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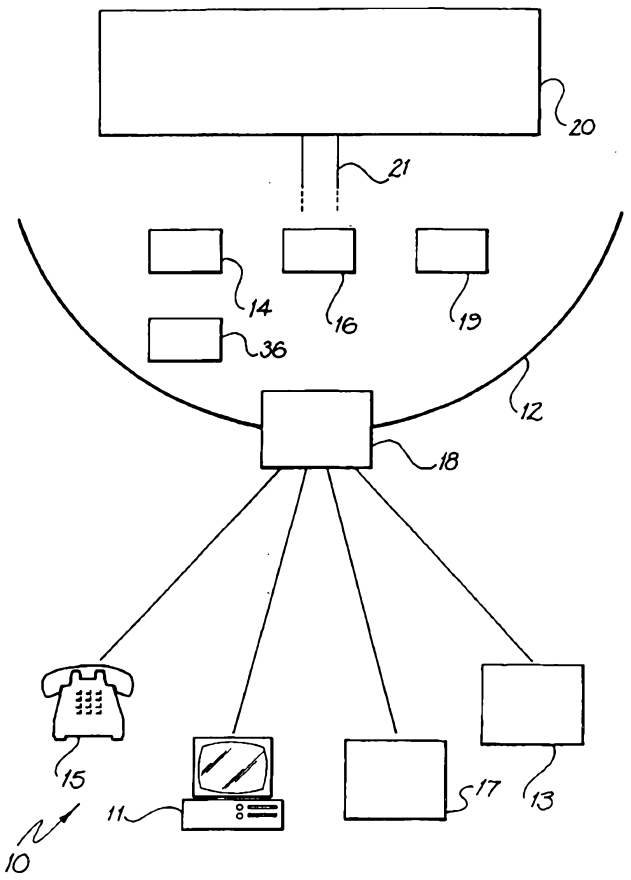
(57) Abstract

A mail system is disclosed which is accessible by a caller using an external first communications link. The system includes a plurality of client mail accounts, each client mail account being associated with a client, means for receiving and storing messages in said client accounts, means for identifying and verifying a client, and means for retrieving messages from a client account. The mail system may also include means for establishing a second communications link from the mail systems, means for connecting a caller to the second link and means for maintaining the first link, upon the termination of the second link.



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TELECOMMUNICATIONS SYSTEM

The invention is described in the following statement:

The invention relates to improvements in telecommunications systems. The invention has application in telecommunications systems that support an interactive voice structure. The invention also relates to telecommunications systems that provide document delivery services and/or financial services through a telecommunications network. The invention further relates to a telecommunications system structure that can be used in implementing the above systems though the structure also has application in more conventional systems.

In the specification, the term "messages" is used broadly and will be understood to mean audible messages, facsimile messages, electronic messages, that is, messages such as e-mail, voice messages, or any other information which is audible or viewable or convertible to a format which is audible or viewable.

In this specification, the terms 'voice messages', 'voice documents' and 'voice files' will be understood to mean messages, documents and files which contain information which is readily convertible into audible format.

In a first form, the invention resides in a mail system accessible by a caller using an external first communications link, said system including a plurality of client mail accounts, each client account being associated with a client, means for receiving and storing messages in said client accounts, means for identifying and verifying a client, means for retrieving messages from a said client account, said system further including means for establishing a second communications link from said mail system, means for connecting a caller to said second link and means for maintaining said first link upon termination of said second link.

In one embodiment of this form of the invention, the second communications link connects the client to a telephone address selected by the client.

In a second embodiment, the second communications link connects the client to one of a limited number of addresses specified by the client for that client account.

Preferably, the first communications link connects the mail system to a user interface. The user interface is preferably a telephone, cellular phone, pager, computing device, or Wireless Application Protocol (WAP) terminal.

Preferably, the second communications link connects the mail system to an extension of a telephone network, for example a Public Switched Telephone Network (PSTN), and the mail system further includes means for detecting a busy or engaged signal on said extension, and means for automatically establishing the second communications link between said client and said extension through said mail system when said busy signal or said engaged signal is no longer detected.

Preferably, the mail system further includes means for storing messages in a client account in electronic form such that said messages can be retrieved by a client using a computing device and a modem.

Preferably, the mail system further includes means for converting messages stored in electronic form to voice messages so that a client may receive voice messages from the mail system.

The mail system preferably further includes voice recognition means adapted to recognise speech and to generate system commands in response to the recognised speech.

A second form of the invention resides in a mail system including a voice user interface, a graphical user interface, a user access path having a path structure including a plurality of user selectable options, means to convey said path structure to a user through said voice user interface, and means to convey said path structure to a user through said graphical user interface.

Preferably, the path structure is customisable by a user with either the voice user interface or the graphical user interface. The path structure is preferably conveyed in the form of a menu structure.

Preferably, the form of the path structure conveyed through the voice user interface corresponds to the form of the path structure conveyed through the graphical user interface.

This form of the invention provides a more user friendly mail system than prior art systems because the user is able to connect to the system and receive the system options in either a voice format or a graphical format.

This form of the invention also provides a more user friendly mail system than prior art systems because system familiarisation and customisation obtained by the user through use of the graphical user interface allows the user to conjure a mental image when using the voice interface.

In a third form, the invention resides in a mail system including a plurality of user mail accounts, means to access said system from an external communications link, distributing means adapted to distribute a plurality of documents to a plurality of user mail accounts through said external communications link, means for facilitating access by a user to a user mail account associated with the user, and means for retrieving documents stored in the user mail account.

Preferably, in each of the abovementioned forms of the invention, the mail system is a voicemail system.

In a fourth form, the invention resides in a telecommunications network including a plurality of user accounts, each user account being associated with a user and each user account including a user message receiving account and a user financial transaction account, a user financial server adapted to receive a financial commodity and to distribute said financial commodity into at least one said user transaction account, means for entering a receipt message into at least one said

user message account, said receipt message corresponding to receipt of a financial commodity in said at least one user financial account, and means for facilitating retrieval of messages from the at least one user message account by said user.

The financial commodity may correspond to a monetary value or to reward points of a customer loyalty scheme.

Preferably, a user message account includes a voicemail account, the arrangement being such that a user can retrieve messages from the voicemail account by accessing the network from an external user interface.

A user may retrieve electronic messages by accessing the network from an external computer terminal or through a computer network such as the world wide web.

The network preferably includes a Text To Speech (TTS) converter, adapted to cooperate with said user message accounts so that electronic text messages are retrievable from a user message account as voice messages.

This fourth form of the present invention facilitates telephone and internet banking by co-locating a user message account and the corresponding user financial account. All financial transactions including payments, withdrawals and deposits generate messages relating to those transactions in the appropriate user message account.

In a fifth form, the invention resides in a document delivery system including a plurality of user accounts, each user account being associated with a user and each account including a message receiving account and a financial transaction account, means to receive and transfer messages into said message account, said messages including messages relating to user financial statements, message retrieval means for retrieving messages from said message account, and means for facilitating transfer by a user of a financial commodity from the financial transaction account of the user.

Preferably, the financial statement messages are received from an external entity and the financial commodity transfer means includes means for transferring a financial commodity to a financial account specified by said entity.

The financial statements may be related to receipt of funds into a user's financial transaction account, transfer of funds from a user's account, a financial liability of a user such as a credit card debt, loan repayment or invoice, or an investment related statement such as an interest bearing deposit, a share distribution statement, or a share purchase or registration record.

In order to assist startup viability of the new system, it is preferred that the financial accounts in the fourth and fifth forms of the invention are accounts existing within an established institution to which respective linked mail accounts are then added.

A sixth form of the invention resides in a telecommunication system including one or more data storage sites, means for establishing a connection with a user at a user interface through a telecommunications link, a random access memory, means for loading one or more storage applications into said random access memory, means for receiving user provided commands through said connection, means for opening a data storage site in response to a user request, wherein opening said data storage site includes allocating a portion of said random access memory to said data storage site, and loading one or more software applications into said allocated random access memory, wherein at least one of said loaded software applications prompts a user to provide commands to perform one or more processes in said allocated random access memory, said allocated random access memory being made available for re-allocation to a data storage site in response to either termination of the user connection or a conclusion of said processes operating in said allocated random access memory.

Preferably, the system further includes processing means adapted to carry out said one or more processes in response to the commands.

Preferably, the system further includes means for identifying a user as one of a plurality of user types, wherein at least one of said loaded software applications is loaded dependent on said user types.

Preferably, access to the data storage site is provided on two or more levels, access to at least one of those levels being protected by a firewall.

Preferably the level of access provided to a user determines the data that a user can view or retrieve and/or the software applications that the user can access.

Preferably, the data communications link allows the transfer of electronic files from the data storage site to the allocated random access memory. The system preferably further includes software storage means linked to the random access memory.

Alternatively, or in addition, the software applications may be stored in the data storage or loaded into the random access memory through an external telecommunications link, for example from the world wide web. Accordingly, the system may further include software access means linked to the random access memory, the surface access means being adapted to access software stored at a remote location.

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig 1 is a schematic showing an exemplary network structure for the present invention;

Fig 2 is a schematic showing an exemplary memory structure;

Fig 3 is a schematic showing a user connection to a client account;

Fig 4 is a schematic of an exemplary visitor menu structure;

Fig 5 is a schematic of an exemplary client menu structure;

Fig 6 is a schematic showing an on-calling feature of the present invention;

Fig 7 is a schematic of an embodiment showing a staff rostering system;

Fig 8 is a schematic of an embodiment of the invention as it applies to a university;and

Fig 9 is a schematic of an alternative memory structure.

With reference to Fig. 1 a network structure shown generally at 10 includes a local area network 12. Within the network 12 are a number of servers including a financial server 14, a voicemail server 16, a web server 19 and a telecommunications billing server 36. Access to the network 12 is provided through a network access device 18. The device 18 has access ports for connection to data transmission links and voice links. The network is preferably connected in a way that allows both voice and electronic information to be transferred simultaneously using a single telephone line. Such systems are known per se for example, from US Patent 5 349 636. The network access device 18 may be connected externally of the network 12 to a Private Automatic Branch Exchange (PABX) 13 or a Public Switched Telephone Network (PSTN) 17 or both. The network 12 can be accessed using a link from a standard telephone 15 but can also be accessed through the worldwide web, through a computer terminal connection from a graphical user interface 11, through a WAP terminal (not shown), through a pager (not shown) or through any other suitable user interface.

In addition, the connection may employ a "phone doubler", such as the type developed by Ericsson, at the user end that allows a telephone line to have incoming and outgoing calls even though the telephone line is connected to the network.

The LAN 12 communicates with a memory structure 20 through a data pipe 21. As shown in Fig 2, the memory structure includes a plurality of data storage sites. Each data storage site is associated with a client account 23 and data associated with the client accounts is stored in a re-writeable memory on a computer hard disk. The client accounts are protected by firewall security 24. The memory structure 20 further includes a Random Access Memory (RAM) 25 operating in conjunction with a plurality of processors 26. The RAM 25 may be subdivided into blocks with one or more processors 26 assigned to each block. A memory

controller 27 is provided to control allocations of the RAM 25. In communication with the RAM 25 is a software storage memory 40 that stores software applications for example a Text To Speech converter (TTS) 41, voice recognition software 42, Interactive Voice Response (IVR) software 43 and document tagging software 44, that can be downloaded into the RAM 25 when required. Software applications can also be loaded into the RAM 25 from a client account 23, from the servers 14, 16 and 19, or from an external computer or network through a communications link.

A message account 28 capable of receiving and storing voice and/or electronic mail messages forms a part of each client account 23. The client accounts also include a financial transaction account 29. The client accounts 23 are capable of receiving and storing electronic files including digitised voice files, electronic text files, video files, facsimile files, software applications and the like.

Referring to Fig 3, to access a client account a user dials into the network access device from a remote interface 31 such as a telephone, computer terminal, pager, WAP terminal, etc. to establish a connection 30. The connection may be a direct line into the network access device 18 or may be through a PABX or PSTN network. On dialling into the network the user may be connected to a reception interface 32 that prompts the user to provide a request to access a client account. Alternatively, the request to access a client account may be determined by the user location or the dialling code entered by the user when connecting to the network. The user may further be prompted to provide security information to determine the user type, for example if the user is a client owning the account or a visitor to the client account. The security information may include a Personal Identification Number (PIN) or may be spoken words that are then processed by voice recognition software to determine the identity of the user. Once the user type has been determined, the user connection passes through the firewall 24 at a level dependent on the type of the user.

When a request to access a client account 23 is received, the memory controller 27 allocates a portion 33 of the RAM 25 to that client account. The allocated RAM 33 communicates with the client account through a data communication path 34. The RAM is selected from a list of available RAM addresses by the memory controller 27. The amount of memory allocated to the client account 23 is determined from a history of RAM requirements for that client account. The amount of RAM allocated may also depend on whether the user accessing the client account is a client or visitor.

Once the RAM 25 has been allocated and the user type determined, one or more software applications are downloaded into the allocated RAM. The software applications will include standard applications such as TTS and/or voice recognition software. The loaded software will also include applications that depend on the user type. For example, if a user is accessing their own client account, the loaded software may allow the user to perform functions such as retrieving messages or manipulating files, or to use the network commerce facilities. If the user is a visitor to a client account, the loaded software may only allow the visitor to deposit voice or electronic messages in the client message account.

The loaded software applications allow a user to command processes within the RAM. Processes may include transferring new files to the client account from a site external to the network, creating new files within the RAM using the software applications and then transferring the files to the client account or forwarding the files to another site within or external to the network, or manipulating and interacting with files that already exist within the client account. These functions may be limited by the level of access provided to the user. For example, an account administrator may be able to view all files and operate all available processes such as manipulating the file information to achieve a process result, while a lower level user may only be able to access certain parts of a file to perform limited processes such as updating the file information.

Manipulation of the client account is controlled by an interactive customisable menu having a menu structure that can be conveyed to a user in a voice based or graphics based form depending on how the user accesses the network. The menu includes a list of operations that can be performed by accessing that particular client account. The conveyed menu and thus the available operations will depend on whether the user is a client accessing their own account, or a visitor seeking access to a limited range of operations and files. Access at the client level is protected by the firewall 24. The software required to perform the available operations may be loaded automatically into the allocated RAM 33 when the client account is opened or only when those operations are selected from the menu.

A RAM process may include an operation that requires access to a second data storage site, in which case a request is transmitted to open that site and the site is opened in the manner previously described. The allocated RAMs of the respective sites are linked so that the user can perform functions using the software applications in either RAM. The user may, for example, be connected to the first site as a client and to the second site as a visitor. Therefore by accessing only one client account, for example their own, a user may potentially obtain indirect access to some or all other client accounts.

If the allocated RAM 23 is insufficient to conduct all the processes that the user desires, more RAM can be allocated to the client account 23 by the memory controller 27. The RAM requirements of a client account are logged and used for future memory allocations.

When the user connection 30 to the client account has been terminated and the processes operating in the client account's allocated RAM have concluded and any results of those processes have been either stored in the account or transferred to an alternative site, the allocated RAM 33 is de-allocated by returning the allocated RAM addresses to the list of available RAM addresses. Once this

occurs, any information within the allocated RAM 33, for example the software applications, is lost and the RAM is then able to be re-allocated to any client account by the memory controller 27.

Because the software applications 41, 42, 43, 44 operate within the memory structure 20, instead of, for example, within a user interface such as a computer terminal or telephone handset, as is the current methodology, the amount of data that must be transferred through the user connection 30 to the user can be greatly reduced. The user interface can be used merely to provide commands to operate processes in the RAM, and to receive the results of those processes. The allocated RAM 33 thus provides a virtual screen within the network that can be conveyed to a user by voice or graphics and manipulated with only simple interface inputs such as keypad entry or click select icons. It is envisaged that this form of the present invention will reduce the amount of data that must be transferred through the communications links by up to 100 times when compared with conventional operating systems.

Software applications requiring a large amount of memory or that are commonly used by a plurality of users may be permanently stored in the RAM and accessed from any allocated RAM block. In particular these loaded applications can be accessed simultaneously from a plurality of RAM allocations. This can provide a saving in the total amount of RAM required by the system and the time taken to make a connection and run the more common processes.

The client accounts 23 may allow more than one user to access each account at any one time. RAM may be allocated to an account dependent on the number of users, that is more RAM may be allocated as the number of connected users connected to one account increases. As the number of user connections reduces, the amount of allocated RAM is correspondingly reduced. Alternatively the RAM may be allocated as a block when the client account is first opened with the amount of RAM allocated based on the average requirement of the site. The allocation is maintained at the average level as further users connect and disconnect until all user connections to the account are broken or the account

requires more RAM to be allocated in order to handle process requirements.

An alternative memory structure for use in conjunction with the network is discussed herein with reference to Fig 9. The memory structure shown generally at 90 communicates with the LAN through the data pipe 21. A bank 91 of receivers and processors form a reception interface that receives incoming connections from the network access device (not shown).

The memory structure 90 also includes software applications storage 92, and data storage sites 93 operating in conjunction with site processors 94. A further bank of processors 95 controls signal traffic into and out of the store of RAM 96 and RAM processors 97. The control processors 95 also include a memory controller for allocating portions of RAM to a data storage site. The above features are interconnected along a connection path 99.

When a connection is made to the network, the connection is transferred to the reception interface 91 from the network access device. If the data package associated with the incoming connection does not include a request to access a data storage site, the connecting user is prompted to provide a site identifier.

Once the data storage site has been determined, the connection proceeds to the software applications storage 92 and specified data storage site 93 where it picks up software applications and any files required to run with those applications. The connection is then received by the signal control processors 95 where a portion of the RAM store 96 is allocated to the data storage site. The software applications and files are then loaded into the allocated RAM.

A return connection 98 is made between the allocated RAM and the reception interface that passes through the bank of signal control processors 95 but bypasses the data storage site 93 and software application storage 92. The return connection 98 provides a two way communications link from the allocated RAM to the user that can be used to receive commands from the user to operate processes in the RAM, and convey information such as the results of those processes from the

RAM to the user. The connection to the data storage site is maintained so that files can be transferred between the data storage site and the allocated RAM as required.

The invention will now be described with reference to a voicemail system. A caller connects to the network from a remote telephone address through a telephone link. The caller may be attempting to contact a person directly and is diverted to the network on receiving a busy, engaged or unavailable signal. When the connection to the network is established, the caller is prompted to provide a client account identifier. Alternatively the client account identifier may be determined from the caller's telephone address or from the dialling code provided by the caller when connecting to the network. The latter methods provide the most direct route to the client account. Once the client account identifier is determined, the client account is opened by allocating a portion of RAM to the client account and linking the RAM to the client account through a data communication path. The caller is then prompted to provide security information in order to establish if the caller is the owner of the client account.

If the caller is verified as a visitor to a client's account, IVR software that includes a visitor path structure pre-determined by the client is loaded into the allocated RAM. Referring to Fig 4, the IVR software provides the caller with transient messages such as a greeting, and voice prompts providing the caller with a menu 50 of options selectable using the keypad of the caller's telephone handset or by spoken command employing the voice recognition facility. If access to the network 12 is through the web server 19 from a remote computer terminal, a graphical menu of substantially the same structure as the voice menu is provided through a Graphical User Interface (GUI) to prompt the user. The menu includes, at a first level, options 51 to record a non-urgent voice, text or facsimile message to the client's message account.

The menu preferably also includes an option 52 to advance to a second level whereby an attempt is made to contact the client on an alternative extension, external or internal to the network, such as a mobile phone, pager or alternative

telephone extension, pre-selected by the client. If the second level call is connected 53 and then terminated, the caller may be returned to the IVR visitor path before their connection to the network is terminated to allow them to perform any other caller functions. If the second level call cannot be connected the caller is prompted by a further voice prompt 54 to record a voice message, the message being flagged as urgent.

If, on connecting to a client account through a connection 30 from a voice interface 31 (Fig. 3), a caller provides the appropriate security information to gain access to the client account through the firewall they are greeted as the client and receive an update on the state of their voicemail box. The update may include the number of new voice, email, and facsimile messages as well as a total of each maintained in the clients account. As the client is receiving the greeting, the appropriate client software applications are loaded into the RAM allocated to the client account.

After receiving the greeting and update the client is connected to a client access path, provided by the IVR software, through which the client may perform a range of functions provided by the network. An exemplary client path is described below with reference to Fig. 5.

The client access path 60 includes an entrance level menu 61 having a plurality of selectable options. The menu is related to the client by a voice communicator. The client can select any one of the options by pressing the corresponding number(s) on the keypad or by providing voice commands that are interpreted using the voice recognition software.

One of the options is to access the client's voicemail box 62. On opening the voicemail box the client is presented with a further range of options relating to voice messages in the voicemail box including listen, delete and save functions.

The voicemail box may also include an option to return a call to a caller whereby an external link may be provided through the on-calling menu 64 described below, to connect the client with the caller. A further option selectable from the entry level menu 61 on the client access path 60 is to open the client's electronic mail box 63. Within the electronic mail box 63 the client may listen to a summary of messages contained within the mail box, redirect messages to a facsimile machine by providing the appropriate dialling address, or listen to the messages using a Text To Speech (TTS) converter 41. The document tagging facility 44 described below may be employed to relate only the key elements of a message to the client. Standard email functions as are known in the art, such as redirecting, save and delete functions, can also be performed.

Retrieved messages that have not been deleted are stored in a records storage box 65 that can be accessed from the entry level menu 61. The records storage box 65 can also be used to store a range of different documents. By converting paper documents to electronic documents, for example by scanning and electronic mailing or by facsimile transfer, a client may use their account as secure back-up storage for, inter alia, insurance policies, contracts, birth certificates, share certificates, purchase receipts etc. A client may later obtain a copy of a stored document by directly transferring a copy of the document to a local printer through the telecommunications link, by redirecting the document to a facsimile machine in a manner known in the art, for example from US Patent No. 5 349 636, or by requesting that a copy of the document be forwarded to the client's mail address by standard post.

The client access path 60 further includes an on-calling feature 64. When this menu is selected from the entry level menu 61 or from any other menu within the client access path an external communications link 72 is provided through the network access device 18 as shown in Fig. 6. Using this link the client may connect to any node extension 73 ordinarily available through a standard PSTN 17 and perform standard voice communications between themselves at their voice interface 31 and a person at the node extension 73. On termination of the link 72, the client is returned to the on-call menu 64 within the client access path. The

on-call menu 64 includes an option to request automatic call back when an engaged or busy signal is detected at the node extension 73. If this function is selected, further attempts are made to establish a connection between the network access device 18 and the extension node 73. Once an engaged signal is no longer detected at the extension node 73 the network access device 18 confirms that the client link 30 is still maintained and re-establishes the link in the event that it has been terminated. The network access device 18 then connects the client link 30 with the extension node 73. The client access path 60 may include a feature to select the number of attempts the switch will make in order to establish the link 72 and/or the interval between attempts. This selection feature may be provided in the on-call menu 64 or in a client customisation menu described below.

Further options selectable from the entry level menu 60 (Fig. 5) may include a banking menu 66 providing access to the network financial server 14 and a bill payment menu 67 that may, for example, allow a client to pay an account held with the network provider using the telecommunications billing server 36.

With reference to Fig. 1, the network 10 can be accessed from a remote computer terminal having a Graphics User Interface (GUI) 11 by direct connection or through a computer network such as the worldwide web. The features and functions of the network 10, in particular the client access path 60 are provided in a graphical form by the web sever 19 to the GUI 11. The graphical structure of the client access path is substantially identical to the voice structure. For example the entry level menu 60 is provided as a numbered list of options with the same corresponding numbers as provided by the IVR software. The user may select a menu option through their GUI by pressing the corresponding number on their keypad, by highlighting and selecting the option with their mouse or by manoeuvring their mouse over a graphical keypad provided on their screen that simulates the keypad of a telephone handset. By connecting to the network 10 from a computer terminal, a user also may gain access to the worldwide web through the web server 19.

The client path 60 includes a customisation menu 68. By selecting this menu from the entry level menu 60, the client may customise their client path according to their specific needs. The customisation menu 68 may include options to change what functions are available to the client by adding or removing the software applications used to perform those functions. The client can also select which software applications are loaded into the allocated RAM automatically when the client account is opened, and which ones are loaded only on request. The customisation menu 68 may also allow changes to user preferences such as alternative contact extensions, the assignment of specific functions to keypad buttons, graphical user interface layout options and the like. Changes to the path structure 60 are implemented in a manner that simultaneously alters the presentation of the path structure in the graphical and voice based forms.

As shown in Fig 2, within each client account 23 is a financial transaction account 29. Payer clients may transfer finances into the financial transaction accounts of payee clients by accessing the financial server 14 through the access device 18 and providing the appropriate client account identification. In particular, a list of client accounts can be provided in order that a plurality of financial transactions involving a plurality of client accounts can be conducted with one connection to the network. The user drives the transactions through an interactive menu structure as described above, provided to the user on connection to the network.

The financial server 14 can therefore be employed to distribute inter alia a user's wages, share dividends, superannuation pension etc. The server 14 can also track other financial commodities such as reward points from customer loyalty schemes. When finances are received into a client's financial transaction account 29, a statement relating to the transaction is entered as an electronic and/or voice message into the client's message account 28.

Conversely, third parties may notify a client of pending financial liabilities by sending a voice and/or electronic invoice to the client's message account 28 using

the voicemail or web servers 16, 19. In particular, the servers 16, 19 are adapted to distribute a plurality of documents to a plurality of client accounts with one connection to the network 10. In this way the system can be utilised to distribute a goods or service provider's customer accounts such as council rates, water and electricity bills and the like. On receiving the invoice, the client may use the interactive menu system described above to access the financial server 14 and download software into the client account's allocated RAM that allows the client to pay the invoice by a transfer of funds from the client's financial account 29 to a specified account within a banking network accessed by the financial server 14. As the funds are transferred a financial record relating to the transaction is entered into the client's message account.

The financial records are preferably entered into a client's message account as electronic text and are only converted to voice messages on request by the client. In this way the statement can be readily stored, printed, redirected to a second email account for printing or redirected to a facsimile machine.

The financial server 14 may be connected through the network access device 18 to an existing banking network in a manner that allows a client to make cash withdrawals from their financial account from existing Automatic Teller Machines (ATMs). The financial account can therefore be used as a day to day bank account with increased ease of withdrawals, deposits and payments provided by the interlinked message account and interactive menu structure.

The network structure described above can be used as a complete commerce network. When a client accesses their own client account 23 they receive, as part of the general update on the state of their account, a review of their financial transaction account 29. The review includes the balance of their financial account, an amount of credit available to them, and any outstanding financial liabilities.

The client may then access any vendor client within the network using the interactive menu and the appropriate software applications. On providing the appropriate vendor site identification, the client's allocated RAM is linked with the vendor site's allocated RAM. The vendor site's RAM may include software that automatically provides a product catalogue to the client in a voice based or graphics based form. Alternatively, the vendor may provide the catalogue through conventional advertising channels such as the print or television media. The catalogue includes a list of purchasable products, their respective prices, and if necessary a product code. A client purchases a product by selecting the product or entering the code. On selecting a product the order is recorded by the vendor account, including the delivery address of the client. At the same time, the purchase price is debited from the available credit of the client. The client can continue to purchase products from all vendor sites within the network provided they have credit available. The financial server transfers a financial amount corresponding to the purchase from the client's financial account to the vendor's financial account. This transaction may not occur until the vendor provides a guarantee that the purchased goods have been sent to the delivery address of the client.

Because the client accounts are protected by firewall security, the identity or authority of a purchasing client can be guaranteed and does not have to be verified at each transaction. In addition both the purchaser and vendor can be guaranteed of the purchaser's ability to pay for the goods because the purchaser can at all times be made aware of the amount of credit available to them. This is a level of security not previously available through prior art commerce networks. The described network also has advantage in speed because verification through an external link does not have to occur for every transaction as presently occurs for many credit card based commerce networks.

The invention is not limited to the delivery of financial documents. All types of documents may be delivered to the client accounts. In particular the network can be used to deliver interactive documents from one client account to another. An example of this type of delivery system is described below with reference to a

staff rostering system. The embodiment is described by way of example only as it will be apparent to the skilled reader that the described embodiment can have far broader application.

As shown in Fig. 7 a staff manager accesses the network 12 through the web server 19 from a computer terminal 11 having a Graphical User Interface (GUI) with a keyboard and mouse. The staff manager causes a computerised rostering form 80 to be displayed on the GUI. The form 80 includes space 81 to enter a number of first choice employees for the same number of vacancies for a particular work shift. The form also includes space 82 to enter second and subsequent choice employees. Each of the candidates is entered together with an identifier for their corresponding voicemail account. The staff manager can also specify on the form 80 a time frame in which an employee has to accept a work shift.

On completing the form for all unfilled shift vacancies, the staff manager submits the form 80, for example by selecting a submit icon 83 on the form with their mouse. The entered information is then retrieved from the form by the web server 19. Using the employee voicemail account identifier, an interactive message is entered in the voicemail accounts 28 of all the first choice employees. The message includes the date and time of the available shift and any other necessary information, for example work site location. Also included with the message are instructions for responding to the message including a time frame in which to respond. When the employee receives the message, they can respond to the message by following the instructions. For example, the employee may receive a voice prompt saying "Press 1 to accept shift, Press 2 to reject shift, Press 3 to contact employer".

If the employee accepts the shift, the acceptance is communicated through the network to the computerised form 80 where that employee's shift entry 81 is flagged as accepted, for example by a colour change on the form. If the employee

rejects the shift or does not respond to the message within the specified time frame the next choice employee is chosen and the work shift message is entered in their corresponding voicemail account.

As has been described, a staff manager may organise and deliver an entire roster with a single connection to the network. In particular, the manager is better equipped to handle emergency staff requirements because second choice employees are automatically contacted if no response is received from the first choice employees.

The described network further includes a document tagging software application 44. A user may employ this application to tag the key elements of a document. When the document is provided to a user through a telecommunications link only the tagged elements need be conveyed. For example the document may be an electronic mail message including text and graphics. The sender may tag the text portions so that when the client connects to their account by a telephone link to receive the message, the TTS and document tagging applications work in tandem to convert only the text portions to speech and the graphics are ignored. If the client connects using a graphics enabled device, the entire message can be retrieved.

A further application of the tagging software 44 is provided by the commerce network described above. A vendor may establish a product catalogue in the form of a web page. The page may include background graphics and text chosen for its aesthetic appeal as well as product specific information. The vendor may tag only the product specific information so that when a purchaser accesses the catalogue using an IVR system previously described only the product specific information is conveyed to the purchaser. This increases the speed with which a purchasing transaction can be conducted. The tagging software application therefore facilitates an entire voice-based commerce network.

It is envisaged that the tagging software application 44 will have wide application to the use of WAP terminals, that is hand held graphics enabled web browsers. To date, WAP terminals have not been widely accepted due to their inability to handle the vast amount of information that a standard personal computer can accept, and that standard web pages provide.

By using the tagging software application all non-essential information such as background graphics and unrequested advertising and hyperlinks can be removed from a web page, thereby significantly reducing the amount of information that must be conveyed to the WAP terminal for display. The WAP terminal can therefore be used as a more effective communication tool than previously possible.

Connection from a remote computer terminal to the web server 19 of the described network 10 can provide a user with an entry point to the world wide web in a manner well known in the art. Furthermore, the network structure of the present invention allows access to the worldwide web from any standard voice interface such as a conventional or mobile telephone. This feature can be provided by the present invention because nearly all of the processing occurs within the memory structure 20 and only a minimum amount of data is required to be transmitted to the user interface.

Information from a web page on the world wide web may be conveyed to a voice interface web browser using the TTS software. This may occur in conjunction with the key element document tagging feature described above. For web pages that are commonly accessed from a voice interface, the web page creator may incorporate interactive sound files into the web page so that these may be conveyed directly to the voice interface without the need for any processing.

An embodiment combining all forms of the present invention is described below with reference to Fig 8 . The embodiment is described with particular reference to a university system though it can be equally applied to any similar institution and many other systems. The system 100 includes a site PABX 102, access to which can be through a pre-existing PABX 104, hardwired telephone sites 106 located throughout the university grounds or through a radio phone link 109 from a radio base 108. Students and staff of the university may be provided with short range radio handsets 110 to access the radio base 108. The site PABX 102 serves as the network switch for the network 12.

Students and staff are each assigned an account within the network, the account being capable of receiving voice, electronic and facsimile messages as described above. The university network system 100 can therefore be used as a means of communication between staff and students to, for example, provide information on assessments, exams, and marks, to receive and return student assignments, and provide course notes, video lectures and tutorials and the like. In addition the financial server 24 of the network 12 can be used to receive money from students for expenses such as library fines, field trips, text books etc. The financial server 24 can also be used in payment of university staff.

While particular embodiments of this invention have been described, it will be evident to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments and examples are therefore to be considered in all respects as illustrative and not restrictive, and all modifications which would be within the competence of those skilled in the art are therefore intended to be embraced therein.

CLAIMS

1. A mail system accessible by a caller using an external first communications link, said system including a plurality of client mail accounts, each client account being associated with a client, means for receiving and storing messages in said client accounts, means for identifying and verifying a client, means for retrieving messages from a said client account, said system further including means for establishing a second communications link from said mail system, means for connecting a caller to said second link and means for maintaining said first link upon termination of said second link.

2. A mail system as claimed in Claim 1, wherein the second communications link connects the client to a telephone address selected by the client.

3. A mail system as claimed in Claim 1 or Claim 2, wherein the second communications link connects the client to one of a limited number of addresses specified by the client for that client account.

4. A mail system as claimed in any one of Claims 1 to 3, wherein the first communications link connects the mail system to a user interface.

5. A mail system as claimed in Claim 4, wherein the user interface is a telephone, cellular phone, pager, computing device, or Wireless Application Protocol (WAP) terminal.

6. A mail system as claimed in any one of Claims 1 to 5, wherein the second communications link connects the mail system to an extension of a Public Switched Telephone Network (PSTN), the mail system further including means for detecting a busy or engaged signal on said extension, and means for automatically establishing the second communications link between said client and said extension through said mail system when said busy signal or said engaged signal is no longer detected.

7. A mail system as claimed in any one of Claims 1 to 6, further including means for storing messages in a client account in electronic form such that said messages can be retrieved by a client using a computing device and a modem.

8. A mail system as claimed in any one of Claims 1 to 7, further including means for converting messages stored in electronic form to voice messages so that a client may receive voice messages from the mail system.

9. A mail system as claimed in any one of Claims 1 to 8, further including voice recognition means adapted to recognise speech and to generate system commands in response to the recognised speech.

10. A mail system including a voice user interface, a graphical user interface, a user access path having a path structure including a plurality of user selectable options, means to convey said path structure to a user through said voice user interface, and means to convey said path structure to a user through said graphical user interface.

11. A mail system as claimed in Claim 10, wherein the path structure is customisable by a user with either the voice user interface or the graphical user interface.

12. A mail system as claimed in Claim 10 or Claim 11, wherein the form of the path structure conveyed through the voice user interface corresponds to the form of the path structure conveyed through the graphical user interface.

13. A mail system as claimed in Claim 12, wherein the path structure is conveyed in the form of a menu structure.

14. A mail system including a plurality of user mail accounts, means to access said system from an external communications link, distributing means adapted to distribute a plurality of documents to a plurality of user mail accounts through said external communications link, means for facilitating access by a user to a user mail account associated with the user, and means for retrieving documents stored in the user mail account.

15. A mail system as claimed in any one of the preceding claims, wherein the mail system is a voicemail system.

16. A telecommunications network including a plurality of user accounts, each user account being associated with a user and each user account including a user message receiving account and a user financial transaction account, a user financial server adapted to receive a financial commodity and to distribute said financial commodity into at least one said user transaction account, means for entering a receipt message into at least one said user message account, said receipt message corresponding to receipt of a financial commodity in said at least one user financial account, and means for facilitating retrieval of messages from the at least one user message account by said user.

17. A telecommunications network as claimed in Claim 16, wherein the financial commodity corresponds to a monetary value.

18. A telecommunications network as claimed in Claim 16, wherein the financial commodity corresponds to reward points of a customer loyalty scheme.

19. A telecommunications network as claimed in any one of Claims 16 to 18, wherein said user message account includes a voicemail account, the arrangement being such that a user can retrieve messages from said voicemail account by accessing the network from an external user interface.

20. A telecommunications network as claimed in any one of Claims 16 to 19, wherein said user message account includes an electronic mail account adapted to receive messages in electronic form.

21. A telecommunications network as claimed in any one of Claims 16 to 20, further including a text to speech converter adapted to cooperate with said user message accounts so that electronic text messages are retrievable from a user message account as voice messages.

22. A telecommunications network as claimed in any one of Claims 16 to 21, further including voice recognition means.

23. A document delivery system including a plurality of user accounts, each user account being associated with a user and each account including a message receiving account and a financial transaction account, means to receive and transfer messages into said message account, said messages including messages relating to user financial statements, message retrieval means for retrieving messages from said message account, and means for facilitating transfer by a user of a financial commodity from the financial transaction account of the user.

24. A document delivery system as claimed in Claim 23, wherein said financial statement messages are received from an external entity and the financial commodity transfer means includes means for transferring a financial commodity to a financial account specified by said entity.

25. A telecommunications system including one or more data storage sites, means for establishing a connection with a user at a user interface through a telecommunications link, a random access memory, means for loading one or more storage applications into said random access memory, means for receiving user provided commands through said connection, means for opening a data storage site in response to a user request, wherein opening said data storage site includes allocating a portion of said random access memory to said data storage site, and loading one or more software applications into said allocated random access memory, wherein at least one of said loaded software applications prompts a user to provide commands to perform one or more processes in said allocated random access memory, said allocated random access memory being made available for re-allocation to a data storage site in response to either termination of the user connection or a conclusion of said processes operating in said allocated random access memory.

26. A telecommunications system as claimed in Claim 25, further including processing means adapted to carry out said one or more processes in response to said commands.

27. A telecommunications system as claimed in Claim 25 or Claim 26, further including means for identifying a user as one of a plurality of user types, wherein at least one of said loaded software applications is loaded dependent on said user types.

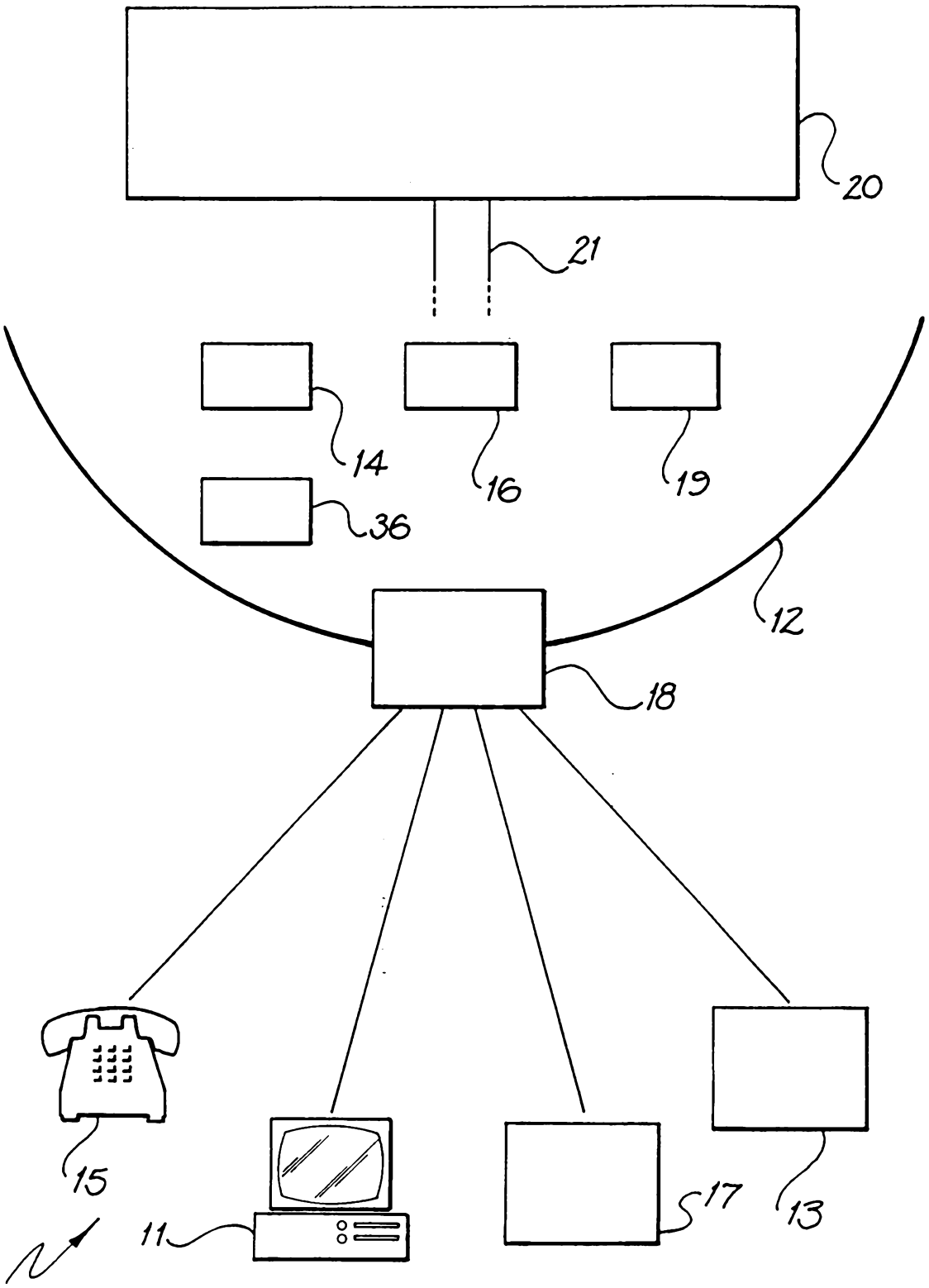
28. A telecommunications system as claimed in any one of Claims 25 to 27, wherein access to the data storage site is provided on two or more levels, access to at least one of those levels being protected by a firewall.

29. A telecommunications system as claimed in Claim 28, wherein the level of access provided to a user determines the data that a user can view or retrieve and/or the software applications that the user can access.

30. A telecommunications system as claimed in any one of Claims 25 to 29, wherein the data communications link allows the transfer of electronic files from the data storage site to the allocated random access memory.

31. A telecommunications system as claimed in any one of Claims 25 to 30, further including software storage means linked to the random access memory.

32. A telecommunications system as claimed in any one of Claims 25 to 30, further including software access means linked to the random access memory, the surface access means being adapted to access software stored at a remote location.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36
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11
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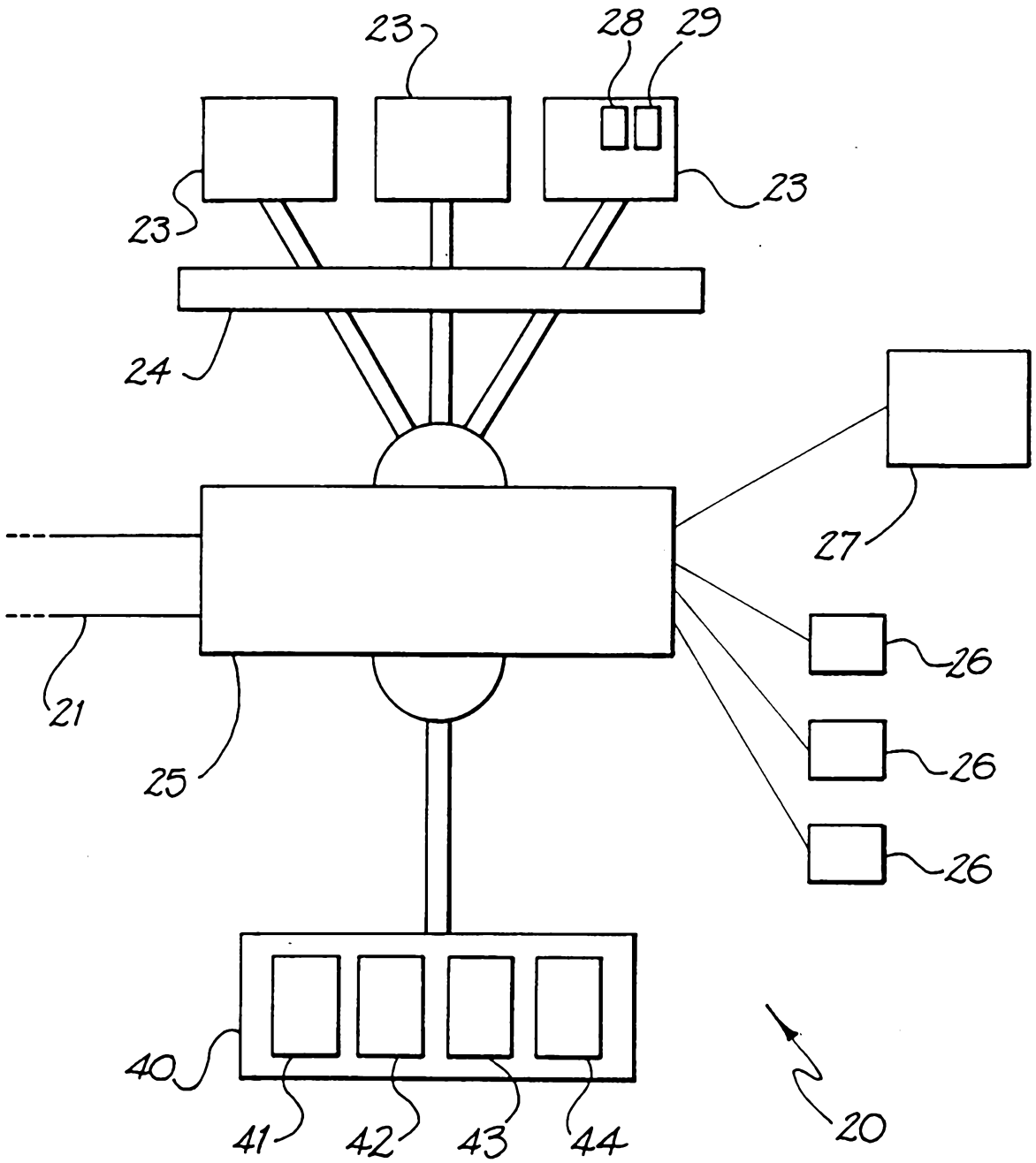

FIG. 2

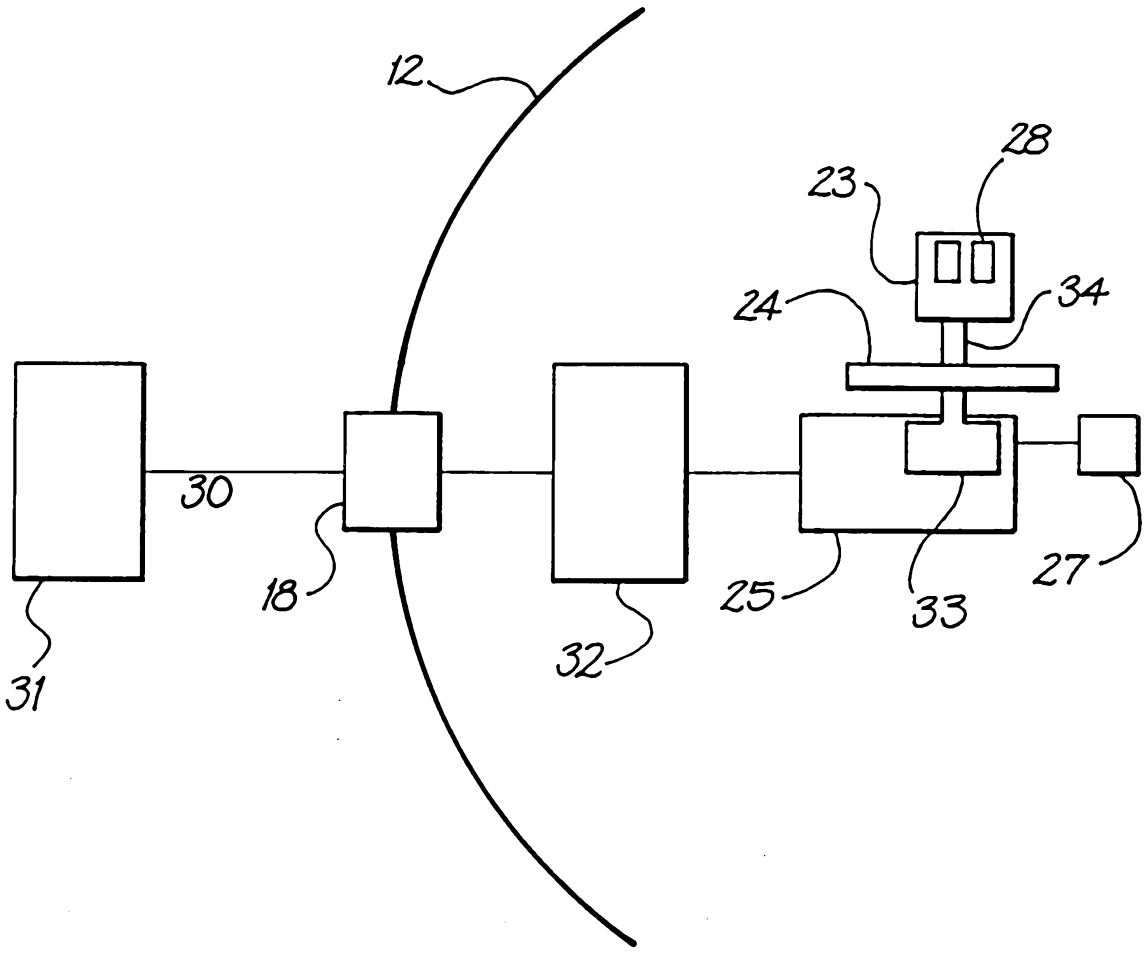

FIG. 3

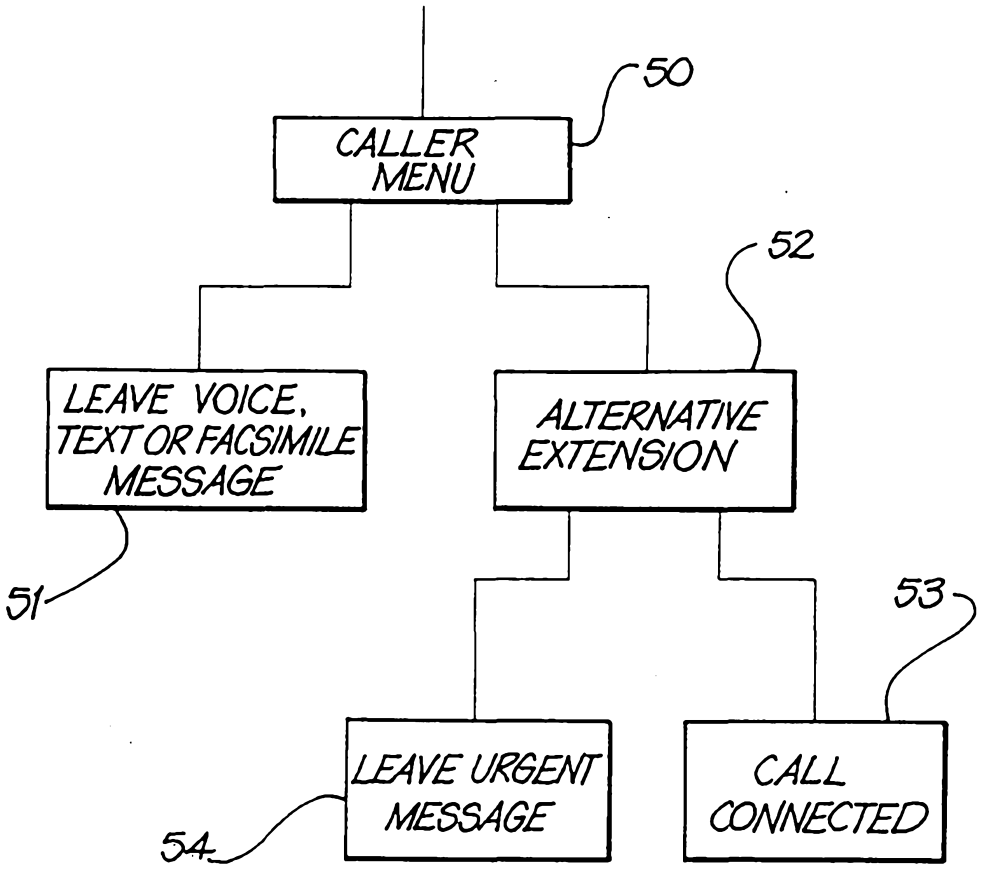
50
CALLER MENU
52
LEAVE VOICE, TEXT OR FACSIMILE MESSAGE
ALTERNATIVE EXTENSION
51
53
LEAVE URGENT MESSAGE
CALL CONNECTED
54

FIG. 4

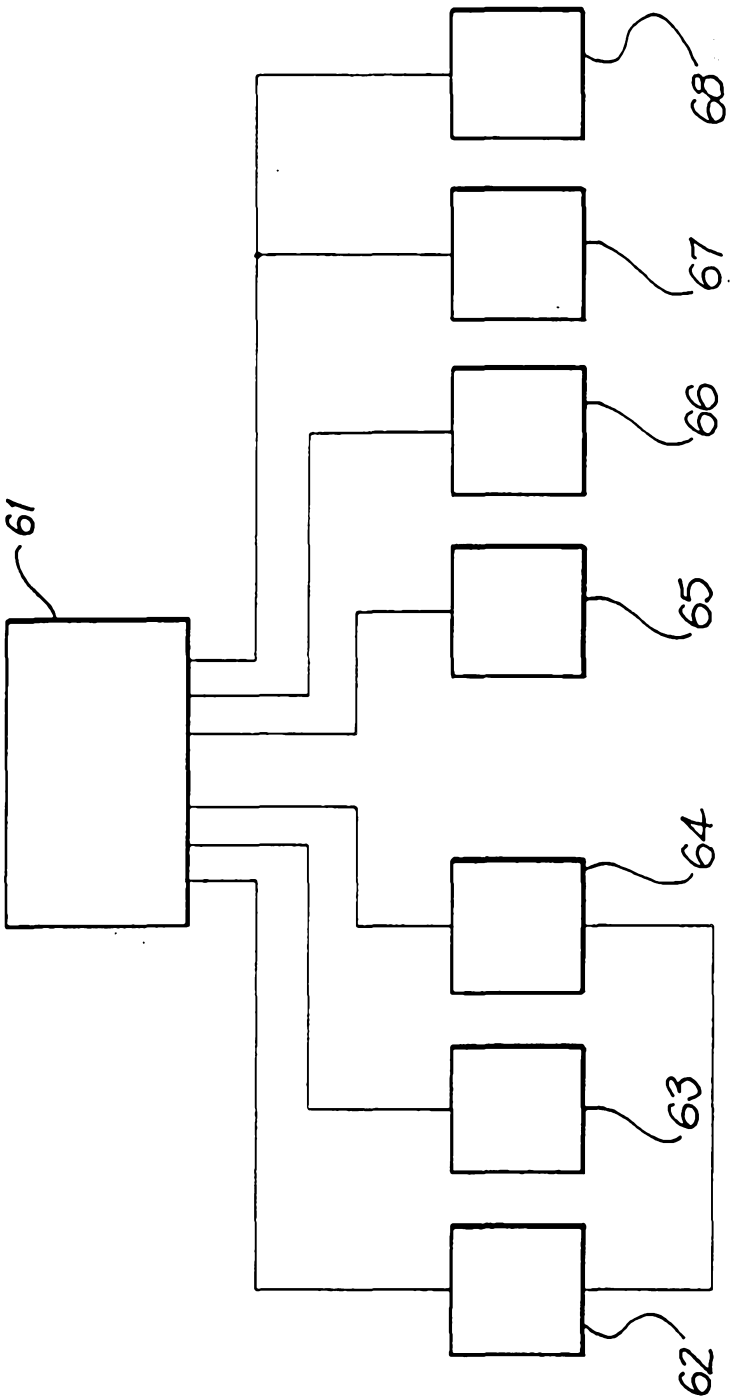

FIG. 5

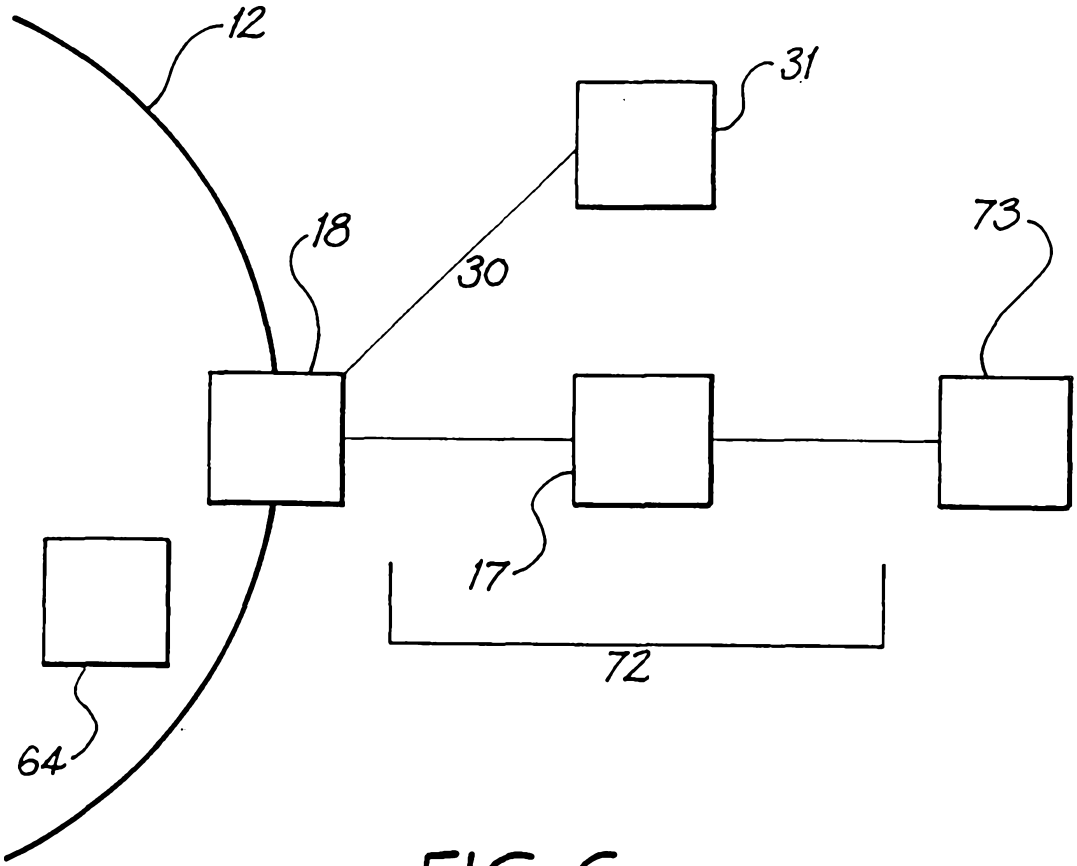

FIG. 6

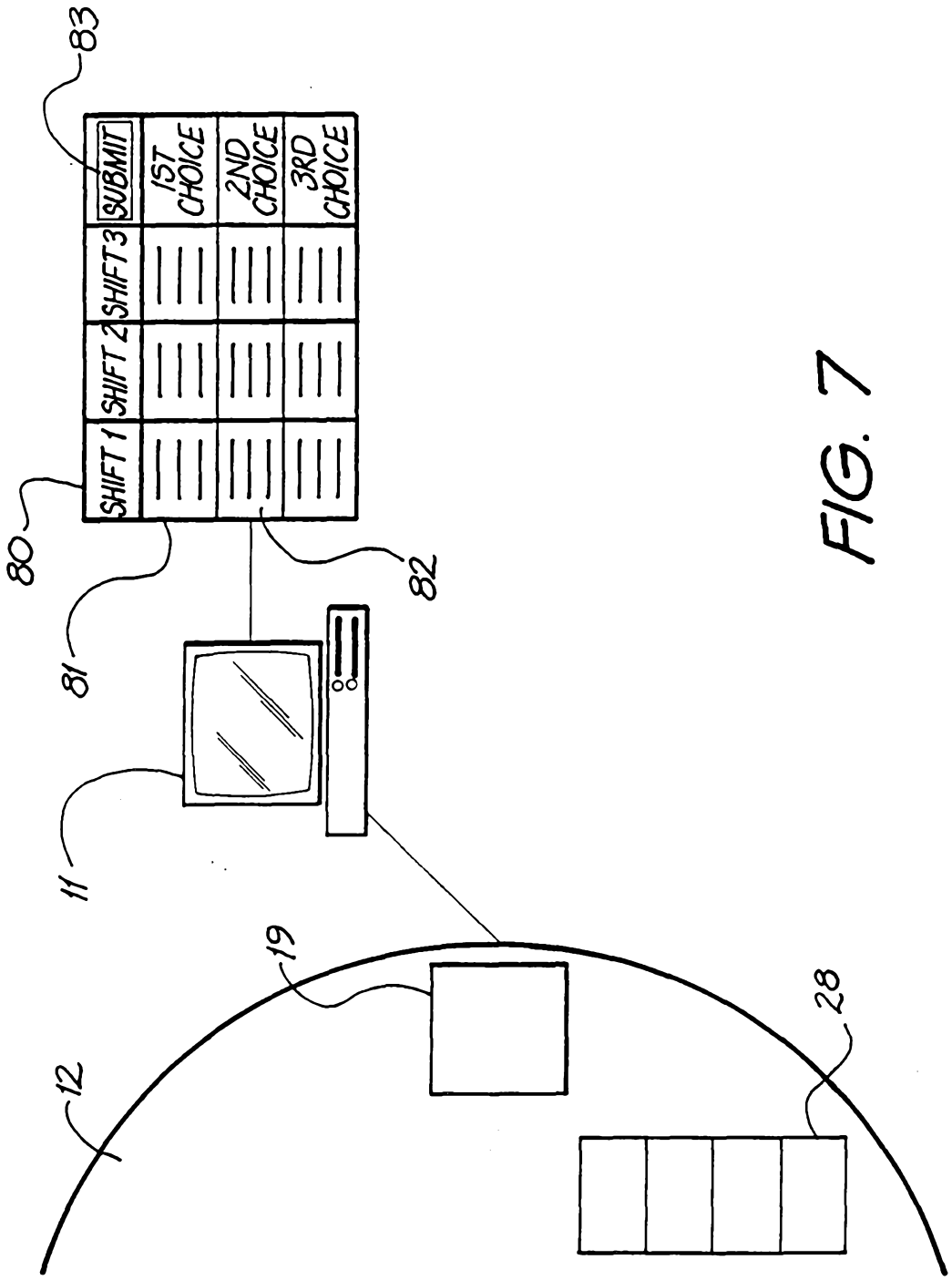
83
SUBMIT
1ST CHOICE
2ND CHOICE
3RD CHOICE
SHIFT 3
SHIFT 2
SHIFT 1
80
81
82
11
19
28
12

FIG. 7

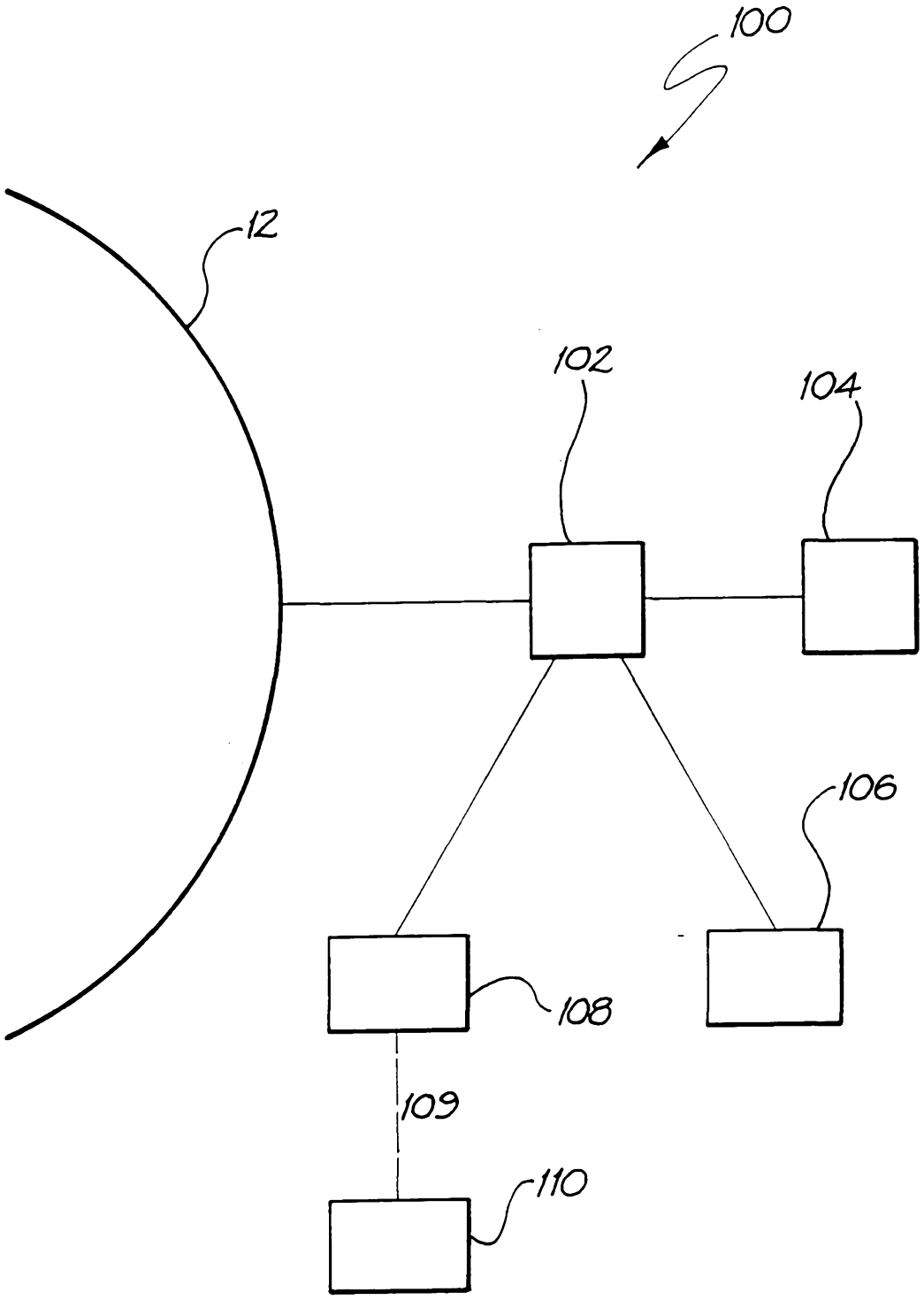

FIG. 8

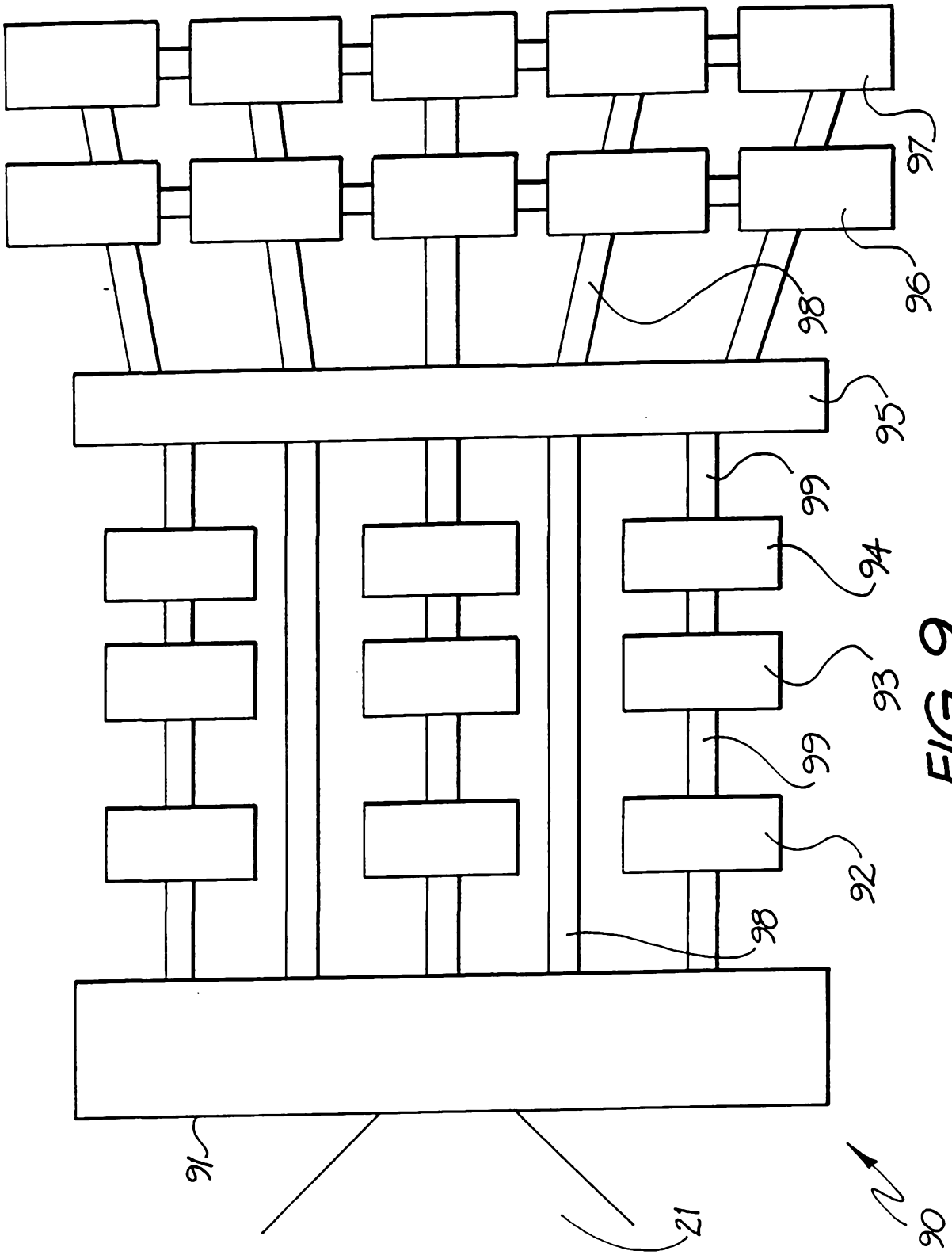

FIG. 9