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(54) **METHOD AND SYSTEM FOR INTELLIGENT  
AUTOMATED SECURITY TRADING VIA  
THE INTERNET**

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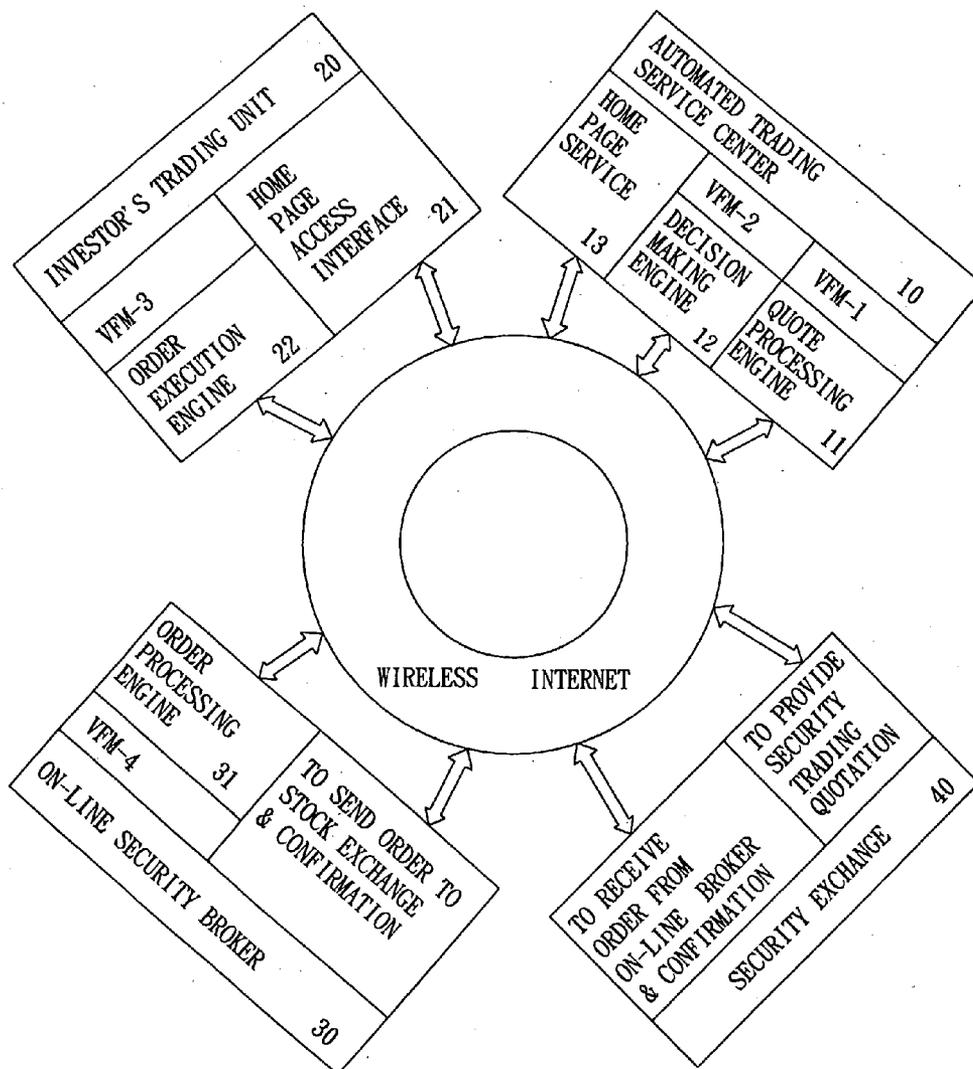
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(57) **ABSTRACT**

A method and system for intelligent automated security trading via the Internet, which provides an Automated Trading Service Center (ATSC), offering a Home Page Service and managing at least one Virtual Fund Manager (VFM) system. The ATSC is a wireless e-commerce service center providing automated trading services to investors anytime anywhere. By accessing the HPS, the investor can interact with ATSC to develop a custom investment strategy based personal VFM system to automatically trade electronic trading based securities. The VFM is a real time running program incorporated by four engines: the Quote Processing Engine, the Decision Making Engine, the Order Execution Engine, and the Order Processing Engine. Under commands of ATSC server, the VFM can periodically retrieve quotation from the security exchange, monitor the market fluctuation by performing intensive calculations to detect the desired Buy/Sell timing as predetermined by investor's proprietary investment strategy algorithms, and ultimately execute the transaction automatically.



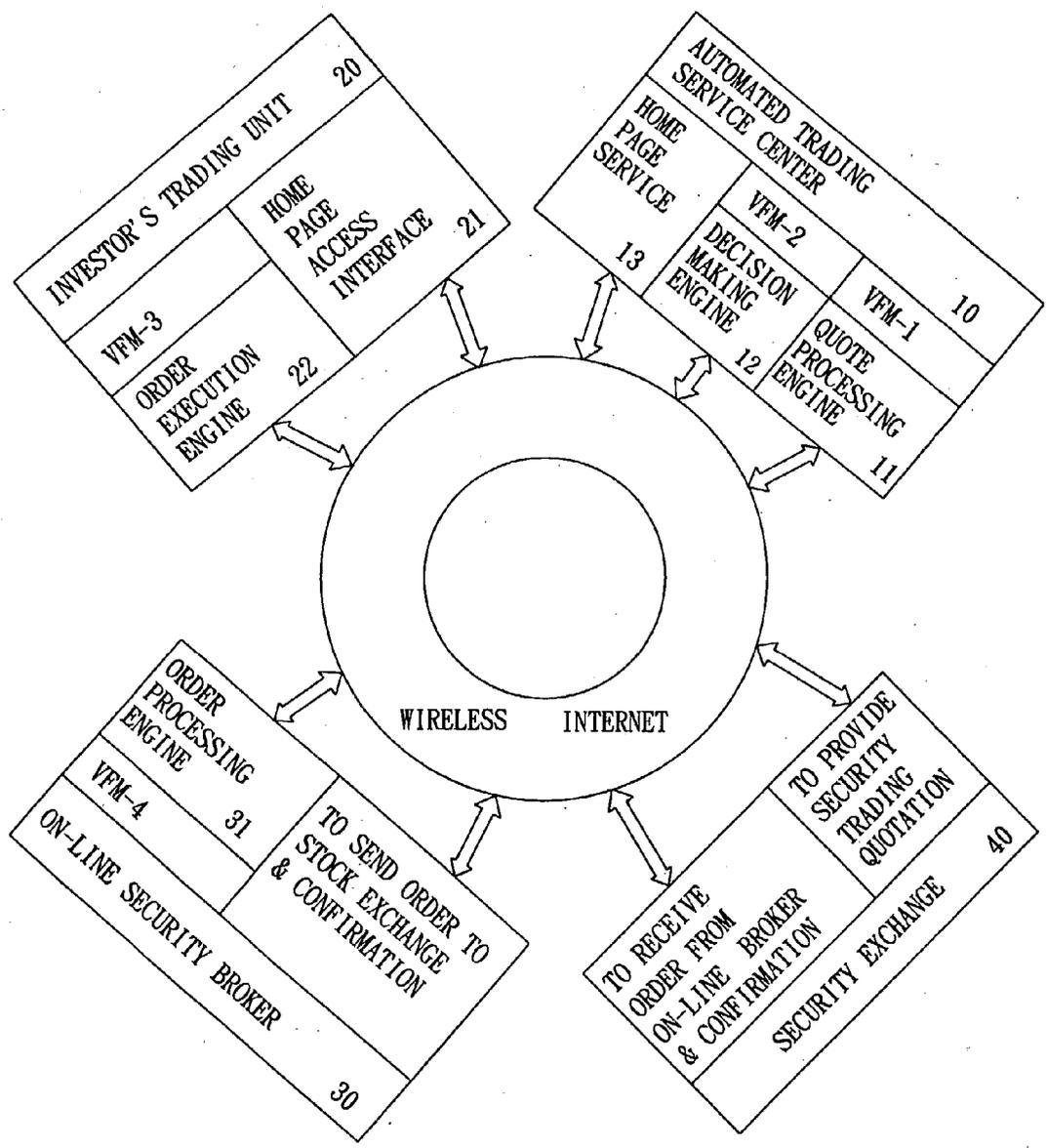


FIG.1

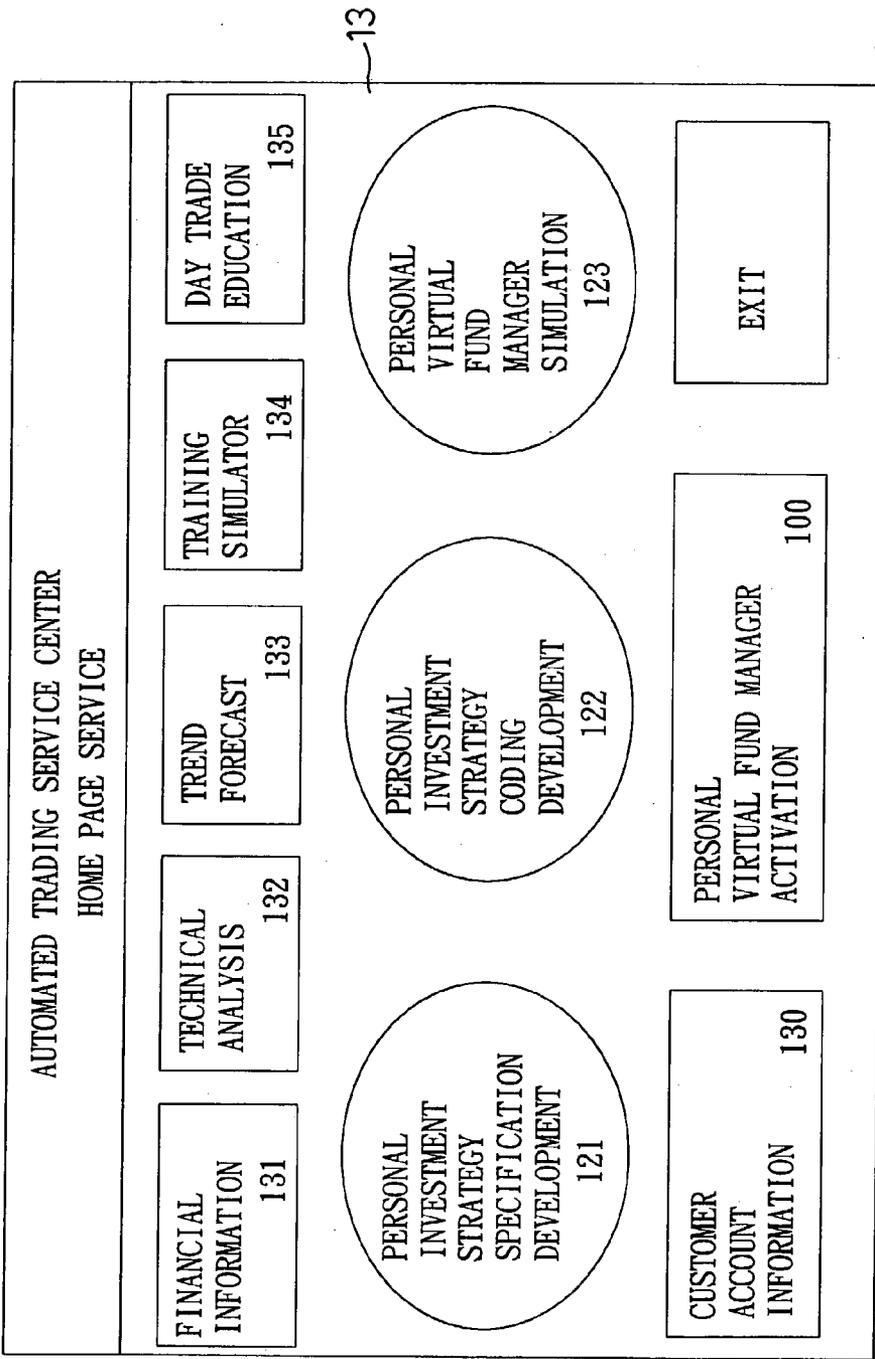


FIG.2

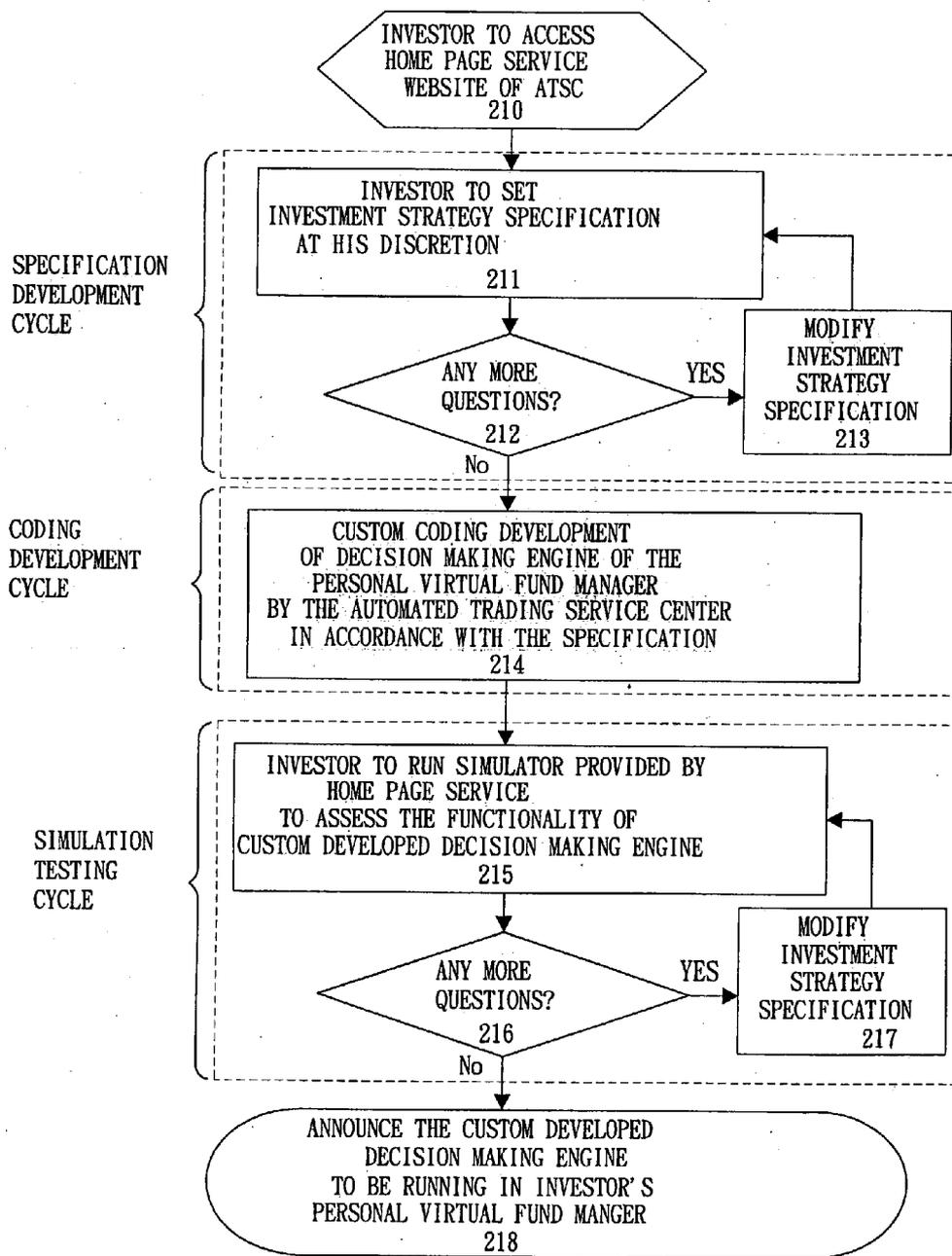


FIG. 3

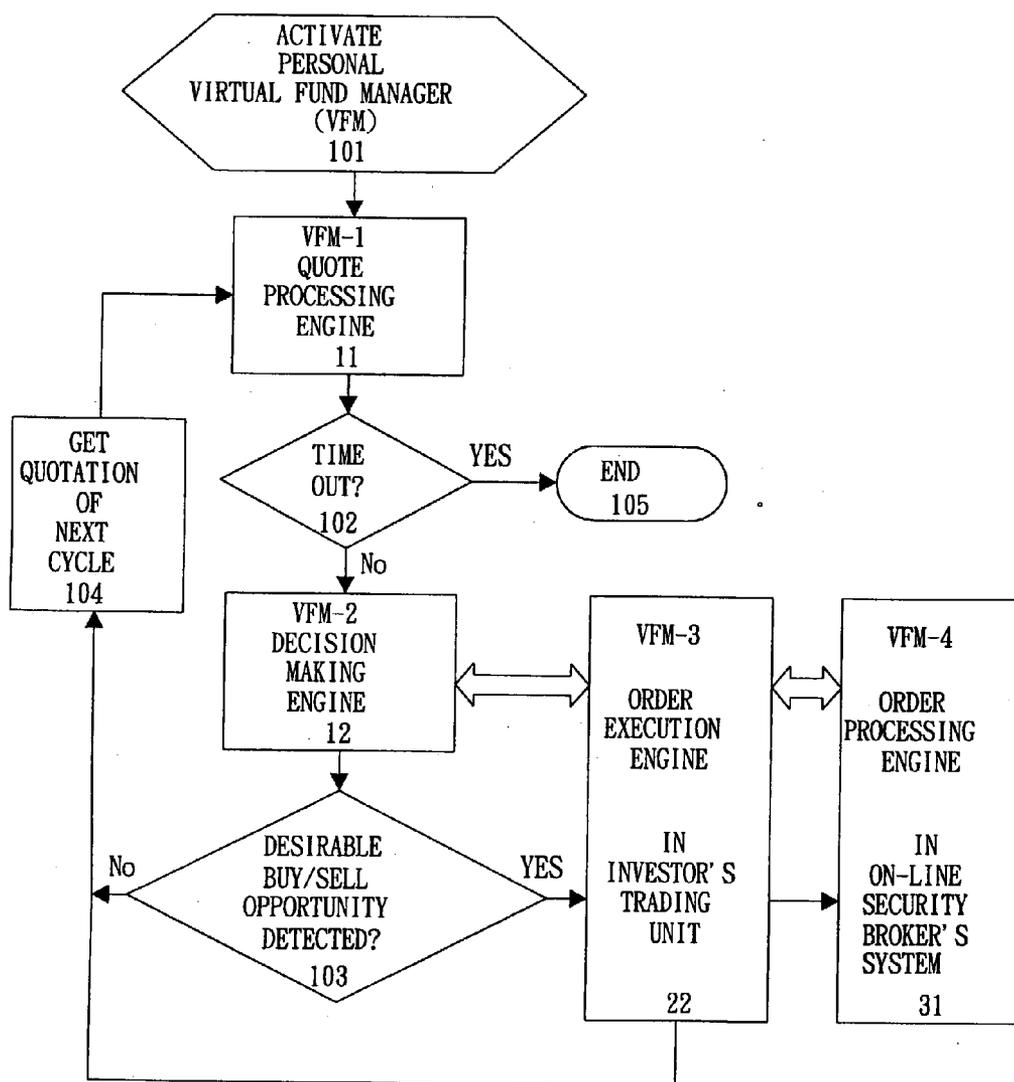


FIG.4

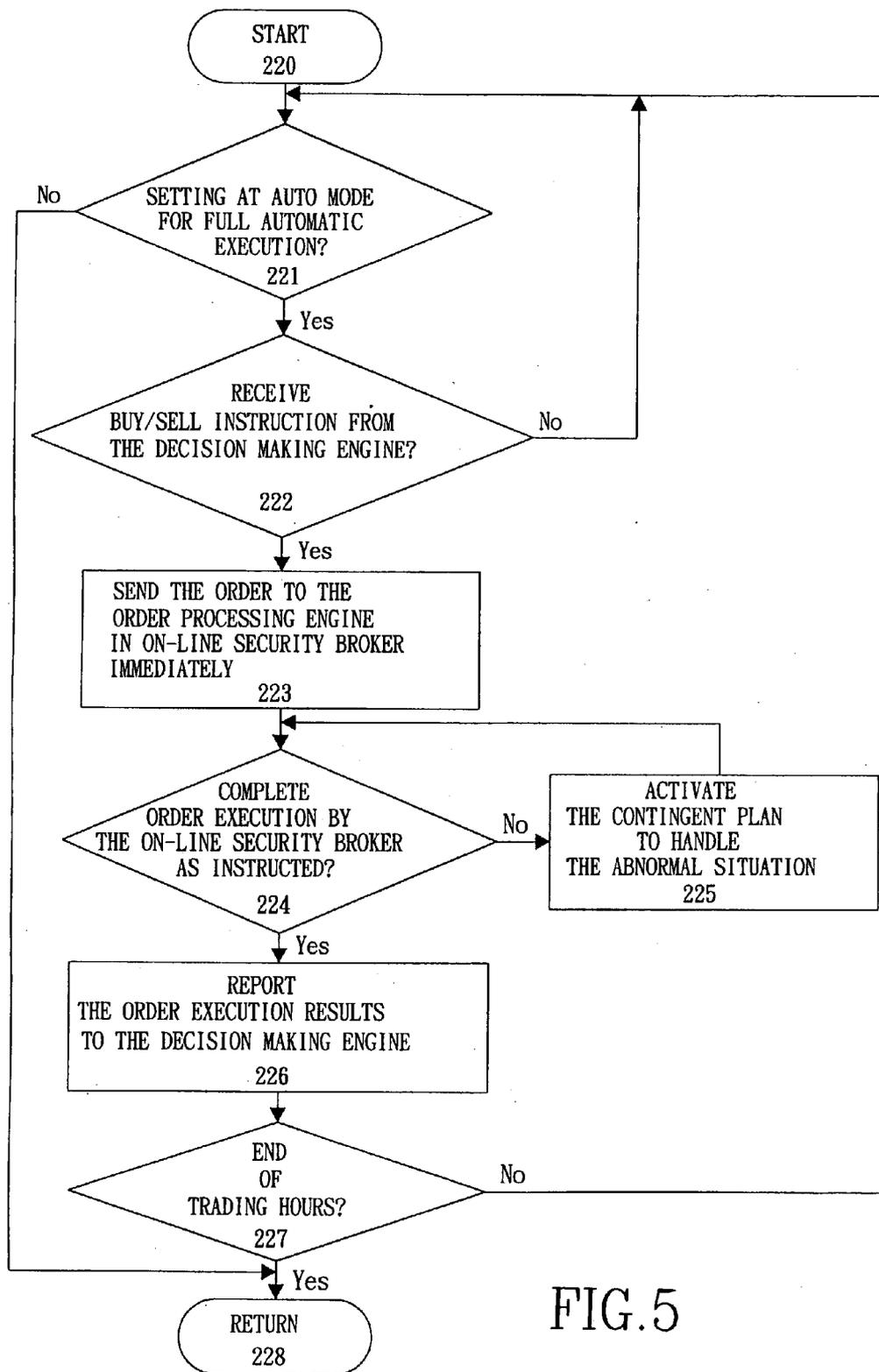


FIG. 5

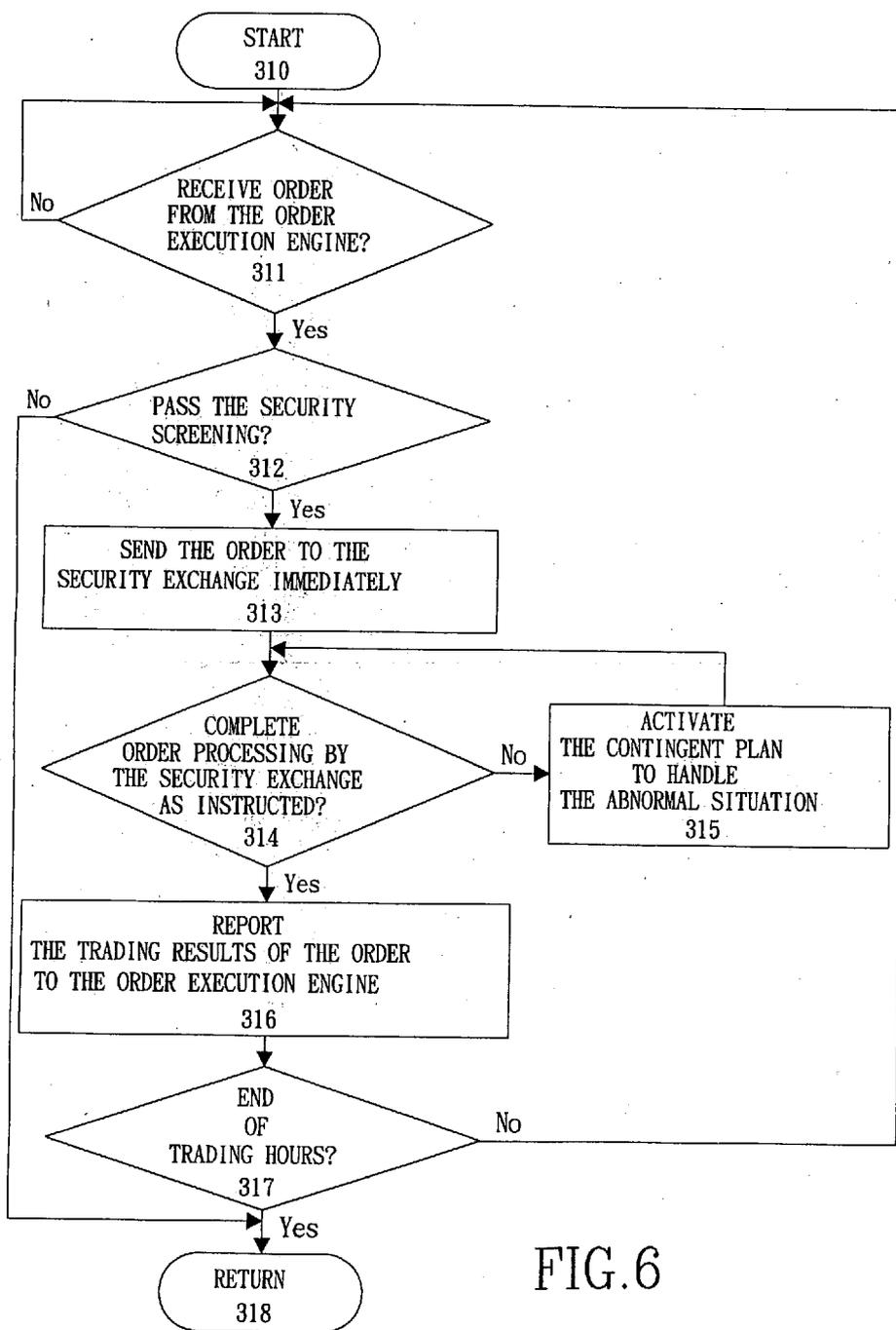


FIG. 6



[0014] FIG. 2 is a block diagram of HOME PAGE SERVICE (HPS) offered by Automated Trading Service Center (ATSC) in accordance with the present invention;

[0015] FIG. 3 is a flow chart showing a procedure that an investor interacts with the HOME PAGE SERVICE of ATSC to develop a custom investment strategy based Decision Making Engine which serves as the logic unit of the whole personal Virtual Fund Manager (VFM) system;

[0016] FIG. 4 is a flow chart of the personal Virtual Fund Manager system integrated by four engines running in real time at three separate systems located at different locations;

[0017] FIG. 5 is a flow chart of an Order Execution Engine of Virtual Fund Manager running in the Investor's Trading Unit; and

[0018] FIG. 6 is a flow chart of an Order Processing Engine of Virtual Fund Manager running in On-Line Security Broker's system.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] A method for intelligent automated security trading in accordance with the present invention includes three parts interacted via the wireless Internet: a web server system known as the Automated Trading Service Center (ATSC), a client system located at Investor's Trading Unit and an On-Line Security Broker. These three parts are described as follows:

[0020] (1) A first part of the method under control of an ATSC web server system offering Home Page Service (HPS) has steps of:

- [0021] engineering custom automated trading system for each new investor;
- [0022] managing daily account activities for each active trader;
- [0023] promoting automated trading service to prospective customers; and under control of an ATSC web server system executing at least one custom developed automated security trading system known as the personal Virtual Fund Manager (VFM) has further steps of:
- [0024] retrieving market fluctuation quotation from at least one stock exchange;
- [0025] monitoring market open/close trading time;
- [0026] making investment decision in accordance with each investor's own investment strategy; and
- [0027] notifying Investor's Trading Unit an investment instruction whenever timing of placing an order is detected based on the investment decision.

[0028] (2) A second part of the method under control of a client system located at Investor's Trading Unit performing subsequent functions of the personal Virtual Fund Manager has steps of:

- [0029] receiving the investment instruction from ATSC web server system;
- [0030] executing an order placing process, wherein an order is automatically sent; and

[0031] setting operation mode at auto trading mode or semi-auto trading mode.

[0032] (3) A third part of the method under the control of an On-Line Security Broker performing subsequent functions of the personal Virtual Fund Manager has steps of:

- [0033] receiving the order from the second part in the Investor's Trading Unit;
- [0034] finalizing transaction with at least one stock exchange in accordance to the order.

[0035] Based on the forgoing description, the method provides a complete on-line automated security trading procedure to serve one or many investors to run their own personal Virtual Fund Manager systems at the same time.

[0036] With reference to FIG. 1, all the above mentioned three parts further connect to at least one electronic Security Exchange (40) via the wireless Internet based communications network to perform functions of the intelligent automated security trading. The security exchange (40) provides market fluctuation quotation and open/close trading time to the web server system (not shown) of ATSC (10) which has a Home Page Service (13) and at least one Virtual Fund Manager, which further comprises a Quote Processing Engine (11), and a Decision Making Engine (12).

[0037] With further reference to FIG. 2, the Home Page Service (HPS) (13) provides various electronic commerce services to all investors including engineering, management, and promotion. The first portion of the HPS e-commerce services provides the engineering service of custom developing automated security trading system for each new investor, which offers a personal investment strategy specification development (121), a personal investment strategy coding development (122) and a personal Virtual Fund Manager simulation (123). The second portion of the HPS e-commerce services provides daily account activities management for each active investor, which offers a Customer Account Information (130) and a Personal Virtual Fund Manager Activation (100). The third portion of the HPS e-commerce services promotes automated security trading service to prospective customers by providing internal materials or hyperlinked to relevant sources, which offers a Financial Information (131), a Technical Analysis service (132), a Trend Forecast (133), a Training Simulator (134) and a Day Trade Education (135).

[0038] With further reference to FIG. 1, in addition to provide HPS (13), the web server system of ATSC (10) also keeps each VFM system component within its control operational for all active investors. The Virtual Fund Manager is a real time running program integrated by four engines: the Quote Processing Engine (11), the Decision Making Engine (12), the Order Execution Engine (22), and the Order Processing Engine (31), wherein the web server system of ATSC (10) controls both the Quote Processing Engine (11) and the Decision Making Engine (12) of each VFM system.

[0039] The Quote Processing Engine (11) (also known as VFM-1) connects and communicates with the electronic Security Exchange (40) to periodically retrieve and process real time market information including quotation and the open/close trading time via the Internet.

[0040] The Decision Making Engine (12) (also known as VFM-2) further analyzes, calculates and determines a buy/

sell timing according to the predetermined custom investment strategy specification based on the real time market information from the Quote Processing Engine (11), and then sends order instructions to the Order Execution Engine (22). As disclosed by the first part of the Method of the present invention, an investor can custom order his/her own desirable Decision Making Engine as part of his/her personal VFM system via the engineering service provided by the Home Page Service (13). With further reference to FIG. 3, an operational procedure of the ATSC Home Page Service provides three processing cycles to perform engineering service of custom developing the Decision Making Engine described as follows:

[0041] (a) Specification Development Cycle, wherein an investor accesses the HPS via the wireless Internet to set the investment strategy specification at the his/her discretion;

[0042] (b) Coding Development Cycle, wherein the investment strategy specification is coded to form the Decision Making Engine (12) which executes the investor's proprietary investment strategy; and

[0043] (c) Simulation Testing Cycle, wherein the investor can select the personal Virtual Fund Manager simulation service (123) on the HPS (13) to simulate functionality of the VFM by integrating the developed Decision Making Engine with the Quote Processing Engine (11).

[0044] With further reference to FIG. 1, the Investor's Trading Unit (20) is a desktop/mobile computing platform providing a Home Page Service Access Interface (21) and an Order Execution Engine (22) (also known as VFM-3). The Investor's Trading Unit (20) is implemented in accordance with the second part of the method as disclosed above. The home page service access interface (21) is provided to investors to interact with the server of the ATSC (10) by accessing the Home Page service (13) of the ATSC (10) via the wireless Internet. The Order Execution Engine (22) receives the order instructions from the Decision Making Engine (12) and automatically places orders including order instructions by interacting with the On-Line Security Broker (30) under a fully automated execution mode.

[0045] The On-Line Security Broker (30) has an Order Processing Engine (31) (also known as VFM-4) implemented in accordance with the third part of the method as disclosed above. The Order Processing Engine (31) receives the order instructions from the Order Execution Engine (22) to process the orders, and then further finalizes transaction by interacting with the Security Exchange (40). The Security Exchange (40) can practically sell/buy electronically traded securities, including stocks, futures, options, bonds, and foreign currencies etc. In addition, the Security Exchange (40) also can receive and confirm orders from the On-Line Security Broker (30) and can provide security trading quotation in the real time.

[0046] With reference to FIGS. 1, 2 and 3, the investor can remotely order his/her custom VFM system by executing the three processing cycles of the ATSC (10) through the electronic commerce engineering service offered by the HPS (13). That is, the investor can access the Personal Investment Strategy Specification Development (121) sector first to negotiate with the ATSC (10) to finalize the specification to

code the Decision Making Engine (12). Then, the investor can access the Personal Investment Strategy Coding Development (122) sector to dialogue with the ATSC (10) during the programming cycle based on the specification developed. Once the coding is done, the investor can access the Personal Virtual Fund Manger Simulation (123) sector to test the functionality of the developed program for the eventual approval.

[0047] The ATSC (10) further provides management service via the HPS (13) for investors to effectively utilize their VFM systems previously ordered. For daily trading needs, the investor can access the Customer Account Information (130) to acquire the update status of the investor's account, or to access the Personal Virtual Fund Manager Activation (100) to activate the investor's personal Virtual Fund Manager system. One investor can develop any numbers of personal VFM systems as needed to adopt different investment strategies for different securities. During trading hours, the investor can activate all his/her personal VFM systems concurrently. During the activation process, investors are asked to set all the necessary parameters, such as auto/semi-auto trading mode selection, security screening features, and mobile/desktop mode selection.

[0048] FIG. 3 is a flow chart of a routine for an investor to interact with the ATSC via the Home Page Service to develop a custom investment strategy based personal Virtual Fund Manager system (210). Since the nature of e-commerce based business is most suitable to serve remote customers with custom specification requirement, the Home Page Service (13) of ATSC (10) is designed to serve this role. The core issue in implementing an automated security trading system is how to instruct the computer to trade securities on investor's behalf. Since the computer is able to execute millions of instructions per second, the present invention allows investors to implement highly sophisticated investment strategies such as adopting self-learning artificial intelligence algorithms with capabilities to concurrently calculate and trace in real time a series of parameters as typically analyzed in technical analysis.

[0049] By accessing the Personal Investment Strategy Specification Development (121) sector in Home Page Service (13) provided by the ATSC (10), the investor can initiate the specification development cycle to negotiate with the ATSC (10) for finalizing a mutually acceptable specification. The Investor can set investment strategy specification at the investor's discretion (211). If questions remain (212), the investor can work with ATSC (10) to modify investment strategy specification (213) until all problems clarified. The ATSC (10) then launches the coding development cycle to programming investor's custom Decision Making Engine (12) of the personal Virtual Fund Manager in accordance with the specification (214), as provided by the investor via the Home Page Service (13). Once the coding is done, the simulation testing cycle follows. The investor runs the simulator provided by the Home Page Service (13) to assess the functionality of the coding results (215). If questions remain (216), the investor works with ATSC (10) to modify the coding (217) until all problems clarified. The announced custom developed Decision Making Engine (218) is then integrated with other parts of the personal Virtual Fund Manager system to fulfill investor's custom specification ordered via the electronic commerce Automated Trading Service Center.

[0050] With reference to FIG. 4, a block diagram of Virtual Fund Manager (VFM) system is integrated by four major systems; the Quote Processing Engine (11), the Decision Making Engine (12), the Order Execution Engine (22), and the Order Processing Engine (31). The Decision Making Engine (12), the Order Execution Engine (22) and the Order Processing Engine (31) communicate with each other to provide a full-auto trading mode and a semi-auto trading mode.

[0051] The investor can access ATSC (10) to activate the investor's personal VFM system via the wireless Internet. Once activated (101), the VFM is a real time automated trading program running periodically at a time interval parameter assigned by investors, for example 0.1 seconds per period. Both the Quote Processing Engine (11) and the Decision Making Engine (12) are located at the server of ATSC (10) to perform the full-auto trading mode. The Quote Processing Engine (11) can periodically retrieve and process quoting information for a particular security of interest from the Security Exchange (40). The VFM system checks if the market is closed (102) before proceeding to the Decision Making Engine (12), which can monitor the market fluctuation to make investment decision by adopting investor's predetermined proprietary investment strategy with intensive calculation if necessary. Once the desirable Buy/Sell timing is identified (103), the Decision Making Engine (12) immediately interacts with the Order Execution Engine (22) located at Investor's Trading Unit (20). The Order Execution Engine (22) then automatically interacts with the Order Processing Engine (31) located at On-Line Security Broker (30) to immediately execute the order if the system is setting at full-auto trading mode, or simply automatically receive the notice from the Decision Making Engine (12) for the investment opportunity being identified, if the VFM system is set at semi-auto trading mode pursuing automatic monitoring and notification only. The VFM system retrieves quotation of next cycle immediately once Buy/Sell cycle is done (104). The VFM system ends subsequent operations when time out (105).

[0052] FIG. 5 is a flow chart of a routine to disclose how the Order Execution Engine (22) of the personal Virtual Fund Manager running in Investors' Trading Unit (20) handling the order execution. The Order Execution Engine (22) provides operating modes of either an automatic monitoring function, or a full automatic execution function. That is, by allocating the Order Execution Engine (22) at Investors' Trading Unit (20), the investor has the option to select either the automatic monitoring/notification only, which is also known as the semi-auto trading mode, or the automatic execution, which is also known as the full-auto trading mode. In addition, the investor can update the security features offered by the system from time to time to effectively minimize the risk of on-line trading crime. Since the Investors' Trading Unit (20) can be switched between a desktop and a mobile platform, overall, the investor can enjoy the benefit of highly secured semi/full automated trading service anytime anywhere via the wireless Internet communications network. Once the market is open, the VFM system is activated (220). The VFM system keeps ignoring any order instruction until the system is set at full automatic execution mode (221). The VFM system keeps waiting for the Buy/Sell instruction from the Decision Making Engine (222). Once the instruction is received, the Order Execution Engine (22) sends the order to the Order

Processing Engine (31) located at On-Line Security Broker (30) immediately (223). Then, the system checks if the order is completed by the On-Line Security Broker (30) as instructed (224). If not, a contingent plan is activated to handle the abnormal situation (225). Once the order execution is confirmed, the VFM system reports the order execution results to the Decision Making Engine (226). The VFM system then checks if the trading time is due (227). If not, the system waits for next cycle of transaction. If yes, it ends today's operation (228).

[0053] FIG. 6 is a flow chart of a routine to disclose how the Order Processing Engine (31) of the personal Virtual Fund Manager operated in On-Line Security Broker (30). Once the market is open, the system is activated (310) and keeps waiting for the Buy/Sell instruction from the Order Execution Engine (311). Once the instruction is received, the VFM system conducts a security screening to assure that the trading pattern matches investor's pre-registered information (312). If the security check is successful, the VFM system sends the order to the security exchange immediately (313). The VFM system then checks if the order is fulfilled by the security exchange as instructed (314). If not, a contingent plan is activated to handle the abnormal situation (315). Once the transaction of this order is confirmed, the VFM system reports the trading results to the Order Execution Engine (316). The VFM system then checks if the trading time is due (317). If not, the VFM system has to wait for next cycle of transaction. If yes, the VFM system ends today's operation (318).

[0054] Based on the forgoing description, the present invention provides many easier usages for trading securities in Internet or Wireless Internet anytime anywhere. The innovative smart personal VFM system not only automatically monitors and notifies the sell/buy timing to the investor, but also, upon request of the investor, automatically sells or buys orders. Therefore, the investor can substantially enhance the profitability by the present invention while reduce trading time and effort. The day traders can even intensively day trade huge amount of securities to capture profit in real time that is unachievable by manual operations. By adopting the present invention, the risk of trading securities can be timely minimized when the market trend turns against the prediction. Thus, the present invention is also regarded as an effective tool for investors to conduct risk management for security trading.

[0055] Even though numerous characteristics and advantages of the present invention have been set forth in the forgoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of sequence, parameter, and algorithm of system modules within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

What is claimed is:

1. A method of real time intelligent automated security trading via the wireless Internet, including but not limited to stock trading, futures trading, options trading, bonds trading, and foreign currencies trading, comprising steps of:

under control of an Automated Trading Service Center (ATSC) web server system offering Home Page Service (HPS) has steps of:

engineering custom automated security trading system for each new investor;

managing daily account activities for each active trader;

promoting automated trading services to prospective customers; and

under control of the Automated Trading Service Center (ATSC) web server system executing at least one automated security trading system known as the personal Virtual Fund Manager (VFM) has further steps of:

retrieving market fluctuation quotation from at least one security exchange;

monitoring market open/close trading time;

making investment decision in accordance with each investor's own investment strategy; and

notifying the Investor's Trading Unit an investment instruction whenever timing of placing an order is detected based on the investment decision.

under control of a desktop/mobile client system located at the Investor's Trading Unit performing subsequent functions of the personal Virtual Fund Manger has steps of:

receiving the investment instruction from ATSC web server system;

executing an order placing process, wherein an order is automatically sent; and

setting operation mode at auto trading mode or semi-auto trading mode; and

under the control of an On-Line Security Broker performing subsequent functions of the personal Virtual Fund Manger has steps of:

finalizing transaction with at least one electronic security exchange wherein the On-Line Security Broker completes the transaction by executing an order placing process of the Investor's Trading Unit.

**2.** The method as claimed in claim 1, wherein the step of engineering custom automated security trading system for each new investor further comprises the sub-steps of:

developing a personal investment strategy specification at investor's discretion;

programming a Decision Making Engine in accordance with the investment strategy specification; and

testing the functionality of the program by running a personal Virtual Fund Manager simulator.

**3.** The method as claimed in claim 2, wherein the step of programming the Decision Making Engine further comprises the steps of:

coding the investment strategy specification for forming the Decision Making Engine;

integrating the Decision Making Engine with a Quote Processing Engine to form partial of investor's personal Virtual Fund Manager system jointly running in ATSC web server; and

creating a personal Virtual Fund Manager simulator.

**4.** The method as claimed in claim 1, wherein the step of managing daily account activities for each investor further comprises the steps of:

activating investors' personal Virtual Fund Manager systems for daily transaction; and

updating account information of investors' daily trading activities.

**5.** The method as claimed in claim 1, wherein the step of promoting automated trading services to prospective customers further comprises the step of:

providing a financial information service, a technical analysis service, a trend forecast service, a training simulator service and a day trade education service.

**6.** The method as claimed in claim 1, wherein the step of auto trading mode operated in an Order Execution Engine located at Investor's Trading Unit further comprises the steps of:

receiving the notification for placing order from the Decision Making Engine in the web server;

sending an order automatically to an Order Processing Engine located at On-Line Security Broker;

receiving the notification from the on-line security broker to confirm the result of the transaction; and

judging whether the market trading time is due to end today's operation when time out.

**7.** The method as claimed in claim 1, wherein the step of semi-auto trading mode operated in an Order Execution Engine located at Investor's Trading Unit further comprises the steps of:

receiving the notification from the Decision Making Engine in the ATSC web server for an immediate investment opportunity to place an order; and

determining whether to proceed the transaction at investor's discretion.

**8.** A web server system for intelligent automated security trading via the wireless Internet based communications network comprises an Automated Trading Service Center (ATSC) to provide electronic commerce services to investors.

**9.** The system as claimed in claim 8, wherein the Automated Trading Service Center (ATSC) interacting with at least one Investor's Trading Unit further comprises:

a Home Page Service (HPS) operative to develop custom investment strategy based personal Virtual Fund Manager (VFM) system;

a Home Page Service further operative to manage investor's daily investment account activities; and

a Home Page Service further operative to promote automated security trading to prospective customers.

**10.** The system as claimed in claim 9, wherein at least one Virtual Fund Manager system running in ATSC web server further comprises:

a Quote Processing Engine (also known as VFM-1) interacted with at least one Security Exchange to retrieve real time market information; and

a Decision Making Engine (also known as VFM-2) running in real time to analyze, calculate, and determine

the buy/sell timing according to the predetermined investment strategy algorithms.

**11.** The system as claimed in claim 10, wherein a Virtual Fund Manager system running in Investor's Trading Unit further comprises:

an Order Execution Engine (also known as VFM-3) with functionalities to receive order instructions from the Decision Making Engine and to place order with the On-Line Security Broker.

**12.** The system as claimed in claim 11, wherein a Virtual Fund Manager system running in On-Line Security Broker further comprises:

an Order Processing Engine (also known as VFM-4) with functionalities to receive order instructions from the Order Execution Engine and to place order with the Security Exchange.

**13.** The system as claimed in claim 8, wherein the Decision Marking Engine, the Order Execution Engine and the Order Processing Engine communicate with each other to provide an auto trading mode and a semi-auto trading mode, wherein

the auto trading mode authorizes that the Order Execution Engine automatically places the orders to the Order Processing Engine when the ATSC sends a buy/sell instruction to the Order Execution Engine; and

the semi-auto trading mode authorizes that the ATSC sends a buy/sell instruction to the Order Execution Engine to alert the investor to handle the subsequent investment activities by himself/herself.

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