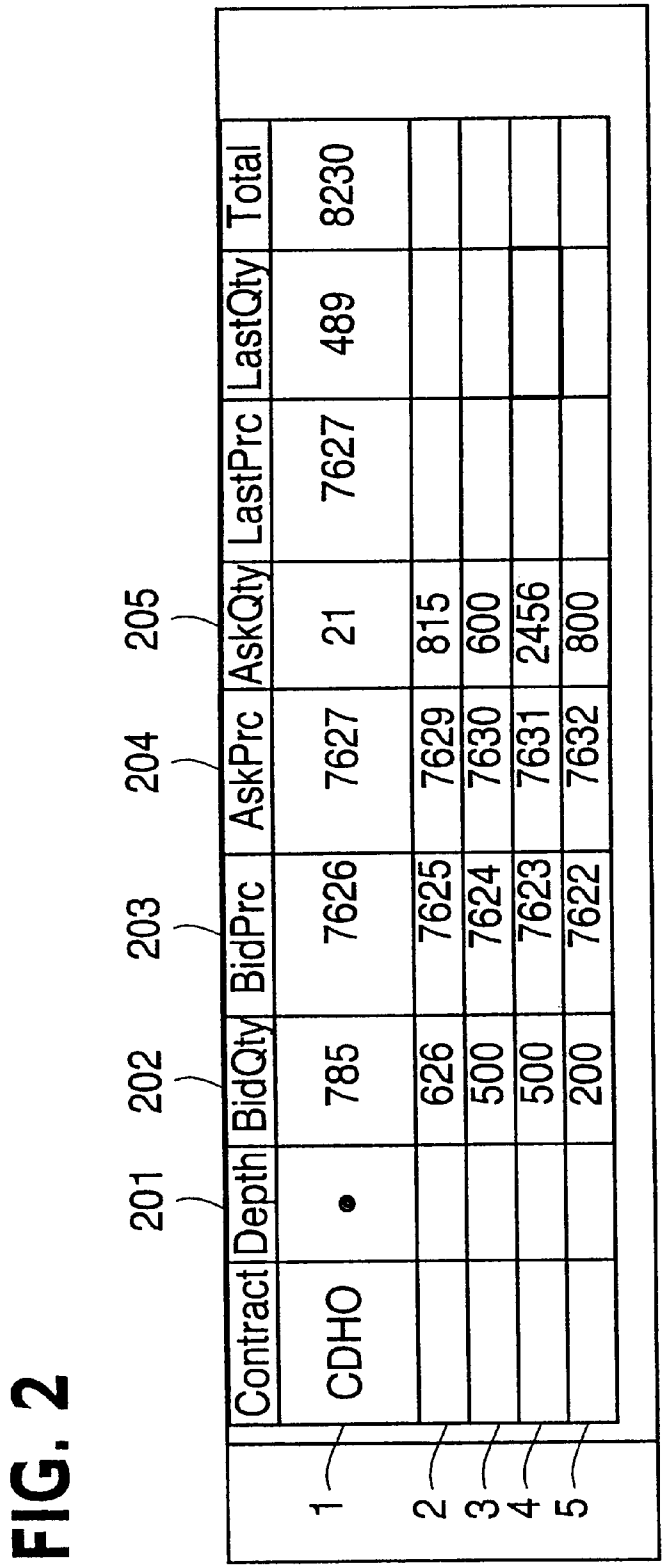
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FIG. 2

FIG. 3

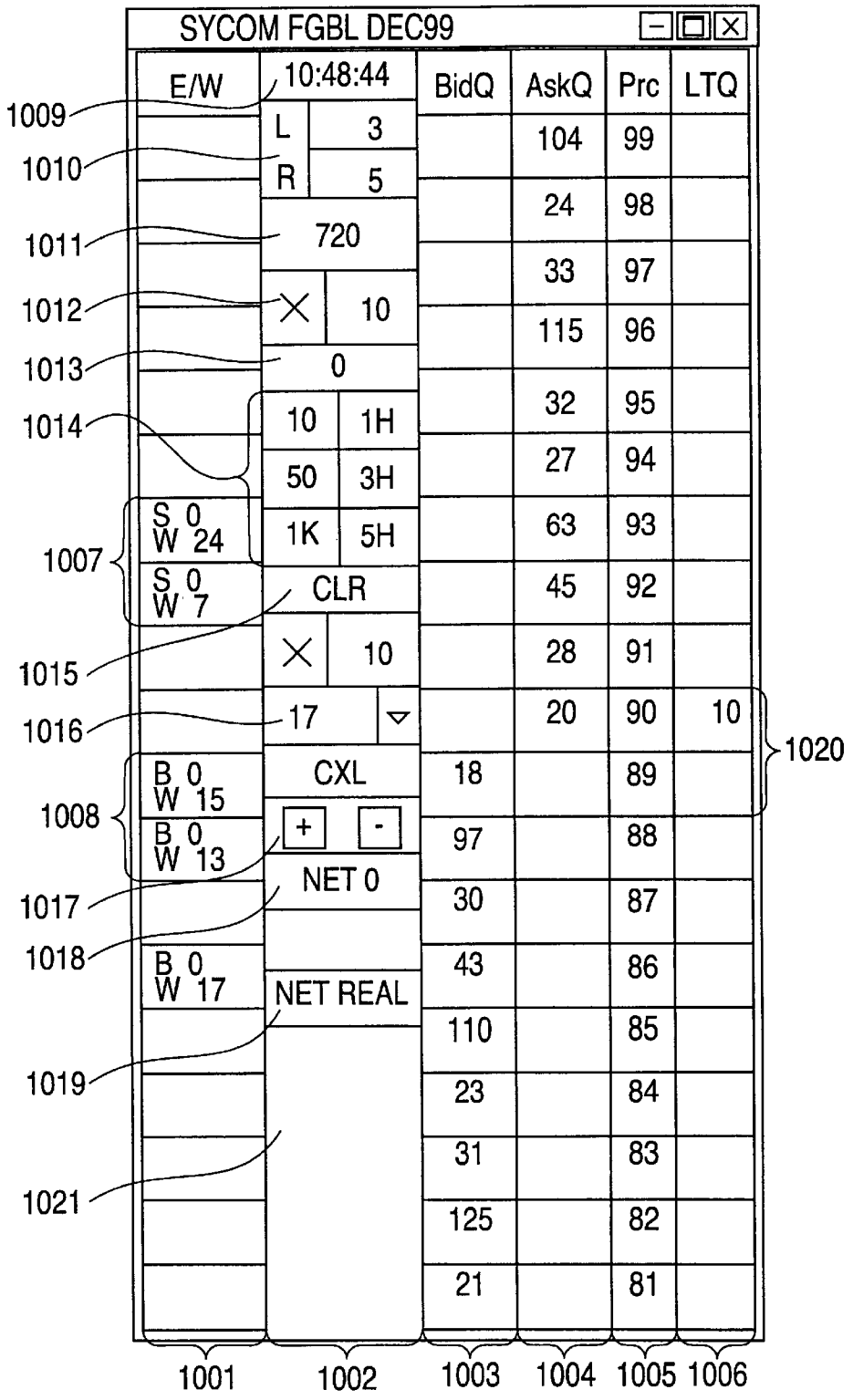
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FIG. 4

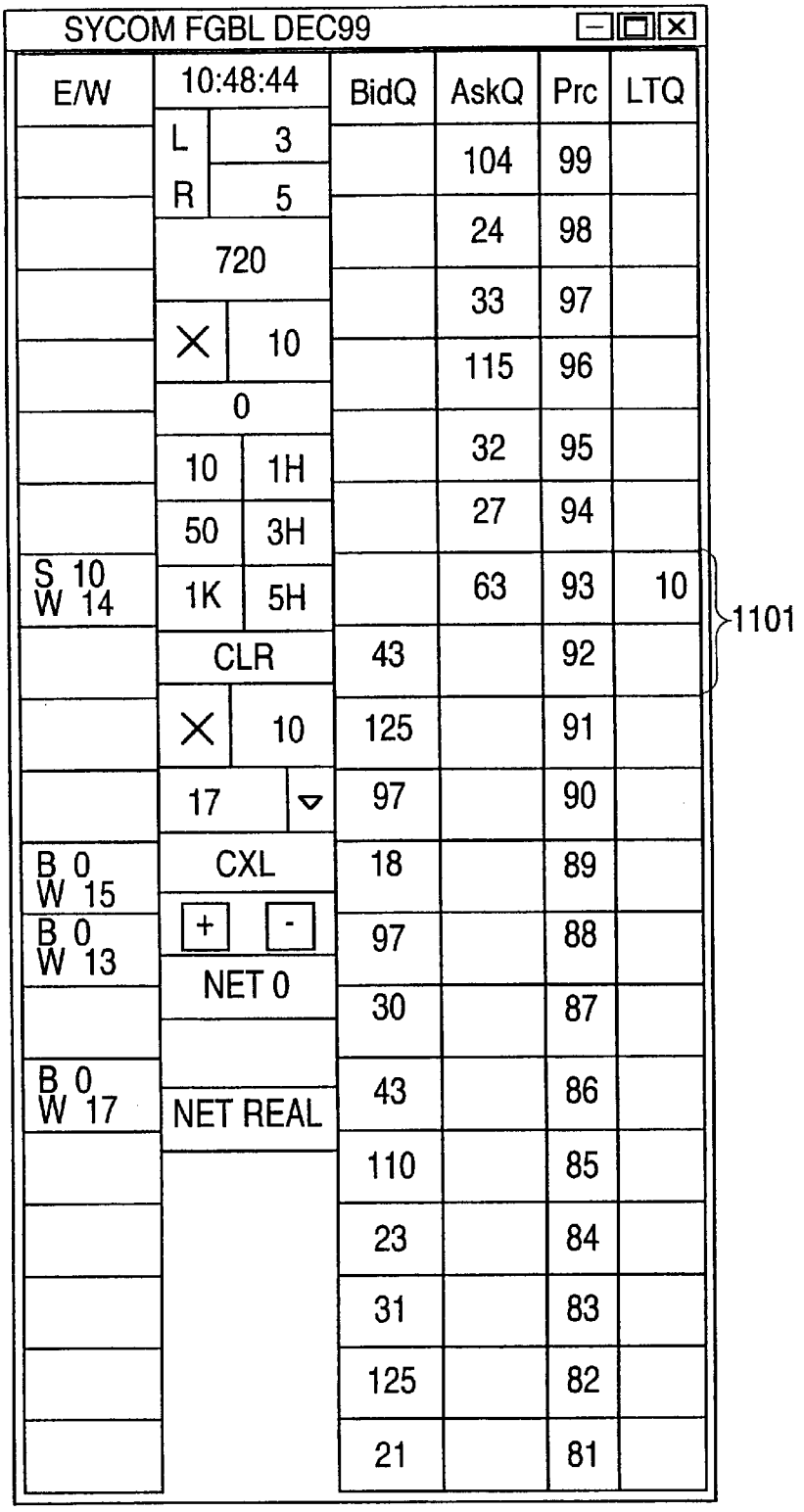
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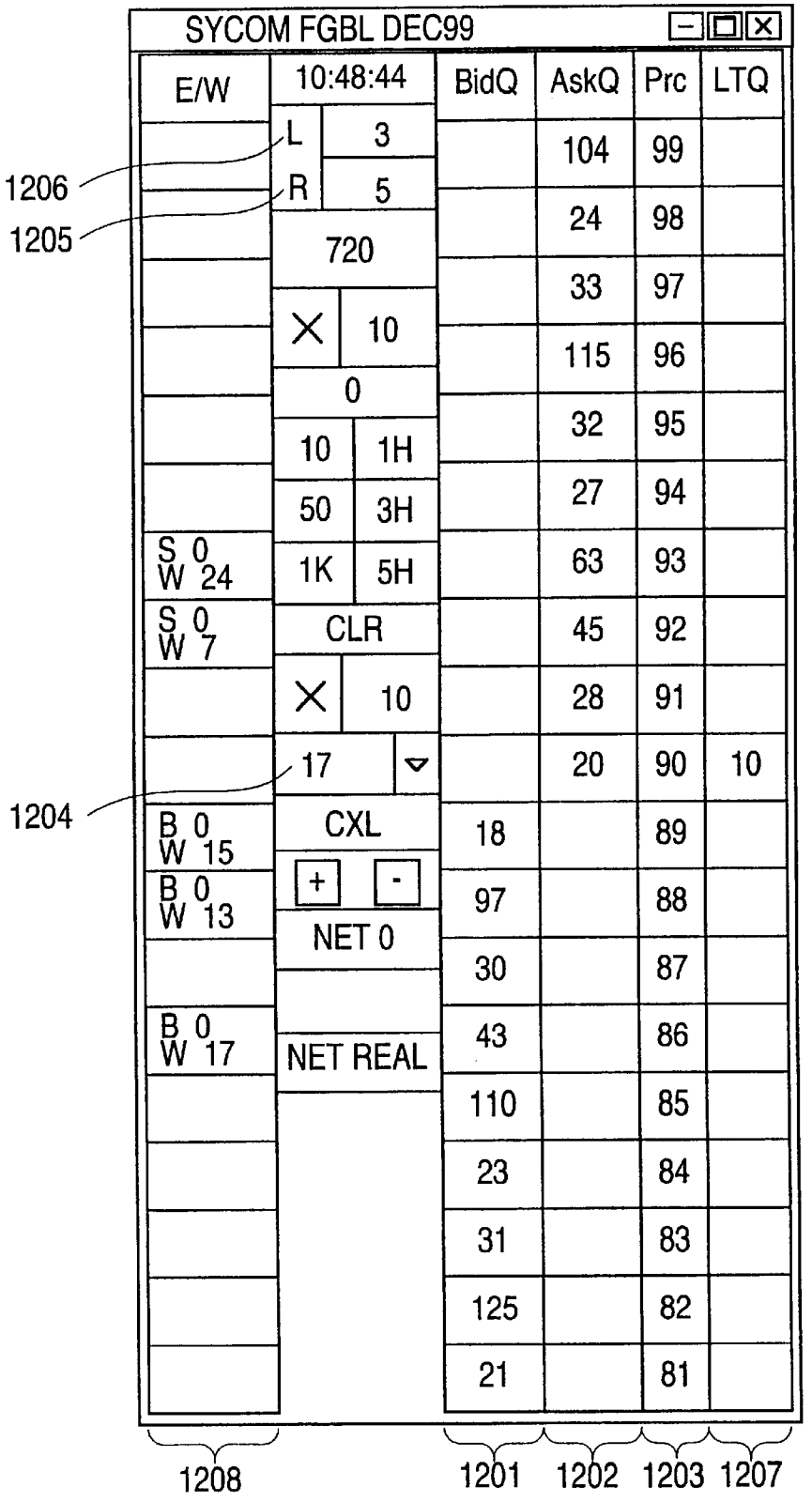
FIG. 5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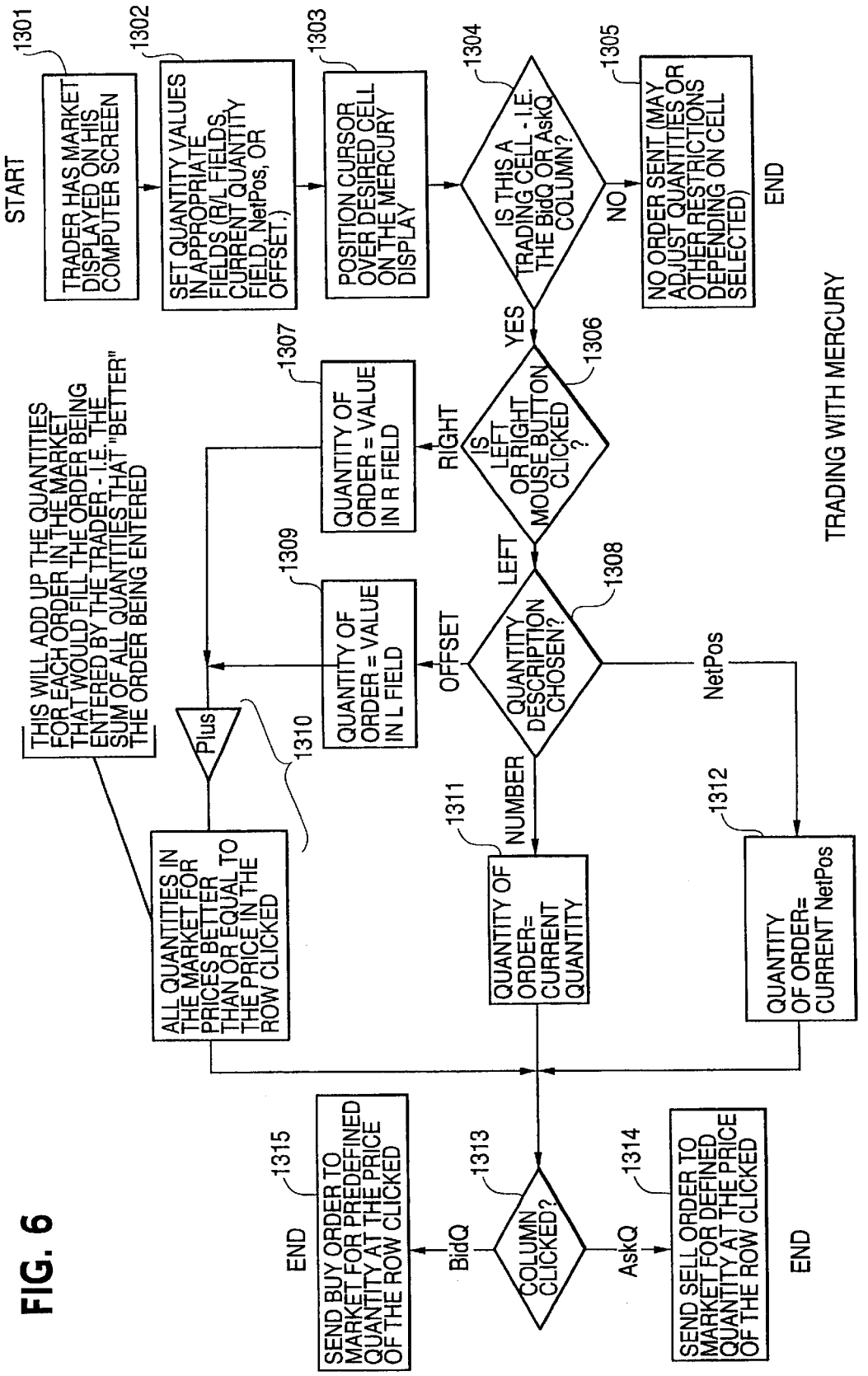
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TRADER HAS MARKET DISPLAYED ON HIS COMPUTER SCREEN
1302
SET QUANTITY VALUES IN APPROPRIATE FIELDS (R/L FIELDS, CURRENT QUANTITY FIELD, NetPos, OR OFFSET.)
1303
POSITION CURSOR OVER DESIRED CELL ON THE MERCURY DISPLAY
1304
IS THIS A TRADING CELL - I.E. THE BidQ OR AskQ COLUMN?
NO
1305
NO ORDER SENT (MAY ADJUST QUANTITIES OR OTHER RESTRICTIONS DEPENDING ON CELL SELECTED)
END
YES
1306
IS LEFT OR RIGHT MOUSE BUTTON CLICKED ?
RIGHT
1307
QUANTITY OF ORDER = VALUE IN R FIELD
LEFT
1308
QUANTITY DESCRIPTION CHOSEN?
OFFSET
1309
QUANTITY OF ORDER = VALUE IN L FIELD
NetPos
1310
Plus
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
ALL QUANTITIES IN THE MARKET FOR PRICES BETTER THAN OR EQUAL TO THE PRICE IN THE ROW CLICKED
NUMBER
1311
QUANTITY OF ORDER= CURRENT QUANTITY
1312
QUANTITY OF ORDER= CURRENT NetPos
1313
COLUMN CLICKED?
BidQ
AskQ
1314
SEND SELL ORDER TO MARKET FOR DEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED
END
1315
SEND BUY ORDER TO MARKET FOR PREDEFINED QUANTITY AT THE PRICE OF THE ROW CLICKED
END
TRADING WITH MERCURY

FIG. 6

CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET DEPTH

PRIORITY

The present application claims priority to a U.S. Provisional Patent Application No. 60/186,322 entitled "Market Depth Display Click Based Trading and Mercury Display" 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, high speed 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 without 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 of 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 format. This translation function may be disposed anywhere 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 workstation. 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 accordance with the trading methods described herein, in multiple exchanges using a single trading terminal.

The preferred embodiments of the present invention 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 single 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 entered into the market, subject to the limits noted below, 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 information to each trader on the exchange. The present invention processes this information and maps it through simple algorithms and mapping tables to positions 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" Ser. No. 09/589,751, filed on Jun. 9, 2000, 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 "CDHO". 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

Abbreviations

COLUMN	DESCRIPTION
Month	Expiration Month/Year
Bid $Mbr_{(1)}$	Bid Member ID
$WrkBuys_{(2)}$	Working Buys for entire Group ID
BidQty	Bid Quantity
$ThrshBid_{(6)}$	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
$ThrshAsk_{(6)}$	Threshold Ask Price
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
Mkt BQQ	Market Bid Quote Quantity
Mkt BQP	Market Bid Quote Price
Quote	Checkbox activates/deactivates contract for quoting
Mkt AQQ	Market Ask Quote Quantity
Mkt AQP	Market Ask Quote Price
AQP	Ask Quote Price
AQQ	Ask Quote Quantity
Imp $BidQty_{(5)}$	Implied Bid Quantity
Imp $BidPrc_{(5)}$	Implied Bid Price
Imp $AskQty_{(5)}$	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
$Vola_{(31)}$	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 click trading 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 no 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, Q=Current Quantity, Q_a=Total of all quantities in AskQ column at an equal or better price than P, Q_b=Total of all quantities in BidQ column at an equal or better price than P, N=Current Net Position, Bo=Buy order sent to market and So=Sell order sent to market.

Any order entered using right mouse button

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

If BidQ field clicked.

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

If AskQ field clicked.

Orders entered using the left mouse button

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

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

If BidQ field clicked.

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

If AskQ field clicked.

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

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

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

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

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

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

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 "Offset" 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 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. NetPos 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 of placing a trade order for a commodity on an electronic exchange having an inside market with a highest bid price and a lowest ask price, using a graphical user interface and a user input device, said method comprising:

setting a preset parameter for the trade order

displaying market depth of the commodity, through a dynamic display of a plurality of bids and a plurality of asks in the market for the commodity, including at least a portion of the bid and ask quantities of the commodity, the dynamic display being aligned with a static display of prices corresponding thereto, wherein the static display of prices does not move in response to a change in the inside market;

displaying an order entry region aligned with the static display prices comprising a plurality of areas for receiving commands from the user input devices to send trade orders, each area corresponding to a price of the static display of prices; and

selecting a particular area in the order entry region through single action of the user input device with a pointer of the user input device positioned over the particular area to set a plurality of additional parameters for the trade order and send the trade order to the electronic exchange.

2. A method of placing a trade order according to claim **1**, wherein said trade order is a buy order if the position of the pointer at the time of said single action is within a bid order entry region and wherein said trade order is a sell order if the position of the pointer at the time of said single action is within an ask order entry region.

3. A method of placing a trade order according to claim **2**, wherein the trade order is for a pre-determined fixed quantity and for a price corresponding to the position of the pointer at the time of said single action.

4. A method of placing a trade order according to claim **2**, wherein the trade order is for a quantity equal to a current net position of the user in the commodity and for a price corresponding to the position of the pointer at the time of said single action.

5. A method of placing a trade order according to claim **2**, wherein the trade order is for a quantity equal to a pre-determined fixed offset plus the sum of all quantities in the market at prices better than or equal to a price corresponding to the position of the pointer at the time of said single action and for a price corresponding to said position.

6. A method of placing a trade order according to claim **2**, wherein said offset is equal to a first pre-determined value if a single action of a first type is taken and said offset is equal to a second pre-determined value if a single action of a second type is taken.

7. A method of placing a trade order according to claim **2**, further comprising canceling said trade order in response to a subsequent single action of the user input device.

8. A computer readable medium having program code recorded thereon, for execution on a computer having a graphical user interface and a user input device, to place a trade order for a commodity on an electronic exchange having an inside market with a highest bid price and a lowest ask price, comprising:

a first program code for setting a preset parameter for the trade order;

a second program code displaying market depth of a commodity, through a dynamic display of a plurality of bids and a plurality of asks in the market for the

commodity, including the bid and ask quantities of the commodity, aligned with a static display of prices corresponding thereto, wherein the static display of prices does not move in response to a change in the inside market;

a third program code for displaying an order entry region comprising a plurality of areas for receiving commands from the user input device to send trade orders, aligned with the static display of prices, each area corresponding to a price of the static display of prices; and

a fourth program code for receiving a command as a result of a selection of a particular area in the order entry region by a single action of the user input device with a pointer of the user input device positioned over the particular area, to set a plurality of additional parameters for the trade order and send the trade order to the electronic exchange.

9. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim **8**, further comprising program code for establishing that said trade order is a buy order if the position of the pointer at the time of said single action is within a bid order entry region and that said trade order is a sell order if the position of the pointer at the time of said single action is within an ask order entry region.

10. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim **9**, further comprising program code for establishing that the trade order is for a predetermined fixed quantity and for a price corresponding to the position of the pointer at the time of said single action.

11. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim **9**, further comprising program code for establishing that the trade order is for a quantity equal to a current net position of the user in the commodity and for a price corresponding to the position of the pointer at the time of said single action.

12. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim **9**, further comprising program code for establishing that the trade order is for a quantity equal to a pre-determined fixed offset plus the sum of all quantities in the market at prices better than or equal to a price corresponding to the position of the pointer at the time of said single action and for a price corresponding to said position.

13. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim **12**, further comprising program code for establishing that said offset is equal to a first pre-determined value if a single action of a first type is taken and said offset is equal to a second pre-determined value if a single action of a second type is taken.

14. A client system for placing a trade order for a commodity on an electronic exchange having an inside market with a highest bid price and a lowest ask price, the system comprising:

a parameter setting component for setting a preset parameter for the trade order;

a display device for displaying market depth of a commodity, through a dynamic display of a plurality of bids and a plurality of asks in the market for the commodity, including the bid and ask quantities of the commodity, aligned with a static display of prices corresponding thereto, wherein the static display of prices does not move when the inside market changes, and for displaying an order entry region aligned with the static display of prices, comprising a plurality of areas for receiving commands to send trade orders, each area corresponding to a price of the static display of prices;

a user input device for positioning a pointer thereof over an area in the order entry region; and

a trade order sending component for receiving a command as a result of a selection of the area in the order entry region by a single action of the user input device with a pointer of the user input device positioned over the area, to set a plurality of additional parameters for the trade order and send the trade order to the electronic exchange.

15. A client system for placing a trade order for a commodity according to claim **14**, wherein said trade order sending component establishes that said trade order is a buy order if the position of the pointer at the time of said single action is within a bid order entry region and that said trade order is a sell order if the position of the pointer at the time of said single action is within an ask order entry region.

16. A client system for placing a trade order for a commodity according to claim **15**, wherein said trade order sending component establishes that the trade order is for a pre-determined fixed quantity and for a price corresponding to the position of the pointer at the time of said single action.

17. A client system for placing a trade order for a commodity according to claim **15**, wherein said trade order sending component establishes that the trade order is for a quantity equal to a current net position of the user in the commodity and for a price corresponding to the position of the pointer at the time of said single action.

18. A client system for placing a trade order for a commodity according to claim **15**, wherein said trade order sending component establishes that the trade order is for a quantity equal to a predetermined fixed offset plus the sum of all quantities in the market at prices better than or equal to a price corresponding to the position of the pointer at the time of said single action and for a price corresponding to said position.

19. A client system for placing a trade order for a commodity according to claim **18**, wherein said trade order sending component establishes that said offset is equal to a first pre-determined value if a single action of a first type is taken and said offset is equal to a second predetermined value if a single action of a second type is taken.

20. A method according to claim **1**, wherein said displaying the market depth of a commodity traded in a market further comprises displaying said bids and asks in a vertical orientation.

21. A method according to claim **1**, wherein said displaying the market depth of a commodity traded in a market further comprises displaying said bids and asks in a horizontal orientation.

22. A method according to claim **1**, wherein a plurality of said displayed bids and asks in the market include bid and ask quantities of the commodity.

23. A method according to claim **1**, wherein said displaying the market depth of a commodity traded in a market further comprises displaying said bids and asks in different colors.

24. A method according to claim **1**, further comprising re-centering said prices corresponding to the bids and asks about an inside market price upon receipt of a re-centering instruction.

25. A method according to claim **1**, further comprising dynamically displaying working orders in alignment with the prices corresponding thereto.

26. A method of displaying according to claim 1, further comprising dynamically displaying entered orders in alignment with the prices corresponding thereto, wherein said entered orders indicate a quantity of said commodity for which a trader's orders have been filled at said corresponding prices.

27. A method according to claim 1, wherein said displaying the market depth of a commodity traded in a market further comprises displaying said statically displayed prices in at least one direction in numerical order.

28. A method according to claim 1, wherein said displaying the market depth of a commodity traded in a market further comprises displaying said statically displayed prices along a single line in numerical order.

29. A method of displaying according to claim 1, wherein said displaying the market depth of a commodity traded in a market further comprises dynamically displaying a last traded quantity for said commodity in alignment with the price corresponding thereto.

30. A computer readable medium according to claim 8, further comprising program code to ensure that said displayed bids, asks and prices are oriented vertically.

31. A computer readable medium according to claim 8, further comprising program code to ensure that said displayed bids, asks and prices are oriented horizontally.

32. A computer readable medium according to claim 8, further comprising program code to ensure that a plurality of bids and asks in the market include bid and ask quantities of the commodity.

33. A computer readable medium according to claim 8, further comprising program code to ensure that bids and asks are displayed in different colors.

34. A computer readable medium according to claim 8, further comprising program code to ensure that said displayed prices corresponding to the bids and asks are re-centered about an inside market price upon receipt of a re-centering instruction.

35. A computer readable medium according to claim 8, further comprising program code for dynamically displaying working orders in alignment with the prices corresponding thereto.

36. A computer readable medium according to claim 8, further comprising program code for dynamically displaying entered orders in alignment with the prices corresponding thereto, wherein said entered orders indicate a quantity of said commodity for which a trader's orders have been filled at said corresponding prices.

37. A computer readable medium according to claim 8, further comprising program code to ensure that said statically displayed prices are displayed in at least one direction in numerical order.

38. A computer readable medium according to claim 8, further comprising program code to ensure that said statically displayed prices are displayed along a single line in numerical order.

39. A computer readable medium according to claim 8, further comprising program code for dynamically displaying a last traded quantity for said commodity in alignment with the price corresponding thereto.

40. A client system according to claim 14, wherein said displays are oriented vertically.

41. A client system according to claim 14, wherein said displays are oriented horizontally.

42. A client system according to claim 14, wherein said displays of the pluralities of bids and asks in the market include bid and ask quantities of the commodity.

43. A client system according to claim 14, wherein said displays are displayed in different colors.

44. A client system according to claim 14, wherein said display of prices corresponding to the bids and asks is re-centered about an inside market price upon re-centering instruction from a user.

45. A client system according to claim 14, further comprising a display of working orders displayed in alignment with the prices corresponding thereto.

46. A client system according to claim 14, wherein said display device displays entered orders in alignment with the prices corresponding thereto and wherein said entered orders indicate a quantity of said commodity for which a trader's orders have been filled at said corresponding prices.

47. A client system according to claim 14, wherein said static display of prices is displayed in at least one direction in numerical order.

48. A client system according to claim 14, wherein said static display of prices is displayed along a single line in numerical order.

49. A client system according to claim 14, wherein said display device displays a last traded quantity for said commodity in alignment with the price corresponding thereto.

50. The method of claim 2, wherein the bid order entry region overlaps with a bid display region and the ask order entry region overlaps with an ask display region.

51. A computer readable medium having program code recorded thereon, for execution on a computer to place a trade order according to claim 9, wherein the bid order entry region overlaps with a bid display region and the ask order entry region overlaps with an ask display region.

52. A client system for placing a trade order for a commodity according to claim 15, wherein the bid order entry region overlaps with a bid display region and the ask order entry region overlaps with an ask display region.

53. The method of claim 1 wherein the market depth is based on an exchange order book and wherein the static display of prices does not move in response to the addition of a price to the exchange order book, the additional price comprising a displayed price.

54. The method of claim 53 wherein the static display of prices does not move in response to the removal of a price from the exchange order book, the removed price comprising a displayed price.

55. The method of claim 1 wherein the market depth is based on an exchange order book and the static display of prices never moves in response to a price change in the exchange order book relating to a price which is displayed.

56. The method of claim 1 wherein the plurality of additional parameters comprises a price and type of order.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,772,132 B1
DATED : August 3, 2004
INVENTOR(S) : Gary Allan Kemp II, Jens-Uwe Schluetter and Harris Brumfield

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

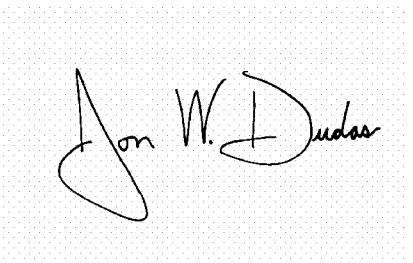
Title page,
Item [56], **References Cited**, OTHER PUBLICATIONS, after the last entry, insert -- Patsystems News Release, PATSYSTEMS LAUNCHES J TRADER, November 06, 2001 --.

Column 9,
Line 65, delete "sell" and insert -- buy --.

Column 10,
Line 2, delete "buy" and insert -- sell --.

Signed and Sealed this

Second Day of August, 2005



JON W. DUDAS
Director of the United States Patent and Trademark Office

US006772132C1

(12) EX PARTE REEXAMINATION CERTIFICATE (6740th)
United States Patent
Kemp, II et al.

(10) Number: US 6,772,132 C1
(45) Certificate Issued: Mar. 31, 2009

(54) **CLICK BASED TRADING WITH INTUITIVE GRID DISPLAY OF MARKET 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.**, Evanston, IL (US)

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G06Q 40/00 (2006.01)
G06F 3/048 (2006.01)

(52) **U.S. Cl.** ..... **705/36 R**; 705/35; 705/10; 705/14; 715/814

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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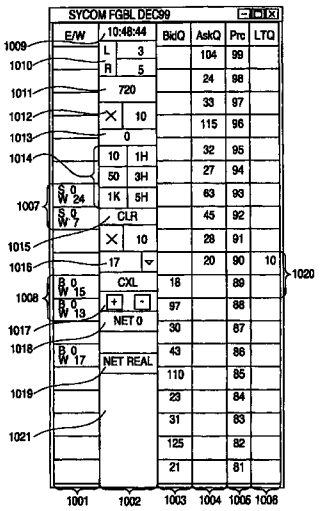
Primary Examiner—Jeanne M. Clark

(57) **ABSTRACT**

A method and system for reducing the time it takes for a trader to place a trade when electronically trading 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 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.



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EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1**–**56** is confirmed.

* * * * *

EXHIBIT 3

PW 1252255

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

December 01, 2004

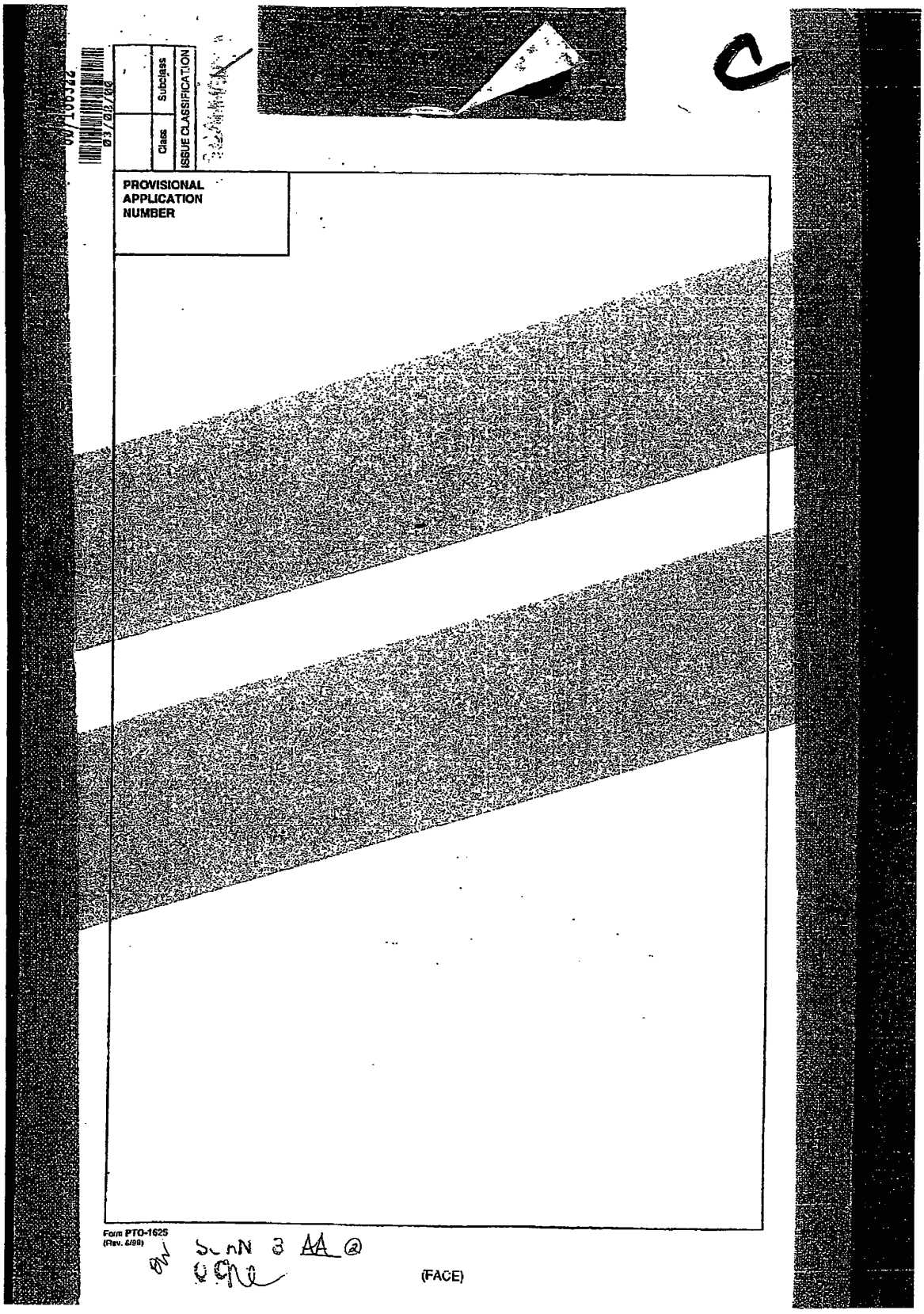
THIS IS TO CERTIFY THAT ANNEXED IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF THE FILE WRAPPER AND CONTENTS OF:

APPLICATION NUMBER: *60/186,322*
FILING DATE: *March 02, 2000*

By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

M. K. HAWKINS
Certifying Officer

eS0000065516



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PATENT APPLICATION SERIAL NO. 60/186322

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

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*U.S. GPO: 1998-433-214/80404

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03/02/00 490 U.S. PTO

Atty. Dkt. No. 024051/0105

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: TRADING TECHNOLOGIES INTERNATIONAL, INC.

Title: MARKET DEPTH DISPLAY CLICK BASED TRADING AND MERCURY DISPLAY

Appl. No.: Unassigned

Filing Date: March 2. 2000

Examiner: Unassigned

Art Unit: Unassigned

Jc541 U.S. PTO 60/186322 03/02/00

03/02/00 60186322

PROVISIONAL PATENT APPLICATION TRANSMITTAL

Assistant Commissioner for Patents
Box PROVISIONAL PATENT APPLICATION
Washington, D.C. 20231

Sir:

Transmitted herewith for filing under 37 C.F.R. § 1.53(c) is the provisional patent application of:

Gary Allan Kemp II
Winnetka, IL

Jens-Uwe Schluetter
Evanston, IL

Harris Brumfield
Chicago, IL

Enclosed are:

[X] Specification and Drawings (42 pgs)

[X] Small Entity statement.

eS0000065519

The filing fee is calculated below:

		Rate		Fee Totals
Basic Fee		$150.00		$150.00
[X]	Small Entity Fees Apply (subtract ½ of above):		=	$75.00
	TOTAL FILING FEE:		=	$75.00

[X] A check in the amount of $75.00 to cover the filing fee is enclosed.

[ ] The required filing fees are not enclosed but will be submitted in response to the Notice to File Missing Parts of Application.

[X] The Assistant Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Assistant Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

Please direct all correspondence to the undersigned attorney or agent at the address indicated below.

Respectfully submitted,

Date March 2, 2000

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3/2/00

Market Depth Display and Click Based Trading

I. Introduction & Background

A. Introduction

Trading Technologies has developed software that will enable traders of any product that can be traded (a "commodity") on an electronic exchange or electronic marketplace to send orders with a single click of a computer mouse. Three of the most innovative features of Trading Technologies' trading method are the "Click" and "Dime" trading methods and the "Mercury" display and trading method. Click and Dime trading methods enable a trader to execute single click trades for large volumes of commodities at a price within a pre-specified range. The Mercury display and trading method ensure fast and accurate execution of trades by displaying market depth on a vertical plane, which fluctuates logically up or down as the market price moves up or down. A trader can trade quickly and efficiently using this display. This document sets forth the background of electronic trading and describes Trading Technologies' innovative Click and Dime trading and the Mercury display.

B. Background of Electronic Exchanges and Traders' Needs in Electronic Exchanges

Approximately 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, high speed communications servers and the internet. High speed data lines establish direct connections between the client and the host. For example, while the data line size and speed may vary, a high speed data line connection between a Chicago exchange and a New York trader might be configured like this:

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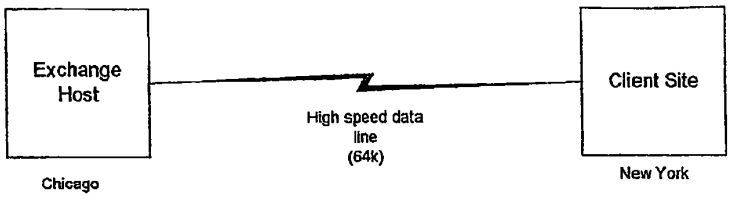
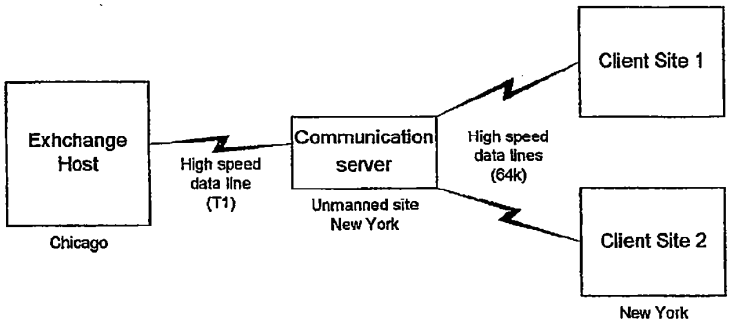


Another connection can be established by configuring high speed networks or communications servers at strategic access points worldwide in locations where traders physically are located. Data is transmitted in both directions between traders and exchanges via dedicated high speed communication lines. Such a connection between a Chicago exchange and multiple New York traders might be configured as follows:



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. Such a connection might be configured as follows:

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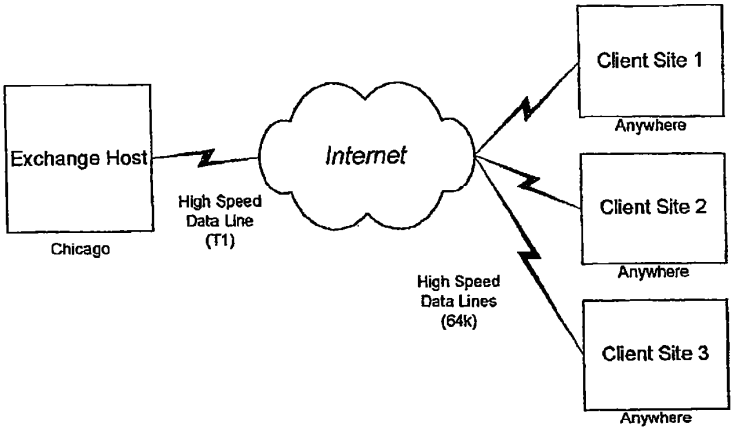

Regardless of the way in which a connection is established, the exchange participants' computers allow traders to participate in the market. They use software that creates specialized interactive trading screens on the traders' desktops. The trading screens enable traders to enter and execute orders, 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.

C. Importance of Speed for Traders

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.

Regardless of what screen 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.

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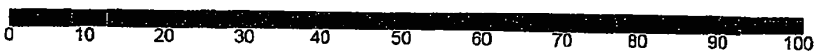
With these variables being constant, a competitive speed advantage must come from other aspects of the trading cycle. X_TRADER and Mercury provide a significant advantage during the slowest portion of the trading cycle-- while the trader manually enters his/her order. If one assumes the cycle of an electronic trade is broken down into 100 units, approximately 80 of those units are spent manually entering an order. This time continuum is demonstrated in the following diagrams:

Time Continuum
100 Units



Key:

Blue:	**Time between the host generating the price and the Client application receiving the price—*8 Units*.**
Green:	**Time it takes the client application to display the price to the trader—*4 Units*.**
Red:	**Time it takes trader to read the prices and enter an order—*80 Units*.**
Purple:	**Time it takes for order to return to the Host—*8 Units*.**

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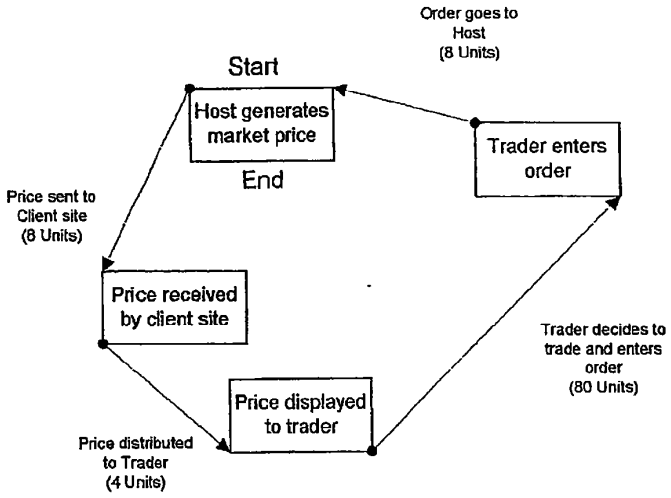
Concept of time value
Entire continuum = 100 Units



The Mercury Display, Click and Dime trading simplify the manual motion involved, which results in significant time savings. Traders recognize that the value of such time savings may amount to millions of dollars annually.

D. The Trading Technologies solution

One screen, many exchanges

Trading Technologies provides a comprehensive, turnkey solution to trading electronic markets. Trading Technologies' flagship product, the X_TRADER® Trading System, provides a single, advanced front-end design to trade multiple exchanges from one screen with single click trading and quoting with a complete range of execution tools. The screen can be displayed on a computer screen in many, customizable formats. For example, the following screen shot shows the most basic X_TRADER® screen, which displays the commodity being traded, the "inside market," and various trade execution buttons:

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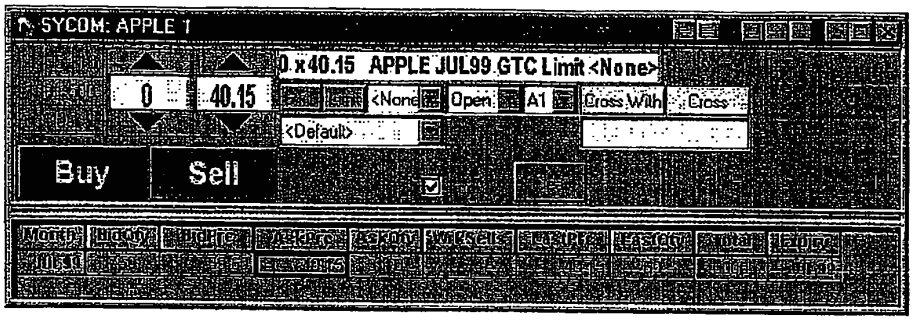
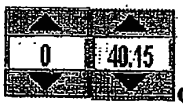


By default, both the Order Entry window and Market Grid open when a product is selected. The following key describes each field in the above screen.

Order Entry Window:

Quantity Buttons: The pre-set buttons in the upper left corner of the screen allow traders to quickly enter and increment a quantity. The quantity defaults are 1, 5, 10, 100, and 500. Traders may edit these buttons to reflect customized quantities. The Clear button located below the Quantity buttons can be used to clear the Quantity field.



Quantity/Price Fields: The order quantity appears immediately to the right of the Quantity buttons; the price field appears to the right of that. Each field has its own spinners-- the up and down arrows. Click on the spinners to increase and decrease the quantity and/or price.

Order Information: This field will automatically reflect the contract information provided when a trader left clicks on any row in the Market Grid. Information like quantity, price, product, month/year, and order restriction type will be displayed. This field will also display a "C" for call or "P" for put.

GTD/GTC/Date Button: Located immediately to the right of the price field, a trader would click this button to toggle between GTD (Good 'til Day), GTC (Good 'til Cancelled), and Date. The default selection is GTD. The X_TRADER GTD designation indicates the order will be valid for the current trading session only. The GTC designation indicates the order will be valid until the trader cancels the order or the

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contract expires. The Date designation allows a trader to select an order expiration date. Selecting Date will open a calendar with the current date circled in red. The trader would select the expiration month and day for the order and press OK.

Limit (Market) Button: The trader would click this button, located to the right of the GTC button, to toggle between Limit (default) and Market orders.

<None **Order Restrictions**: Located to the right of the Limit button, a trader would click the Order Restrictions pull down menu to designate any restrictions on the order. Available restrictions include: None, DiscQty, FOK, IOC, MV, and STOP.

None: No additional restrictions are placed on the order.

DiscQty: Disclose Quantity—disguise trading volume by disclosing a partial amount of total quantity. When selected quantity box will open on the Order Entry window.

FOK: Fill or Kill—defined as an immediate fill of the entire quantity or if this is not possible, an immediate cancellation of the order.

IOC: Immediate or Cancel—defined as an immediate partial fill before the balance is cancelled.

MV: Minimum Volume—defined as the minimum volume of partial fills. The default is zero. The minimum volume is entered on the Order Entry window. When this restriction is chosen, a field labeled Min Vol will appear. The trader would then enter the minimum volume quantity, and place the order.

STOP: The Stop order price triggers a market buy or sell order. When the STOP restriction is chosen, a field labeled Stop Prc will appear. The trader would then enter the trigger price, and place the order. A stop order is displayed in the Order Book with a "Working" status, but it is not actually in the market. A negative order number (-###) is displayed indicating that it is a "synthetic" order. When the stop triggers, the order becomes the native order type and remains in the Order Book until filled.

If the trader who originated the order is not logged in when the order is triggered, the order will be sent to market with the trader ID of another trader with the same Group ID. If another trader is not available, the order status will change from "Working" to "Hold" until the order is resubmitted by the original trader or a trader with the same Group ID.

Open **Open/Close:** Located to the right of the Order Restrictions button, this pull down menu allows the trader to choose an Open Position or Close Position. This enables a trader to send an order at the open or close of the market.

A1 **Acct:** A trader can select one of the following account types (A1 is selected in the above example):

A1	First Agent Account (e.g., broker)
G1	Pre-Designated Giveup Trade
G2	Designated Giveup Trade
M1	First Market Maker Account

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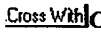
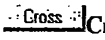
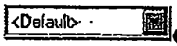
M2 Second Market Maker Account
P1 First Principal Account (e.g., proprietary trader)
P2 Second Principal Account
U1 Unallocated—for orders that have not been allocated to a customer account or where allocation is a middle/back office function.



Cross With: A trader would click the Cross With button to trade with a specific counter party. The trader would enter the counter party's Trader ID where indicated.



Cross: The trader would click the Cross button to perform a cross trade. The Order Entry pane will change to display the appropriate fields to perform a cross trade—including **BUYER** and **SELLER** drop lists of customer accounts. In addition, the BUY and SELL buttons will be replaced by **BUY FIRST** and **SELL FIRST** buttons.



Customer Selection Field: The Order Entry window Customer Selection drop list is located below the GTD and Limit buttons. This field displays the current customer defaults profile in use.

Buy and Sell Buttons: Traders click these buttons to send an order to market.

Lock: When the Lock box is checked, a buy or sell confirmation is requested before sending an order to market. After pressing the buy or sell button, the appropriate button title will change to **Apply Buy** or **Apply Sell.** A trader would click the appropriate button to confirm the order and send the order to market. To cancel the order (prior to sending it to the market), a trader would click the Clear button.

Clear: The Clear button located to the right of the Lock check box and below the order type information will clear all contract, price, and quantity data without sending the order to market. Note: the Quantity Clear button is located below the quantity buttons. This button will change the Quantity to zero without impacting the other fields.

The Market Grid:

The market grid appears as follows:

The market grid can display price, quantity, the month of expiration and a long list of other information. The Bid and Ask quantities and prices in the above market grid represent the "Inside Market," which is the best bid and ask quantities and prices in the

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market. The figures are displayed dynamically in real time and are provided directly from the exchange on which the trader is trading. Not all exchanges provide data for all of the available market grid columns, but to the extent the market provides the information, each column of the Market Grid can be customized to include or exclude any of the following fields:

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COLUMN	DESCRIPTION	COLUMN	DESCRIPTION
Month	Expiration Month/Year	TheoBid	Theoretical Bid Price
Bid Mbr(1)	Bid Member ID	TheoAsk	Theoretical Ask Price
WrkBuys(2)	Working Buys for entire Group ID	QAct	Quote Action (Sends individual quotes)
BidQty	Bid Quantity	BQQ	Test Bid Quote Quantity
ThrshBid(6)	Threshold Bid Price	BQP	Test Bid Quote Price
BidPrc	Bid Price	Mkt BQQ	Market Bid Quote Quantity
Bid Qty Accum	Accumulated Bid Quantity	Mkt BQP	Market Bid Quote Price
BidPrc Avg	Bid Price Average	Quote	Checkbox activates / deactivates contract for quoting
AskPrc Avg	Ask Price Average	Mkt AQQ	Market Ask Quote Quantity
AskQty Accum	Accumulated Ask Quantity	Mkt AQP	Market Ask Quote Price
AskPrc	Ask Price	AQP	Ask Quote Price
ThrshAsk(6)	Threshold Ask Price	AQQ	Ask Quote Quantity
AskQty	Ask Quantity	Imp BidQty(5)	Implied Bid Quantity
WrkSells(2)	Working Sells for entire Group ID	Imp BidPrc(5)	Implied Bid Price
Ask Mbr(1)	Ask Member ID	Imp AskQty(5)	Implied Ask Quantity
NetPos	Net Position	Imp AskPrc(5)	Implied Ask Price
FFNetPos	Fast Fill Net Position	Gamma(3)	Change in Delta given 1 pt change in underlying
LastPrc	Last Price	Delta(3)	Change in price given 1 pt change in underlying
LastQty	Last Quantity	Vola(3)	Percent volatility
Total	Total Traded Quantity	Vega(3)	Price change given 1% change in Vola
High	High Price	Rho(3)	Price change given 1% change in interest rate
Low	Low Price	Theta(3)	Price change for every day that elapses
Open	Opening Price	Click Trd	Activate / deactivate click trading by contract
Close	Closing Price	S (Status)	Auction, Closed, FastMkt, Not Tradable, Pre-trading, Tradable, S = post-trading
Chng	Last Price-Last Close	Expiry	Expiration Month/Year
TheoPrc	Theoretical Price		

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[1] If supplied by the exchange/marketplace
[2] WrkBuys and WrkSells reflect the total number of working contracts for your entire group across all prices. Group ID from exchange login: e.g., AAAAABBB001--AAAAA represents Member ID, BBB represents Group ID, and 001 represents Trader ID. One or more traders may be assigned the same Group ID.
[3] Options Theoretical Pricing Model (Theo Server) data categories
[4] When the Click Trd check box is deselected (blank), click trading is disabled for that strike/expiry. If click trading is attempted for this contract, the Audit Trail will display and error message.
[5] For options there are two sets of these columns (put and call sides). Use of these columns is exchange dependent. LIFFE supports implied pricing with the exception of strategies. Calculate implied prices for strategies using Excel.
[6] Threshold prices for MATIF and MONEP are the upper and lower price reasonability limits established by the exchange. If trading occurs outside the thresholds, the exchange will cease trading for the product. A frozen market requires manual release by the exchange.

For purposes of this patent, it is important to understand the following Market Grid data elements or fields:

BidQty (Bid Quantity):	This column displays the quantity for each working bid.
BidPrc (Bid Price):	This column displays the price for each working bid.
AskPrc (Ask Price):	This column displays the quantity for each working ask.
AskQty (Ask Quantity):	This column displays the price for each working ask.
LastPrc (Last Price):	This column displays the price for the last bid and ask that were matched in the market.

Order entry without Click and Dime trading

When using an electronic trading system, traders typically execute a trade with the above screen or one similar to it. To enter an order, the trader inputs the desired commodity, quantity, price, any order restriction and then clicks on the "buy" or "sell" button. Electronic exchanges require this type of information to be submitted before an order will be accepted.

Using the simplest window in X_TRADER®, the trader would position the cursor with his mouse and click on the appropriate fields. To select the quantity, the trader would move the cursor to the upper left quadrant of the screen and click the 1, 5, 10, 100 or 500 or click the up or down arrows, which border the quantity field (the white field above showing "0") until the appropriate quantity appeared. Second, the trader would enter the price he is willing to accept or pay by clicking the up or down arrows, which border the price field (the white field above showing "40.15"). Third, the trader would implement any order restrictions by clicking the GTD (good 'til day), GTC (good 'til cancel), Limit, or other order restriction on the pull down menu next to the Limit button. Fourth, the

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trader would select the appropriate account on the pull down menu to the right of the order restriction field. Finally, the trader would click the buy or sell button to send the order to market. A trader using any other trading screen would execute the same or similar actions.

The requirement of having to set multiple elements of an order, as described above, prior to an order being sent to market, is obviously time consuming for the trader. The more time a trader takes entering an order, the more likely the price he wanted to bid on 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 he'll miss his price and the more likely he will make money.

II. The Inventions

Trading Technologies' inventions dramatically reduce the time it takes a trader to manually execute a trade when electronically trading on an exchange. As a result, a trader's chances of filling orders at desirable prices and quantities increase.

A. Market Depth

- *INNOVATION #1: DISPLAY OF MARKET DEPTH HORIZONTALLY UNDER THE INSIDE MARKET*

Trading Technologies has developed the advanced concepts of Click and Dime trading and the Mercury display. These concepts display "Market Depth" and allow traders to view the Market Depth and to execute trades within the Market Depth with a single 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 entered into the market that is not the inside market—market depth falls outside the market.

The market sends the price, order and fill information to each trader on the exchange. Trading Technologies software processes this information and maps it through simple algorithms to positions in a theoretical grid program. The grid program is proprietary software licensed to Trading Technologies that enables X_TRADER® to align the information on a screen in the format desired.

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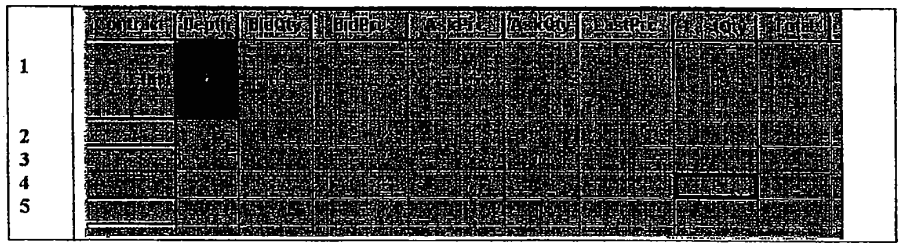
How far into the market depth X_TRADER® can display depends on how much of the market depth the exchange provides. Some exchanges supply an infinite market depth, while others provide no market depth or only a few trades away from the inside market. Each trader can also chose how far into the market depth he wants to display on his screen.

Traders gain a significant advantage by seeing the market depth because they can see trends in the orders in the market. 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 strategy could be utilized.

X_TRADER® displays market depth in the Market Grid as follows:



Row 1 represents the "Inside Market," which is the best bid price and quantity and the best ask price and quantity

Rows 2-5 represent the "Market depth."

Market Depth will list all available next-best bids and asks. The working buy and sell quantities for each price level will be displayed. 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.

The Market Depth column will inform the trader of its status by displaying different colors. Yellow indicates that the 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.

Note that any standard method may be used for displaying this and other data on the screen. By way of example, but not by way of limitation, each tradeable object is identified by a key string. A standard mapping table may be used to map the tradeable objects onto appropriate cells in a screen display.

When the system is designed to receive data from multiple exchanges, then the preferred implementation is to translate the data from various exchanges into a simple format. This

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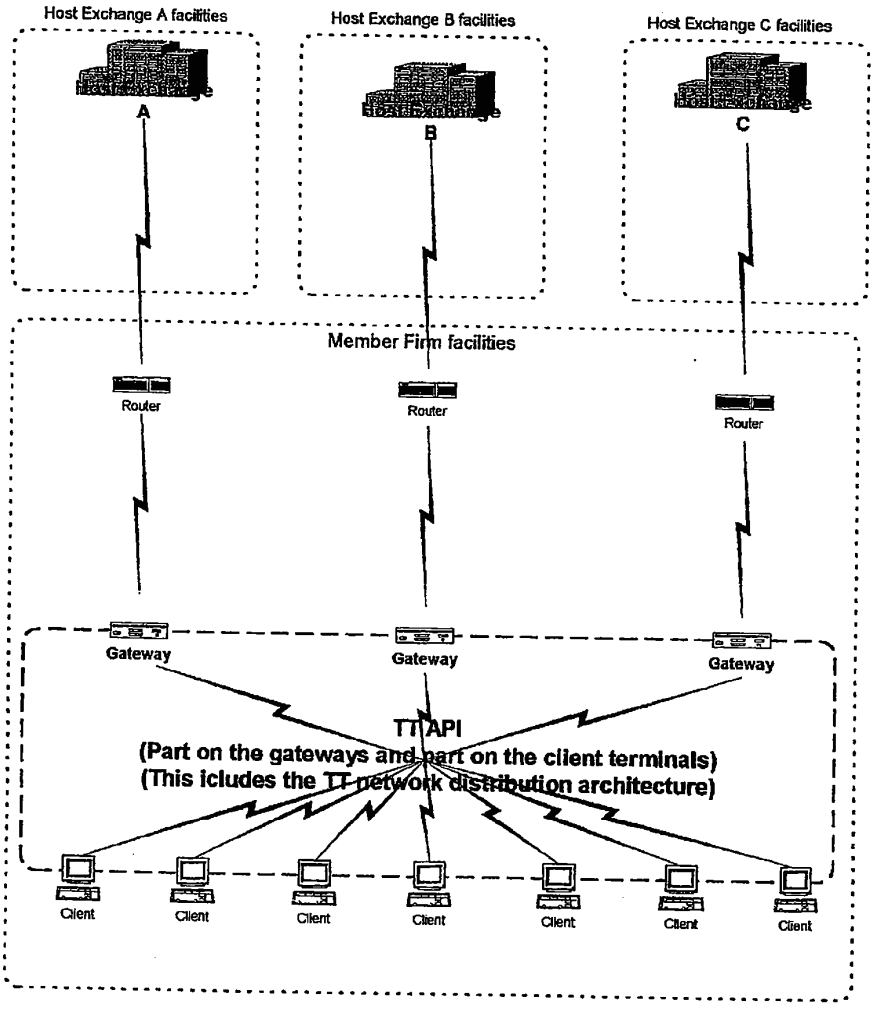
"translation" function is illustrated in the figure below. The Trading Technologies applications program interface ("TT API") depicted in the figure translates the incoming data formats from the different exchanges to a simple preferred data format. This translation function may be disposed anywhere in the network, for example, at the gateway server, at the individual workstations or, as shown in the figure, at both. The gateway servers and the client workstations also cache historical data such as order books.

Connection to multiple exchanges



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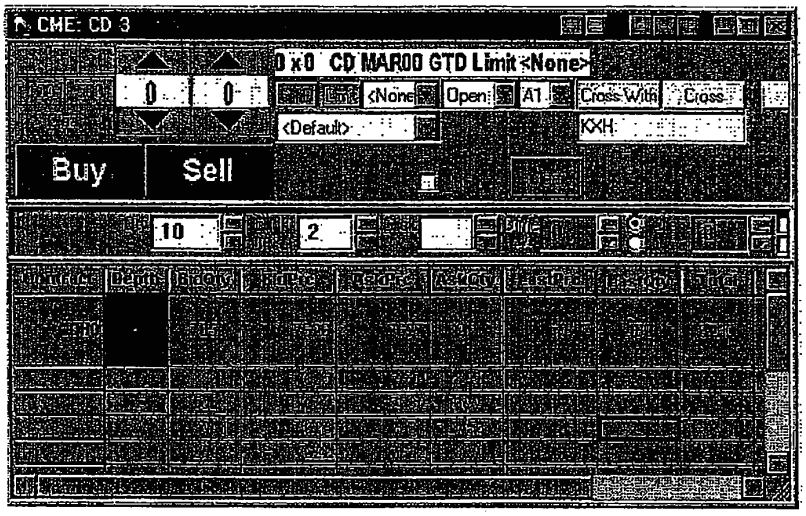
The entire window with Market Depth can be formatted to appear on the trader's screen as follows:



B. Click Trading

- ***INNOVATION #2: TRADING BASED ON MULTIPLE VARIABLES WITH A SINGLE CLICK IN THE HORIZONTAL MARKET DEPTH***

Click Trading enables a trader to execute trades with a single click within the market depth. The trader inputs a quantity and price range once and then sends orders to market with one click on a price field in the Market Depth grid. Utilizing the traditional X_TRADER® screens, a trader would enable Click trading in a context menu selection, which would add the following screen to the X_TRADER® screen displayed above:

- ***INNOVATION #3: METHODOLOGY OF SETTING PRE-SPECIFIED VARIABLES WITH CLICKS IN EACH FIELD***

The number in each field may be adjusted up or down automatically by clicking in the field itself. There is no need to click the arrow buttons to the right of each field. For example, the Qty (Quantity) field, which represents the amount of the commodity to be

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traded can be adjusted simply by clicking in the white field rather than clicking the up or down buttons. The maximum order quantity is 9999.

- *INNOVATION #4: CLICK OFFSET SAFETY MECHANISM FOR CLICK TRADING*

The Click Offset field, which is inactive in the above screen shot, and thus greyed out, is a safety device used with the Click trading mode that won't allow a trader to send an order that is too far away from the Last Traded Price. Effectively, the trader establishes a floor or ceiling above or below the last traded price by enabling Click Offset. To use the Offset feature, a trader would set the +/- value to zero. He would then set a figure in the Click Offset field. This will halt any orders that are above or below the last traded price by at least the number of ticks in the Click Offset field. A "tick" is the minimum change in a price value that is set by the exchange for each commodity (for example, $.01, $.05, $.10 or any other value).

Without the Click Offset feature, a trader might intend to click on a particular price, but between the time he decides to do so and the time he actually clicks (which may be only hundredths of a second) the price may change. He may not be able to stop the downward motion of his finger and the order would be sent to market at the wrong price. Sometimes the change in price is significant and could cost the trader a lot of money.

Using Click Offset a trader could trade in the market depth, but no order would be sent to market that is entered by the trader for a price further from the last price than the figure displayed in the Click Offset field.

Using the following screen shot, the following trading scenario could take place:

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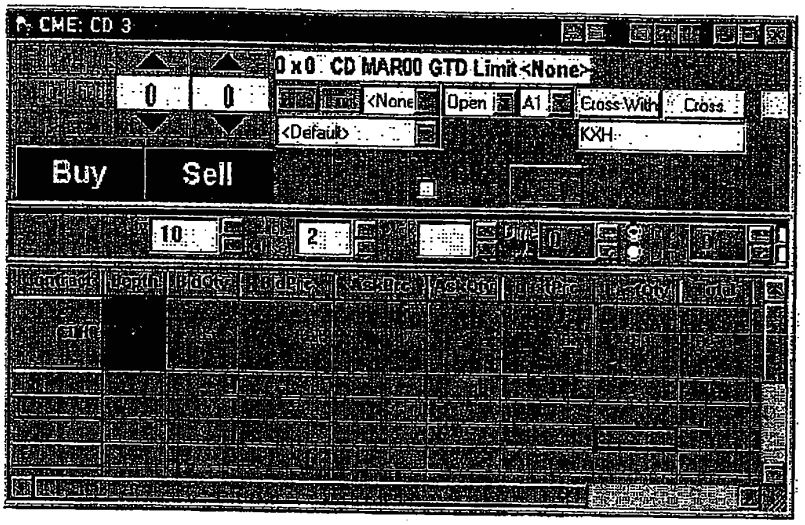

- Because the Click Offset field is in use, the trader cannot trade more than 2 ticks from the last traded price. In this screen, the last traded price is 7627 so the trader might right click on 7629, which is one row below the inside market ask price. This would send a buy order to the market for his previously entered quantity (10 in the screen above) for 7627. Because this is within two ticks of the last traded ask price, the order would go to the market. All 10 lots would be filled because there are 836 (815 plus 21) lots in the market at least at this price.
- If the trader clicked on 7630 or higher, he could not enter a trade because the price is greater than 2 ticks above the last traded price.

- ***INNOVATION #5: PRICE SETTING AUGMENTATION BASED ON A PRESET VARIABLE (CLICK +/-)***

Trading with Click +/- allows a trader to chase a fast moving market up to a certain amount of ticks. A trader would set the number of ticks in the Click +/- field once. He would then be able to send orders to market with a single click in the market depth for a price up to (or down to if selling) the price clicked plus (or minus if selling) the number of ticks in the Click +/- field. The best available order in the market within the preset parameters would be filled.

If the market was moving fast and the inside market was rapidly increasing or decreasing (or both alternatively), Click +/- will insure that the trader can keep up with the changes. Using the traditional electronic trading method, he might not be able to sell or buy large quantities at or near the price he needs because the prices moved before he could enter all of the required data. Using Click +/-, he can trade pre-specified quantities at any chosen

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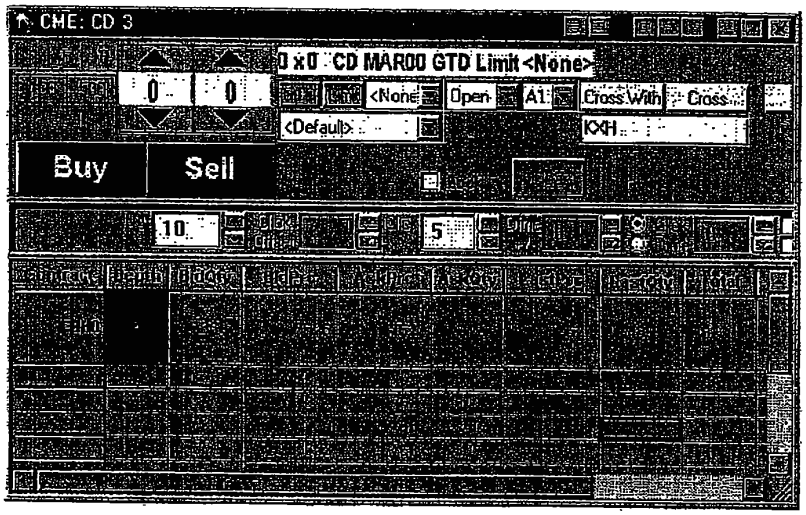
price plus or minus the ticks chosen. This might insure that his trades get filled before the market moves away.

The following screen depicts Click trading with the Click Offset feature disabled and a Click +/- quantity greater than 0 entered. This entry will enable the trader to trade at any price he clicks in the market grid and enter an order for up to (or down to if selling) 5 ticks above (or below) the clicked price.



In the above screen shot the following trading scenarios might take place:

- The trader seeks to sell 10 lots, so he clicks on the 7623 Bid Price, which is three below the inside market. This will send an order to market to sell 10 lots for as low as 7618 (7623 minus 5 ticks). The best available price will be filled first. Thus, in this scenario, all 10 lots will be filled because offers exist in the market place in this price range that amount to many more than 10 lots. Note that without Click Offset enabled, this trade will go through regardless of how far away from the Last Price it is.
- The trader would buy 10 lots for as much as 7635 by clicking on the 7630 field in the Ask Price column. All of these orders will also be filled.

Equations for Innovations 4 & 5:

The concepts set forth in Innovations 4 & 5 can be reduced to the following formulas:

KEY:

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Ask Price clicked with Click trading button = A
Bid Price clicked with Click trading button = B
Last Traded Price = L
Click Offset value = Off
Click +/- value = C
Quantity = Q
Buy limit order sent to the market = Bo
Sell limit order sent to the market = So

Equations:

If C > 0 then Bo = (A + C)Q

If C > 0 then So = (B - C)Q

If C = 0 and if absolute value of (L-A) > Off then NO ORDER SENT

If C = 0 and if absolute value of (L-B) > Off then NO ORDER SENT

If C = 0 and if absolute value of (L-A) ≤ Off then Bo = (A)Q

If C = 0 and if absolute value of (L-B) ≤ Off then So = (B)Q

- ***INNOVATION #5: SAFETY OVERRIDE AND PRICE SETTING AUGMENTATION BASED ON A PRESET VARIABLE (DIME +/-)***

Dime trading allows traders to join the market at a value above or below the best bid or ask by a specified number. Using Dime +/- a trader would enter orders into the market that would not be filled until an equal match met the order in the market. The trader would select the quantity as he did when Click trading and enter the tick amount in the "dime +/-" field. A setting of zero ("0") ticks will enter an order for the price clicked. A tick setting of any amount greater than or less than zero ("0") sends an order to the market for the price clicked plus (minus if selling) the dime +/- setting. If the trader clicked on the Bid order column, a bid would be sent, while a click on the Ask column would send an Ask order. This type of trading may be utilized to join the market or to move the prevailing prices up or down.

The following screen shot shows an X_TRADER® screen with dime trading enabled:

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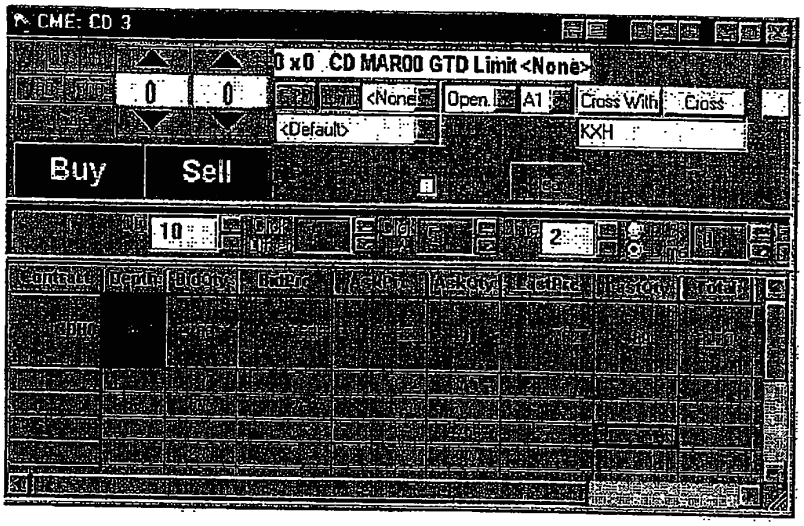

Using the above screen shot, the following trading scenarios could take place:

- In this screen, the trader might right click on 7622, which is four rows below the inside market bid price. This would send a buy order to the market for his previously entered quantity (10 in the screen above) for 7624 or better (up to two ticks above the clicked price). Nothing would be filled at this point. Rather, the orders would be placed in the market as a Bid limit order at 7624 and would only be filled if an Ask order entered the market for 7624 or better.
- If Dime +/- was set at a negative number, for example -3, a right click on 7622 in the BidPrc column would enter a Bid limit order for 7619. None of these would be filled in the market until the asks meet or beat 7619.

Equations for Innovation #6

Dime trading can be reduced to the following formulas:

KEY:
Ask Price clicked with Dime trading button = A
Bid Price clicked with Dime trading button = B
Dime +/- value = D
Quantity = Q
Buy limit order sent to the market = Bo
Sell limit order sent to the market = So

Equations:

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Bo = (A + D)Q
So = (B – D)Q

- ***INNOVATION #6: USE OF A THREE BUTTON MOUSE WHEN TRADING IN A HORIZONTALLY DISPLAYED DEPTH OF MARKET WHERE THE MIDDLE MOUSE BUTTON EFFECTS DIME TRADING AND THE RIGHT MOUSE BUTTON EFFECTS CLICK TRADING***

If using a three-button mouse, the trader would "dime" the market with a single click of the middle mouse button. If the trader selected a 3 button mouse in the Click Trading Properties setup, these radio buttons are inactive . A trader would simply maneuver the screen cursor above the price in the market depth and click the middle button. A dime trading order would be sent to market in the manner described above.

Using the three button mouse, a click on the right mouse button with the cursor positioned above a price in the market depth would send a click trade to market as described above.

- ***INNOVATION #7: USE OF A TWO BUTTON MOUSE WHEN TRADING IN A HORIZONTALLY DISPLAYED DEPTH OF MARKET WITH THE ABILITY TO TOGGLE (SWITCH BETWEEN) DIME AND CLICK TRADING WHERE THE RIGHT MOUSE BUTTON EFFECTS BOTH DIME AND CLICK TRADING DEPENDING ON WHICH IS ENABLED***

If using a two-button mouse, the dime radio button must be selected before using the right mouse button to send the order to market. If the trader's Click Trading Properties designates a 2 button mouse, these radio buttons are active and a trader must manually select Click or Dime trading modes. Once chosen, the trader can send as many orders as he desires, each with one click of the right mouse button and each either a Click or Dime order depending on which mode he chose.

- ***INNOVATION #8: ABILITY TO AUGMENT CLICK TRADING LOGIC WITH THEO CHECK***

Traders may also enter or restrict trades based on pre-determined theoretical values. The values are derived from equations, which can be set up in various programs such as Excel (a Microsoft program) or other proprietary software other than X_TRADER®. X_TRADER® allows the trader to input the value derived from the equation into a field, which would appear below the following Theoretical Edge Implementation field: . The trader's click trades would then be restricted by this value and no order would be allowed that was not as good or better than the theoretical value. This value would be applied regardless of whether the trader attempted to buy or sell. Thus, if the theoretical value was 102 and the trader attempted to click trade in the BidPrc column

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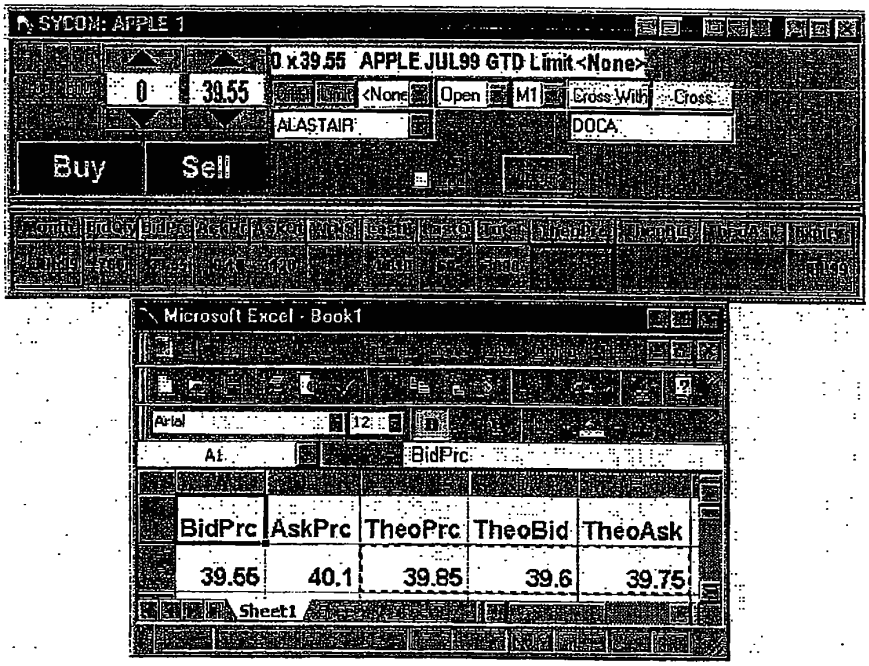
at 101, no order would be sent because the clicked value was worse than the theoretical value. Clicks on 102, 103, 104 or higher in the BidPrc column would be allowed because these would send orders as good as or better than the theoretical value.

To engage the theoretical price feature, the trader would click in the box next to "Theo" in the screen shot above. The theoretical values would be imported into X_TRADER® as demonstrated in the following screen shot:



- *INNOVATION #9: ABILITY TO AUGMENT CLICK TRADING LOGIC WITH B/A*

If the trader clicked in the box next to B/A in the screen shot above, a separate theoretical value could be established for each bid and ask. Separate bid and ask theoretical values would be established for each row in the market depth. Each attempted bid or ask order would be checked against each corresponding theoretical bid or ask value. If the clicked price is as good or better than the corresponding Bid or Ask theoretical value, then the order will be sent.

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- *INNOVATION #10: ABILITY TO MODIFY EDGE FOR THEO CHECK*

Traders may also edge their trades away from the theoretical values described above. When Theo or B/A are checked, a white field appears in the box to the left of "Theo" and "B/A." Traders can input a number of ticks here which allows them to enter orders that are within the specified number of ticks away from the corresponding theoretical value. For example, with a 12.2 theoretical, a 12.6 market bid, and an edge value of 4 ticks, a trader's order to sell the bid will pass the edge test. But if the bid moved one tick lower, to 12.5, an attempt to sell would fail the edge test, because only 3 ticks of edge would be made on the trade.

Edge trading can also be used with the Click +/- setting. A trader who sets the +/- value to 4 ticks will construct a bid 4 ticks higher than the offer or an offer 4 ticks lower than the bid. If this constructed price fails the edge test, the order won't be sent.

X_TRADER MERCURY

As explained above, X_TRADER® greatly improves the speed and accuracy of electronic trading. However, 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. Despite the safety feature of Click Offset and the innovative Click and Dime trading, which allow traders to keep up with fast moving markets, a fluid market can still leave a trader behind. Rapid price fluctuation may move the market beyond even the Click Offset and click and Dime trades. In addition, some traders may find the display of market depth to be difficult to follow. X_TRADER® lists charts the market depth vertically so that both Bid and Ask prices descend the grid. In X_TRADER®, the Bid prices descend the market grid as the prices decrease. However, in a somewhat counterintuitive manner, Ask prices also descend the market grid as these prices actually increase. Mercury remedies these issues in a new, 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 a tracking trades in an extremely efficient manner.

- *INNOVATION #11: VERTICAL DISPLAY OF MARKET DATA INCLUDING MARKET DEPTH*

X_TRADER Mercury displays market depth in a logical, vertical fashion or horizontally or at some other convenient angle or configuration. A vertical field will be shown 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. Mercury displays a static vertical column

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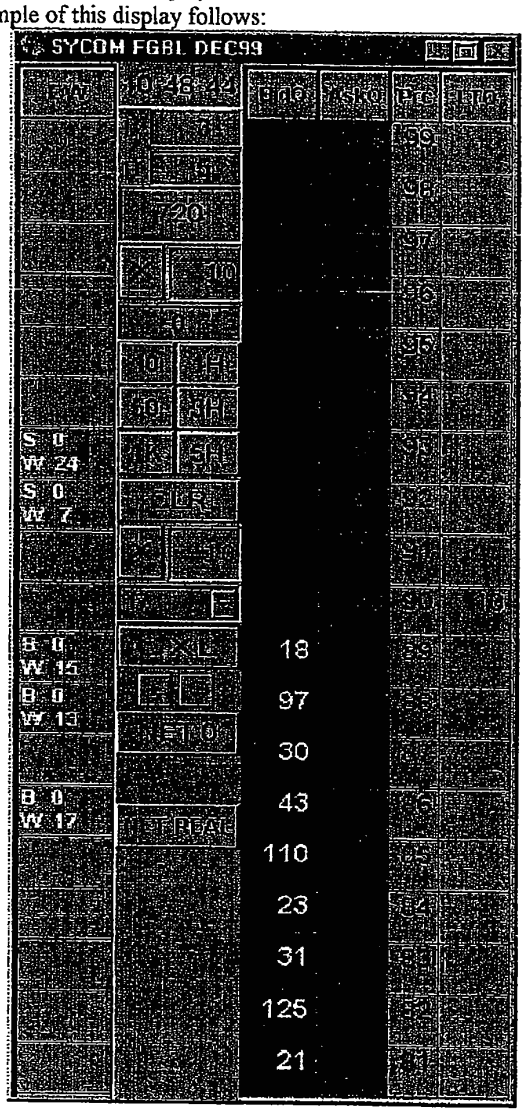
of prices with the bids and asks displayed in vertical columns to the side of the price column. An example of this display follows:



Bid quantities are in the blue column and ask quantities are in the red column. In this example, the inside market is 18 (best bid quantity) at 89 (best bid price) and 20 (best ask quantity) at 90 (best ask price).

Each field is described as follows:

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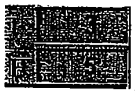
E/W column: This column (entered/working column) displays the current status of the trader's orders. The status of each order will be displayed in the price row where it was entered.

S/W: 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 program is working on filling the order.

B/W: 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 program is working on filling the order.

10:48:44: This is the actual time of day.



L/R: These fields indicate a quantity value, which may be added to the order quantity entered. This process is explained below.

Market Volume: Below the L and R fields, a number appears which represents the current market volume. This is the number of lots that have been traded for the chosen contract.

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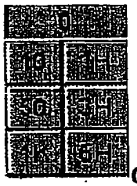
Net Quantity: This field displays the the current position of the trader on the chosen contract. The number represents the trader's buys minus sells.


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:

Quantity Variables: These buttons increase the current quantity by the indicated amount—"10" will increase it by 10; "1H" will increase it by 100; "1K" will increase it by 1000.

Clear: Clicking this button will clear the Current Quantity field.

Quantity Description: This pull down menu allows the trader to chose a Quantity Description.

#: Chosing a number in this field will set a default buy or sell quantity.
Offset: Chosing "offset" in this field will enable the L/R buttons.
NetPos: Choosing "NetPos" will set the current Net Quantity as the trader's quantity for his next trade.

+/-: These buttons will alter the size of the screen—either larger (+) or smaller (-).

Net 0: Clicking this button will reset the Net Quantity to zero.

Net Real: Clicking this button will reset the Net Quantity to its actual position.

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BidQ column: This column represents the current market bid quantities in the corresponding rows of each price.

AskQ column: This column represents the current market ask quantities in the corresponding rows of each price.

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Prc column: This column represents prices for the chosen commodity.

LTQ: This column lists the last traded quantity in the corresponding row of the last traded price.

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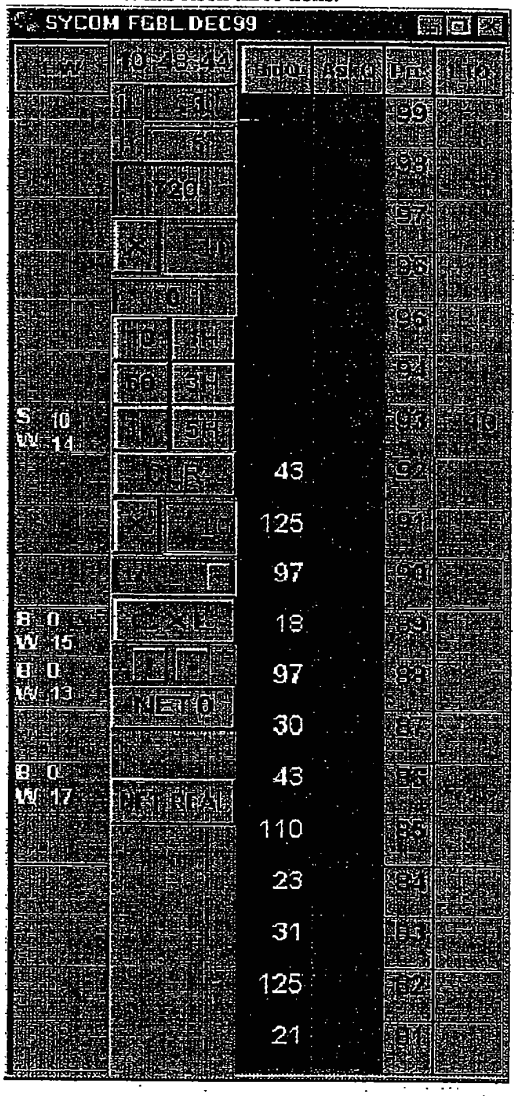
INNOVATION #12: THE DYNAMIC, VERTICAL DISPLAY OF MARKET MOVEMENT

The inside market and market depth ascend and descend as prices in the market increase and decrease. For example, the following screen depicts the same market at a later interval where the inside market has risen three ticks:



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Now the inside market is at Price: 93 with the AskQ: 63 and the BidQ: 43. 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.

- ***INNOVATION #13: HORIZONTAL DISPLAY OF MARKET DATA INCLUDING MARKET DEPTH***

The same information and features can be displayed and enabled in a horizontal fashion.

- ***INNOVATION #14: THE DYNAMIC, HORIZONTAL DISPLAY OF MARKET MOVEMENT***

Just as the market ascends and descends the vertical Mercury display, the market will move left and right in the horizontal Mercury display.

- ***INNOVATION #15: SINGLE CLICK ORDER ENTRY IN MERCURY***

Using Mercury, a trader would first designate the desired comodity and quantities, then he can trade with single clicks of the right or left mouse button.

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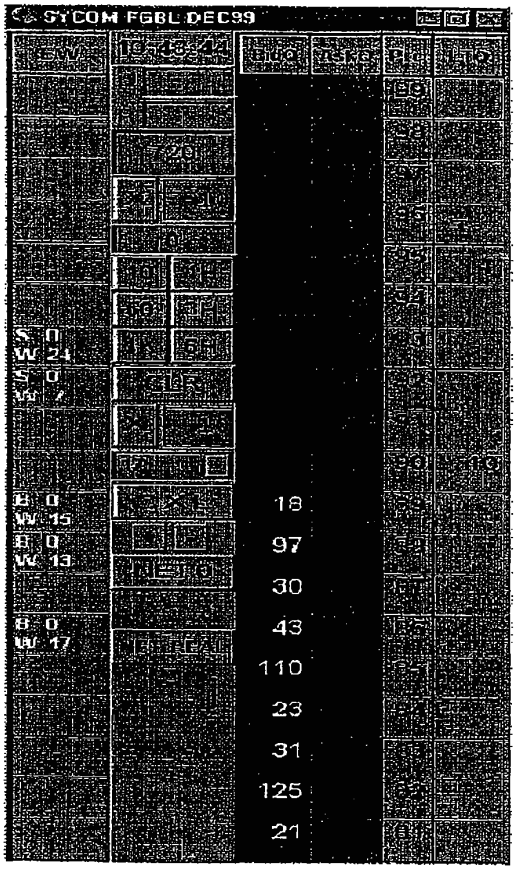

For example, using the above condensed screen shot, a left click on the 18 in the BidQ column will send an order to market to sell 17 (quantity # chosen on the Quantity Description pull down menu) lots of the commodity at a price of 89 (the corresponding price). A left click on the 20 in the AskQ column will send an order to market to buy 17 lots at a price of 90.

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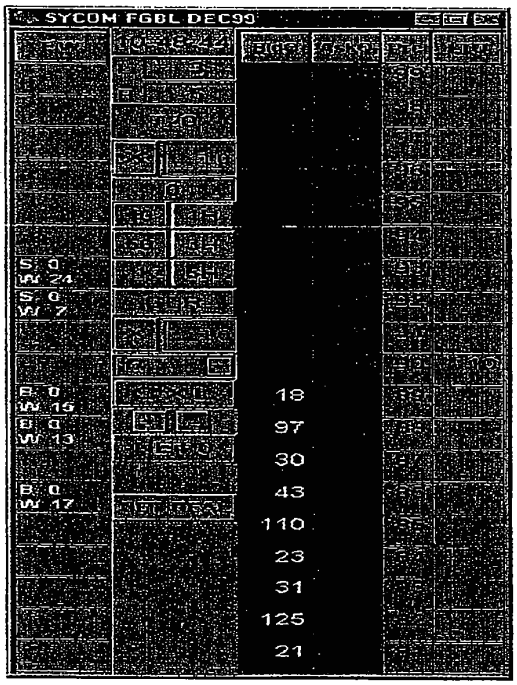
- *INNOVATION #16: SINGLE CLICK ORDER ENTRY WITH PRESET QUANTITIES AND VARIABLES OF QUANTITIES*



Orders can also be sent to market for quantities that vary according to the quantities in the market; quantity variables 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 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 chosen price plus the quantity in the R field. Thus, a right click in the AskQ column above 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 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 because this column represents the

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orders outstanding in the market to purchase the commodity at each corresponding price. The quanitity 5 is the quantity pre-set in the **R** field.

Similarly, a right click in the BidQ column at the same price of 87 would send a buy order to market for a quantity of 5. 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 that equal or better this price. So, 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 "Offset" option chosen in the quantity description field will be calculated in the same way as above, but the quantity in the **L** field will be added instead of the quantity in the **R** field. Thus, a left click in the BidQ column in the 92 price row will send a sell 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 because this column represents the orders outstanding in the market to sell the commodity at each corresponding price. The quanitity 3 is the quantity pre-set in the **L** field.

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 above, 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, 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 the trader's current position on the chosen contract. In other words, if the trader bought 10 more contracts than he sold, this value would be 10. NetPos would not affect the quanitity 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.

Equations for order entry with Mercury

Key:

P = Price value of row clicked
R = Value in **R** field
L = Value in **L** field
Q = Current Quantity
Q_a = Total of all quantities in AskQ column at an equal or better price than P
Q_b = Total of all quantities in BidQ column at an equal or better price than P

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N = Current Net Position
Bo = Buy order sent to market
So = Sell order sent to market

- **Any order entered using right mouse button**
  **All orders using the right mouse button will be limit orders.*

$Bo = (Q_a + R)P$

$So = (Q_b + R)P$

- **Orders entered using the left mouse button**

If "Offset" mode chosen in Quantity Description field then:
**In Offset mode, all orders using the left mouse button will be limit orders.*

$Bo = (Q_a + L)P$

$So = (Q_b + L)P$

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

$Bo = QP$

$So = QP$

If "NetPos" mode chosen in Quantity Description field then:
**In "NetPos" mode, all orders using the left mouse button will be limit orders.*

$Bo = NP$

$So = NP$

- ***INNOVATION #17: DELETING ALL ORDERS WORKING IN THE MARKET WITH A SINGLE CLICK***

Mercury 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. 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.

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- *INNOVATION #18: DELETING ALL ORDERS WORKING IN THE MARKET AT A GIVEN PRICE LEVEL WITH A SINGLE CLICK*

Mercury 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 will delete all working orders in the cell that was clicked. Thus, if a trader believes that a 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.

- *INNOVATION #19: CENTERING THE INSIDE MARKET ON A SCREEN WITH A SINGLE CLICK*

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 se the inside market to assess future trades. Mercury solves this problem with a one click centering feature. With a single click at any point in the grey area below the "Net Real" button, Mercury will re-center the inside market on the trader's screen.

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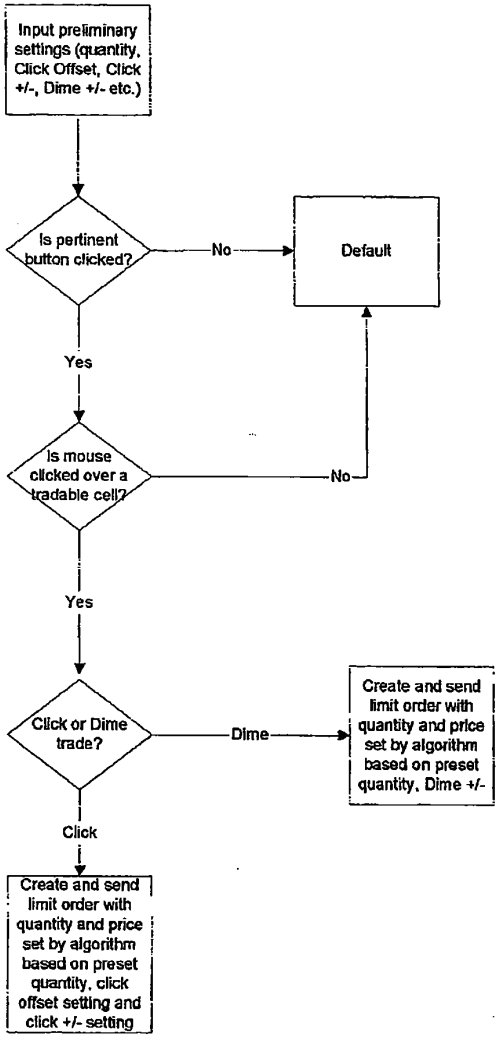
FLOW CHARTS OF THE PROCESSES:

Click and Dime Trading

Click and Dime Trading



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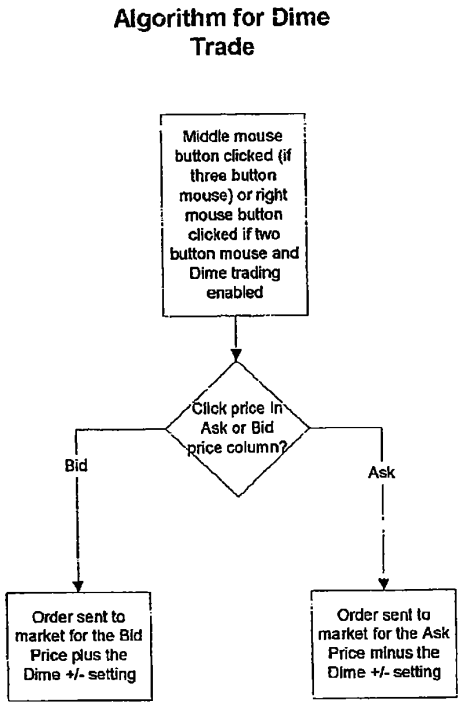
Flowchart of Dime Trade Algorithm



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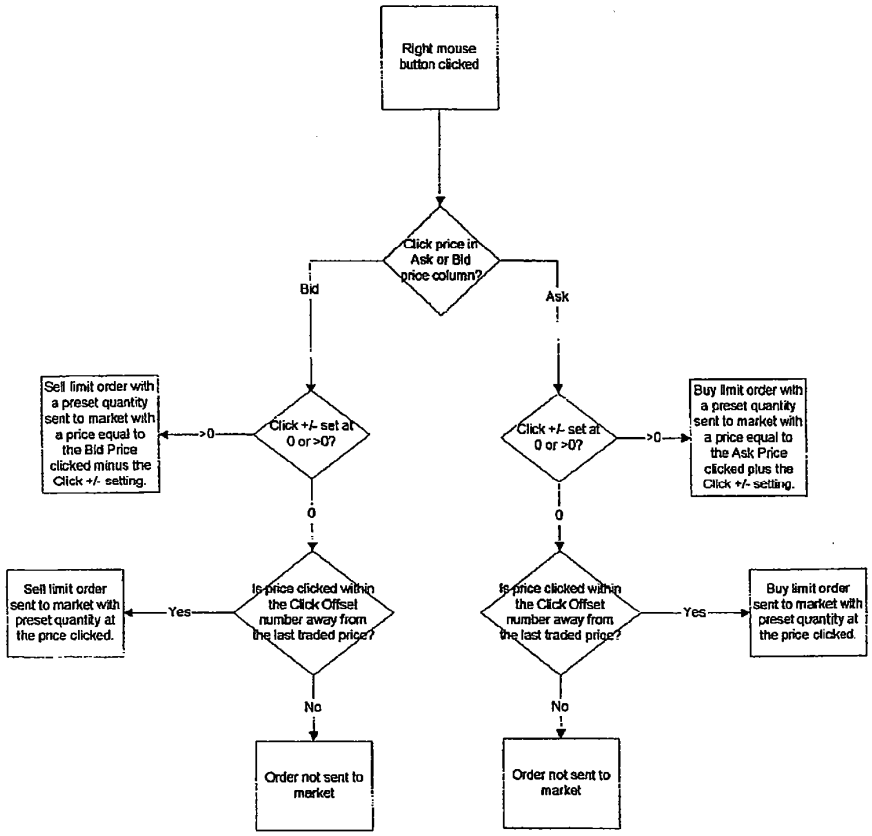
Flowchart for Algorithm for Click Trading

Algorithm for Click Trade



*Note: Limit orders may have other restrictions to them (like FOK, GTD, GTC etc.), which may further restrict these orders.

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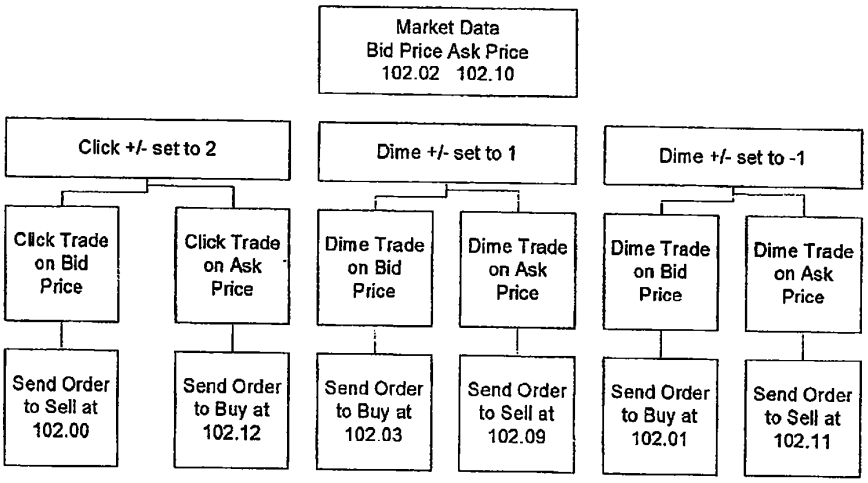
Example of Click and Dime trading:



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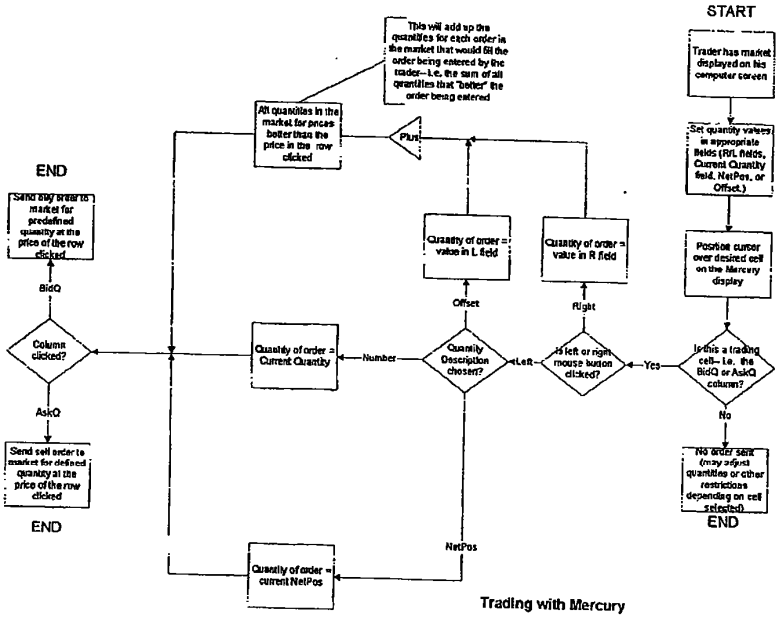
Mercury Display and Trading



Trading with Mercury

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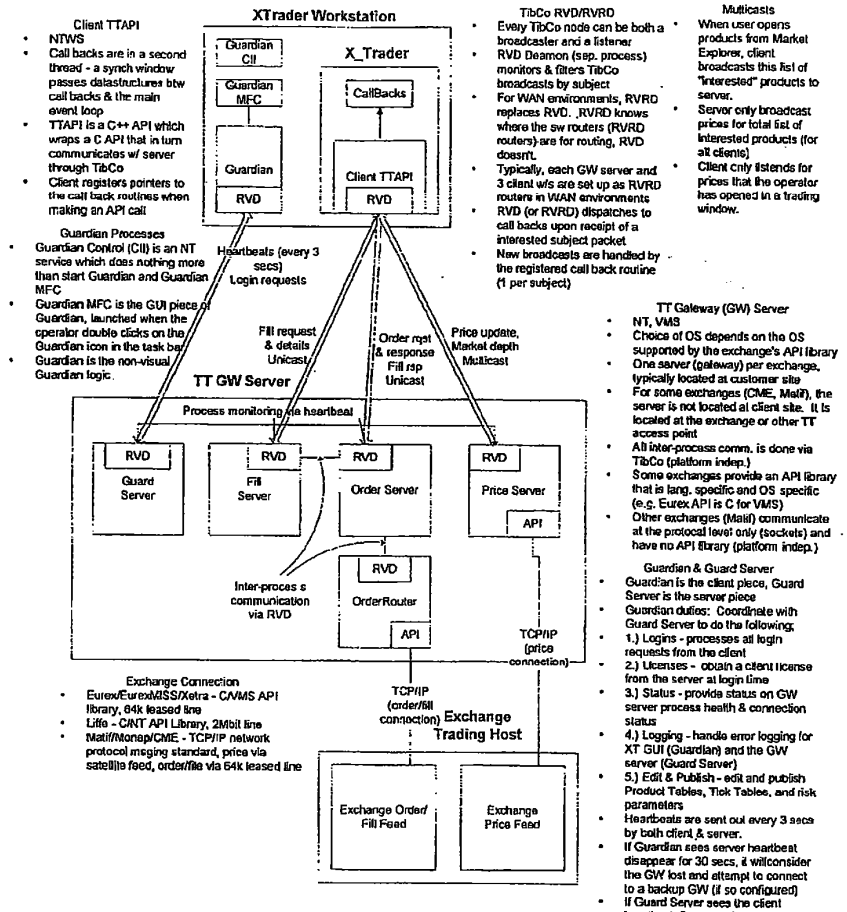
X_Trader System Architecture at a Glance



Client TTAPI
- NTWS
- Call backs are in a second thread - a synch window passes datastructures btw call backs & the main event loop
- TTAPI is a C++ API which wraps a C API that in turn communicates w/ server through TibCo
- Client registers pointers to the call back routines when making an API call

Guardian Processes
- Guardian Control (Cll) is an NT service which does nothing more than start Guardian and Guardian MFC
- Guardian MFC is the GUI piece of Guardian, launched when the operator double clicks on the Guardian icon in the task bar
- Guardian is the non-visual Guardian logic.

TibCo RVD/RVRD
- Every TibCo node can be both a broadcaster and a listener
- RVD Deamon (sep. process) monitors & filters TibCo broadcasts by subject
- For WAN environments, RVRD replaces RVD. .RVRD knows where the sw routers (RVRD routers) are for routing, RVD doesn't.
- Typically, each GW server and 3 client w/s are set up as RVRD routers in WAN environments
- RVD (or RVRD) dispatches to call backs upon receipt of a interested subject packet
- New broadcasts are handled by the registered call back routine (1 per subject)

Multicasts
- When user opens products from Market Explorer, client broadcasts this list of "interested" products to server.
- Server only broadcast prices for total list of interested products (for all clients)
- Client only listends for prices that the operator has opened in a trading window.

TT Gateway (GW) Server
- NT, VMS
- Choice of OS depends on the OS supported by the exchange's API library
- One server (gateway) per exchange, typically located at customer site
- For some exchanges (CME, Matif), the server is not located at client site. It is located at the exchange or other TT access point
- All inter-process comm. is done via TibCo (platform indep.)
- Some exchanges provide an API library that is lang. specific and OS specific (e.g. Eurex API is C for VMS)
- Other exchanges (Matif) communicate at the protocal level only (sockets) and have no API library (platform indep.)

Guardian & Guard Server
- Guardian is the client piece, Guard Server is the server piece
- Guardian duties: Coordinate with Guard Server to do the following;
- 1.) Logins - processes all login requests from the client
- 2.) Licenses - obtain a client license from the server at login time
- 3.) Status - provide status on GW server process health & connection status
- 4.) Logging - handle error logging for XT GUI (Guardian) and the GW server (Guard Server)
- 5.) Edit & Publish - edit and publish Product Tables, Tick Tables, and risk parameters
- Heartbeats are sent out every 3 secs by both client & server.
- If Guardian sees server heartbeat disappear for 30 secs, it willconsider the GW lost and attempt to connect to a backup GW (if so configured)
- If Guard Server sees the client heartbeat disappear for 30 secs, it will consider the client lost, close the connection, and return its license to the pool

Exchange Connection
- Eurex/EurexMISS/Xetra - CAMS API library, 64k leased line
- Life - CMT API Library, 2Mbit line
- Matif/Monep/CME - TCP/IP network protocol mesging standard, price via satellite feed, order/fills via 64k leased line

41A

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FOLEY & LARDNER DOCKET NO.: 024051/0105
Appl. No.: Unassigned Filing Date: 3/02/2000
Inventor(s): Gary Allen KEMP II, et al.
Group Art Unit: Unassigned
Sheet 1 of 2

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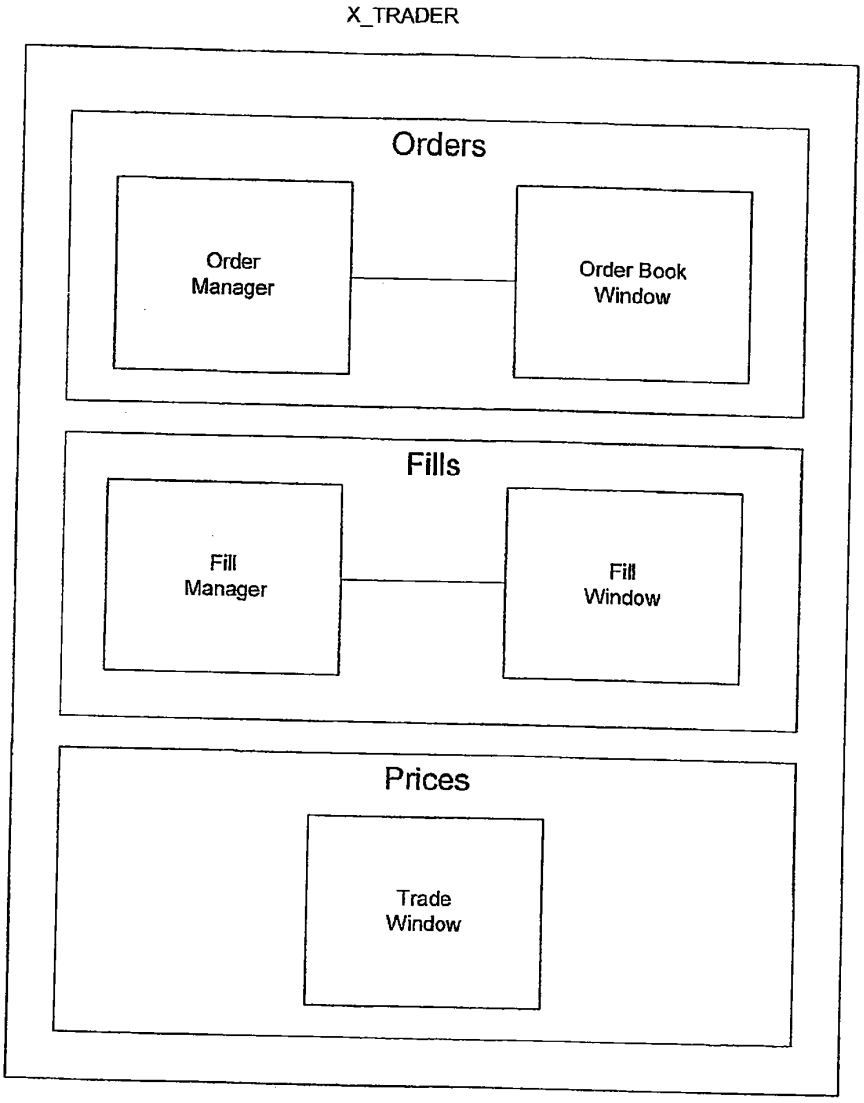

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Applicant or Patentee: Trading Technologies International, Inc.
Serial or Patent No.: _____ Atty. Dkt. No. 024051/0105
Filed or Issued: March 2, 2000
For: MARKET DEPTH DISPLAY CLICK BASED TRADING AND MERCURY DISPLAY

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27 (c)) -- SMALL BUSINESS CONCERN

I hereby declare that I am
( ) the owner of the small business concern identified below:
(X) an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Trading Technologies International, Inc.

ADDRESS OF CONCERN 1603 Orrington Avenue, Suite 1300, Evanston, IL 60201

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18 and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled MARKET DEPTH DISPLAY CLICK BASED TRADING AND MERCURY DISPLAY by inventor(s) Gary Allan Kemp II; Jens-Uwe Schlueter; Harris Brumfield described in

(X) the specification filed herewith
( ) application serial no. _____, filed _____
( ) patent no. _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e). * NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities: (37 CFR 1.27)

NAME:
ADDRESS:
( ) INDIVIDUAL ( ) SMALL BUSINESS CONCERN ( ) NONPROFIT CORPORATION

NAME:
ADDRESS:
( ) INDIVIDUAL ( ) SMALL BUSINESS CONCERN ( ) NONPROFIT CORPORATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate: (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Michael G. Ryan
TITLE OF PERSON OTHER THAN OWNER: Vice General Counsel, Trading Technologies International, Inc.
ADDRESS OF PERSON SIGNING: 1811 West Wrightwood, Unit D Chicago, IL
SIGNATURE: Michael G Ryan DATE: 3/2/00

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