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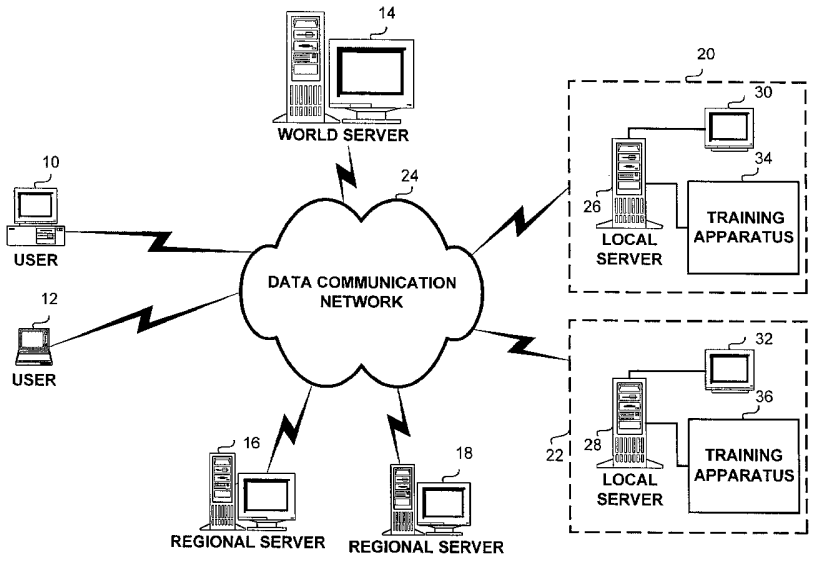

(57) Abstract: A system and method for a training center network operative in the implementation of personalized training programs managed and controlled by network-based computing devices is disclosed. The system and method provides the selection of an exercise program for a user desiring to enter an exercise regimen, the dynamic customizing of the selected exercise program by the user, a central server-based registration of the user into a training centers network for the purpose of performing regularly and persistently the selected and customized exercise program, and the dynamic ordering of one or more exercise sessions associated with a user and performable across alternative local training centers connected to a data communication network.

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SYSTEM AND METHOD FOR THE IMPLEMENTATION OF PERSONAL EXERCISE PROGRAMS USING MULTI-FUNCTIONAL APPARATUS MANAGED AND CONTROLLED BY COMMUNICATIONS NETWORK-BASED COMPUTING DEVICES

RELATED APPLICATIONS

The present application claims priority from Israel patent application serial number 148772 titled SYSTEM AND METHOD FOR THE IMPLEMENTATION OF PERSONAL EXERCISE PROGRAMS USING MULTI-FUNCTIONAL APPARATUS MANAGED AND CONTROLLED BY COMMUNICATIONS NETWORK-BASED COMPUTING DEVICES, filed March 19, 2002.

This application is related to the Israel patent application serial number 143819, entitled "MULTI-FUNCTIONAL EXERCISE APPARATUS WITH ADJUSTABLE WORKING AXIS", filed 26 June 2001 and to PCT/IL02/00465 filed on 16 June 2002 under the PCT, received International Publication Number WO02/102464 and having its International Publication Date on 27 December 2002, both filed on behalf of Yuval REGEV and are hereby incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates generally to health and exercise programs provided by health and fitness centers and, more particularly to dynamically customizable exercise programs implemented in a computing and communications environment and controlled by specifically developed software installed in computing devices operating across a data communication network.

DISCUSSION OF THE RELATED ART

Following a plurality of scientific researches, medical studies, practical experiments and the affirmative operational results produced in the course of the last half century, it is inarguable today that the human body receives numerous physiological as well as psychological benefits from a properly performed program of regular exercise. For instance, a regular routine of weight training may result in increases in muscle mass, flexibility, blood circulation, efficient energy conversion and motor coordination. In addition to the physiological benefits, the psychological advantages of a regular exercise regimen include a substantial contribution to an enhanced sense of well being.

It is also well known that the results achieved by the individuals performing the exercise routine depends on the amount of effort put forth by the individual as well as on certain inherited and unchangeable factors such as genetic makeup, sex, and age. Regardless of human factors, however, an individual must perform a comprehensive exercise program to achieve the best results. For a comprehensive exercise program to be conducted properly pre-determined exercise types should be provided. Specific exercise types such as weight training include a proper sequence of applying force against an artificially set up resistance. The application of force by the individual against the variable set of artificially set up resistances in diverse directions and along various axes is designed such that the exerted force selectively activates specific muscles or specific groups of muscles. Following the substantially regular and carefully controlled activation of the muscles for specific pre-determined periods of time particular physiological effects are generated, which are operative in the production of the above-mentioned benefits.

In order to conduct a comprehensive effective and useful exercise program, the exerciser needs either a suitable set of single-function exercise machines or a suitable multi-purpose exercise machine, which can provide the appropriate combination of exercise protocols designed such that the suitable various

muscles or groups of muscles are suitably activated. The current patent application referred to in the foregoing provides such a multi-purpose exercise apparatus. The proposed apparatus makes available to the potential user of the equipment the option of varying the axes of the resistance and thus allow for exercising different muscles or group of muscles according to a pre-defined exercise program.

To achieve a bio-mechanically correct conditioning effect, the user of the exercise machine has to perform a pre-defined exercise regimen or exercise program within a substantially rigid timetable. An exercise program typically includes a plurality of training sessions performed on the multi-purpose exercise apparatus where the sessions are pre-determinedly spaced over time. Thus, the proper progress of a pre-determined exercise regimen could typically require the user to perform one or more exercise sessions weekly or even daily. It is well known that performing the session on the specifically determined day and at the specifically determined time of day is very important for the success of the exercise regimen.

The substantially rigid timetable associated with the pre-defined exercise regimen creates a number of difficulties to individuals leading an active life and having a dynamic lifestyle. Typically, an individual exercises as his home or at a specific commercially operating health and fitness center having a set of exercise machines installed. The majority of the individuals perform the pre-determined exercise program at specifically designed, properly organized, suitably equipped, and staffed health and fitness centers. Typically to use the services of such institutions the individual desiring to perform an exercise program has to register in a selected training center placed at a selected location has to reserve specific time slots for the performance of a set of exercise sessions and then physically access the location at the pre-determined time. Thus, the individual desiring to perform and complete an exercise program in a useful and therefore orderly manner (e.g. exercising strictly according to the pre-defined time table) is required to physically access the specifically selected health and fitness center regularly and often very frequently. For

individuals leading an active life and having a dynamic lifestyle, such as for example for people who travel frequently on business, and/or for people with heavy social obligations, crowded timetables, and the like, it is not always convenient or even possible to physically access the fitness center for the purpose of performing a scheduled exercise session.

The selection of a suitable exercise program involves the consideration of a plurality of factors, such as the personal health condition of the potential trainee, such as sex, age, weight, and the like, health and fitness-related historical data, such as previous injuries, bodily limitations, current or past illnesses, the functional objectives the desired exercise program, such as desiring weight loss, body-building, professional training, and the like. These parameters are operative in the appropriate tailoring of an exercise program for an individual. In addition, exercise program performance-related practical problems have to be considered. For example, the address of the individual and the availability of nearby accessible fitness centers are important in the selection of the exercising locations. The availability of the required exercise equipment at the center, and the availability of the desired time slots could also influence the selection. Further, the private and professional timetable and the general lifestyle of the individual are decisive factors in the selection of the exercise program and the associated exercising locations.

Currently the selection of an exercising program, the selection of a specific training and fitness center are complex, time-consuming and substantially non-efficient processes which generally limit the potential exerciser to a single health and fitness center at which to perform the exercise regimen. As a result, some individuals find it difficult to adhere to the pre-determined exercise regime as a result of, for example, professional or social obligations involving travel to remote locations (e.g. visiting a different city or even a different country). Certain lifestyles make it difficult to physically access the originally selected health and fitness center regularly. In addition, the tailoring of the exercise program to an individual is

substantially limited by the difficulties involved in determining the right program, in modifying an exercise program in-progress, and the like.

The designers of training apparatus, training programs, training methods, and training locations should consider the following problems and examine the existing solutions thereof, that are involved in the correct implementation of an exercise regimen: a) Presently, the majority of individuals engaged in existing exercise programs have neither sufficient information nor adequate experience regarding the proper execution of the exercise. Therefore, suitable professional assistance, such as guidance, instruction, information and support should be provided, b) To be efficient a training program should be dynamically upgraded during the course of the program by substantially continuous modifications of the training program parameters, such as the amount of resistance, the length of an exercise session, the type of the exercises included in the session, the repetition rate of the discrete exercise elements, the number of the discrete exercise elements performed, the pace of the exercise session, and the like. The availability of professional assistance is important for the performance of a properly managed program, c) For specific types of exercises such as for example resistance training a high level of concentration is required from the individual performing the exercise. Public training environments, such as common exercise rooms in commercial training centers are not helpful for these types of exercises as a result of potential environmental distractions. The use of private training locations solve this problem but raise other difficulties, such as the unavailability of professional help, low levels of safety, and lack of supporting environment, d) A training program requires the substantially continuous use of a pre-defined set of related exercise machines having a single function or the continuous use of a pre-defined multi-functional apparatus. It may happen that one or more of the required machines are unavailable at the required point in time at a specific training location during the performance of the exercise and thus the individual is forced to wait for a considerable period until the required

machine becomes available. Only a very carefully coordinated and organized timetable could solve this problem, e) certain types of exercises, such as resistance trainers should be carefully controlled since, for example, the use of excessive resistance may cause physical injury to the individual attempting to perform the exercise in an uncontrolled manner. The present solutions involve enhanced supervision by personal human trainers, f) Exercise machines (like all types of machines) are subject to potential breakdowns. When such a breakdown occurs in the course of an exercise physical injury could be caused to the training individual. Again the typical solution is close personal supervision by a personal trainer, g) In modern society an increasing number of individuals are leading a dynamic lifestyle involving increased mobility that hampers the ordered and persistent performance of a training program in a fixed location. The current solution is to use different locations during the course of the program. It means multiple registration in multiple locations, checking that the required equipment is available at the multiple locations and the like, h) Following the increased popularity of training programs more and more exercise machines are installed in diverse locations such as hotels, holiday resorts, fitness rooms at working places, private homes, and the like. Typically such locations do not have supporting personnel. As a result the level of exercise-related safety at such locations is not sufficient. I) Typically a considerable number of individuals do not persist in the ordered performance of an exercise program and often even abandon the program. Some of the problems described in the foregoing are important factors in exercise program abandonment. For example an individual who suffers an injury as a result of lack of guidance, low safety levels, machine breakdowns, unavailable exercise machines, and the like is more likely to interrupt and even finally abandon an exercise program than an individual who is properly instructed, routinely provided with information, guidance, support, reliable hardware, and safe exercise procedures.

The most important factor in the abandonment of an exercise program is the loss of motivation by the individual. In order to substantially increase his/her motivation, the individual is preferably should be provided with a highly supportive environment that will include efficient training programs, high safety levels, adequate information, professional guidance, personal encouragement, progress-related feedback, reliable exercise machines, communication with companions having substantially the same objectives, needs, problems, and interests.

It would be easily perceived by one with ordinary skills in the art that in order to provide the suitable supportive environment for the trainees a training program system should preferably create a communication forum for the various individuals having the same training profiles and participating in the same training programs. Furthermore, the system should preferably collect exercise related information from a plurality of trainees having diverse training profiles in a central information center to be used for the continuous improvement of the training programs. Further, the system should preferably collect information regarding the accumulative achievements and progress of a trainee, and to enable the trainee to access the collected information. The system should also provide sophisticated monitoring mechanisms for the exercise machines to minimize the possibilities of breakdowns during the performance of an exercise, to generate suitable warnings and to effect automatic fail-safe procedures. The physical condition of the trainee should also be monitored constantly to minimize the risk of sudden or gradual health deterioration, to issue timely warnings, and to provide effective health supervision. As the services of a personal human trainer are substantially expensive the system should provide suitable alternatives, such as software programs functioning as virtual support personnel through the substantially close emulation of a personal human trainer's behavior.

There is a need for an improved system and method that could allow an individual to select an exercise program in an efficient, and convenient manner, to

use simultaneously the services of several alternative health and fitness centers during the progress of the same exercise program for different exercise sessions in accordance with the requirements of an exerciser, to dynamically upgrade the exercise program for a trainee according to the individual's health condition, objectives, rate of progress through the exercise program, personal data, and private requirements, to switch among training centers located a geographically diverse places during the course of a specific exercise program in accordance with the exigencies of the individual preferably without the need to undergo a complex and time-consuming re-registration process.

The required system should preferably guide a trainee during the course of the exercise program and should preferably provide periodical encouragement to the trainee. The system and method would preferably collect exercise program-related information from a plurality of trainees to be used for purposes of health and fitness research and for purpose of fitness program development. The thus developed efficient exercise programs will provide the trainees with specifically personalized programs, in specifically organized locations having no environmental distractions and without the need for long waits for available exercise equipment.

Preferably the system should support a common meeting place for the trainees, such as on-line forums, bulletin boards or user groups for a plurality of trainees to participate in, in order to exchange health, fitness, and exercise and safety information. The meeting places will form a supporting environment for the trainees and will contribute to the personal commitment of a trainee to the steady performance of an exercise program.

SUMMARY OF THE PRESENT INVENTION

One aspect of the present invention regards a training center network system for the implementation of personal training programs utilizing training apparatus, managed and controlled by data communication network -based computing devices. The system includes at least one client computing device operated by at least one user of the training center network system communicatively connectable to at least one training center network server computing device via a wide area data communications network, at least one training center network server computing device communicatively connected to the wide area data communications network, and connected to an at least one training apparatus controller device, at least one training apparatus controller device connected to the at least one training center network server computer device, at least one training apparatus utilized for the performance of at least one training program by the at least one user of the training center network system, connected to the at least one training apparatus controller device and controllable by the at least one training apparatus controller device, and a wide area data communications network intermittently linking the at least one client computer device to the at least one training center network server computer.

A second aspect of the present invention regards a training center network method for the implementation of personal training programs utilizing training apparatus, managed and controlled by data communication network -based computing devices. The method includes the following steps: on the training center network server computing device storing at least one standard training program template in the training center network server computing device, on the training center network server computing device receiving request introduced by at least one user associated with at least one client computing device concerning registration in order to enter into a training regimen associated with a training program, on the training center network server computing device receiving, analyzing, and storing user personal information, user health information, user preferences, on the training

center network server computing device generating and storing personalized training program for the at least one user in accordance with the received user information, health data, user preferences, and specific user requests, on the training center network server computing device receiving request submitted by the at least one user of the at least one client device to effect training session scheduling, periodically transmitting consolidated training session data from the training center network server computing device to the training apparatus controller device, managing and controlling a training session from the training apparatus controller device to the at least one training apparatus, collecting historical training session data at the at least one training apparatus controller device, and periodically receiving historical training session data from the at least one training apparatus controller of the at least one training apparatus to the at least one training center network server computing device.

A third aspect of the present invention regards a physical training system having a training apparatus controlled by a programmable computer device for the implementation of at least one personal training program. The system consists of at least one training apparatus controller device connected to the at least one physical training apparatus device for managing and controlling the operation of the training apparatus in accordance with a pre-defined training program, and at least one training apparatus utilized for the performance of at least one personal training program by the at least one user of the training apparatus, connected to the at least one training apparatus controller device and controllable by the at least one training apparatus controller device.

A fourth aspect of the present invention regards a physical training method for the implementation of personal training programs for a trainee utilizing at least one training apparatus associated with at least one training apparatus controller device, managed and controlled by at least one training apparatus controller device. The method consists of the following steps: on the training apparatus controller

device storing user personal information, user health information, user preferences; on the training apparatus controller device storing at least one personalized training program for an at least one user; managing and controlling a training session performed on the at least one training apparatus by the training apparatus controller device; and collecting historical training session data at the at least one training apparatus controller device.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a schematic block diagram of an exemplary computing and communications environment in which a preferred embodiment of the present invention could operate;

Fig. 2 is an illustration of an individual user communicating via a computer interface with the proposed system, in accordance with a preferred embodiment of the present invention;

Fig. 3 is an illustration of an individual user during the performance of an exercise session in a local health and fitness center, in accordance with a preferred embodiment of the present invention;

Fig. 4 is an illustration of an individual user operating the multi-purpose exercise equipment, in accordance with a preferred embodiment of the present invention;

Fig. 5 is a schematic block diagram representing the architecture of the world training center network, in accordance with a preferred embodiment of the present invention;

Fig. 6 is a schematic block diagram illustrating the structure of the world training center network database, in accordance with a preferred embodiment of the present invention;

Fig. 7 is a schematic block diagram showing the functional components of a local training center, in accordance with a preferred embodiment of the present invention;

Fig. 8 is a schematic block diagram of the structure of the exercise session file in a local training center computer, in accordance with a preferred embodiment of the present invention;

Fig. 9 is a simplified flow diagram describing the process of initial communication between a user and the world training center network server, in accordance with a preferred embodiment of the present invention;

Fig. 10 is a simplified flow diagram of the user registration procedure in the world training center network server, in accordance with a preferred embodiment of the present invention;

Fig. 11 is a flow diagram of the exercise session scheduling procedure in the world training center network, in accordance with a preferred embodiment of the present invention;

Fig. 12 is a schematic block diagram showing the components and the associated logical processes relating to an exercise session between a world training center network server and a local training cente r computer, in accordance with a preferred embodiment of the present invention;

Fig. 13 is a flow diagram illustrating the procedure associated with an exercise session in the local training center computer, in accordance with a preferred embodiment of the present invention;

Fig. 14 shows a simplified visual structure of display screen presented to a user communicating with the world training center network server during the registration procedure, in accordance with a preferred embodiment of the present invention; and

Figs. 15, 16, and 17 illustrate several simplified visual structures displayed on suitable display screens, which are presented to a user communicating with a central server while selecting an exercise program, in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

An improved system and method for the selection of an exercise program for a user desiring to enter an exercise regimen, for the dynamic customizing of the selected exercise program by the user, for a central server-based registration of the user into a training network for the purpose of performing regularly the selected and customized exercise program, and for the dynamic ordering of one or more exercise sessions associated with a user and performable across a set of alternative local training centers connected to a data communication network is disclosed. The present invention overcomes the disadvantages of the prior art by providing a method and system for the computer-assisted selection of and the customizing of an exercise program by a user, for the computer-based establishment of a membership within a chain of health and fitness centers linked by a data communications network constituting local training server computers, and/or regional and/or world server computers, and for the dynamic selection of a desired and available local training center location by the user for the performing a specific exercise session.

Reference is made now to Fig. 1 illustrating a simplified, exemplary computing and communications environment that could be used as a basic framework for the operation of a preferred embodiment of the proposed system and method of the present invention. Client devices 10, and 12 are associated with individual users, such as individuals desiring to enter an exercise program or are engaged in an exercise program in-progress. The client devices 10, 12, are typically computing devices such as personal computers (PCs), laptop computers, Personal Digital Assistants (PDAs), workstations associated with mainframe computing devices, cellular phones with computing and communication capabilities, and the like. The client devices 10, 12 are intermittently connected to a data communications network 24 through standard communication devices, such as a modem, telephone lines, Network Interface Cards (NICs), and the like. In the preferred embodiment of the present invention the network is the Internet although in other preferred

embodiments a Local Area Network, (LAN), a Metrop olitan Area Network (MAN), a Wide Area Network (WAN), a satellite network, a cable television network, a Wireless Local Area Network (WLAN) could be used as the framework for the system and method proposed by the invention. The client device 10, 12 communi cate via the network 24 alternatively to local training centers 20, 22, to regional servers 16, 18, and to world server 14. The client devices 10, 12 are typically installed in the homes or in the offices of the users operating the devices 10, 12. The loca l training centers 20, 22 are typically installed in and operating from health and fitness centers while the regional servers 16, 18, and the world server 14 are installed in and operating from specific locations such as the offices of the world training c enter network enterprise. The local training center 20 includes a local server computer 26, a local training server computer user interface 30, and a training apparatus 34. The local server computer 26 is linked to the local server computer interface 30 an d to the training apparatus 34. In the preferred embodiment of the invention the training apparatus 34 is a multi-functional exercise apparatus with adjustable working axes as disclosed in the related patent application mentioned hereinabove. In other preferred embodiments other training equipment could be used. In the preferred embodiment of the invention the training apparatus 34 is under the control of the local server computer 26 in respect to the management functions, and under the control of its own associated controller computer in respect to the performance of a pre-determined exercise session. The management functions include the reception and storage of the user-specific exercise programs, the reception and storage of the exercise session assignments for a specific user, the supervision of the operation of the training apparatus 34, and the like. The local server computer 26 is also responsible in communicating with the regional servers 16, 18, the world server 14, and the client devices 10, 12. The local server 26 is also functional in the execution of routine maintenance tasks such as periodical diagnostic runs, disk maintenance, error-recovery, backup, restore, communications control, and the like. Although on

the drawing under discussion only a single local server is shown it would be easily perceived by one with skill in the art that in a practical configuration a number of local servers could be used in order to balance the load on the system, to assign different functionalities, to control different training machines, and the like. Similarly in the drawing under discussion a single training apparatus 34 is shown. In a practical environment several local servers could control a plurality of training apparatuses.

Still referring to Fig. 1 the local training center 22 is located in a specific health and fitness center and it includes a local server computer 28, a local training server computer user interface 32, and a training apparatus 36. The local server computer 28 is linked to the local server computer interface 32 and to the training apparatus 36. In the preferred embodiment of the invention the training apparatus 36 is identical in structure and functionalities to the training apparatus 34 in the local training center 20. Thus, the training apparatus 36 is a multi-functional exercise apparatus with adjustable working axes as disclosed in the related patent application mentioned hereinabove. In other preferred embodiments other training equipment could be used. In the preferred embodiment of the invention the training apparatus 36 is under the control of the local server computer 28 in respect to the management functions, and under the control of its own associated controller computer in respect to the performance of a pre-determined exercise session. The management functions include the reception and storage of the user-specific exercise programs, the reception and storage of the exercise session assignments to a specific user, the supervision of the operation of the training apparatus 36, and the like. The local server computer 28 is also responsible in communicating with the regional servers 16, 18, the world server 14, and the client devices 10, 12. The local server computer 28 is also functional in the execution of routine maintenance tasks such as periodical diagnostic runs, disk maintenance, error-recovery, backup, restore, communications control, and the like. Although on the drawing under discussion only a single local

server is shown it would be easily perceived by one with skill in the art that in a practical configuration a number of local servers could be used in order to balance the load on the system, to assign different functionalities, to control different training machines, and the like. Similarly in the drawing under discussion a s ingle training apparatus 36 is shown. In a practical environment a plurality of training apparatuses could be controlled by one or morel local server computers. It should be noted that in other preferred embodiment of the invention both the management functions and the exercise session controlling functions could be implemented in the local server computers 26, 28 respectively. In other preferred embodiments the local servers 26, 28 could be dispensed with and each training apparatus 34, 36 could operate independently, i.e., executing the entire set of necessary functions, such as system maintenance, communications control, data and/or voice communication with the regional servers 16, 18, with the world server 14, and with the client devices 10, 12. Although on the drawing under discussion only two client devices and only two local training center servers are shown it would be easily understood that in a realistically configured network a plurality of client devices could be linked communicatively with a plurality of local training servers across the network 24.

Still referring to Fig. 1, the client devices 10, 12 communicatively linked via the network 24 to the regional server computer 16, 18 and to the world server computer 14. Similarly to the connection to the local training centers 20, 22 the connection between the client devices 10, 12 and the regional server computers 16, 18, and the world server computer 14 is accomplished via standard communication devices, such as modems, NICs, telephone lines, coaxia l cables, fiber channels, wireless transmitters, satellite interfaces and the like. The regional server computers 16, 18 and the world server computer 14 are computing and communications platforms implementing specific communication devices, communication protocols, network server devices, and a specifically developed world training center network application. The application is operative in providing diverse services to the users of

the system such as storage of control information, the processing of user requests, the generation and transmission of exercise programs to the appropriate local training centers, registration of new users, reception of users requests for the allocation of desired of exercise sessions, the assignment of the allocated exercise se ssion to specific local training centers, and the like. A more detailed description of the structure and functionalities of the regional server computers 16, 18 and the world server computer 14 will be provided hereunder in association with the following drawings. Although only a limited number of regional server computers and only a single world server computer are shown in the drawing under discussion it would be easily understood that in a realistic environment a plurality of regional server computers and world server computers could service a plurality of local training centers and client devices.

The users of the client devices 10, 12 connect to the regional servers 16, 18 in order to participate in a personalized exercise regimen provided by the system . The users of the client devices 10, 12 communicate with the servers 16, 18, 14 in order to receive information concerning the service provided, in order to perform registration, to select and customize one or more exercise programs to participate in, in order to select initially one or more potential local training center to exercise in, to request modifications in an exercise program in -progress, to request re-assignment of one or more allocated exercise sessions to one or more alternative local training centers, to cancel an exercise session, to submit queries concerning past performances and progress of the active exercise program, and the like. The regional servers 16, 18 and alternatively the world server 14 respond to the requests of the users operating the client devices 10, 12 by providing the requested information, performing registrations, allocating exercise sessions, assigning local training centers, and the like. It should be noted that in the preferred embodiments there is a definite differentiation between the functionality and responsibilities of the local servers computers 26, 28, the regional server computers 16, 18, and the world server

computer 14. The world server computer 14 is used as the highest level control device for the entire world training center network. The world sever computer 14 is typically associated with the world. The world server computer may be associated with a country or a state, such as the U.S or the state of California. The server 14 stores and processes standard exercise program data templates, and standard exercise session data templates, comprehensive financial information, operative network information such as the list, physical addresses and network addresses of the regional servers, and the like. The world computer 14 receives new programs from the operators of the networks, receives general updates relating to specific control tables and inserts the received information into specific files. The standard exercise program templates and other updated information are periodically or by specific request are downloaded to the regional servers 16, 18. The regional servers 16, 18 are typically associated with a geographical region such as a county, town, city borough or the like. The regional servers 16, 18 accept standard exercise program data templates from the world server 14 in a routine manner or by request and store the received information into suitable data structures. The regional servers 16, 18 handle the requests and communications with the client devices 10, 12. Thus, the regional servers 16, 18 perform registration, generate personalized exercise programs by user request, allocate exercise sessions, assign local training centers to the requesting users, download exercise program and exercise session information to the local server computers, accept uploaded information from the local server computers 26, 28 concerning the history of the completed exercise sessions, and other data. In turn, the regional servers 16, 18 upload specific high level information to the world server 14. Thus, in general the client devices 10, 12 communicate with the regional servers 16, 18 for administration purposes. The users of the client devices 10, 12 or the trainees access physically the local training centers 20, 22 in order to perform an assigned and allocated exercise session. The regional server computers 16, 18 download the suitable exercise session data with the associated trainee information to

the local server computer 26, 28 at a pre-defined point in time before the scheduled beginning of the exercise session. The local server computer 26, 28 communicates the exercise session information to the scheduled training apparatus 34, 36, respectively in order to enable the performance of the exercise session. In the preferred embodiment of the invention the trainee arrives at the local training center 20, 22 and performs the exercise session on the assigned training apparatus 34, 36, respectively. The session is controlled in detail by the exercise session data stored in the processor of the training apparatus 34, 36. After the completion of the session the information associated with the session is communicated from the training apparatus 34, 36 to the local server computer 26, 28, respectively, which, in turn communicates the relevant information to the regional server computer 16, 18, or directly to the world server computer 14. When the transmission is performed to the regional server computer 16, 18 then some essential elements of the received information are transmitted from the regional computer 16, 18 to the world computer 14 for purposes of financial accounting, history, statistics, error-correction, marketing, potentially advertising, data aggregation, and the like.

It would be easily understood by one with skill in the art the configuration of the network and the functional interactions among the network particles could be organized in a different manner. In some embodiments, such as in a small sized network, the services of the world server 14 could be dispensed with and the functionality of the server 14 could be implemented by one or more regional server computers 16, 18. In other embodiments a plurality of world server computers could be controlled by an even higher level system server and some of the functionalities of the world server could be implemented in the high level system server. In this instance, the world servers could be associated with a limited geographical region such as a city borough while the system server could be associated with the entire country. Various alternative arrangements, configurations, hierarchical organizations could be contemplated in accordance with the size of the network, the power of the

devices utilized, the available transmission rate of the communication lines, the anticipated load on the system, and the like. In a specific low power embodiment, for example, the entire network could include an independently operating local server computer connected to several training apparatuses via a local area network where the entire set of devices is located in a single building. In this instance, all the above described functionalities could be implemented within the local server computer. In contrast, in an opposite very high power system, tens of thousands of client devices could be serviced by thousands of local server computers, which in turn could be controlled by hundreds of regional servers, dozens of world servers and one or more high level system servers.

A potential user or an active user (trainee) of the proposed system and method communicates with the network via a computing device having communication capabilities. Via the computing device the potential user or trainee interacts with the regional server for purposes of administration, registration, exercise program selection, exercise program customizing, useful queries, requests for exercise session allocation, requests for local training center assignment and the optional selection (if applicable) of a specific training apparatus. In the preferred embodiment of the present invention the potential user or trainee accomplishes these objectives by activating a personal computing device installed in the user's premises or office. In other embodiments of the invention the user could communicate with the network by utilizing an input device in the local training center.

Reference is made now to Fig. 2, illustrating a potential user or an active user (trainee) 100 communicating with the network 24 of Fig. 1 by activating a personal computer 102. The user 100 accomplishes communication with the network 24 by connecting to the network 24 from the personal computer 102 utilizing a display screen, an associated keyboard, a pointing device (mouse), and standard communication devices such as a modem, a telephone device, and standard telephone lines. After a suitable communication channel is set up by the training

network via a data communication network, such as the Internet or more specifically the World Wide Web (WWW) between the user 100 and the suitable regional server computer the user 100 introduces appropriate requests to the world training center network concerning system information, registration, exercise program selection, exercise program customization, health and fitness center selection, exercise session allocation, accumulative results of exercise sessions indicative of the progress of the user in the performance of an ongoing exercise program, and the like. The user 100 communicates with the server device by using as a front end a standard network browser such as the Microsoft Explorer or the Netscape Navigator. The server responds by activating a specifically developed back end program i.e., the world training center network application. The application responds to the request of the user by downloading information to be displayed, processing and storing user-specific parameters, examining the availability of function network resources such as desired exercise programs, local training centers, training apparatuses, timetables, and the like. According to the results of the processing the user 100 is notified in regard to the exercise program, scheduled exercise sessions, identification of local training center, identification of the training apparatus, and the like. Thus, via a pre-determined set of operational step the user 100 interfaces with the system and method proposed by the present invention using the computing device 102. Note should be taken that in other preferred embodiments of the invention the user 100 could communicate functionally with the system and method from any other computing and communicating device having the appropriate hardware and software resources such as his private cellular phone, a two-way radio, a paging device, a game console, and the like. In the preferred embodiment the user interface is graphically enhanced but it would be easily perceived that other types of user interfaces could be utilized such as a command line interface, a visual menu -based interface, an Interactive Voice Interface (IVR) for the aurally disadvantaged, and many other more advanced types of interfaces. Of course, for these additional

embodiments advanced functional devices should be installed in the appropriate server computers, such as for example a Voice Response Unit (VRU), additional software components will be used and other suitable enhancement and modifications will be made.

In order to perform a scheduled exercise session the user physically accesses the assigned local training center. The local training center is typically a health and fitness center or gym having computing equipment, communication facilities, and training apparatuses. The local training center is typically staffed by administrative personal, and exercise support personal such as professional trainers. In the preferred embodiment of the present invention the user (trainee) exercises by operating a pre-determined training apparatus controlled operatively by a controller unit such as microprocessor. In the preferred embodiment of the invention the training apparatus is located in a separate room in order to avoid p otential environmental distractions and thereby providing the user with the capability of high concentration during the performance of the complex exercises. In other embodiments of the invention the apparatus could be located in a common exercise room of the training center. In further embodiments the apparatus could be located at various training locations, such as hotels, community centers, rehabilitation centers, hospitals, working places, and private residences. The training apparatus is a multi-functional resistance trainer having variable working axis as described in great detail in the related patent application. The processor stores the pre-selected and pre - customized exercise session sequence including a set of executable steps operative in the proper performance of the exercise session. The information defining the sequence of the exercise session is transmitted before the commencement of the scheduled exercise session from an associated regional server computer to the local server computer via the data communications network. The local server computer communicates the exercise session-specific information to the pre -determined training apparatus. The supporting staff of the fitness center (if available) does not

physically control the training session and the exercise session is performed independently by the trainee according to instructions generated by the exercise program stored in the processor. In this sense the exercise control program is acting practically as a virtual exercise session support personnel. Human trainers or site supervisors interfere only when specific request is made by the trainee or the exercise program component monitoring the performance of the trainee and the operation of the resistance trainer machine identifies a potential problem concerning software, hardware malfunctions, machine breakdowns, and the physical condition of the trainee. When a hardware malfunction is detected within the training apparatus the supporting staff of the center is suitably notified by the hard ware condition-monitoring component.

Reference is made now to Fig. 3, illustrating in a suitably graphic manner the trainee 100 performing the exercise session. The trainee 100 operates the resistance trainer machine 104 by exerting force against artificial resistance. The multi-functional resistance machine 104 is coupled via suitable electric wires 124 to a computer 108 associated with a keyboard 118, and a pointing device 120. The computer 108 is linked via a cable 128 to a display device 110. The device 110 is preferably a visual display device such as a CRT, an LCD, a TFT or the like. The device 110 is fastened to a rigid but flexibly adjustable supporting arm 116 to enable to suitable orientation of the device 110 in respect to the user in order to allow for convenient observation of the display screen by the trainee 100. The display device 110 is also equipped with one or more loudspeakers 112, 144 to make available the option of providing voice communications from the exercise program to the user 100, such as voice commands, voice encouragements, voice warnings, and the like in addition to the display of similar text on the graphical user interface presented on the display device 110 screen. The computer 108 is linked via suitable communication cable 122 to the communications network. In the preferred embodiment of the present invention the computer 108 is capable of communicating with the local

server computer in order to receive exercise session information, maintenance commands, and other instructions. The computer 108 is capable of communicating error conditions, hardware failure conditions, indications in regard to the progress of the exercise session, and the like. In other preferred embodiments of the present invention the computer 108 could communicate directly with a regional or world server computer to receive directly the scheduled exercise session data, trainee data, updates, and the like. Optionally (e.g. in emergency situations) the computer 108 could also communicate with the controlling devices of the other equivalent training apparatuses, such as notifying the computers of the other training apparatuses concerning a catastrophic hardware failure (preferably instructing them to terminate their own sessions immediately so as not to effect si milar potential failures), notifying the computers of the other apparatuses of an unexpected failure of the local server computer, and the like. Further, the computer 108 could optionally be used as a back up computer and could take over the some or all of the functionalities of the local server computer.

Still referring to Fig. 3, the computer 108 includes a microprocessor (not shown) operative in the controlling of the exercise session. The microprocessor is interfaced to specific sensors (not shown) installed in the resistance trainer 104, which send suitable electric signals to the processor in order to indicate specific states of the resistance machine 104. Thus, the processor will be aware that the trainee 100 slows down the exercise or stops the seque nce of the exercise steps entirely. Accordingly the processor will send a command to the graphical user interface associated with the display device 110 and to the voice interface associated with the loudspeakers 112, 114 to issue an appropriate warning or instruction to the trainee 100 concerning the detected phenomenon. The sensor devices could also generate signals to the processor indicating the amount of force exerted by the trainee 100, the direction of the exerted force, and the like. As a result the processor could monitor the progress of the exercise session at any point in time during the

performance of the session. Moreover, the processor is operative in scanning the exercise session information and accordingly instructs the user in regard to type of the action to be taken next, the requested number of movements, the sufficiency of the force exerted, the direction of the movement, and the like. The processor could be programmed to introduce real-time modifications to the sequence of the session, such as changing the order of the operative steps, skipping some of the steps, and the like. The processor could be also modifying the duration, type, and number of the actions in accordance with requests of the trainee 100. The trainee 100 is enabled to communicate with the computer 108 by utilizing the suitable input devices, such as the keyboard 118, or the pointing device 120. Thus, the exercise session is controllable by a) the exercise session definition information, b) the exercise -related actions of the trainee 100, c) by specific requests of the trainee 100, d) optionally by particular commands from the local server computer or from any other apparatus-controlling computer. Several instructions generated by the computer 108 and directed to the trainee 100 concerns the physical modification of the training apparatus' configuration, for example replacing the operating handles. In this instance, the instructions are suitably conveyed to the trainee 100 in order to enable the trainee 100 pausing the exercise, replacing the operating handles of the machine with an alternative set of handles kept on the shelves 106, and then resume the exercise.

It would be easily understood by one skilled in the art that the above-described arrangement is exemplary only. Alternative, enhanced and improved configurations and useful additional components could be used, such as headphones provided for the trainee 100 in order to replace the loudspeakers 112, 114 so as not to interfere with the exercise activities of the trainees using adjacent machines in a shared exercising environment. The computer 108 could be controlled by voice input from the trainee 100 in which case suitable microphones could be supplied to the trainee 100. Other major or minor modifications could be cont emplated, such as

changing the relative location of the functional components, and the like. The above description is intended to provide a clear understanding of the concept of the present invention and was not meant to be limiting to any possible enhance ments, improvements, and additions effected during the reduction to practice of the present invention.

The concept and the principles of the multi-functional training apparatus with adjustable working axis were described in the related patent application i n detail. Fig. 4 illustrates briefly the possible movements executable by the trainee 100 when exercising with the exercise machine 104. The trainee 100 can change his position along the axes 109', 109'' by changing the orientation of his body relative to the machine. The exercise is performed through the exertion of the trainee's 100 force against a resistance. The force is exerted by the turning of the operating handles 105. The axes of the handle movement are changeable. In the preferred embodiment of the present invention three alternative axes are operational. The alternative axes are designated in the drawing under discussion by the directional arrows 107', 107'', and 107'';. Each operation along a specific axis is effects the movement of the handles 1 05 against the resistance unit constituting the artificial resistance in two possible directions. Thus, the exercise consists of three different type of movements along three different axes 107', 107'', 107''', in two different directions, and in the modifying of the trainee's body posture. Each different combination of trainee body posture, exerted force direction and axis of exerted force effect the activation of different muscles or different groups of muscles. It would be obvious to one skilled in the art that a properly designed and ordered sequence of actions each associated with a specific body posture -direction-axis combination will constitute a properly performed exercise session. It would be also obvious that the different sessions involve different parameters such as the number of movements to be made in each action in the sequence; the measure of resistance, the requested rate of the movements will be different among different sessions. The above-mentioned

data is used by the exercise control program as input parameters to a specific exercise session. A pre-defined set of pre-defined exercise sessions having specific order-related and frequency-related parameters defines an exercise regimen or exercise program.

Referring now to Fig. 5 that illustrates a set of hardware and software components constituting the world training center server. The server 46 is set of software devices implemented on a computing and communicating platform 37, which is connected to the data communications network 24 of Fig. 1. The computing and communications device 37 includes several functional hardware devices, such as an input device 44, a communications device 42, an output device 40, and a printer device 38, a processor device 50, and a memory device 52. The platform could be any of the standard computing devices available on the market. The input device 44 is operative in accepting input introduced by the users of the server 46. Any one of the standard or advanced input devices could be utilized as device 44, such as a keyboard, a pointing device (mouse), a keypad, a microphone, command-specific switches, and the like. The communications device 42 is a set of standard communications tolls such as a modem, a telephone device, a NIC, a communication controller, a multiplexer, telephone lines, and the like. The communications device 42 is operative in the setting up of a communications channel between the platform 46 and the data communications network. The communications device may include specific communications controlling software or communications protocols implemented either as executable program instructions stored in an internal memory area or built into specific integrated circuits. The output device 40 is used for communications between the platform 37 and the users of the platform. The output device 40 is typically a display screen such as a CRT, an LCD, a TRT or the like, utilizing a graphical user interface (GUI) vis-à-vis the users of the device. Any type of known off-the-shelf display devices could be used for this purpose. The printer

device 38 is operative in the generation of hard copy documents. The device 38 could be a laser printer, an inkjet printer or any other standard printer. Utilizing the printer device 38 the users of the platform could suitably output documents, reports, listings, and the like. The processor device 50 is responsible for the appropriate execution of the programming instructions, in the processing of the information, and in the manipulation of stored data structures. The processor de vice 50 further performs calculations, string handling, decisions, and any other operation involved in the operation of the platform 37. The processor device 50 is typically a microprocessor, implemented on an integrated circuit chip such as the Pentium series, the PowerPC series, and the like. The memory device 52 stores the entire set of software programs, associated data structures, temporary working structures, virtual memory contents, and the like. The memory device 52 includes a read/write storage area having sufficient storage capability in the range of gigabytes of data. The memory device 52 is preferably a hard disk, a magnetic disk, an optical disk, a mass storage system, a RAM, an SDRAM or any other suitable storage devices with the read/write capability and sufficient storage space. A plurality of storage devices is available on the market either separately or as part of a package that includes hardware components constituting an operable system.

Still referring to Fig. 5, the memory device 52 includes an operating system 54, a web server 51, a communications handler 48, a training center application 56, and a training center database 58. The operating system 54 is responsible for controlling the activities of the system. The operating system 54 allocates resources, manages processes and sub- processes, coordinates input/output operations, loads and executes utility programs, monitors system activity, and the like. Any operating system routinely used as a control program in a communications environment could be utilized for system 54, such as one variant of the Window series (e.g. Windows NT, Windows 2000, Windows XP), one of the Unix variants or clones (e.g. Linux), among many others available on the market. The web server 51

is operative in accepting connection requests originating from network browser operating in the network, processing the requests and in accordance with the request parameters either responding directly or activating suitable back end applications, receive from the back end applic ations the requested data and download the data through the communications network back to the requesting network browser. Several standard web servers could be used as server 51, such as the well known Apache server typically used for Unix-based platforms , or any other similar web server.

Still referencing Fig. 5 the world training center server 46 is a set of software programs and data structures operative in the execution of the world training center method in accordance with a preferred embodiment of t he present invention. The server 46 includes a training center application 56, and a training center database 58. The training center application is a set of software programs operative in the running of the world training center method. The application 56 includes an application controller component 60, an accounting component 62, a management component 64, a history builder component 66, a personalization component 65, a registration component 68, a user handler component 70, a session scheduling component 72, a communications component 74, and virtual training support handler component 74. The components constituting the application 56 are functional program modules consisting of specifically ordered and organized sequences of programming instructions, wh ich are loaded, activated, and executed in accordance with the progress of the world training center process. Each of the components is preferably responsible for a specific sub-function operative in the accomplishment of a particular task. The overall logical control of the application 56 is the application controller component 60 or the main logic sequence of the application 56. The application controller 60 is activated when a specific request is made either from one of the users of the system, such as a client device, a regional device, or the like. The application controller 60 could activate the application 56

independently according to the indication of some event, such as the setting of a pre-defined value in a timing register by a real-time clock. The application controller 60 could be activated by the human operators of the platform 37 for the performance of maintenance tasks, such as running of a diagnostics program, routine utility operations (e.g. printing, disk compaction, backup, and the like. Subsequent to its activation the application component 60 begins to analyze the parameters associated with the activation process in order to determine the type of activity to take. Thus, according to the received parameters the component 60 loads and activates the other functional components of the application 56. For example, when a user submits a request to the system the user handler component 70 is activated. The user handler component 70 is responsible for communicating between the requesting user, such as a potential or actual trainee, and the application 56. The handler 70 accepts requests introduced by the user and communicates the type of requests to the application controller 60. The controller 60 identifies the request and activates the appropriate component responsible for suitable response. Thus, for example, if the requesting user is interested in registration the then the controller 60 will load and execute the registration component 68. The component 68 is responsible for accepting user registration-specific information, such as personal data, health condition, desired exercise program, customization option, preferred training centers, preferred timetable, and the like. The component 68 itself could load and execute additional components. For example, if the user desires to schedule an exercise session the component 68 could either return control to the controller component with suitable indication in regard of the activation of the session scheduling component 72 or could activate the session scheduling component 72 independently of the controller 60. Subsequently the session scheduling component 74 will examine the list of the training centers defined by the user, check the availability of the desired dates and times for the performance of the exercise session, update the suitable data structures, and return a confirmation to the user. The confirmation message is sent to the user

handler component 70, which, in turn will communicate the confirmation message to the user. The entire process involved in the running of the application 56 is managed in this manner. If the user desires to customize a selected exercise program then the personalization component 65 will be responsible for the performance of the task. The component will interrogate the user though the user handler 70 in regard to the required parameters and will generate a personalized exercise program or will modify an existing exercise program. The history builder 66 will accept control at the reception of previous exercise session info rmation. The component 66 will process the relevant data, and will insert the information into the proper data structures. The communications component 74 is responsible for decision if communication is necessary, accepts the required network address and will send it to the communications handler 48 to initiate an actual communication channel between the platform 37 and the required address. The management component 64 handles data, which is independent of the users, such as the list of regional, or local s ervers, exercise program templates, and the like. The accounting component 62 is operative in the financial; management of the system. The component 62 updates prices, answers queries concerning costs, generating payroll, registers expenses, outputs financial statements, creates and sends bills, and receipts, and updates data structures holding vital financial information. The virtual training support handler component 74 is responsible for the real-time interaction between a trainee and the selected training apparatus. The virtual training support handler 74 is distributed periodically among the local training centers and loaded into the training apparatus memory area previous to the performance of a scheduled exercise session. The handler 74 is capable of managing an exercise session, to communicate with the trainee according to the selected and customized exercise program, to monitor the activities of a trainee in the framework of the exercise session, to dynamically control and optionally modify the sequence of the exercise session, and to communicate with the local training server computer when needed. The entire set of the routines constituting the

training center application 56 is maintained, improved, upgraded, corrected in the world training center server and downloaded to the local training servers according to the requirements (i.e., when a new local training center is opened, when a new version of the application is created or when a specific request is made from one or more of the local centers.)

It would be easily understood by one with ordinary skill in the art that the above-described list of components is exemplary only. In a practical application several additional components could be implemented, some components could be deactivated, others could be divided into two or more new components, several existing components could be combined, and the like. For example, specific separate components could be designed and developed for marketing purposes, for exercise program building, for error-corrections, for statistical purposes, for the creation of aggregates of exercise-related data in order to be used as a potential source database for health and fitness research and for exercise program development, improvement, and enhancement, and the like. Further the virtual training support handler could be duplicated with a slightly different structure and functionality in order to be used for a new training apparatus operative in the performance of a novel exercise program.

The training center database 58 is a group of functional data structures that store information vital for the operation of the world training center application 56. The database 58 includes a standard training program and training session templates 82, a personalized training programs and sessions file 84, an accounting file 86, a virtual training support routines file 77, a registered users list 76, a personal scheduled exercise session file 78, a personal exercise session history file 80, and a local training centers list 81. The standard training program and training session templates file 82 holds a plurality of encoded records in a machine-readable format, which represent standard training programs and sessions. A record in the file 82 includes several data fields where each field indicates a specific aspect of the standard training program and session. The fields could include for example a

training program identification, program-specific information, such as the number of sessions, recommended frequency of the sessions, and the like. Further the record could include fields relating to specific exercise sessions, such as session identification, length of session, recommended number of exercises, recommended number of repetitions for each exercise, type of handle to used, recommended resistance value, recommended direction of movement, and the like. The standard template file 82 provides a specific user of the system with a standard recommended procedure where the program template is adjusted to the personal health information, the objectives, the accumulated results indicative of the user's progress, and the pre-defined objectives of the user. For example, a different template could be recommended for a healthy individual than for an individual with some previous injury, current disability, or for a convalescing individual undergoing a physical rehabilitation process. Similarly, different program templates will be recommended for different sexes and different age groups. It would be readily perceived that a eighteen-year old male would be recommended to exercise in a program which is more stressful and physically more difficult than that recommended to a middle -aged woman.

Consequent to the customization of a recommended exercise program by a user the personalized training program and sessions file 86 is generated. The file 84 is preferably unique for each individual user although in practice only a limited number of personalized programs will be generated and thus a plurality of users will be assigned a substantially identical personalized program. The system and method proposed by the invention will recommend not customizing an exercise programs as the system will attempt to tailor a certain program to the specific characteristics of the requesting individual. If personalization is still re quired specific custom parameters are queried from the user, such as number of sessions, length of the sessions, and the like. Following the introduction of the personalization parameters a unique user-specific personalized program record will be generated where the new

record is created from a similar program template modified by the introduced parameters. The records in the file 84 will be indexed by a user identification value and will be downloaded to a local training center at a pre-determined point in time previous to the scheduled start of the exercise session. Although not highly recommended the user is also provided with the option of re -customizing or re-personalizing an assigned exercise program during the progress of the exercise regimen. Further the user could dynamically re -customize one or more exercise sessions. For example, if the user finds a specific session too difficult to perform the next scheduled session could be modified in such a manner that the degree of difficulty is reduced. Of course, users in good physical conditions with past experience in the type of exercising practiced could personalize the exercise regimen to make it harder in order to benefit from it in an accelerated manner. It should be noted that the personalization parameters are accepted by the system only within certain limitations depending on the history of the user, on the health conditions, on the inborn genetic characteristics and the like. Thus, for example, if a user requires the modification of a session such as to perform significantly harder activities the system will examine the relevant user-specific data, if necessary will warn the user of the risks involved and in some cases may also refuse the request.

The registered users list 76 stores the user- specific information required by the system and method. The list 76 includes encoded, machine-readable data including data fields representing a certain aspect of the user information, such as personal information (name, address, etc.), health information, such as bodily characteristics, sex, historical data, historical information, such as previous injuries, surgical procedures performed, and the like. The file further includes financial data, personalized exercise programs, preferred local training centers, and t he like. The personal exercise session schedules file 80 stores all the information concerning exercise sessions scheduled by the user. The file 80 is built encoded in a machine-

readable format and includes records in regard of the date and time of a scheduled session, location, and the like.

It should be specifically noted that within the framework of an exercise program in-progress a user could request and order an exercise session across a set of alternative local training centers located at diverse geo graphical locations. Thus, the user could perform the majority of the exercise sessions included in the exercise program in a regular or a "home" local training center and perform one or more exercise sessions in alternative local training centers that cou ld be located in different cities and even in different countries. For example, a user who is participating in an exercise program and lives in New York will perform his regular exercise sessions at a local training center in New York. When the same user t akes a vacation and travels to Florida the exercise program is not necessarily interrupted. The user could request and allocated a correctly set up exercise session in a local training center operating in Miami for example. As the user files and programs a re stored and maintained centrally by a regional server or a world server and are downloaded to the designated local training center previous to a scheduled training session, the user is not limited exclusively to a specific local training server but could select any local training center associated with the world training center network having the suitable apparatus and available time slots.

The personal history file 80 is a data structure storing relevant information regarding the past exercise sessions o f the user. The file 80 may include number of sessions completed, indications regarding the rate of success in the sessions (e.g. interrupted sessions, uncompleted exercises, etc.) and the number of exercise program modifications requested by the user duri ng the progress of the exercise program. The file 80 further includes accumulated results of the previous exercise sessions performed and it is indicative of the user's progress in the performance of the exercise program The accounting files 86 store financial data, such as prices, receipts, expenses, accountings, and the like. The local training list 81 is a set of

records representing health and fitness centers associated with the system. The list 81 could indicate the name of the institution, the postal address, the network address of the local computer, the telephone number, the type and the number of available training apparatuses, the number of active users preferring the institution, and the like. The file 81 could also include information regarding t he availability of the machines according to a precise timetable. The virtual personal training entity file 77 is a set of programs designed and developed to emulate the behavior of a human personal trainer. The virtual personal training entity file 77 is designed to emulate the behavior of a human trainer and thereby providing substantially identical functionality. The file 77 includes encoded records in machine-readable format where each record consists of fields representing some aspect of the personal virtual training program. The file 77 could for example include the "name" of the entity, the visual graphical image of the entity, important personality traits such as "tough", "easy-going", "aggressive", and the like. The file 77 is used for the customization of a personal virtual training entity by the user. The user is given the option of selecting a basic training entity from the file 77 and subsequently enabled to modify the characteristics of the entity in order to tailor the training entity. The customization is performed by receiving suitable user request concerning the virtual training entity and then generating a personalized entity through using a set of selectable program modules each defining a specific visual, or behavioral aspect of the enti ty for the satisfaction of the requesting user.

It would readily be perceived by one with ordinary skills in the art that the above-described set of files is exemplary only. Additional files could be implemented, such as for example, a statistics file, a m ailing list, a list of training apparatuses, a list of users not allowed joining the network, a list of users for the sending reminders regarding a scheduled exercise session, and the like.

Still referring to Fig. 5, the structure and functionalities of the world training center server described in the drawing are substantially similar to the

structure and functionality of the regional training center servers. In this instance the capabilities and the functions of the world server are substantially identical to the capabilities and functions of the world server. In other embodiments the world server has specific additional functions while some of the functions and files included in the world server are transferred from the world server to the specific regional servers. In a small network all the above-described functions and files could be transferred to a local training server computer to enable the local training server to operate independently and provide comprehensive services to a plurality of local user s.

Fig. 6 provides a more detailed view of the significant files stored on the world training center server 210. The server 210 comprises a world training center network database 212. The database 212 includes a local servers list 216, a standard training program and standard training session list 214, a registered user file 218, and a personalized training program and a personalized training session list 220. The standard training program and session template list 214 includes the training program template-specific records training program 1 (213), and training program 2 (215) where each standard program template is represented by a unique record. The record 213 includes sub-records representing exercise session templates. Thus, the training program 1 record (213) includes a training session sub -record 1 (256), and a training session sub-record 2 (272). The training program records as well as in the training session sub-records include data fields representing specific aspects of the standard training program template or the standard session template. Thus, the training program 1 record (213) includes training program -specific information 254, the training session 1 record (256) includes a training session -specific information 258, and the training session 2 sub -record (262) includes a training session-specific information 266. The program specific information includes program identification, training apparatus identification, duration of the program, number of exercise sessions, health-related and other limitations concerning participation in the program,

and the like. The training session-specific data includes session identification, session length, number of exercises, and the like. Similarly the training program 2 record 270 includes a training session 1 sub-record (274) and other non -specified training session sub-records. The training program template 2 record (270) includes a program template-specific data 274 while the training session 1 sub-record includes session-specific data 276.

The personalized training program and session file 220 is established on the memory device of the world training center server. The file 220 is generated from the list 214 in conjunction with the customizing parameters supplied by the user desiring to perform a customized training program. The file 220 consists of personalized program records 295. The record 295 consists of a training program record 1 (296), which in turn includes program -specific data 298, a training session 1 sub-record 300 and session-specific data 304. The personalized program and session file 220 is unique for a certain user and is downloaded to the local training server computer to be transferred from the local server computer to the control computer of the training apparatus as a preparation for the s cheduled exercise session.

The registered users file 218 is established on the memory device of the world training server. The file 218 is created and updated following the registration of the users to the system. A user-specific information record is crea ted and maintained for each registered user. The user record includes a user identification 280, a user personal data sub-record 282, a user health sub-record 284, a user financial sub-record 286, a personalized training program and exercise session sub-record 288, a training session schedules record 290, a history sub-record 292, and other non-specified sub-records.

A local servers list 216 is established on the memory device of the world training center server. The list 216 is generated and maintained in accordance with the entry of a local health and fitness center to the world training center network. The list 216 is further updated periodically by the uploading of certain information from

the local training center server computer, such as the communication of relevant financial data. The 216 include a set of records representing local training centers. Thus, the list 216 includes a server 1 record 222, a server 2 record 232, and a server N record 242. The server records 222, 232, and 242 include local server -specific sub-records. Thus, server 1 record 222 includes a location data field 224 (address, town, state, country, etc.), a communications data record 226 (network address, telephone number, etc.), a financial data record 228, and a non -specified data record 230. Similarly, the server 2 record 232 includes a location data field 234 (address, town, state, country, etc.), a communications data record 236 (network address, telephone number, etc.), a financial data record 238, and a non -specified data record 240. The server N record 242 includes the same types of records.

It should be noted that only the files most relevant to the concept underlying the present invention were described in a detailed manner. Further the structure of the files and the type of records and sub-records described is exemplary only as each sub-record could be further described in terms of its constituent fields. Further, in other embodiment of the present invention additional types of record, sub-records, and fields could be added, some of the records could be disposed with and the files could be designed in a different manner during the process of the reduction to practice. The description of the database was intentionally simplified in order not to obscure the salient features of the present invention. The simplification of the description was not meant to be limiting to additional, advance data structures that could be contemplated. Furthermore, the database management system, access methods and internal formatting of the data was not specified as it would be readily perceived by one with skill in the art that diverse different types of data organization, record connection, and access methods could be used without essentially depart from the spirit and scope of the invention.

Reference is made now to Fig. 7 that illustrates the system components operative to the execution of the proposed method within an exemplary local training center 352. The local training center 351 is typically a privately or publicly -owned commercial enterprise usually located in one or more buildings and comprises one or more exercise rooms with associated administrative offices, refreshing areas, showers, and the like. The local training center is operative in providing actual training services to a plurality of individuals engaged in or desiring to be engaged in physical exercise programs. The functional components of the local training center relating to the world training center network include a local training center server device 352, an apparatus controller device 353, and a training apparatus 358. Although on the drawing under discussion only a single apparatus controller device and a single training apparatus are shown it would be readily perceived that in a realistic environment a plurality of training apparatuses could be installed such as to be suitably controlled by a plurality of apparatus controller devices. The local training center server device 352 is a computing and communicating device such as a personal computer, a mini-computer or a mainframe computer with sufficient processing and storage capabilities. The server computer 352 is communicatively connected to a data communication network 350. The network 350 could be a Metropolitan Area Network (MAN), a Wide Area Network (WAN), a satellite network, or the like. In the preferred embodiment of the invention the network 350 is the Internet. The server computer 352 communicates via standard communication devices, lines, software, and protocols with regional training server computers and world training server computers across the data communications network 350. The server computer 352 includes an apparatus list 357, and a temporary session file 359. The list 357 and the 359 are suitably designed and generated data structures stored on a memory device (not shown) of the computer 352. The apparatus list 357 is a set of data records representing training apparatuses. The list of temporary session files 359 consists of data records where each data record represents temporary

information regarding a scheduled exercise session associated with a specific training apparatus and an associated user. The temporary session file 359 is created consequent to the downloading of information from a regional server computer or a world server computer connected to the network 350. The presence of a specific record in the session file 359 indicates that a scheduled exercise session is about to begin. Consequent to the downloading of the session records the server computer 352 transmits the temporary session file record to an allocated training apparatus controller device 353 via standard communication devices such as telephone lines, electric wiring, wireless transceivers, and the like, utilizing appropriate communication software and suitable protocols. In preparation for the start of the exercise session the transmitted session record is stored in a temporary memory area (not shown) of the apparatus controller device 353 and a timing device such as a real-time clock begins to count down the suitable time units left to the scheduled start of the exercise session. The controller device 353 is preferably a personal computer having sufficient processing rate and sufficient storage capability. The controller device 353 includes an input device 360, a display device 356, a processor device 354, and a memory device 371. The controller device 353 is coupled to a training apparatus 358. In the preferred embodiment of the invention the training apparatus 358 is a multi-functional resistance trainer with variable axis. The apparatus 358 includes a data buffer 362, a motors controller 360, encoders/decoders 364, 366, 368, 370, 372 encoding/decoding signals sent to/ received from the motor units 378, 376, a resistance unit 374, and the motors unit 380, 382, respectively. The apparatus further includes operating handles 384 and 386 to exert force against the resistance unit. The training apparatus is provided with electrical power from a power source 369. The mechanical components and the operating modes of the training apparatus 358 were described in detail in the related patent application incorporated in its entirety herein and therefore and will not be described. At the scheduled starting time of the exercise session the user is suitably informed by the

controller device 353 and the session begins. The session consists of controller device 353 instructing the user regarding the sequence of the pre-defined exercises, the user performing the exercises, the apparatus sensing the activity of the user and sending suitable feedback to the controller 353 via the encoder/decoder units 264, 366, 368, 370, 372. The units encode the electric signals generated by the unit sensors and place the resulting data into the data buffer 382. The data is obtained from the data buffer 362 by the controller' 353 input/output control sub-system (not shown). Subsequently the controller 353 analyzes the data sent by the unit sensors through the encoder/decoder units 364, 366, 368, 370, 372, and the data buffer 362 and generates suitable commands to the motors and resistance unit controller 360, which, in turn generates suitable data decoded into electrical signals by the encoder/decoder units 364, 366, 368, 370, 372. The decoded signals appropriately modify the operating characteristics of the motor devices 376, 378, the resistance unit 374, and the motor devices 380, 382, respectively. In addition the controller generates specific responses directed at the user. The responses are transmitted from the processor device 354 to the display device in order to be communicated to the user. The responses are communicated via a specifically developed interface routine referred to as the "personal virtual training entity". This specific interfacing process is supported by an in-built Graphical User Interface mechanism (GUI) utilizing the display device 356 of the controller computer 353. The user receives the responses of the controller 353 visually and./or aurally and responds to the instructions accordingly. The user also responds to the variations in the operations of the motor units 376, 378, 382, 388, and of the resistance unit 374. The user is allowed to interface with the controller device 353 via the input device 360. For example, if the user desires to terminate an exercise session the suitable commands could be introduced into the controller 353 by inputting the commands via the input device 360. The controller device 352 is capable of optionally communicating with the server computer 352. For example, if a hardware error is detected by the controller

353, the exercise session will be interrupted and a request could be transmitted to the server computer 352 concerning the appropriate execution of a hardware diagnostics program. At the completion of the session the controller device 353 informs the user, deactivates the training apparatus 358 and transmits a suitably structured message to the server computer 352. In addition, the relevant session data is sent to the server 352 to enable the suitable update of the data files and to enable preparation of the information for remote transmission to the regional server or the world server through the network 350.

In other embodiments of the present invention the training apparatus such as the resistance trainer in association with the training apparatus controller could constitute an independently operating training unit, referred to as the "local system". In such a case the local system will not be linked to a local training center server computer and to the world training center network. The independently operable local system could be located in diverse training locations such as in a shared training area in a training center such as a health club, in a separate room in the training center, in private residences, in hospitals, in a rehabilitation centers, in specifically desi gnated exercise rooms in a community center, and the like. The training apparatus controller could include software functional in controlling the operation of the training apparatus as described above. The controller could further include a personalized or standard training program, a personalized or standard virtual training entity, a data collection component, a local database to store the personalized training program, the personalized virtual training entity, historical data, and the like. The local sys tem could include an input unit such as a CD -ROM, a diskette device, and the like to allow for the loading of the specific software and associated control tables (established and optionally customized in a separate computing environment and distributed via traditional software distribution channels) functional in providing computerized control to the operation of the training apparatus. In the limited configuration involving the local system only, some of functionalities of the local

training center server and/or the world training center network will be embedded in the training apparatus controller.

In the preferred embodiment of the present invention the training apparatus controller is external to the training apparatus. Thus, in specific environments a separate personal computer could be used as the training apparatus computer. In a private home, for example, the software and associated data structures could be implemented in an existing personal, computer, which could be interfaced appropriately to the training apparatus via a specific cable and a specific compute port. In other embodiments the training apparatus controller could be an integral part to the training apparatus. Many other possible configurations could be contemplated, such as connecting the training apparatus to a cable communication network that could transmit the pre-defined personal program downstream from a cable service head-end having a training center application implemented.

In the preferred embodiments of the present invention the training apparatus 358 is a multi-functional resistance trainer having adjustable working axes. Typically a trainee performs an exercise by grasping the set of operating handles 384, 386 coupled to an active resistance unit 366. In the preferred embodiment of the invention the resistance unit 366 is an electromechanical device. The amount of resistance to the movement of the handles, affected by the efforts of the trainee, is under the control of the training apparatus controller 353 in accordance with the customized training program data stored in the controller 353. The force exerted by the trainee is encoded into electrical signals by force sensor devices (not shown). The electrical signals are transmitted to an encoder/decoder 372, which encodes the signals and feds the signals to processor device 354 of the training apparatus controller 353. The processor 354 examines the received signals and if optionally generates suitable commands for the motors controller 360. Consequently the controller 360 transmits suitable control signals to the resistance unit 374 in accordance with the sensed the level of effort exerted by the trainee in association

and with the pre-defined parameters of the personal training program stored in the memory device 371. The settings of the resistance unit 374 are substantially continuously modified during the course of the training sessions, in accordance with the setting of the apparatus configuration in concert with the performance of each successive exercise constituting the exerci se session.

In order to enable the proper sequence of exercises constituting a training session the configuration of the training apparatus 358 should be modified after the completion of one exercise and prior to the beginning of the next exercise in th e sequence. The configuration of the apparatus 358 is modified by the combined adjustment of the operating handles' position, changing the level working unit position, changing the bench declination and vertical position, and by the variation of the working axes. In the preferred embodiment of the invention the modifications are accomplished via the training apparatus controller. The controller automatically activates suitable powering units, such as bi -directional electrical motors. The motor units 376, 378, 380, 382 installed in the training apparatus 358 are functional in providing motion for the adjustment of the operating handles' initial and final position, for providing motion for the adjustment of the level working unit in the vertical and horizontal position, for providing motion for the adjustment of the of the adjustable bench along vertical and horizontal planes, and for varying the working axes. The motors 376, 378, 380, 382 are controlled by the training apparatus controller 353, which is utilizing the parameters of the personalized training program, and the signals received from sensors and switches associated with the mechanical elements whose movements are powered by the motors 376, 378, 380, 382. Thus, in accordance with the parameters of the personalized training program, the motors 376, 378, 380, 382 effectively modify the settings of the training apparatus successively for each new exercise element.

The sensors and switches are operative in stopping the operations of the motors when a desirable mechanical movement along a pre-programmed had been

accomplished. The sensors and switches are also operative in monitoring the condition of the training apparatus, to generate appropriate electrical signals, which are fed to the training apparatus c ontroller 353 subsequent to the encoding of the signals into processor-readable format by the encoder/decoder units 362, 366, 368, 370, 372.

In other embodiments of the present invention different exercise-specific configuration methods could be used. The training apparatus could be re-configured in the following modes: a) manually where the trainee (or a training support personnel) mechanically re-sets suitable mechanical elements or activates electrical switches, and b) semi-automatically such as when the setting of one element by the trainee or the support personnel automatically re -sets an associated element.

When a trainee indicates willingness to begin an exercise session to the training apparatus controller 353, the personal training program is loade d from the memory device 371 and executed. As a result the processor 354 generates suitable control signals. The signals are transmitted to the motors controller 360 in the training apparatus 358. The motors controller 360 feds the signals to the motors 374, 378, 376, 380, and to the resistance unit 374 through the suitable encoder/decoder units 364, 366, 368, 370, Subsequently the motors 376, 378, 380, 390, the resistance unit 374, and the operating handles 384 are activated in order to set the configuration of the training apparatus 368 to the initial exercise. The bench of the training apparatus is moved to the appropriate position, the level working unit is displaced accordingly, the handles are set into the proper position, the working axes is initialized, and the resistance unit is set to the pre -determined resistance value. The trainee begins the training session by moving the operating handles 384 along a pre-defined range, a pre-defined axis, and a pre-defined force. The movement of the handles generate signals concerning the force exerted, the rate of the exercise, the number of to movements, the direction of the movements, and the like. The signals are sent to the processor 354, which processes the received data and takes optional

actions in accordance with the result of the processing. For example, if the trainee maintains a slow rate of the exercise the processor 354 generates a warning message enhanced by a visual display that is displayed on the display device 356. If the trainee pauses in the performance of the exercise the processor creates a warning message and if no suitable trainee-reaction is sensed then the processor 354 may deactivate the training apparatus 358 and generate an alert for the training support personnel. The processor 354 maintains a set of software (or hardware) counters utilized, for example, for monitoring the number of repetitions of the exercise element. In the preferred embodiment of the invention, the counter is set to the value of the appropriate parameter in the personalized training program. For each repetition of the exercise element by the trainee the value of the counter is decreased by one. When the counter value reaches zero the processor notifies the trainee, and re-configures the apparatus 358 according to the pre-defined parameters of the personalized training program. The re-configuration is accomplished by the generation of suitable control signals to the motors, and the resistance unit. The signals effect the activation of the motors for a specific period of time, and in a specified direction. The motors could be de-activated after a pre-defined number of seconds or could be cut off by the sensors associated with the moving elements. Consequently the halting of the motors effects the transmission of specific control signals back to the processor 354 of the training apparatus controller 353. The processor 354 integrates and processes the received control signals, examines the condition of the training apparatus 358, and notifies the trainee in regard of the next exercise. In addition, the processor 354 receives current health-related data from sensors (not shown) monitoring the physical condition of the trainee, such as pulse rate, perspiration, heart activity, inhalation rate, blood pressure, and the like. The processor 354 is pre-programmed to execute specific emergency procedures, which are activated as a result of irregular health data.

It would be readily perceived by one with ordinary skills in the art that the foregoing description is exemplary only. Other procedures, operational sequences could be used in the framework of the invention. In addition, useful functions could be added such as adaptively adjusting the parameters of the personalized training program to the habits of a trainee.

The consolidated data structure operative in the controlling of the exercise session is the temporary session file 359. This information structure is established on the regional or world servers subsequent to the request of the user for the allocation of an exercise session. The structure is generated also in accordance with pre-defined data stored in the registered users file, personal training program files, local server list, and personal virtual training entities list. The temporary session file is downloaded from the regional server or the world server previous to the start of a scheduled exercise session. In preparation for the scheduled session a selected record of the session file is sent to the controller device associated with the allocated training apparatus, and stored on the memory device. The control program of the controller device obtains the session record and according the control data stored herein activates the real-time clock to start the count down to the beginning of the session, initializes the personal virtual training entity, and activates the training apparatus. During the session the controller utilizes the session record to activate the sequentially defined operations of the training apparatus, to communicate suitably with the user, and terminating the process after the performance of the pre-defined procedure.

Referring now to Fig. 8, the temporary session file 402 includes a set of records 404, 406, 408, 410 where each record is associated with a specific user. Thus the file 402 includes a set of records 404, 406, 408, 410 where each record is associated with a specific user 1, user 2, user 3, and user N, respectively. The user records 404, 406, 408, 410 are associated with a scheduled exercise session. The data

fields in the records 404, 406, 408, 410 relate to a particular aspect of the exercise session, such as the training session identification 412, a pointer to a personal training session 414, a date and hour of the start of the scheduled exercise session 416, the assigned training apparatus identification 418, a pointer to the user's history file 420, and a confirmation flag. The training session identification 412 is used for administrative and indexing purposes, the pointer to the personal training session file 414 is a memory address value set to the location of the appropriate personal training session file that was downloaded alongside the temporary training session file 402 previous to the start of the scheduled exercise session. The date and hour 416 indicate the point in time in which the scheduled exercise session is supposed to begin. The apparatus identification 418 is an internal network address that enables the selective transmission of the session record from the file 402 to the specified training apparatus. The pointer to the user's history file 420 is a memory address value that is set to the address of the history file that was downloaded from the regional server or from the world server alongside the temporary session file 402 previous to the start of the scheduled exercise ses sion. The confirmation flag 422 is data field being assigned several pre-defined values, such as "0" for non-active record (previous to the start of the session), the value of "1" for session in -progress, and the value of "2" for a completed session. Duri ng the performance of the session and consequent of the completion of the session diverse useful information is transmitted from the controller device for the insertion of session- generated information into the history file. Consequently the history file i s uploaded to the regional server or the world server. The server analyzes the history data and optionally re-defines the personal training program of the user. It should be noted that the structure of the session file described and the defined functionalities of the various data fields are exemplary only. In other preferred embodiments useful fields could be added, and additional functionalities could be defined.

In order to use the services of the system suggested by the present invention a potential user must perform a comprehensive registration procedure. Fig. 9 illustrates the registration procedure as performed by the registration component of the application, which is loaded and executed by the controller component of the world training center application. The process is activated begins at a step 88 as relevant input is received from a user. At a step 90 the process identifies the user according to a pre-defined user identification string and optionally an access code. At a decision step 92 it is determined whether the user is a registered user. If the result of the decision step 92 is positive then the process classifies the user as a registered user and the process control proceeds to a step 114. At the step 114 it is determined whether the user identified as a legitimately registered user desires to schedule a training session. If the result of the step 114 is positive then at a step 116 the training session scheduling procedure is performed and subsequently process control return to the step 114. If the result of the step is negative then at a step 115 it is determined whether the user desires to re-customize a personal program definition or personal session definition. If the result of step 115 is negative then process control returns to the application controller at step 110. If the result of the step 115 is positive then personal program or session customization is performed at step 117 and subsequently process control returns to step 114. If at step 92 the user is identified as a non-registered user then at a step 94 the process suggest a promotional tour of the system to the user. Next, at a step 96 it is determined whether the non-registered user is interested in participating in the suggested promotion tour of the system. If the result of the step 96 is positive then a tour of the system is performed at step 98 and process control proceeds to a step 110. If the result of the step 96 is negative then the step 98 is skipped and at the step 110 it is determined whether the user desires to register with the system in order to be provided with the associated services. If the result is negative then the process control returns control to the application control component at step 111. If the user decides to register then at a step 112 the user is

enabled to perform the actual registration process and subsequently process control proceeds to the decision step 114 to further determine whether the user desires to schedule a training session directly after the registration.

Fig. 10 describes the registration process activated at step 112 of Fig. 9 in a greater detail. At a step 120 the user's personal information such as a name, an address, an identification number, a marital status, and the like are obtained. At a step 121 the user is prompted to enter the objectives of the desired training regimen. The response is preferably obtained via the selection of a pre -defined entry out of a set of pre-defined strings located in a GUI -based selection box. The objectives thus obtained could include text associated with an index, such as "1. Weight loss", "2. Body building", "3. Muscle build up consequent to medical treatment", and the like. At a step 122 the user is prompted to input a set of health related information. The information is preferably introduced by the user selecting a pre-defined entry out of a set of pre-defined strings located in a GUI -based selection box. The health data could include information concerning the age of the user, the gender, the current weight, medical history, such as previous injuries, medical treatments, surgical procedures, medications, and the like. At a step 126 the health data provided by the user is analyzed in order to determine specific training program limitations. For example for a user having specific injuries will be restricted to a limited number and type of available training programs. Subsequent to the analysis and according to the results produced by the analyzing process at a step 128 the user is optionally issued specific warnings concerning the performance of a training program and requests are submitted in regard of the provision of required medical certificates. For example, a potential user on specific medication could be requested to send by e -mail, by fax machine, or by traditional mailing services suitable medical certificates that allow the user the participation in a specific exercise program. A further consequence of the analysis is the transmission of a message to the user that includes a

recommendation in regard to one or more standard exercise programs wit h the indication that the exercise program is customizable. At step 129 the user is enabled to build a personalized exercise program, a personalized exercise session and a personalized virtual training entity. At step 130 financial information, such as the price of the exercise program, available payment methods, and possible payment means are displayed with a message requesting the user to submit payment related information. At step 132 payment-related data is obtained from the user, such as credit card number, expiration date of the credit card, name of the card holder, and the like. At step 134 the payment-related data is verified, such as for example, connecting to the credit card company in order to examine the correctness of the information received. At step 136 the registration procedure is finalized by the suitable establishment of the user record in the registered users file, the generation of the personal training program and session record, and the building of the personal virtual training entity record. The user is optionally provided with a valid access code enabling the user to access freely the appropriate programs of the system. At a step 138 a registration confirmation message is built by the process that includes indications concerning the personal exercise program, session, and virtual training entity. The message is transmitted to the user for display and the process is terminated at a step 140 by the generation and transmission of an e-mail message containing registration confirmation, assigned access code, selected and customized exercise program parameters, and the like.

Referring now to Fig. 11, where a process for selection of a preferred local training center is illustrated. The world training center network supports a plurality of local centers. The user is given the opportunity to select a local training center wherein the performance of the exercise program will be affected. The user could typically select a training center, which is conveniently located and could provide suitable exercise session hours. The selection of a local training center is

preferably made by the user choosing a pre-defined local training center out of a set of pre-defined local center identifications located in a selected box. The user is assisted in the selection procedure by the system that will recommend a sub -list of local training centers in accordance with the user address and specific preferences of the users. The process starts at a step 142 by accepting user input. At a decision step 144 the status of the user is determined. If the user is identified as a non -registered user then at a step 148 the user is provided with the option of registering. Consequent to the registration a decision step 150 is performed. At step 150 it is determined whether the user desires to examine the list of local training centers. If it is determined that the list of the local training centers should be displayed then at step 152 the current list of training centers is extracted from the local training centers list 81 of Fig. 5 the list is suitably sorted, and displayed on the display device of the client device 10, 12 of Fig. 1. If no local training centers list display was required then process control skips step 152 and accepts user input in regard the selection of a specific local training center at a step 154. Next, at a step 156 the availability timetable of the available training apparatus is displayed to the user and at a step 158 the user order is obtained. At a decision step 160 it is determined whether the desired training apparatus is available. If the result of the step 160 is positive then at a step 162 the suitable exercise session scheduling file is updated with the user order record, the user record in the registered user file is updated, at a step 164 the user's selection of the training center, training apparatus, and exercise session is confirmed by displaying a confirmation message to the users. The process terminates at step 166 where control returns to the application control component. If at step 160 it is determined that the desired training apparatus is not available then process control returns to step 156 in order to re-display training apparatus availability information and the availability of exercise time. It should be noted that the above-described sequence of operational steps is exemplary only. The logical structure of the process

could be different by the addition of steps. For example, the user could be provided with the option to terminate the process at any stage of the operation.

It should be emphasized again that the proposed system and method provides the user with the option of requesting and ordering an exercise session at any one of the local training centers associated with the world training center network. A user traveling frequently could perform an ordered series of exercise sessions at each of the geographical locations along his route by ordering a sequential set of exercise sessions in the available local training centers operating across the area covered by the trip. Thus, an exercise program need not to be interrupted, delayed, and could be pursued regularly even when the user is unable to physically access his/her regular local training center. Of course, the user could perform exercise sessions for his convenience in two or more different local training center located in geographical proximity, for example a local center in close proximity to his/her home and an alternative local training center near his/her working place.

Standard exercise programs are recommended by the system to a user according to the user information inputted by the user and obtained by the method may not be quite suitable for certain users. Thus, the proposed method and system of the present invention allows the user to modify certain parameters of the standard exercise program in order to build a personal training program. The modifications to the program parameters are allowed within certain limits depending on the user data. The process is executed by the personalization component 65 of Fig. 1. The exercise program could be personalized in respect to the length of the program, the frequency of the exercise sessions, the length of the sessions, the type of exercises, the number of exercise repetitions, the resistance values, and the like.

The proposed system and method provides for a communicative interaction between the local training center server and the regional servers or the world servers. The interaction includes the downloading of the scheduled exercise

session information from the regional server or the world server to the local training server via the data communication network, and uploading of information resulting from the performance of the exercise sessions from the local training center to the regional server or the world server. Fig. 12 illustrates the concept of the communicative interaction between the geographically distributed server computers. The world training center network servers 460 include a web server 462 and an exercise session data download component. The server 460 is linked to a local training center server 470 via the data communications network. The local server 470 includes a web server 472 and an exercise session data upload component 474. At a pre-determined point in time (e.g. one hour previous to the scheduled start of the exercise session) the session data download component 464 is activated. The component 464 marshals the data operative in the performance of the scheduled section, builds appropriate data records including the relevant data, sets up a suitable communication path with the local training center by utilizing the web server 462, and downloads the records 466 to the local training center server computer 470 via the data communications network. Consequent to the completion of the scheduled exercise session the session-related information is uploaded 468 to the world training center network from the local training center 470. The upload could be performed immediately after the completion of the session or could be performed periodically at pre-determined points in time in order to ease the load on the network during periods of intense activity. Preferably the periodical upload could be made during the hours of the night when the majority of the local training centers are closed and therefore the communication lines are not overloaded. The uploaded information is appropriately processed by the world training center network server 460 and the suitable data structures are updated with the processed data. It would be easily perceived that the logic of the communicate interaction between the various network components could be performed in a different manner. For example, raw session data could be transmitted to the local training center server 470 and the suitable building

of the session files could be made at the local t raining center server 470. Further, an uploading of the session data could be made simultaneously to a number of world training center servers 460. The regional servers and the world training servers could cooperate for purposes of load balancing. Thus, a specific regional server could be designated as the operative target for the uploading process. The responsibility of the designated regional server would be to re -transmit the information to the regional servers controlling the originating local servers 470 at a pre-defined point in time.

It is important to note that the exercise program is dynamically organized in a pre-determined manner such that the exercise sessions are upgraded successively according to the progress of the user in then performance of the program. Thus, the initial exercise sessions could involve the execution of a limited number of exercise elements with a slow repetition rate, low resistive force, and an easy pace while more advanced sessions are programmed to be progressively more stressful involving harder exercises, faster repetition rates, higher resistance, and the like. The upgrading of the exercise session is automatic and managed by the software during the building of the personal exercise program. The upgrading the sessions is also influenced by the health condition of the user, by the accumulative results indicative of the progress of the user, and by the measure of the persistence of the user in the performance of the pre-defined orderly spaced exercise sessions. For example, if a user skips a number of sessions along time then the method will delay the upgrading of the next session and will provide the user with a previously performed session with the suitable parameters to enable the user to repeat the previous session.

Referring now to Fig. 13, a scheduled exercise session is controlled by the apparatus controller device 353 of Fig. 7. The control is based on the session information downloaded from a regional server or a world server to the local training center server, which, in turn transmits the session information the apparatus controller device. The session begins at step 174 where the user identity is checked

via the examination of the introduced access code. If the access code is valid, and the user is correctly identified as the user associated with the current exercise session then at a step 176 the personalized exercise session associated with the current user is loaded from the memory device of the controller device. Next, at a step 178 the training apparatus is activated, and at a step 180 the personal virtual training entity is activated. At step 182 the activities of the user during the performance of the exercise session are monitored in real-time to enable control of the session, supervision of the user's activity, and interaction with the user. At a step 184 the interaction with the user is made according to the session data that includes the operative parameters of the personalized session, the activities of the user relative to the pre-defined sequence of the session, timing data, and the like. At a step 186 session data is collected in real-time from the sensor units of the training apparatus for purposes of history data generation, follow-up, error analysis, data aggregation, data consolidation, and the like. At a step 188 the controller computer manages, supervises, and controls the session in accordance with the session data, user actions, timing factors, and the like via the virtual personal training entity. At a decision step 190 it is monitored whether the progress of the session is in accordance with the pre-defined personalized session plan. If the result of the step 190 is positive, then according to the operating conditions received from the unit sensors the process may take one or more of the following steps where a combination of steps could be performed; a) communicate with the user via the virtual personal training entity in order to notify the user in regard of progress of the session, b) pause the session and notify the training center supervisor by transmitting a suitable message to the local server computer (step 202), and c) terminate the session. If the session progresses according to the pre-defined session plan then at a step 200 it is determined whether the session is completed. If the result of the step is negative then the process control proceeds to the step 188 in order to resume the proper management, supervision, monitoring and controlling of the session. If the result of the step 200 is positive then

the process notifies the user via the virtual personal training entity, deactivates the training apparatus and returns control to the operating system of the apparatus controller device (step 204).

In order to register, to select a training center, to customize an exercise program, to schedule a training session, and the like, the user communicates with the world training center network through the client device 10, 12 of Fig. 1. The interaction is accomplished by the activation and utilization of the GUI associated with the input device of the client device 10, 12. Typically the GUI generates display screens consisting of graphical structures operative in the display of information, in the provision of specifically pre-determined spaces into which the user is allowed to enter requests, necessary information to be transmitted to the world training center network. Fig. 14 illustrates a display screen 306 utilized for the introduction of suitable user data during the procedure of the user registration. The screen 306 includes a welcoming message 308 a personal information input box 310, a health information input box 312, a "NEXT" control button 314, a "CANCEL" control button 316 and diverse text operative in assisting the user in introducing the requested information in a proper manner. Subsequent of the presentation of the display screen to the user, the user types in the required data according to the instructions displayed. Thus, the user types in personal information text in the personal information input box 310, medical data in the health condition input box 312, and confirms the input by activating the "NEXT" control button 314 by typically utilizing the pointing device in the standard manner of the GUI -based systems. Typically the "CANCEL" control button 316 is used to abort the input and return to a previous display screen.

Referring to Fig. 15, the display screen 318 is operative in requesting and accepting information from the user, which is utilized to define and generate user-specific control files in the world training center server. The screen 318 includes an

exercise program length definition box 320, a personal virtual training entity selection box 322, a virtual training entity characteristics selection box 324, a "NEXT" control button 326, and a "CANCEL" control button 328. The exercise program length definition box 320 includes a set of radio buttons 330, 332, 334 with associated text strings. The functionally and potential effect of the radio buttons 330, 332, 334 are described by the adjacent text strings. Thus, if the user se lects the radio button 330 the length of the required training program will be defined as three months. In contrast, the selection of the radio button 332 will indicate to the system that the required length of the training program should six month. Simila rly, the radio button 334 is associated with a program length of twelve months. The personal virtual training entity selection box 322 includes the radio buttons 342, 344, 346 where each radio button is associated with a specific personal training entity type. Thus, for example, the selection of the radio button 342 will effect the selection of an "A" type entity where "A" is pre-determinedly defines the entity as a "female". In contrast, the radio button 344 selects a "B" type entity where "B" represents a "male". The selection of one of the radio buttons 342, 344, 346 is required in order to enable the system to generate a personalized virtual training entity suitable to the requesting user. Similarly, virtual training entity characteristics selection box includes the radio buttons 336, 338, 340 that define specific character traits of the virtual training entity, such as "encouraging", "average", "tough", and the like. The display screen 318 is exemplary only as additional input boxes with different radio buttons associated with diverse other personality traits could be designed and developed.

Fig. 16 illustrates an additional display screen operative in the display of information and in requesting the input of user preferences in regard to the desired local training center. The screen 477 includes text 476 operative in assisting the user in the activation of the screen, a user address input box 478, an "OK" control button

364, a "NEXT SCHEDULING" control button 364, and a "CANCEL" control button 364. In order to generate a list of recommended local training centers generally considered substantially ideal for the user, the system needs the address of the user. Thus, the display screen instructs the user to input the address thereof. The various elements of the address are typed in by the user into the address input box 478, and the information is confirmed by the activation of the "OK" control button 364.

Consequently, as illustrated in Fig. 17 a list of recommended local training center is displayed on the display screen 327. The screen includes a title 331 to indicate the type of information presented in the display screen, an instruction string 322 to assist the user in the activation of the screen 327, and a list of available local training centers where each center is selectable via the suitable selection of one of the associated radio buttons 326, 328, 330. The list available local training centers include timetables indicating the dates and hours at which the training apparatus associated with an exercise program is available. Following the selection of a desired local training center the user file is updated by the insertion of a suitable data record and the registration procedure continues by the presentation of additional display screens to the user for the additional input of information operative in the generation of the comprehensive user record on the regional server or the world server.

The proposed system and method of the invention supports the setting of personal objectives by a user. The user could define the objectives of the training program such as the general purpose of the program, the level of achievements the user is desirous of reaching in a given period of time, and the like. The system and method also create, support, control, and maintain one or more communication channels between one or more groups of plurality of users having the same training profile and participating in the same training program. Thus, a common virtual meeting place for the trainees is generated, such as an on-line forum, a bulletin board or a user group intended for a plurality of trainees to participate in, in order to

exchange health, fitness, exercise, and safety information. These meeting places are designed to be utilized as a type of supportive environment where the trainees could meet with other individuals that share the same interest, objectives, problems, and the like. The supportive environment could contribute to the motivation and the personal commitment of a trainee to persist in the performance of the exercise program. In addition the system supports the selective collection and organization of specific data aggregates to allow for the processing of the accumulated information for the purpose of health and fitness research, training programs design, training program development, training program optimization, and the like

It will be appreciated by persons skilled in the art that the present invention is not limited to what has been particularly shown and described hereinabove. Thus, the scope of the present invention is defined only by the claims, which follow.

CLAIMS

I/WeClaim:

1. A system for the implementation of personal training programs utilizing training apparatus, managed and controlled by data communication network-based computing devices, the system comprising the elements of:

at least one client computing device operated by at least one user of a training center network system connectable to at least one training center network server computing device via a communications network;

at least one training center network server computing device connected to the data communications network, and connected to an at least one training apparatus controller device;

at least one training apparatus controller device connected to the at least one training center network server computing device;

at least one training apparatus utilized for the performance of at least one training program by the at least one user of the training center network system, connected to the at least one training app aratus controller device and controllable by the at least one training apparatus controller device;

a data communications network linking the at least one client computing device to the at least one training center network server computer device.

2. The system as recited in claim 1 wherein the client computing device comprises the elements of:

a network browser for providing communication between the at least one client computing device and the at least one training center server computing device via the data communications network; and

a user interface for providing interfacing of the at least one user of the at least one client computing device with the at least one training center network server computing device.

3. The system as recited in claim 1 where in the training apparatus comprises the elements of:

at least one data buffer to store temporarily information and control data received from and sent to the at least one training apparatus controller device;

at least one motor controller to control the op eration of at least one motor and the resistive force of at least one resistance unit associated with the at least one training apparatus;

at least one resistance unit to generate resistance during the performance of the training session;

at least one encoder/decoder unit to transform analog signals to digital data and digital data to analog signals transferred between the training apparatus and the training apparatus controller device;

at least one motor unit to control the configuration of the at least on e training apparatus;

at least one operating handle to perform exercise elements on the at least one training apparatus.

4. The system as recited in claim 1 wherein the training apparatus controller unit comprises the elements of:

an input device to communi cate with the at least one user of the at least one training apparatus;

a memory device to store the user-specific, session-specific, apparatus-specific information;

a processor device to execute the training apparatus control program in conjunction with the training program, training session, and user information communicated from the training center network server computing device, to generate control data for the data and control information from the training apparatus;

a display device to communicate training session-specific instructions to the at least one user.

5. The system as recited in claim 1 wherein the training center network server computing device comprises the elements of:

a training apparatus control table to control the at least one training apparatus controller;

a training session file to store consolidated training program data including training session data, user data, and historical data;

a server to provide communications between the at least one client computing device and the at least one training network server computing device;

a world training center network server application to provide training services to the at least one client computing device and to the at least one training apparatus controller device;

a training center network database to store training center network-specific data structures modifiable by the at least one user of the at least one client computing device and by the at least one controller device of the at least one training apparatus.

6. The system as recited in claim 1 wherein the at least one training network server computing device further comprises the elements of:

an operating system to supervise the operation of the computing device;

a processor device to execute the instructions associated with the operating system and applications installed in the computing device;

an output device to communicate with the operators of the computing device;

a communications device to link the computing device to the data communications network;

a input device to communicate with the operators of the computing device;

a memory device to store the control software, application software and data structures installed in the computing device.

7. The system as recited in claim 5 wherein the training center network application comprises the elements of:

an training center network application controller to control the flow of the application, to load, activate and execute the components constituting the application;

a registration component to enable the at least one user of the at least one client computing device to register in the at least one training center network server computing device in order to enter into a training regimen associated with a training program;

a user handler component to receive request introduced by the at least one user of the at least one client computing device and to

transmit appropriate information to the at least user of the at least one client computing device;

a personalization component to select a training program from pre-defined training program templates, to customize the training program template in accordance with the requests of the user and in accordance with the user's training profile, and to generate a personalized training program for the user;

a session scheduling component to allocate a location and a time slot for a training sessions the request for which is submitted by the at least one user of the at least one client device;

a communication component to transmit the consolidated training session data including personalized training program data, training session data, user data, and historical data to the at least one training apparatus controller of the at least one training apparatus;

a virtual training entity handler to create a personalized virtual training entity in accordance with the requests submitted by the at least one user of the at least one client device;

a history builder component to receive training session-specific information from the at least one training apparatus controller device of the at least one training apparatus, and to insert the received session-specific information into a personal session history file.

8. The system as recited in claim 7 wherein the training center network application further comprises an accounting component to handle the financial aspect of the training center network system.

9. The system as recited in claim 5 wherein the training center network database comprises the elements of:

a registered user list to store user information including personal data, health data, preferences, indicators in regard of the personalized training program, indicators in regard to personalized virtual training entity, financial information, indicators regarding personal session scheduling data, and personal history;

a standard training program and training session template file to hold standard pre-defined training programs and training sessions;

a personalized training programs and sessions file customized in accordance with the introduced requests, health information, preferences, and history of the at least one user of the at least one client computing device;

a virtual training entity list to hold personalized virtual training entities customized in accordance to requests submitted by the user;

a personal training sessions schedules generated in accordance with the requests submitted by the at least one user;

an accounting file to store financial information, price lists, user accounts, bills, receipts, and financial statements;

a local training centers list to store information concerning a on or more local training centers associated with the training center network system.

10. The system as recited in claim 1 further comprises the elements of:

at least one training center network regional server computer device connected to the data communication network i n order to provide pre-defined services to associated local training centers, to control the operation of the local training centers, to handle users' requests, to store training programs, history files, to allocate training sessions, to handle financial functions, to communicate consolidated session information to

the local training centers, to receive historical information from the local training centers, to communicate specific portions of the received information to higher level training center networ k server computing devices.

11. The system as recited in claim 10 wherein the training center network regional server computing device incorporates the training center network application, the training center network database.

12. The system as recited in claim 1 further comprises the elements of:
at least one training center network world server computer device connected to the data communication network in order to provide pre - defined services to associated regional training centers, to control the operation of the regional training centers, to handle users' requests, to store training programs, history files, to allocate training sessions, to handle financial functions, to communicate consolidated session information to the regional training centers, to receive historical information from the regional training centers, and to communicate specific portions of the received information to higher level training center network server computing devices.

13. The system as recited in claim 12 wherein the training center network world server computing device incorporates the training center network application, and the training center network database.

14. The system as recited in claim 12 in combination wherein the at least one training center network world server computing device, the training center network regional server computing device and the training center

network local server computing device are interconnected in a hierarchical manner where a highest level server computer device controls the lowest level server computer devices via intermediate level servers.

15. A training center network method for the implementation of personal training programs utilizing training apparatus, managed and controlled by data communication network-based computing devices, the method comprising the steps of:

on the training center network server computing device storing at least one standard training program template in the training center network server computing device;

on the training center network server computing device receiving request introduced by at least one user associated with at least one client computing device concerning registration in order to enter into a training regimen associated with a training program;

on the training center network server computing device receiving, analyzing, and storing user personal information, user health information, user preferences;

on the training center network server computing device generating and storing personalized training program for the at least one user in accordance with the received user information, health data, user preferences, and specific user requests;

on the training center network server computing device receiving request submitted by the at least one user of the at least one client device to effect training session scheduling;

periodically transmitting consolidated training session data from the training center network server computing device to the training apparatus controller device;

managing and controlling a training session from the training apparatus controller device to the at least one training apparatus;

collecting historical training session data at the at least one training apparatus controller device;

periodically receiving historical training session data from the at least one training apparatus controller of the at least one training apparatus to the at least one training center network server computing device.

16. The method as recited in claim 15 further comprises the steps of:

periodically transmitting consolidated traini ng session data from the training center network regional server computing device to the training center network local server computing device;

periodically receiving historical training session data from the at least one training center network local serv er computing device to the at least one training center network regional server computing device.

17. The method as recited in claim 15 further comprises the steps of:

periodically transmitting consolidated training session data from the training center network world server computing device to the training center network regional server computing device;

periodically receiving historical training session data from the at least one training center network regional server computing device to the at least one training center network world server computing device.

18. The method as recited in claim 15 wherein the step of managing and controlling further comprises the steps of:

at the training apparatus controller device receiving a user request to commence a training session;

at the training apparatus controller device verifying the user 's identity;

at the training apparatus controller loading the operational parameters of the personalized training program associated with the requesting user;

on the training apparatus controller transmitting control data functional in the re-configuration of the training apparatus associated with the requesting user;

at the training apparatus controller device activating the training apparatus associated with the requestin g user;

at the training apparatus controller device activating the personal virtual training entity;

at the training apparatus controlling device collecting information concerning the exercises performed by the user in real time;

at the training apparatus controller device controlling the training session performed by the user on the training apparatus in accordance with the training session data received from the training center network server computing device and the data indicative of the user's acti on on the training apparatus;

at the training apparatus controller device interacting dynamically with the user performing the training session on the training apparatus via the personal virtual training entity by transmitting instructions, warnings, enco uragement, and useful information;

at the training apparatus controller device monitoring the hardware components of the training apparatus;

at the training apparatus controller device transmitting suitable messages to the training center network server computing device indicative of hardware problems, user health-related information, and exceptional circumstances associated with the training session.

19. The method as recited in claim 18 further comprises the steps of:

at the training apparatus control ler device terminating the training session in accordance with a pre -defined parameter of the training session;

at the training apparatus controller device terminating the training session in accordance with a pre -defined parameter of the personalized training program and when exceptional circumstances arise;

at the training apparatus controller device transmitting the collected training session data to the training center network server computing device;

at the training apparatus controller device instructing the user to pause a training session;

at the training apparatus controller generating signals operative in the suitable re-configuration of thethe training apparatus in accordance with a sequentially following pre -defined exercise element in a pre-d efined sequence of exercise elements.

20. The system as recited in claim 1 wherein the training apparatus is a multi-functional resistance trainer having variable axes.

21. The system as recited in claim 1 wherein the personal training programs are resistance training programs.

22. The system as recited in claim 1 wherein the client computing device is a personal computer device.

23. The system as recited in claim 1 wherein the client computing device is a Personal Digital Assistant.

24. The system as recited in claim 1 wherein the client computing device is a cellular telephone device.

25. The system as recited in claim 1 wherein the data communication network is a wide area network.

26. The system as recited in claim 2 wherein the user interface is a Graphical User Interface.

27. The system as recited in claim 2 wherein the network browser is a World Wide Web browser.

28. The system as recited in claim 4 wherein the display device is a Cathode Ray Tube device.

29. The system as recited in claim 4 further comprises sound generating devices, such as a microphone, sound card, and speakers.

30. The method as recited in claim 15 further comprises the steps of:

establishing a user virtual meeting place to enable users to exchange information, encouragements, opinions, and mutual support;

receiving a request from a user to access the virtual meeting place;

connecting the requesting user to the virtual meeting location;

supervising, managing, and controlling the virtual meeting.

31. The method as recited in claim 15 wherein a scheduled training session is allowed to be allocated across a plurality of training center network server computing devices associated with remote training locations operatively connected to the training center network system a nd thereby providing the user the option of performing a scheduled training session at a selected remote training location.

32. A training system having a training apparatus controlled by a programmable computer device for the implementation of at least one personal training program, the system comprising the elements of:

at least one training apparatus controller device connected to the at least one physical training apparatus device for managing and controlling the operation of the training apparatus in accordance with a pre-defined training program;

at least one training apparatus utilized for the performance of at least one personal training program by the at least one user of the training apparatus, connected to the at least one training apparatus controller device and controllable by the at least one training apparatus controller device.

33. The system as recited in claim 32 wherein the training apparatus comprises the elements of:

at least one data buffer to store temporarily information and control data received from and sent to the at least one training apparatus controller device;

at least one motors controller to control the operation of the at last one motor associated with the at least one training apparatus;

at least one resistance unit to generate resistance during the performance of the training session;

at least one encoder/decoder unit to transform analog signals to digital data and digital data to analog signals transferred between the training apparatus and the training apparatus controller device;

at least one motor unit;

at least one operating handle.

34. The system as recited in claim 32 wherein the at least one training apparatus controller unit comprises the elements of:

at least one input device to communicate with the at least one use r of the at least one training apparatus;

at least one memory device to store the user-specific, session-specific, apparatus-specific information;

at least one processor device to execute the training apparatus control program in conjunction with the trai ning program, training session, and user information communicated from the training center network server computing device, to generate control data for the data and control information from the training apparatus;

at least one display device to communicat e training session-specific instructions to the at least one user.

35. A training method for the implementation of personal training programs performable by a user utilizing at least one training apparatus associated with at least one training apparatus controller device, managed and

controlled by at least one training apparatus controller device, the method comprising the steps of:

on the training apparatus controller device storing a user personal information and user's training preferences;

on the training apparatus controller device storing at least one personalized training program for an at least one user;

managing and controlling a training session performed on the at least one training apparatus by the training apparatus controller device;

collecting historical training session data at the at least one training apparatus controller device.

36. The system recited in claim 35 wherein the training apparatus is controllable and selectively re-configurable for the performance of exercise elements operative in the exercising of different muscles and muscle groups.

37. The system recited in claim 35 wherein the training apparatus is controlled and selectively re-configured in a manual manner.

38. The system of claim 35 wherein the training apparatus is controlled and selectively re-configured a semi-automatic manner.

39. The system of claim 37 wherein the training apparatus is controlled and selectively re-configured via a computer program having personalized parameters and implemented on a computing platform.

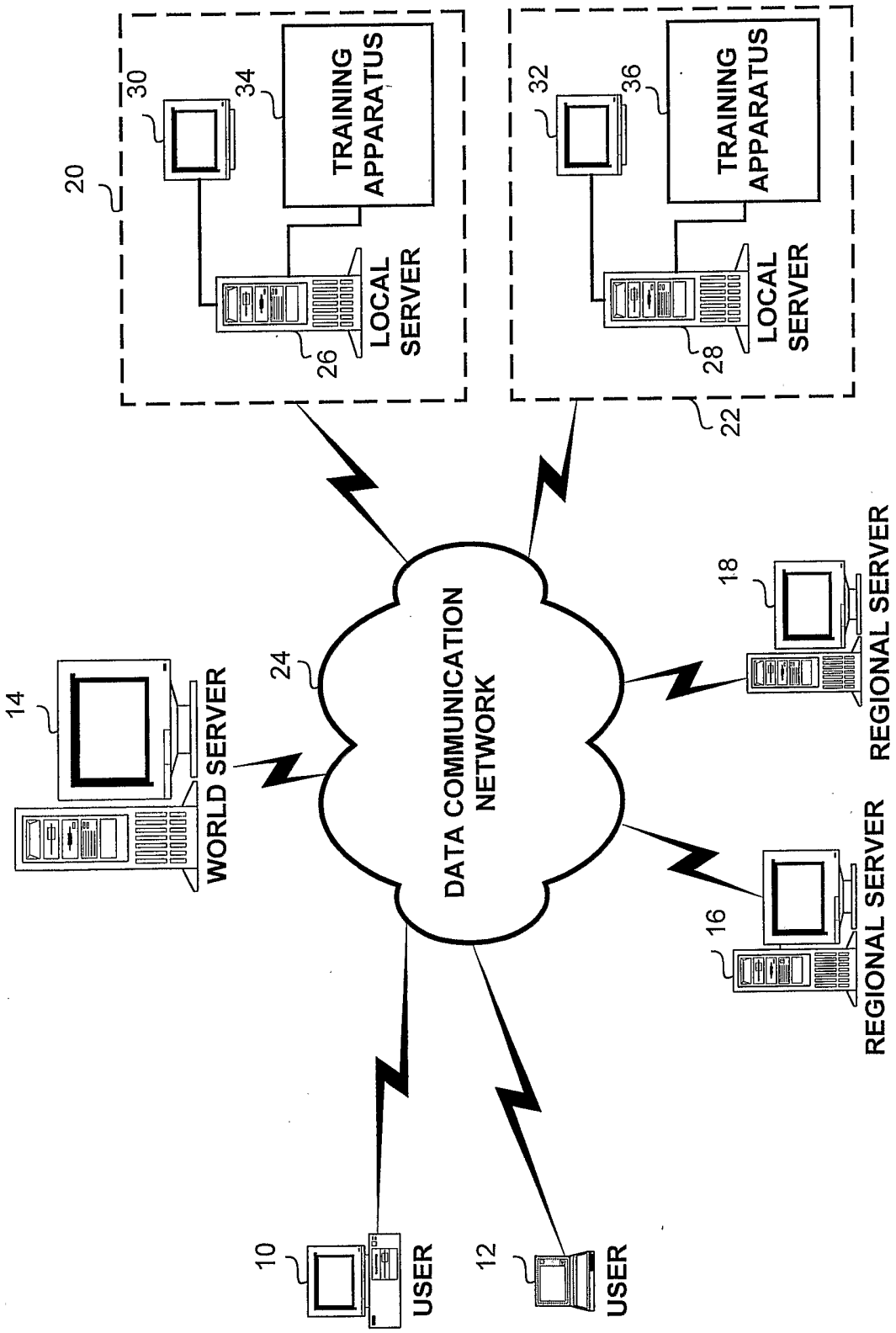
20
30
34
TRAINING APPARATUS
LOCAL SERVER
26
22
32
36
TRAINING APPARATUS
LOCAL SERVER
28
DATA COMMUNICATION NETWORK
24
14
WORLD SERVER
18
REGIONAL SERVER
16
REGIONAL SERVER
10
USER
12
USER

FIG. 1

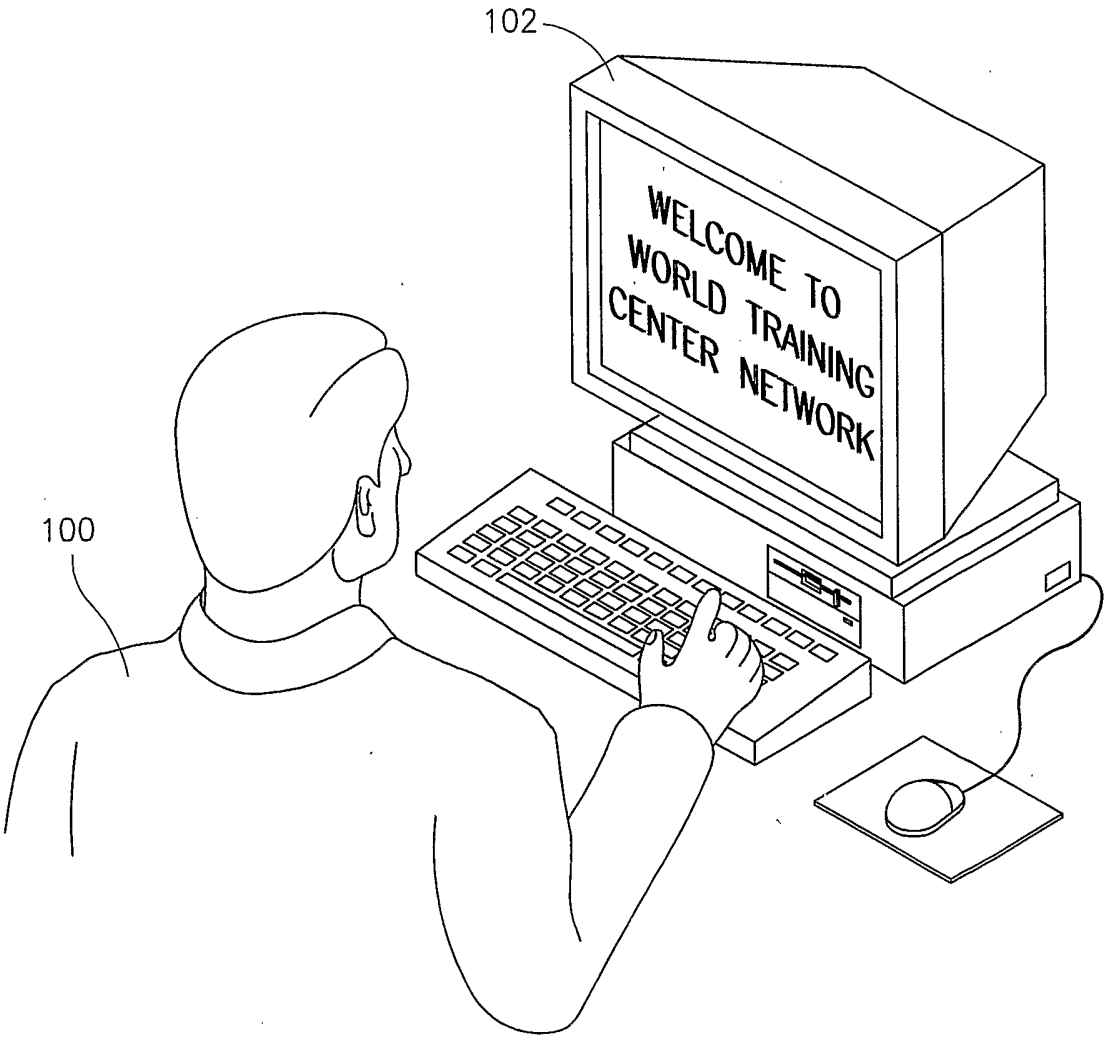

FIG.2

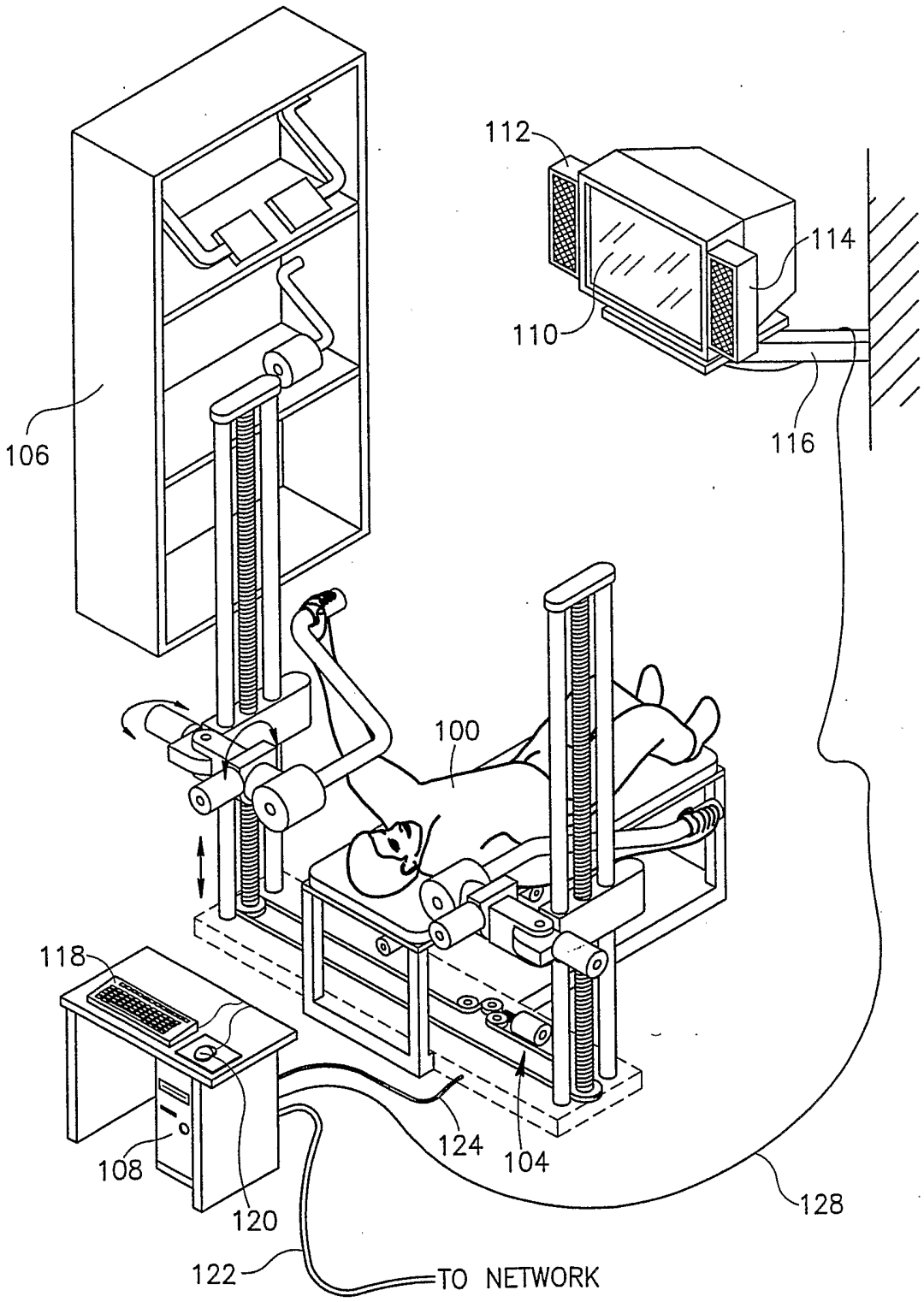

FIG.3

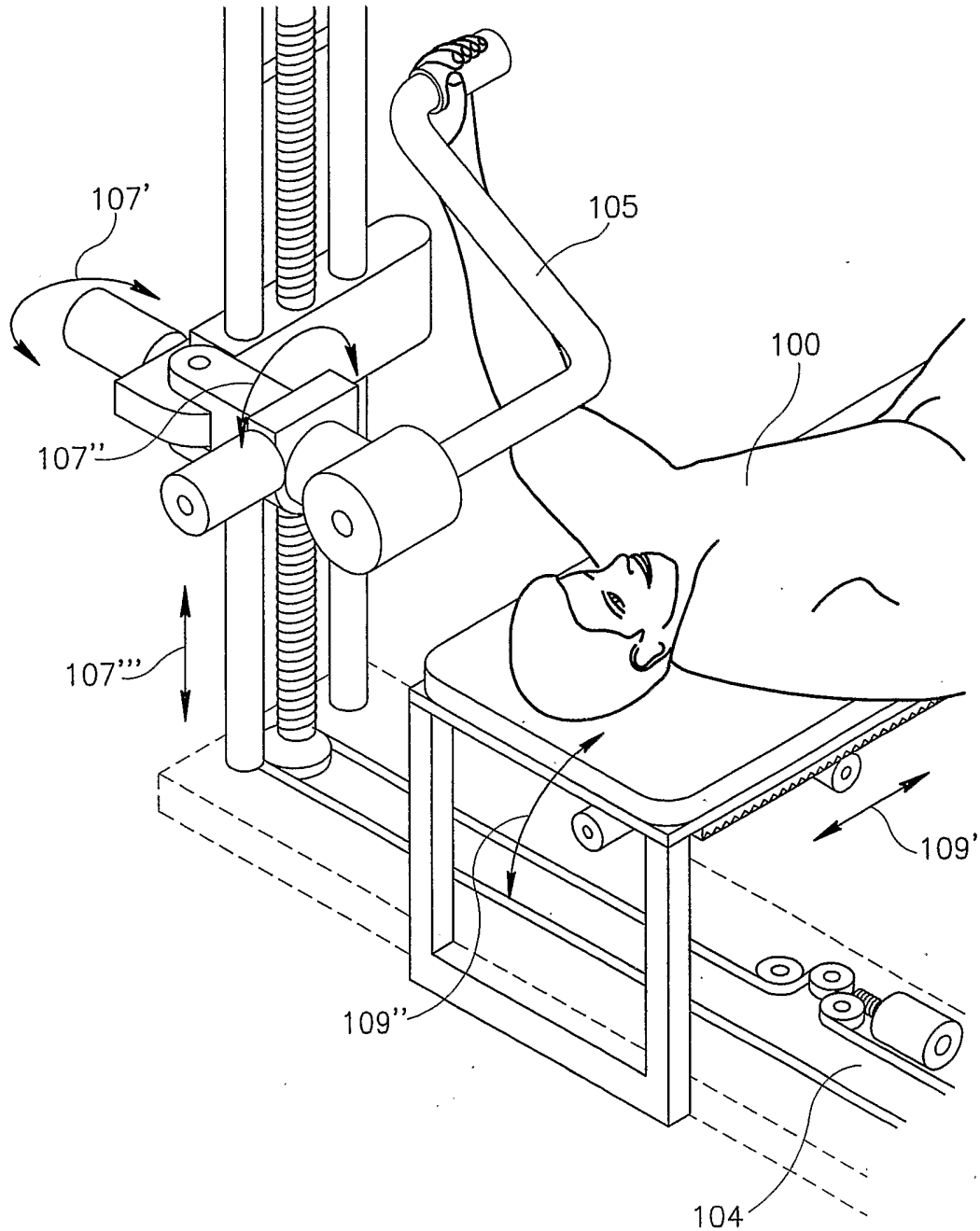

FIG.4

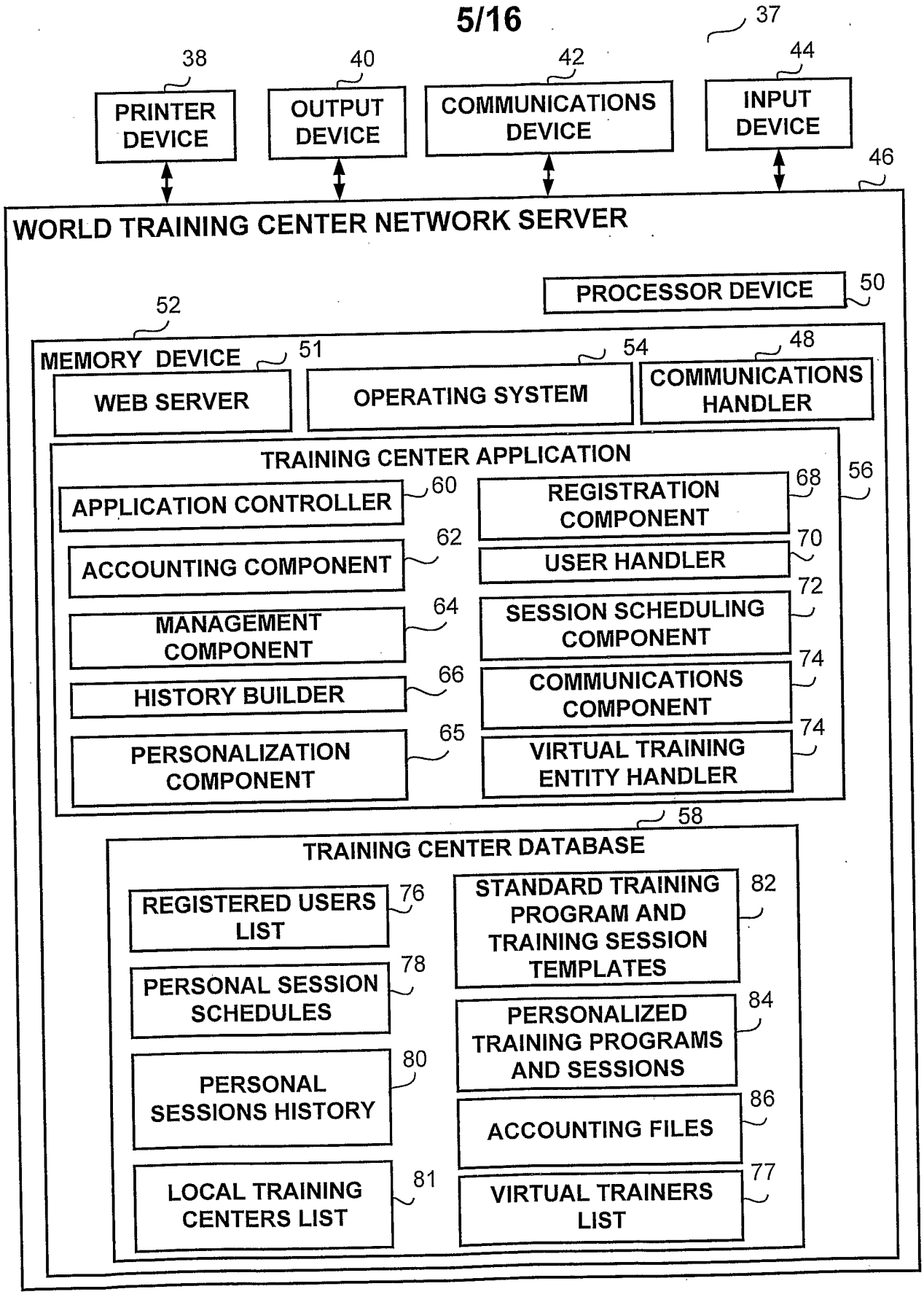
37
38
40
42
44
PRINTER DEVICE
OUTPUT DEVICE
COMMUNICATIONS DEVICE
INPUT DEVICE
46
WORLD TRAINING CENTER NETWORK SERVER
PROCESSOR DEVICE
50
52
MEMORY DEVICE
51
54
48
WEB SERVER
OPERATING SYSTEM
COMMUNICATIONS HANDLER
TRAINING CENTER APPLICATION
56
APPLICATION CONTROLLER
60
REGISTRATION COMPONENT
68
ACCOUNTING COMPONENT
62
USER HANDLER
70
MANAGEMENT COMPONENT
64
SESSION SCHEDULING COMPONENT
72
HISTORY BUILDER
66
COMMUNICATIONS COMPONENT
74
PERSONALIZATION COMPONENT
65
VIRTUAL TRAINING ENTITY HANDLER
74
58
TRAINING CENTER DATABASE
REGISTERED USERS LIST
76
STANDARD TRAINING PROGRAM AND TRAINING SESSION TEMPLATES
82
PERSONAL SESSION SCHEDULES
78
PERSONALIZED TRAINING PROGRAMS AND SESSIONS
84
PERSONAL SESSIONS HISTORY
80
ACCOUNTING FILES
86
LOCAL TRAINING CENTERS LIST
81
VIRTUAL TRAINERS LIST
77

FIG. 5

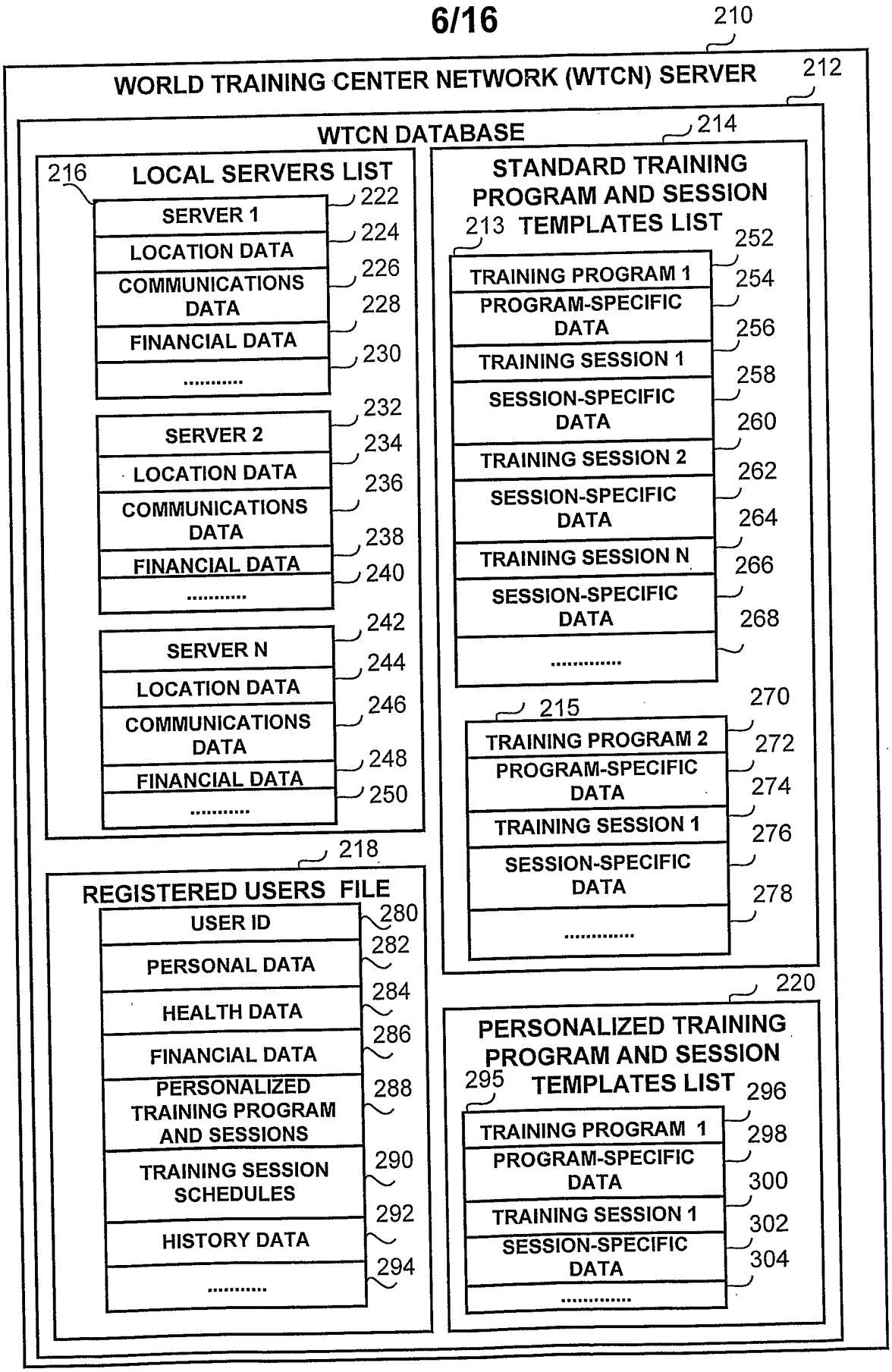
210
WORLD TRAINING CENTER NETWORK (WTCN) SERVER
212
WTCN DATABASE
214
216
LOCAL SERVERS LIST
222
SERVER 1
224
LOCATION DATA
226
COMMUNICATIONS DATA
228
FINANCIAL DATA
230
.....
232
SERVER 2
234
LOCATION DATA
236
COMMUNICATIONS DATA
238
FINANCIAL DATA
240
.....
242
SERVER N
244
LOCATION DATA
246
COMMUNICATIONS DATA
248
FINANCIAL DATA
250
.....
STANDARD TRAINING PROGRAM AND SESSION
213 TEMPLATES LIST
252
TRAINING PROGRAM 1
254
PROGRAM-SPECIFIC DATA
256
TRAINING SESSION 1
258
SESSION-SPECIFIC DATA
260
TRAINING SESSION 2
262
SESSION-SPECIFIC DATA
264
TRAINING SESSION N
266
SESSION-SPECIFIC DATA
268
.....
215
270
TRAINING PROGRAM 2
272
PROGRAM-SPECIFIC DATA
274
TRAINING SESSION 1
276
SESSION-SPECIFIC DATA
278
.....
218
REGISTERED USERS FILE
280
USER ID
282
PERSONAL DATA
284
HEALTH DATA
286
FINANCIAL DATA
288
PERSONALIZED TRAINING PROGRAM AND SESSIONS
290
TRAINING SESSION SCHEDULES
292
HISTORY DATA
294
.....
220
PERSONALIZED TRAINING PROGRAM AND SESSION
295 TEMPLATES LIST
296
TRAINING PROGRAM 1
298
PROGRAM-SPECIFIC DATA
300
TRAINING SESSION 1
302
SESSION-SPECIFIC DATA
304
.....

FIG. 6

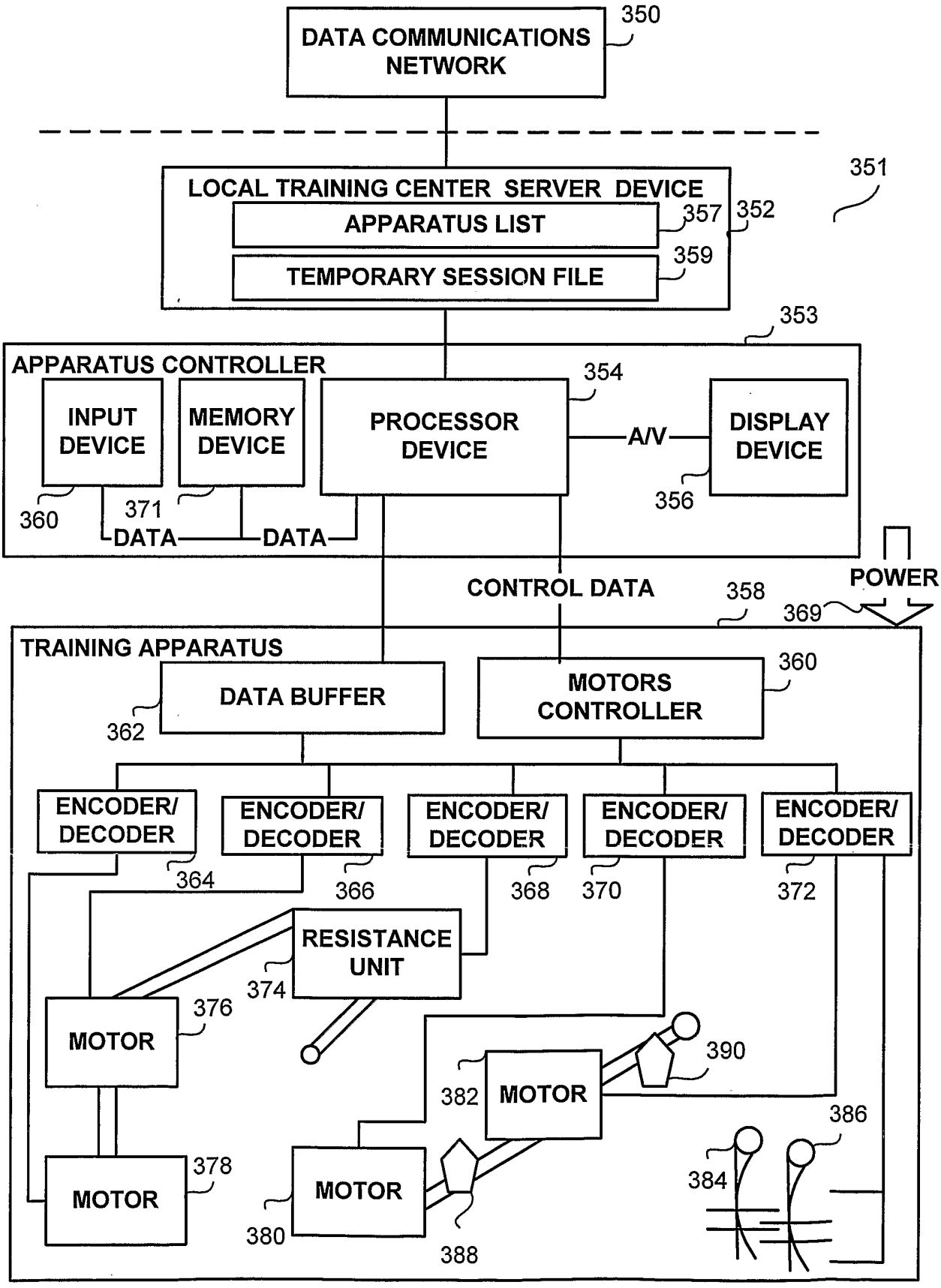
DATA COMMUNICATIONS NETWORK
350
LOCAL TRAINING CENTER SERVER DEVICE
351
APPARATUS LIST
357
352
TEMPORARY SESSION FILE
359
353
APPARATUS CONTROLLER
INPUT DEVICE
MEMORY DEVICE
PROCESSOR DEVICE
354
A/V
DISPLAY DEVICE
356
360
371
DATA
DATA
CONTROL DATA
358
POWER
369
TRAINING APPARATUS
DATA BUFFER
362
MOTORS CONTROLLER
360
ENCODER/ DECODER
364
ENCODER/ DECODER
366
ENCODER/ DECODER
368
ENCODER/ DECODER
370
ENCODER/ DECODER
372
RESISTANCE UNIT
374
MOTOR
376
MOTOR
378
MOTOR
382
390
MOTOR
380
388
384
386

FIG. 7

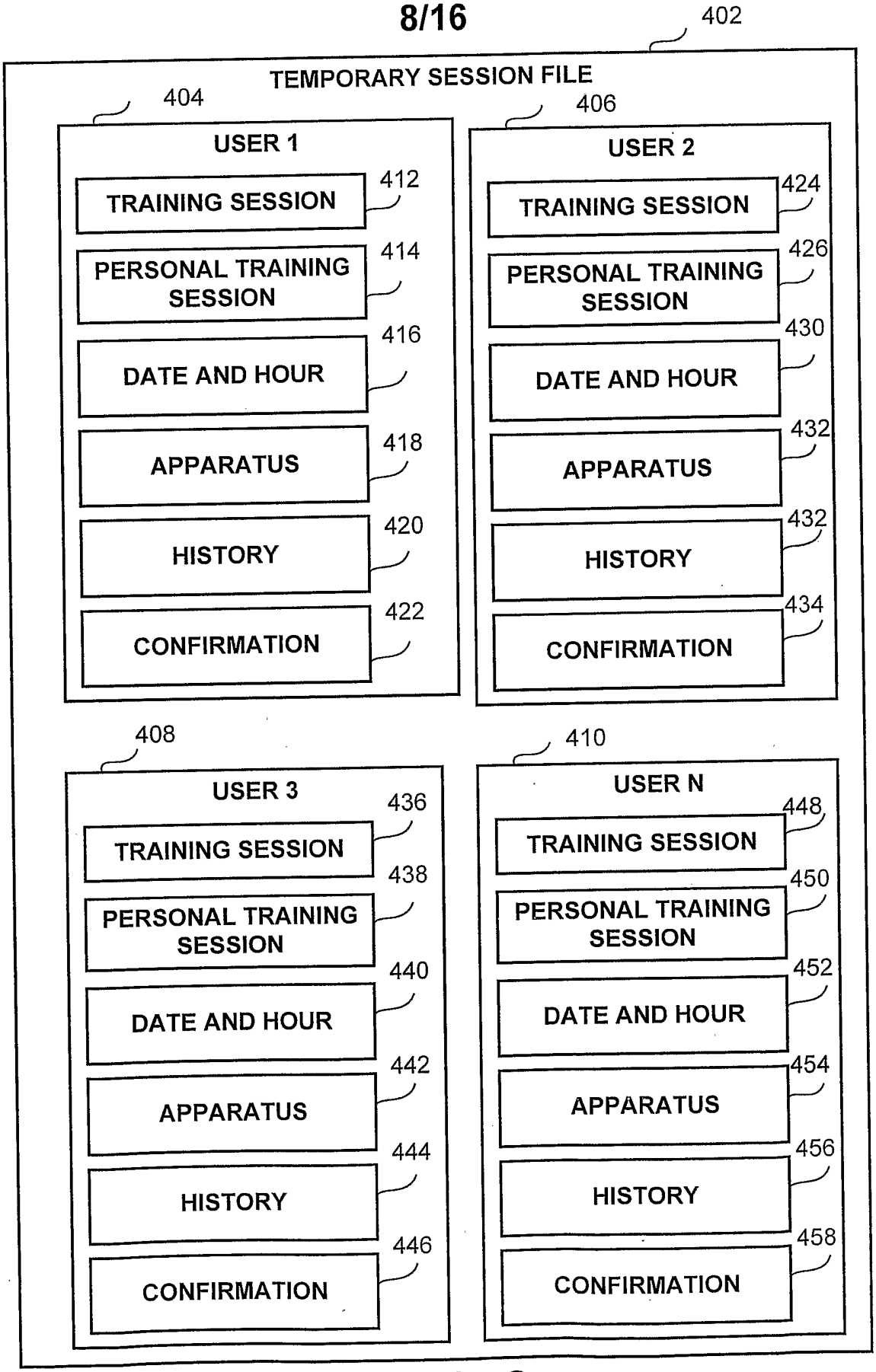
402
TEMPORARY SESSION FILE
404
USER 1
TRAINING SESSION
412
PERSONAL TRAINING SESSION
414
DATE AND HOUR
416
APPARATUS
418
HISTORY
420
CONFIRMATION
422
406
USER 2
TRAINING SESSION
424
PERSONAL TRAINING SESSION
426
DATE AND HOUR
430
APPARATUS
432
HISTORY
432
CONFIRMATION
434
408
USER 3
TRAINING SESSION
436
PERSONAL TRAINING SESSION
438
DATE AND HOUR
440
APPARATUS
442
HISTORY
444
CONFIRMATION
446
410
USER N
TRAINING SESSION
448
PERSONAL TRAINING SESSION
450
DATE AND HOUR
452
APPARATUS
454
HISTORY
456
CONFIRMATION
458

FIG. 8

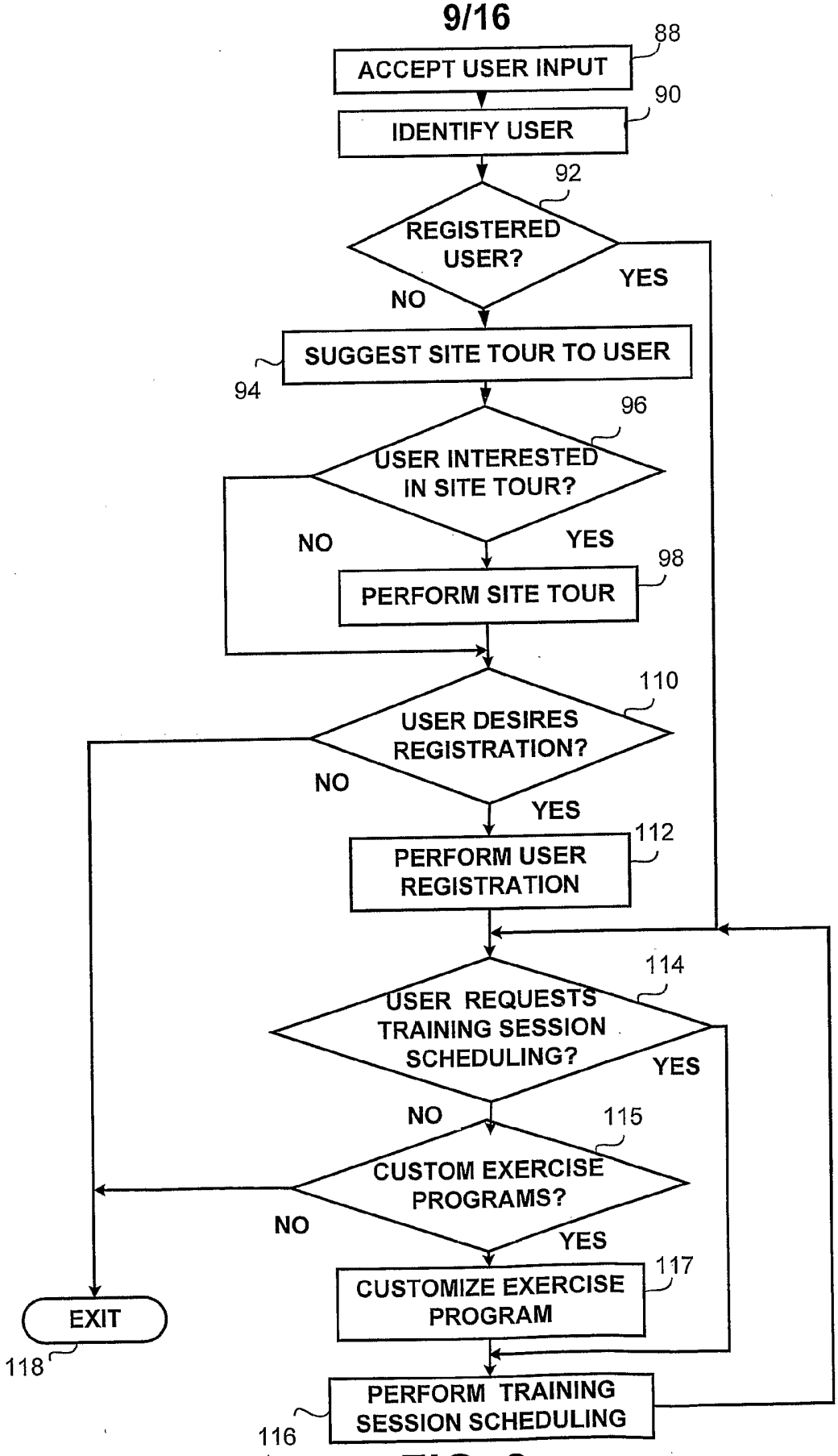
ACCEPT USER INPUT
88
IDENTIFY USER
90
REGISTERED USER?
92
YES
NO
SUGGEST SITE TOUR TO USER
94
USER INTERESTED IN SITE TOUR?
96
NO
YES
PERFORM SITE TOUR
98
USER DESIRES REGISTRATION?
110
NO
YES
PERFORM USER REGISTRATION
112
USER REQUESTS TRAINING SESSION SCHEDULING?
114
YES
NO
CUSTOM EXERCISE PROGRAMS?
115
NO
YES
CUSTOMIZE EXERCISE PROGRAM
117
EXIT
118
PERFORM TRAINING SESSION SCHEDULING
116

FIG. 9

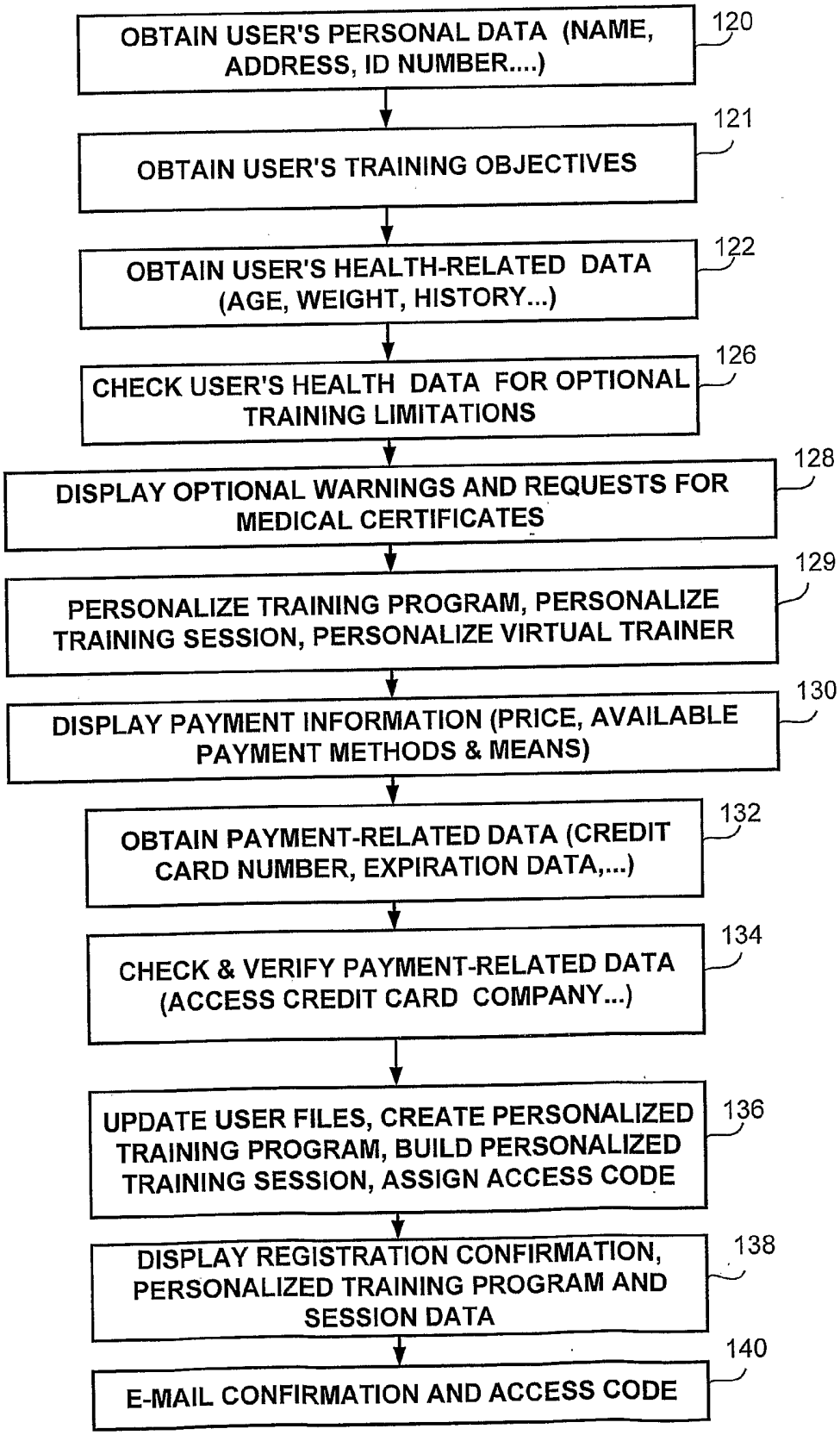
OBTAIN USER'S PERSONAL DATA (NAME, ADDRESS, ID NUMBER....)
120
OBTAIN USER'S TRAINING OBJECTIVES
121
OBTAIN USER'S HEALTH-RELATED DATA (AGE, WEIGHT, HISTORY...)
122
CHECK USER'S HEALTH DATA FOR OPTIONAL TRAINING LIMITATIONS
126
DISPLAY OPTIONAL WARNINGS AND REQUESTS FOR MEDICAL CERTIFICATES
128
PERSONALIZE TRAINING PROGRAM, PERSONALIZE TRAINING SESSION, PERSONALIZE VIRTUAL TRAINER
129
DISPLAY PAYMENT INFORMATION (PRICE, AVAILABLE PAYMENT METHODS & MEANS)
130
OBTAIN PAYMENT-RELATED DATA (CREDIT CARD NUMBER, EXPIRATION DATA,...)
132
CHECK & VERIFY PAYMENT-RELATED DATA (ACCESS CREDIT CARD COMPANY...)
134
UPDATE USER FILES, CREATE PERSONALIZED TRAINING PROGRAM, BUILD PERSONALIZED TRAINING SESSION, ASSIGN ACCESS CODE
136
DISPLAY REGISTRATION CONFIRMATION, PERSONALIZED TRAINING PROGRAM AND SESSION DATA
138
E-MAIL CONFIRMATION AND ACCESS CODE
140

FIG. 10

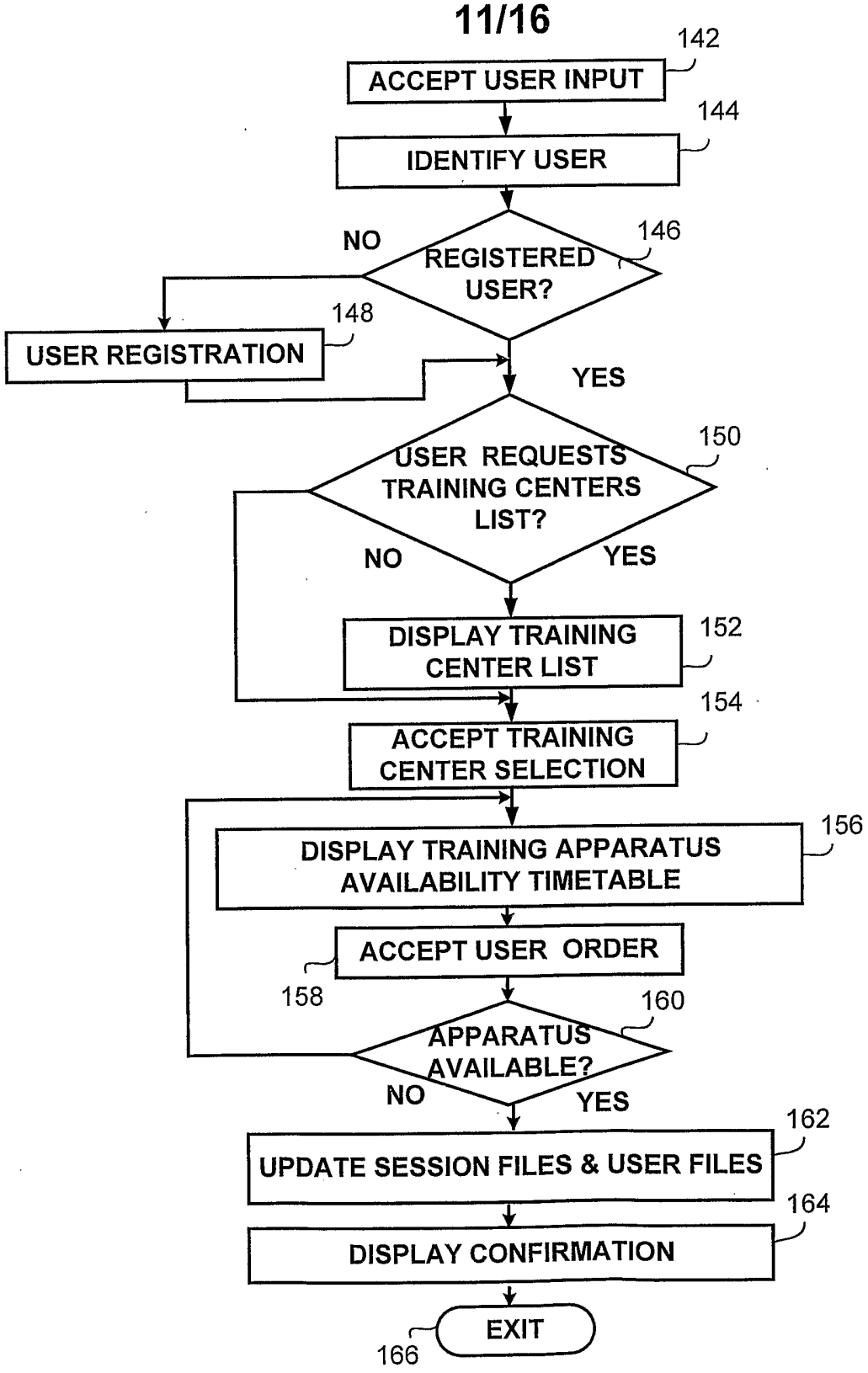
142
ACCEPT USER INPUT
144
IDENTIFY USER
146
NO
REGISTERED USER?
148
USER REGISTRATION
YES
150
USER REQUESTS TRAINING CENTERS LIST?
NO
YES
152
DISPLAY TRAINING CENTER LIST
154
ACCEPT TRAINING CENTER SELECTION
156
DISPLAY TRAINING APPARATUS AVAILABILITY TIMETABLE
ACCEPT USER ORDER
158
160
APPARATUS AVAILABLE?
NO
YES
162
UPDATE SESSION FILES & USER FILES
164
DISPLAY CONFIRMATION
EXIT
166

FIG. 11

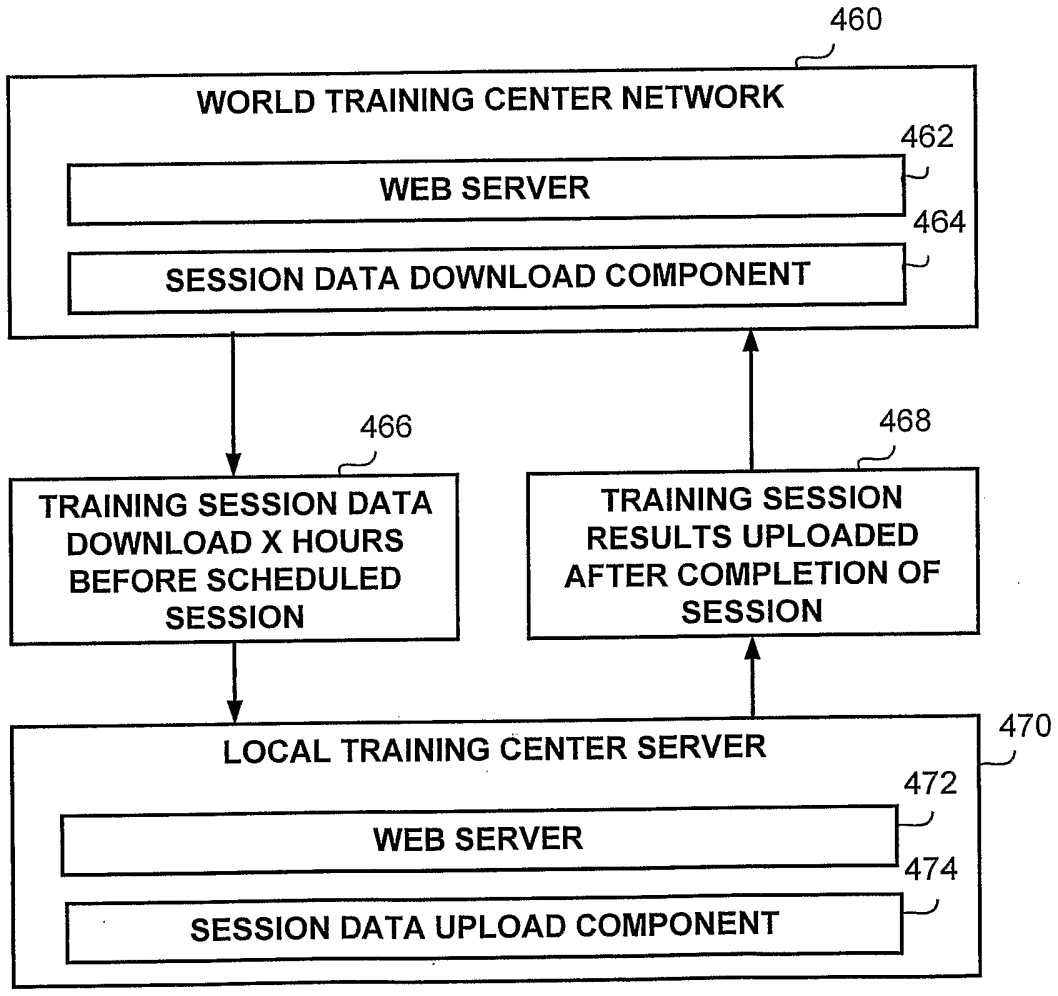
460
WORLD TRAINING CENTER NETWORK
462
WEB SERVER
464
SESSION DATA DOWNLOAD COMPONENT
466
TRAINING SESSION DATA DOWNLOAD X HOURS BEFORE SCHEDULED SESSION
468
TRAINING SESSION RESULTS UPLOADED AFTER COMPLETION OF SESSION
470
LOCAL TRAINING CENTER SERVER
472
WEB SERVER
474
SESSION DATA UPLOAD COMPONENT

FIG. 12

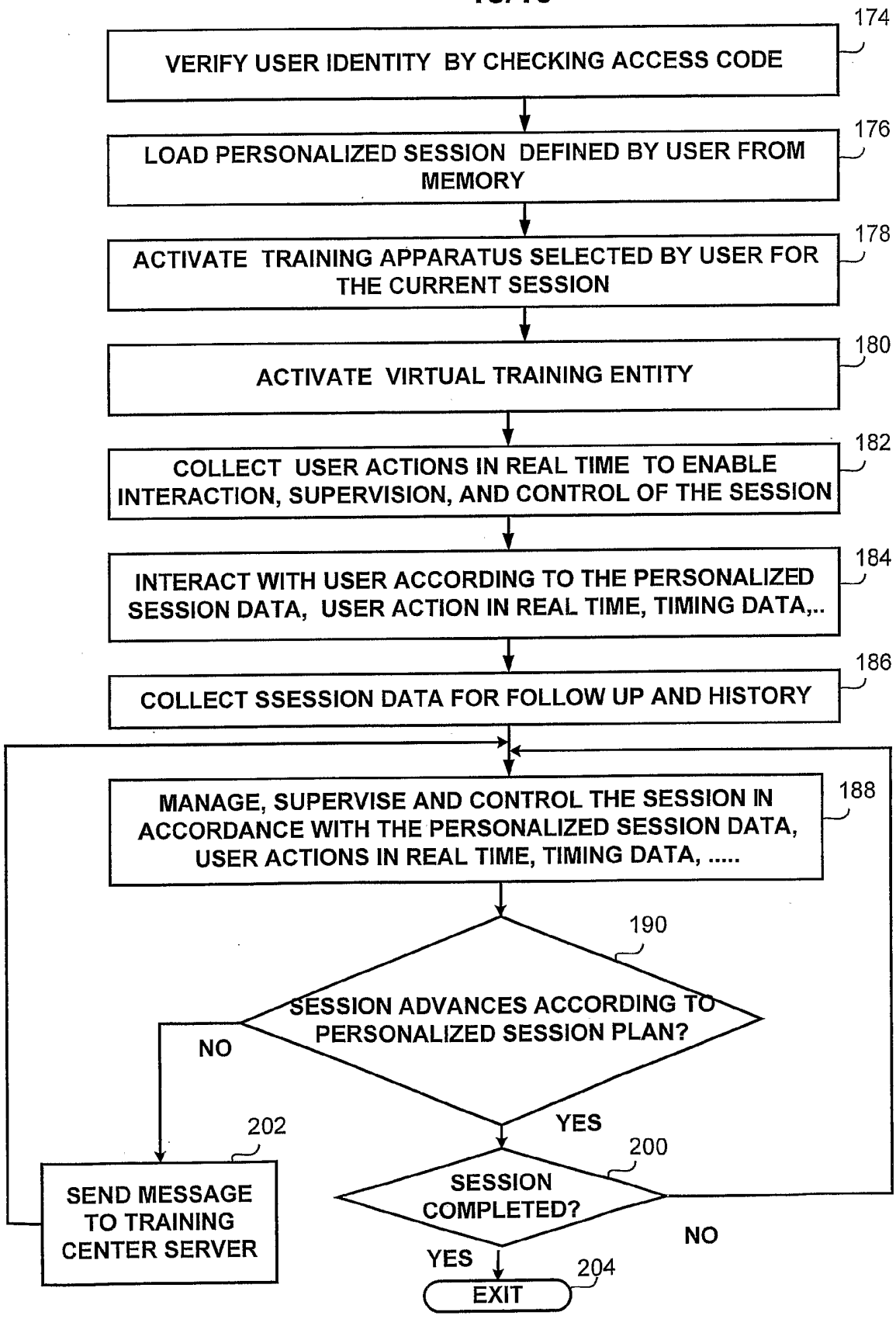
VERIFY USER IDENTITY BY CHECKING ACCESS CODE
174
LOAD PERSONALIZED SESSION DEFINED BY USER FROM MEMORY
176
ACTIVATE TRAINING APPARATUS SELECTED BY USER FOR THE CURRENT SESSION
178
ACTIVATE VIRTUAL TRAINING ENTITY
180
COLLECT USER ACTIONS IN REAL TIME TO ENABLE INTERACTION, SUPERVISION, AND CONTROL OF THE SESSION
182
INTERACT WITH USER ACCORDING TO THE PERSONALIZED SESSION DATA, USER ACTION IN REAL TIME, TIMING DATA,..
184
COLLECT SSESSION DATA FOR FOLLOW UP AND HISTORY
186
MANAGE, SUPERVISE AND CONTROL THE SESSION IN ACCORDANCE WITH THE PERSONALIZED SESSION DATA, USER ACTIONS IN REAL TIME, TIMING DATA, ...
188
SESSION ADVANCES ACCORDING TO PERSONALIZED SESSION PLAN?
190
NO
YES
202
SEND MESSAGE TO TRAINING CENTER SERVER
SESSION COMPLETED?
200
NO
YES
EXIT
204

FIG. 13

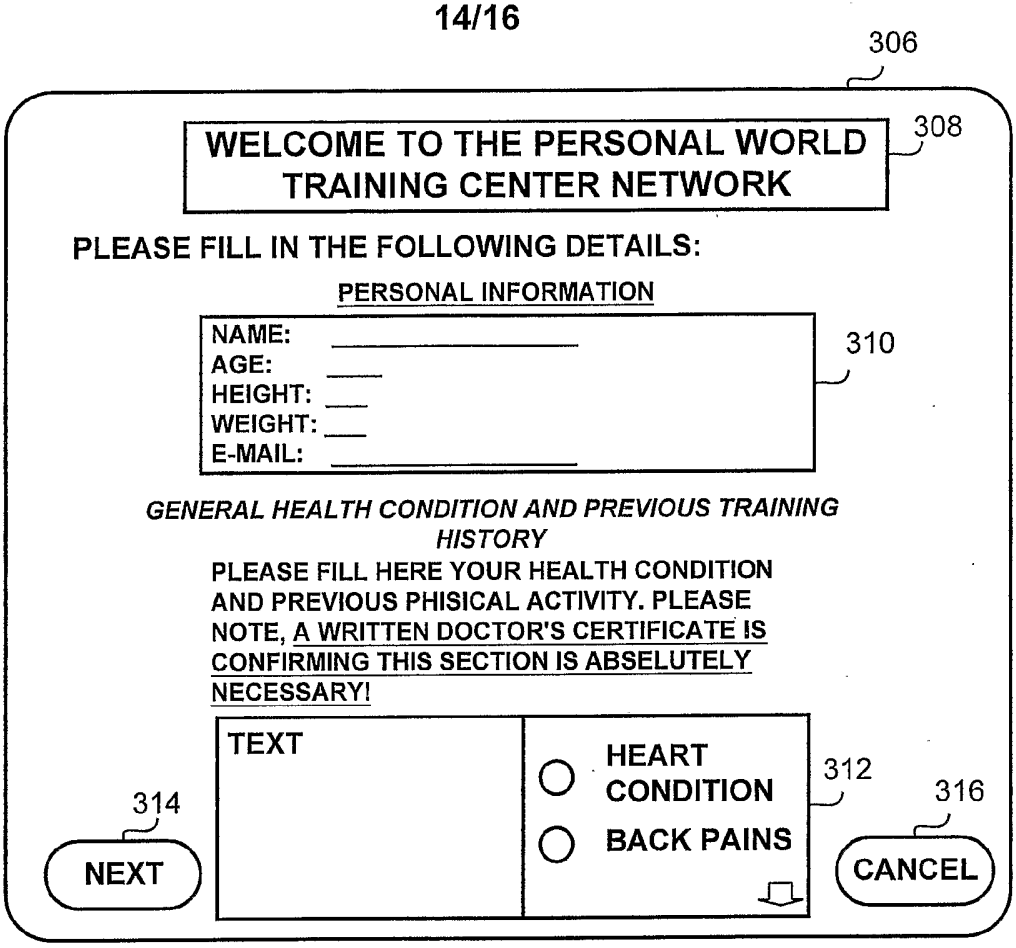
306
WELCOME TO THE PERSONAL WORLD TRAINING CENTER NETWORK
308
PLEASE FILL IN THE FOLLOWING DETAILS:
PERSONAL INFORMATION
NAME:
AGE:
HEIGHT:
WEIGHT:
E-MAIL:
310
GENERAL HEALTH CONDITION AND PREVIOUS TRAINING HISTORY
PLEASE FILL HERE YOUR HEALTH CONDITION AND PREVIOUS PHISICAL ACTIVITY. PLEASE NOTE, A WRITTEN DOCTOR'S CERTIFICATE IS CONFIRMING THIS SECTION IS ABSELUTELY NECESSARY!
TEXT
HEART CONDITION
BACK PAINS
312
314
316
NEXT
CANCEL

FIG. 14

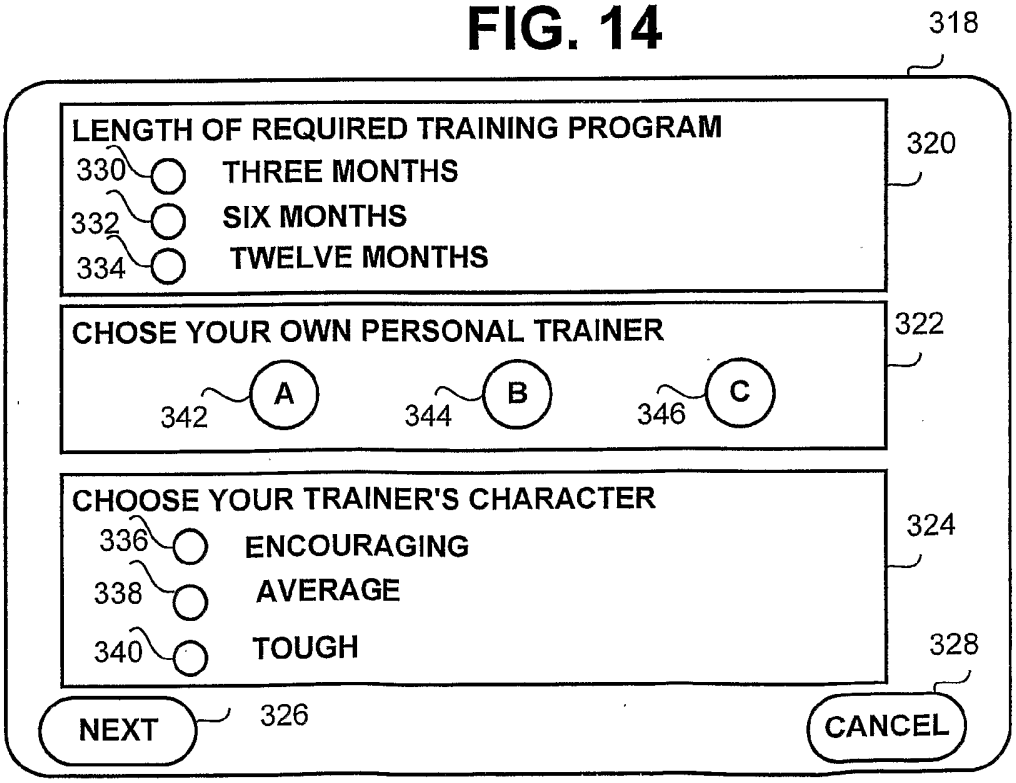
318
LENGTH OF REQUIRED TRAINING PROGRAM
320
330
THREE MONTHS
332
SIX MONTHS
334
TWELVE MONTHS
CHOSE YOUR OWN PERSONAL TRAINER
322
342
A
344
B
346
C
CHOOSE YOUR TRAINER'S CHARACTER
324
336
ENCOURAGING
338
AVERAGE
340
TOUGH
328
NEXT
326
CANCEL

FIG. 15

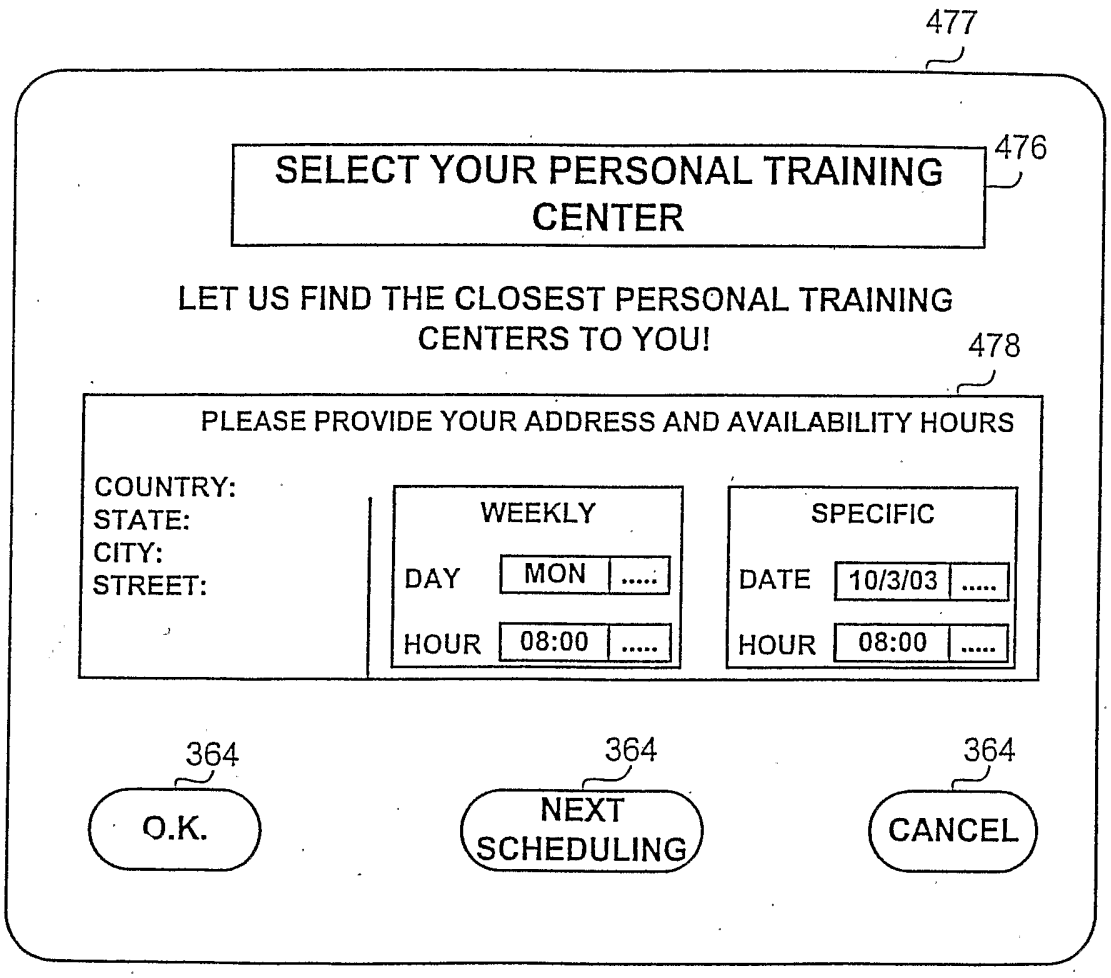
477
476
SELECT YOUR PERSONAL TRAINING CENTER
LET US FIND THE CLOSEST PERSONAL TRAINING CENTERS TO YOU!
478
PLEASE PROVIDE YOUR ADDRESS AND AVAILABILITY HOURS
COUNTRY:
STATE:
CITY:
STREET:
WEEKLY
DAY MON .....
HOUR 08:00 .....
SPECIFIC
DATE 10/3/03 .....
HOUR 08:00 .....
364
O.K.
364
NEXT SCHEDULING
364
CANCEL

FIG. 16

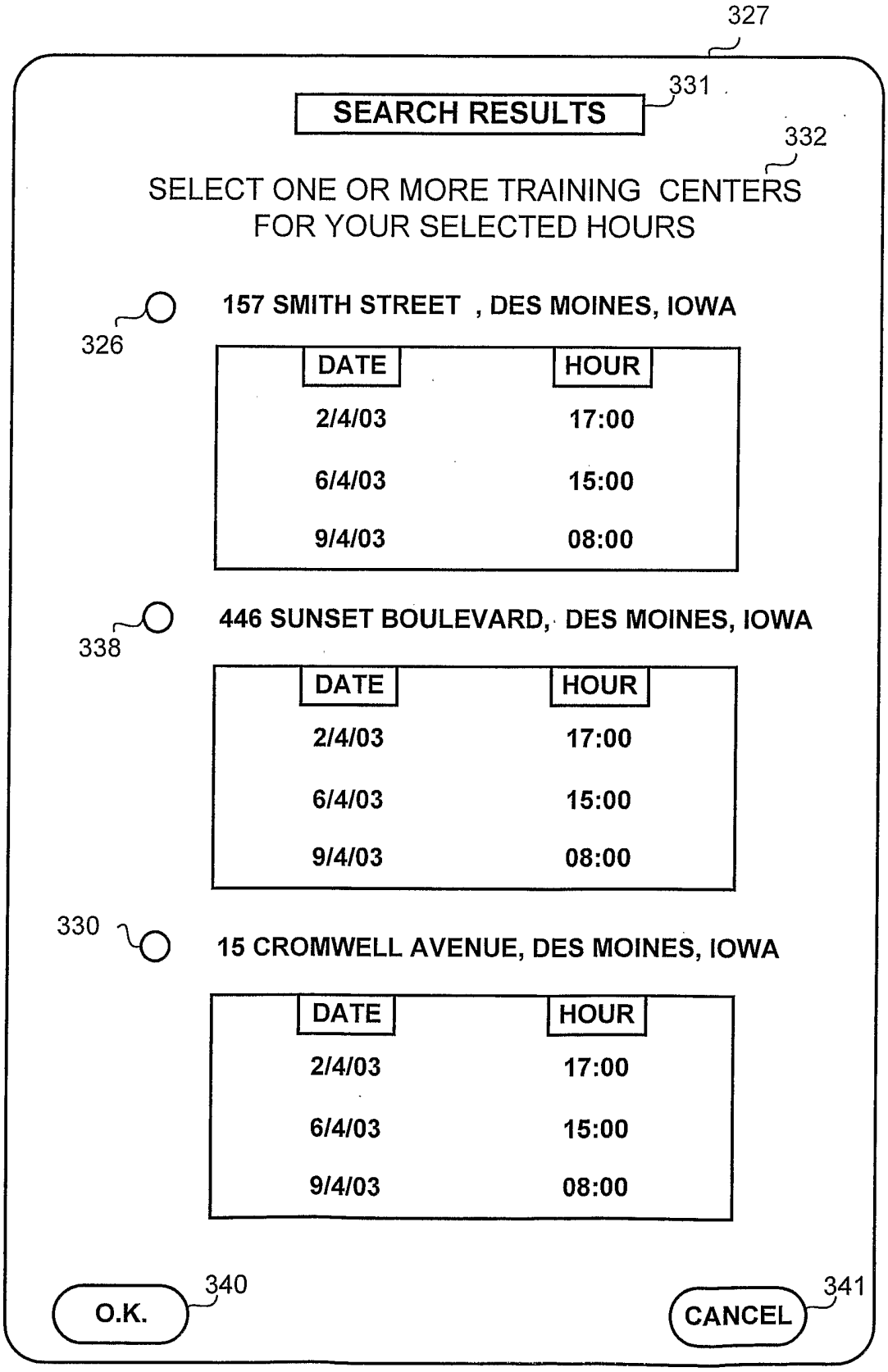
327
331
SEARCH RESULTS
332
SELECT ONE OR MORE TRAINING CENTERS
FOR YOUR SELECTED HOURS
326
157 SMITH STREET , DES MOINES, IOWA
DATE
HOUR
2/4/03
17:00
6/4/03
15:00
9/4/03
08:00
338
446 SUNSET BOULEVARD, DES MOINES, IOWA
DATE
HOUR
2/4/03
17:00
6/4/03
15:00
9/4/03
08:00
330
15 CROMWELL AVENUE, DES MOINES, IOWA
DATE
HOUR
2/4/03
17:00
6/4/03
15:00
9/4/03
08:00
340
O.K.
341
CANCEL

FIG. 17