ANONYMOUS TRADING SYSTEM WITH IMPROVED QUOTE INPUT CAPABILITIES

TECHNICAL FIELD

The present invention is directed generally to computerized trading systems and more particularly to a method and apparatus for anonymous trading wherein an individual offer is made available only to a subset of the available counterparties.

BACKGROUND ART

In many computerized trading systems, the participants (individual traders or institutions) are qualified in advance by an exchange and each offer is broadcast from one participant to all other qualified participants.

When the subject of the trade is a commodity (such as wheat or copper) or a financial instrument (such as Treasury Bills or foreign currency), multiple offers for the same commodity or instrument are conventionally ranked by price per unit. Depending on the trading conventions in effect, offers at the same price may be further ranked by size and/or time in a queue of available offers; however, for any given commodity or financial instrument, only one offer is at the head of an associated queue.

Under many market conditions, "market makers" (institutions and/or individual traders whose open offers are available to other traders) will set a price at or slightly above the best price currently available, with the

expectation that their offer will reach the head of the relevant queue in due course. However, if there is a sudden change in market conditions, the market maker may wish to cancel or modify his outstanding offer before it reaches the head of the queue. To that end, it is known to warn the trader responsible for an open quote when his quoted price is equal to the best price currently available and/or when his offer reaches the head of queue. Similarly, if the maker's quote was ready to be accepted (ie, it is the highest ranked quote in the system) but is subsequently bettered by another maker, the original maker may be given an opportunity to revise his offer or remove it from the market .

In the traditional voice broker foreign exchange market, the broker announces "Your bid" to a market maker when the maker's own quote is at the head of the queue; the broker also (optionally) announces and/or cancels that quote when someone else submits a better price.

In an anonymous electronic brokerage system such as the EBS system or Reuters 2000-2 in which individual trades of foreign currency are settled directly between two banks (or "trading floors") rather than through an exchange or a clearing house, the identity of the parties is kept confidential until an offer from one party has been matched to a bid from another party and the matching criteria include not only price, but also the existence of bilateral credit between the two parties. Thus, unlike a traditional voice broker who processes only one quote at a time (typically the first offer in the queue) and who provides both parties with an opportunity to accept or reject a potential trade after the parties have already been identified, a computerized matching process is able to perform many tasks concurrently and to use objective matching criteria (such as preestablished counterparty credit limits) without divulging any confidential credit information. Moreover, at least the known, EBS system operates in a credit screened market, in which a price is not offered to a potential counterparty unless it is "Dealable" — ie, each party to the potential transaction has previously

indicated a willingness to deal with the other party. Thus there is no longer a single queue for a given currency, but a separate logical queue (typically containing only a subset of the open quotes for each trading floor). Accordingly, the known EBS system displayed an active quote on the maker' s terminal in a red background (a so-called "Red Quote") if that quote was either the best Dealable (or the best regular size Dealable) quote on at least one trading floor, ie, the quote was at the head of some floor's queue of "Dealable" quotes, thereby providing the maker with a signal that his quote has the potential of being about to be accepted. In addition to the visible warning (the quote is displayed on a red background, the EBS voice says "Your bid/offer" and the background of the key fields on the transaction panel turns from yellow to red. Preliminary versions of the EBS system also provided an indication if a quote was "joined" with a Red Quote, ie was in the Dealable queues of at least one trading floor and was equal to the best price that was Dealable to that floor, but was not at the head of the Dealable queue on any trading floor, and thus did not qualify as a Red Quote.

However, as a result the lack of credit between many possible pairs of trading partners and the fact that market makers are reluctant to make an offer that is substantially worse than the best price that is currently available, almost every quote is at the head of the queue on at least one trading floor, and thus the indication that a quote was Dealable on at least one trading floor had limited practical value.

A quote that lost its red status (as indicated by the transaction panel fields turning from red to yellow) is said to be "bettered". If the "Cancel When Bettered option" in the trader profile is set, such a bettered Red Quote was automatically canceled by the EBS system.

More recent versions of the EBS system have also included a capability for aggregating a regular size (typically US$10 Million) Dealable quote from

several quotes for smaller quantities to display a synthetic "regular" size Dealable price whose individual components had priority in time and/or price over any other available quotes. In that case, the "regular Dealable price" would be equal to the worst priced component of the aggregated deal.

DISCLOSURE OF INVENTION

For each quote entered into the system by a market maker, the system determines if it is waiting to be "hit" (about to be accepted) at a substantial number of trading floors, and if so, notifies the trader originating the quote.

In accordance with one aspect of the invention, the substantial number of floors is preferably expressed as greater than a predetermined percentage of the available trading partners with whom credit has been established on a bilateral basis, and is preferably greater than 25%.

In accordance with another aspect of the intention, a quote is considered about to be accepted at a particular trading floor if it would be included as a component in an order at the Regular Dealable price currently available to that trading floor.

In accordance with yet another aspect of the invention, the system provides the market maker with a quantitative indication as to how many trading floors (or percentage of available trading partners) are about to accept his quote, and/or how good his quote must be to be Hittable by a given number of trading floors (or percentage of available trading partners).

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will be apparent from the following description of a presently preferred embodiment taken in connection with the accompanying drawings, in which:

Fig 1 is a functional overview of a computerized trading system in accordance with the present invention showing the sources of the data used to calculate the quote status message and how the status message is transmitted from the Arbitrator to the workstation.

Fig 2 shows the Transaction Panel of the known EBS system, which may be used without modification with the present invention.

Fig 3 is a functional block diagram of the software which determines the current Red Quote status for a particular quote.

Fig 4 shows an alternate embodiment for the Transaction Panel in which the ratio of Hittable floors to available partners is displayed as a horizontal bar graph below the quote, and a numerical indication of what price would be required to be Hittable at a given percent of available trading partners is shown above the quote.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENT

Fig 1 is a functional overview of the EBS system modified in accordance with the present invention. An early version of the EBS system is described in more detail in US 5,375,055, which is hereby incorporated by reference.

The Arbitrator node **ARB** computes and maintains the status of all open quotes and sends **QtePosition** messages to the maker's Mark Access Node (bank node) **MAN** signaling any changes in the status of a quote. If a trader uses the Cancel When Bettered option, the **QtePosition** message also can be used by the bank node **MAN** to determine when his quote needs to be canceled.

Upon receiving the **QtePosition** message, the maker's bank node **MAN** sends the **QtePositionWS** message to the Workstation **WS**. The Workstation then processes the **QtePositionWS** message, updating the quote status display (**Fig 2**) or canceling the quote, as appropriate.

The processing of the **QtePosition** and **QtePositionWS** messages may be conventional and unchanged from prior versions of the EBS system. In particular, when the status of an active quote on the Maker's Transaction Panel (**Fig 2**) changes from normal (logical **0**) to red (logical **1**), the background color **Y/R** of the box **PW** containing the least significant digits of the quoted price ("80" in the illustrated example) as well as the smaller box containing the Big Figure amount (1.40) changes from yellow to red. When the status changes from red to normal, either the quote is withdrawn (if Cancel When Bettered is active) or the background changes from red to yellow.

A quote is "Hittable" from a trading floor, if a regular size hit from that floor would be automatically matched with some part of the quote. In the described embodiment, a quote is "red" if it is Hittable from more than the specified percentage of the trading floors which have bilateral credit with the submitter of the quote. The percentage is a global system parameter, with a default value of 25%.

Suppose that the regular amount is 10M and that the following bids are available (Dealable) to a trading floor **X** (ranked by decreasing price and then by increasing time of submission): Note that in foreign currency trading, the price is conventionally expressed in "pips" [least significant digits of base currency for a predetermined quantity of local currency], that the amount is conventionally expressed in millions of US dollars, and that a quote can be either a single sided bid to buy the local currency, or a single-sided offer to sell the local currency, or a two-sided bid and offer [separated by a spread].

Quote	Price	Amount	Maker
Bid I	65	5M	Floor A
Bid 2	60	3M	Floor B
Bid 3	20	4M	Floor C
Bid 4	20	5M	Floor D

The first three bids are Hittable from floor **X**, while **Bid 4** is not.

Bid 3, for example, is Hittable from floor **X** because a regular size hit (Sell 1O M at 20) from that floor would match a part (2M) of that bid. If **Bid 3** is Hittable from enough floors (25% of the trading floors which have bilateral credit with Floor **C**), then **Bid 3** is red.

Reference should now be made to **Fig 3**, which is a functional block diagram of the "Red Quote" software in the Arbitrator **ARB** which determines the current Red Quote status for a particular quote.

As part of the startup process, the Arbitrator reads (block **100**) the parameter **PctFloorsRedQte** from the Arbitrator section of the **GLOBAL.DAT** file. This is the partner floor percentage determining whether a quote is red.

In known fashion, the Arbitrator maintains (block **102**) for each trading floor that is currently logged into the network, a queue in the form of a linked list of pointers to atomic data objects (individual quotes), with each queue being ordered by price and time and the objects in the queue being those quotes that are currently available to that trading floor. The queues are updated each time a new quote is received or its status is changed (it has been accepted or withdrawn, or it has been tentatively matched pending credit verification and acknowledgment by both parties) (**Quote/Hit** branch

from decision block **104**) and each time the bilateral credit status between any two trading floors changes (**Credit** branch from decision block **104**).

In addition, in accordance with the present invention, for each quote **Q**, the Arbitrator uses the data in the trading floor queues to maintain (block **106**) a respective count of floors H_Q from which the quote can be hit by a regular size buy/sell request (typically ten million US dollars).

The Arbitrator also maintains in known fashion (block **108**) a credit availability matrix containing the bilateral credit status between each pair of trading floors that are currently connected to the system, which is then used to update the quote queues for any affected trading floors (block **102**). In accordance with the present invention, for each floor **F**, the Arbitrator also uses the data in the credit availability matrix to maintain (block **110**) the count of its partners P_F (i.e., other floors that have bilateral credit with the given floor).

The Arbitrator thus is able to dynamically adjust both counts (H_Q and P_F) in response to any trading or credit messages, and determine (block **112**) for each quote whether the quote's H_Q-count is higher than a predetermined percentage (defined initially as 25%) of the P_F- count for the floor that submitted the quote. The result of this test is stored with the other data concerning that particular quote (block **114**), and if the Red Quote status has changed, the QtePosition message is transmitted to the trading floor's bank node **MAN** (block **116**).

The above operations may be clarified with a few numerical examples.

When **PctFloorsRedQte** = 25 (current default value) and **P** = 195, then a quote is red if it is Hittable from more than (195 * 25) / 100 = 4875 / 100 = 48 floors. This illustrates that the above definition of red status requires a strict inequality.

When **PctFloorsRedQte** = 25, and P = 4, then a quote is red if it is Hittable from more than (4 * 25) / 100 = 100 / 100 = 1 floors.

When **PctFloorsRedQte** = 0, a quote is red if it is Hittable from one or more floors. Thus, with this setting of the global parameter, the above definition of Red Quote is very similar to that used in the known EBS system.

When **PctFloorsRedQte** = 100, no quote is ever red. All active quotes should appear "yellow."

From the foregoing description and examples, it should be apparent that the Red Quote status, as defined above, depends on both the ranking of the quote relative to other quotes in the market and on the bilateral credit relationship of the submitting floor with other floors, and that the Arbitrator **ARB** dynamically re-computes the Red Quote status of quotes any time that any of these factors is affected (due, for example, to better prices being submitted or new credit being granted by another floor).

Fig 4 shows an alternate embodiment of the invention in which rather that comparing the variable **H** with a predetermined percentage of the variable **P**, the Arbitrator computes the ratio **H/P**, and includes that ratio in the quote status message **QtePosition** each time the ratio changes by a predetermined increment (for example, 5%). In that case, rather than indicating the status of the active quote as merely normal or red, the workstation can display it as a number or in graphical form. In the illustrated example, the ratio is displayed as a horizontal bar graph **BG** below the quote, which in the illustrated example extends about 2/3 of the full width of the pips window **PW** indicating that that price is Hittable by about 65% of the maker's available (on line and with established credit) trading partners.

As also shown in **Fig 3**, the market maker may also (or alternatively) be provided with a numerical indication **SP** of what price would be required to be Hittable at a predetermined percent of available trading partners (for example, the same percentage **PctFloorsRedQte** as was used in **Fig 3**). This could be readily computed by generating an ordered list of the worst Hittable prices (ie, the price required to complete the lowest ranking component of a regular sized deal) from the quotes of each available trading partner. Since the available partners are already identified in the credit matrix, and since each queue already contains a pointer to the last component of the aggregated regular Dealable price, such a display would not require substantial additional computation, and would provide the market maker with additional assurances that his quote was competitive with other quotes in the market and was priced neither too high nor too low.

It should be apparent that the ratio **H/P** and the numerical price indication **SP** will change at a greater frequency than the Red Quote status **R/Y**. Accordingly, in a system having Market Distributor nodes **MD** as shown in Fig 1 which use a price queue similar to that maintained in the Arbitrator **ARB** for computing Dealable prices and transmitting them to the individual trading floors **MAN**, performing the required computations in a more distributed fashion (in the Market Distributors) will make better use of the communication network.

Doubtless, other variations on the concepts underlying the present invention will be apparent to those skilled in the art.

THIS SHEET HAS BEEN REPLACED



What is claimed is:

1. In a computerized trading system wherein quotes for a particular financial instrument or other commodity are selectively communicated from at least one market maker to a plurality of trading floors eligible to accept that offer:

for each trading floor, taker queue means for determining which of the quotes available to that trading floor would be matched with a predetermined size hit from that trading floor;

for each quote from each market maker, quote status means responsive to each of the taker queue means for determining whether that quote would be so Hittable at at least a predetermined plurality of trading floors,

notification means responsive to the quote status means for notifying each market maker whether his quote would be currently Hittable at said predetermined plurality of trading floors.

2. The computerized system of claim 1, wherein

the predetermined plurality is a predetermined percentage of the available trading partners; and

the quote status is responsive to a credit matrix means indicating for each market maker, those trading partners with whom credit has been established.

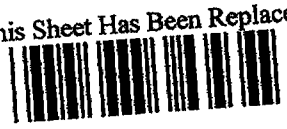
3. The computerized system of claim 2, wherein the credit is established on a bilateral basis,

4. The computerized system of claim 2, wherein the predetermined percentage is greater than 25%.

5. The computerized system of claim 1, wherein

the taker queue means includes a queue for ranking the available offers for each commodity by price and time;

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a regular size order constitutes a predetermined quantity of a particular commodity; and

a quote is considered Hittable at a particular trading floor if:

it is the highest ranking offer available to that trading floor for the particular commodity, or

it is available to that trading floor and all the available offers in the aggregate for that particular commodity do not exceed the predetermined quantity, or

if it would be matched with a regular size hit at the best price that would include not only the highest ranking offer but as many next highest ranked offers as would be necessary to constitute the predetermined quantity of the particular commodity.

6. The computerized system of claim 1, wherein the notification is in the form of a visual and/or audible indication on a terminal from which the quote originated.

7. The computerized system of claim 1, wherein the notification is in the form of a quantitative indication of the percentage of eligible trading partners for whom the quote is Hittable in a regular size hit.

8. The computerized system of claim 1, wherein the notification is in the form of a quantitative indication of the worst price that would be Hittable in a regular size hit by at least said predetermined number of trading partners.

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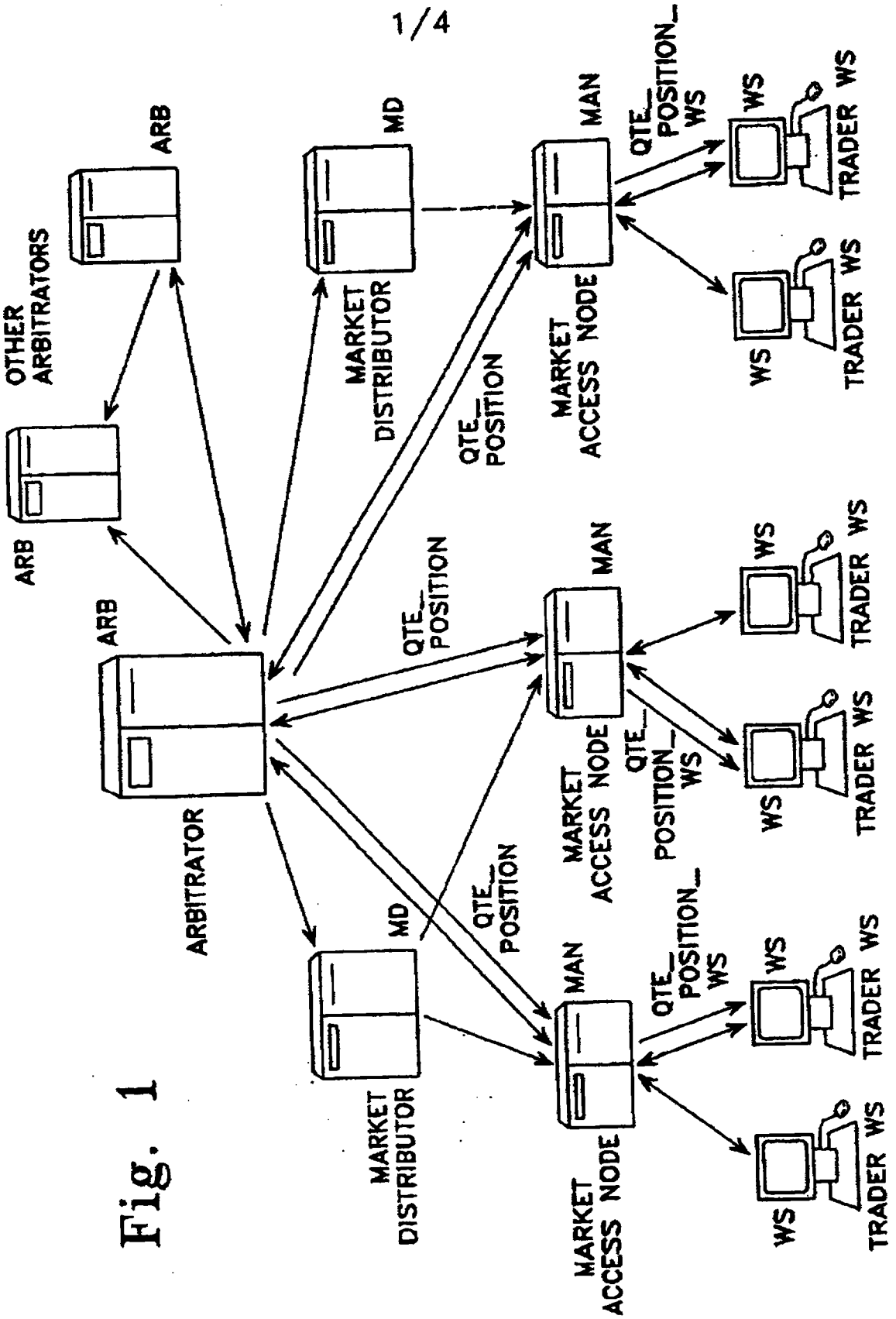

ARB
OTHER ARBITRATORS
ARB
ARB
ARBITRATOR
MD
MARKET DISTRIBUTOR
MD
MARKET DISTRIBUTOR
QTE_ POSITION
QTE_ POSITION
QTE_ POSITION
QTE_ POSITION
MAN
MARKET ACCESS NODE
MAN
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MAN
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Fig. 1

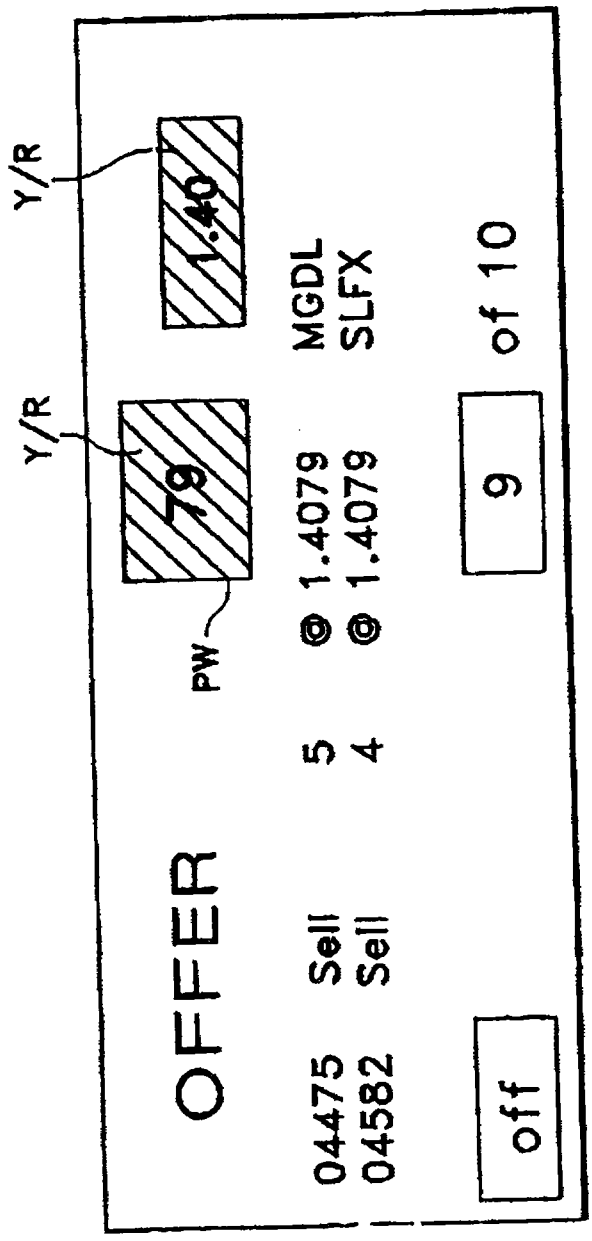

OFFER
04475 Sell 5 @ 1.4079 MGDL
04582 Sell 4 @ 1.4079 SLFX
PW
Y/R
79
Y/R
1.40
9
of 10
off

Fig. 2

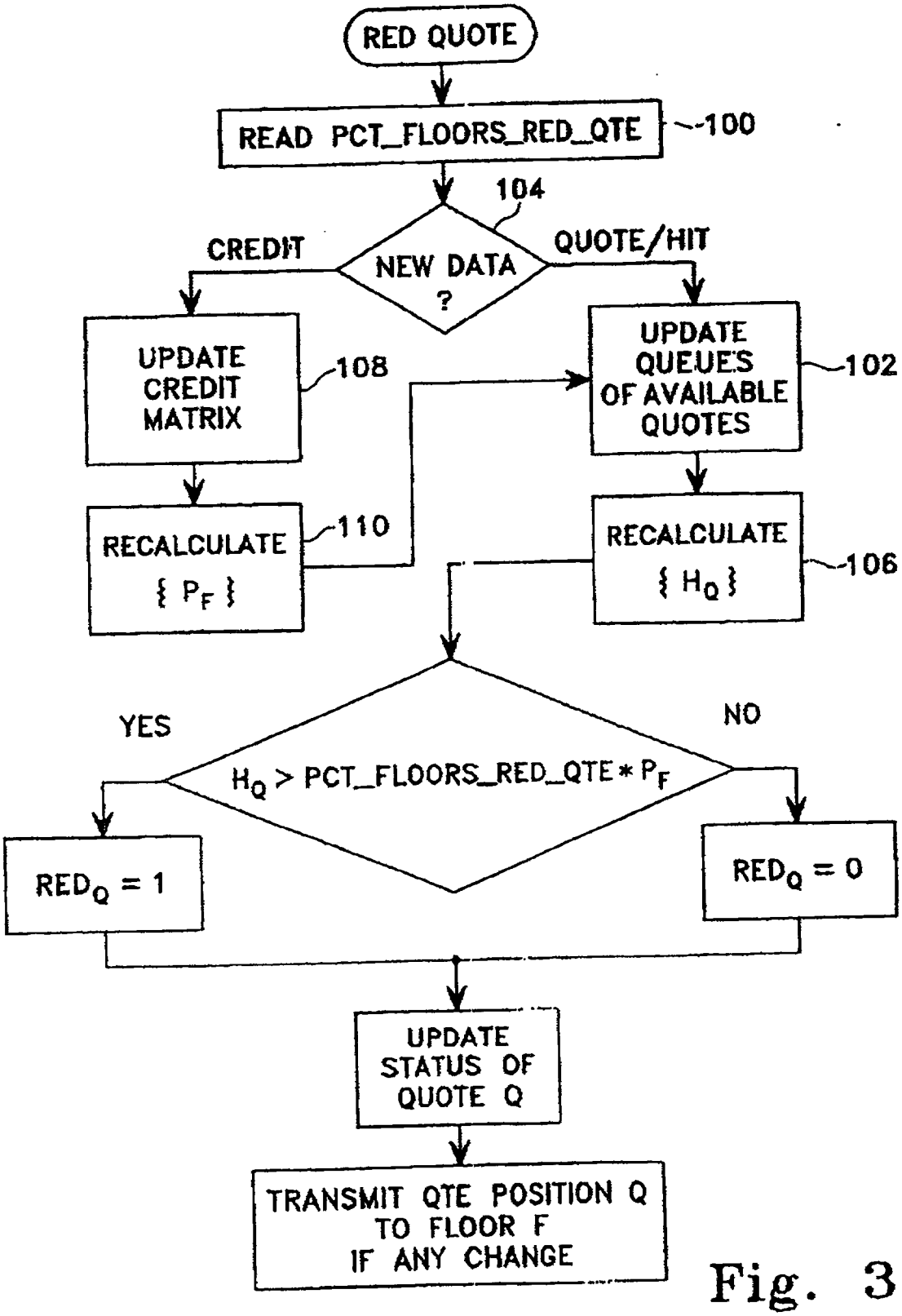

RED QUOTE
READ PCT_FLOORS_RED_QTE
100
104
NEW DATA ?
CREDIT
QUOTE/HIT
UPDATE CREDIT MATRIX
108
UPDATE QUEUES OF AVAILABLE QUOTES
102
RECALCULATE { P_F }
110
RECALCULATE { H_Q }
106
YES
NO
H_Q > PCT_FLOORS_RED_QTE * P_F
RED_Q = 1
RED_Q = 0
UPDATE STATUS OF QUOTE Q
TRANSMIT QTE POSITION Q TO FLOOR F IF ANY CHANGE

Fig. 3

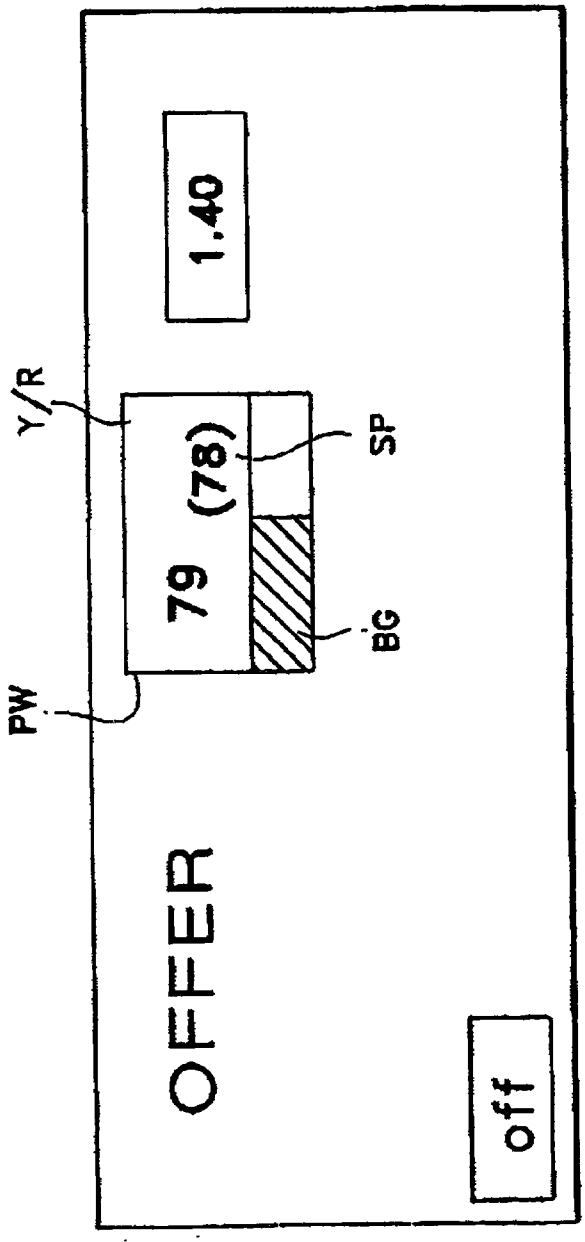


Fig. 4

* C L M S *

What is claimed is:

1. In a computerized trading system wherein quotes for a particular financial instrument or other commodity are selectively made available from at least one market maker only to those trading floors eligible to accept that offer:

for each trading floor,

taker queue means for determining which of the quotes available to that trading floor are Hittable from that trading floor; and

for each quote from each market maker,

quote status means responsive to all said taker queue means for determining whether that particular quote is currently Hittable from at least a predetermined plurality of trading floors, and

notification means responsive to the quote status means for notifying that particular market maker whether that particular quote is currently Hittable from said predetermined plurality of trading floors,

wherein a particular quote from a particular market maker for a particular commodity is Hittable from a particular trading floor, if a hit at the best price available to that floor for a predetermined quantity of that commodity would be automatically matched with at least some part of that quote.

2. The computerized system of claim 1, wherein

the predetermined plurality is a predetermined percentage of the eligible trading floors; and

the quote status means is responsive to a credit matrix means indicating for each market maker, those trading floors which are eligible trading floors.

3. The computerized system of claim 2, wherein the credit is established on a bilateral basis.

4. The computerized system of claim 2, wherein the predetermined percentage is greater than 25%.

5. The computerized system of claim 1, wherein

the taker queue means includes a queue for ranking the available offers for each commodity by price and time;

a particular quote is considered Hittable at a particular trading floor if:

said quote is the highest ranking offer available to said trading floor for the particular commodity, or

said quote is available to said trading floor and all the available offers in the aggregate for that particular commodity do not exceed the predetermined quantity, or

said quote would be automatically matched with a hit from said trading floor at the best price that would include not only the highest ranking offer but as many next highest ranked offers as would be necessary to constitute the predetermined quantity of the particular commodity.

6. The computerized system of claim 1, wherein the notification is in the form of a visual and/or audible indication on a terminal from which the quote originated.

7. The computerized system of claim 1, wherein the notification is in the form of a quantitative indication of the percentage of eligible trading floors for whom the quote is Hittable.

8. The computerized system of claim 1, wherein the notification is in the form of a quantitative indication of the worst price that would be Hittable by at least a predetermined number of said trading floors.

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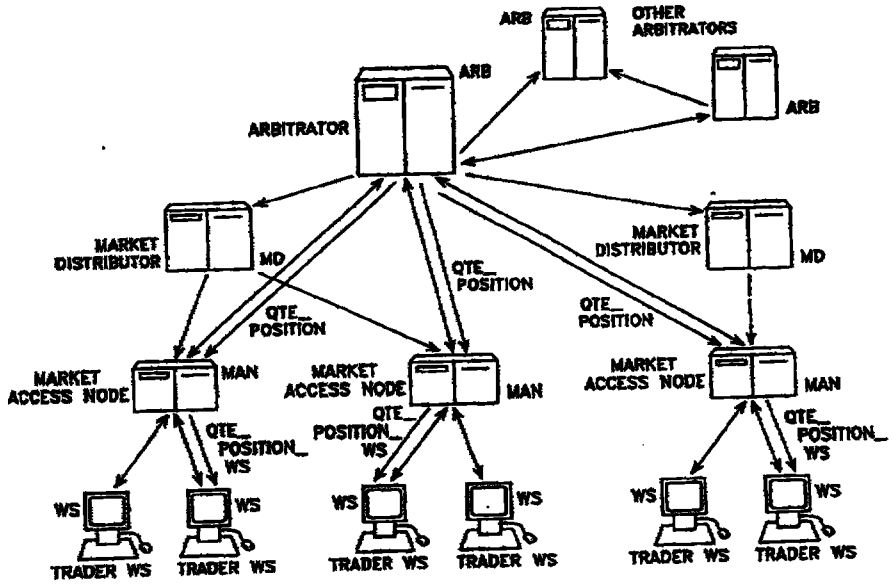
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(57) Abstract

For each quote entered into a computerized anonymous trading system, the system determined if it is waiting to be "hit" (would be matched with the first hit of a predetermined size) at a substantial number of trading floors, and if so, notifies the trader originating the quote. The substantial number of floors is preferably expressed as greater than a predetermined percentage of the available trading partners with whom credit has been established on a bilateral basis, and is preferably greater than 25 %. In an alternate embodiment, the system provides a graphical display to the market maker originating a particular quote indicating how many trading floors are poised to hit that particular quote, and/or a numeric display indicating a price that would be Hittable by a predetermined number or percentage of available trading partners.