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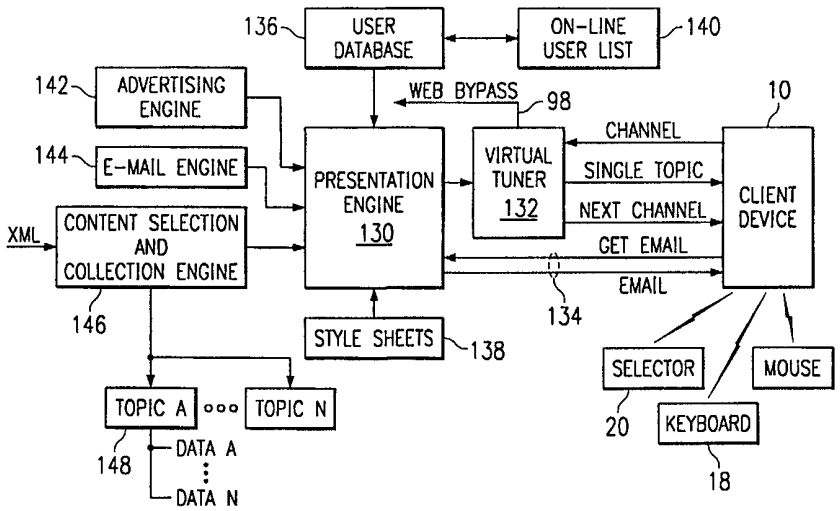

(57) Abstract

A dedicated Internet access device acts as an Internet appliance to reduce the complexity of Internet interactions. The access device stores an embedded operating system, embedded browser and user profile information in programmable read only memory so that a user may easily initiate an interface with the Internet by interfacing the access device with a communications medium, such as a telephone line, and by applying power to the access device. A dedicated portal site funnels information from the Internet and focuses the information to optimize utility and reduce complexity to the user. Information may be presented as topical channels that identify, organize and present relevant information to users with minimal user searching. In one embodiment, the access device reduces time associated with rendering an information from the portal site by preloading predicted information to the access device, and rendering for the predicted information if a user selects the predicted information. Updates to the operating system, browser, user profile and other information loaded in the programmable read only memory may be made through the Internet in a manner that is invisible to the user.

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METHOD AND SYSTEM FOR PRE-LOADING INTERNET CONTENT

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to the field of computer networks, and more particularly to a dedicated internet access device and method for interfacing the device with the internet.

BACKGROUND OF THE INVENTION

The internet has had a dramatic impact on both the American public and American businesses. One important way that the internet has impacted the public and businesses is that the internet has made a vast amount of information easily available to anyone with access to a personal computer. For instance, the public has come to depend on the Internet to follow news, weather and financial markets. Businesses typically use the Internet to perform basic product and service delivery functions such as tracking information on customer orders and business inventories. Another important way that the Internet has impacted the public and businesses is that the Internet has simplified communications between individuals and groups. For instance, e-mail and chat sent over the Internet are now commonly used in the place of regular mail and telephone calls. Recently, the introduction of voice chat over the Internet has gained popularity as a replacement for long distance telephone calls.

The Internet has, in large part, grown in popularity as a means for transferring information and for communications because interfacing with the Internet has become increasingly simple. In particular, the introduction of the World Wide Web as a format for information available through the Internet has increased the popularity of the Internet as a tool for individuals and businesses. The primary reason for the growth in popularity of the World Wide Web ("WWW") format is that the Hyper Text Markup Language ("HTML") and Hyper Text Transfer Protocol ("HTTP") used by the World Wide Web enables the presentation of graphical information through a web browser loaded on a user's personal computer. Web browsers support interesting graphical displays that enhance the presentation of information, and allow users to navigate through various World Wide Web sites by pointing and clicking on Universal Resource Locators ("URLs"). The generally user-friendly presentation of graphical information by a web browser has encouraged the growth in use of the Internet as a tool for selling goods and services by what has been labeled "E-Commerce."

The World Wide Web has encouraged a greater proportion of the population to explore the Internet, but continued rapid growth in Internet use has been hampered due to a number of factors. One major factor that has limited growth of Internet usage is the complexity of interfacing with the Internet with available hardware and software systems. Another important factor in limiting the growth of Internet usage is the cost of interfacing with the Internet, both in the purchase of hardware for interfacing and a service provider that allows interfacing.

Complexity and cost limitations have resulted in a societal gap of information "haves" and "have nots." For

instance, hardware and software complexity have tended to limit Internet growth to a "TechnoElite" who are generally young and well-educated. By comparison, older and less educated individuals are easily overwhelmed by the complexity of hardware and software for interfacing with the Internet. The cost of hardware and connection services also tends to introduce a barrier to lower income people who can not afford an initial investment in a personal computer or extended costly payments for Internet service providers.

Hardware complexity is, in many respects, inherent with the conventional personal computer. Setting up a personal computer presents a daunting task to individuals who are not technically literate. For instance, setting up a personal computer generally involves connecting the computer with a monitor, printer, speakers, microphone and other peripherals using a series of wires. The personal computer generally uses a hard drive to store an operating system that is loaded into local RAM memory upon boot-up of the computer. Variations in hardware configurations, such as can result when a user attempts to incorporate an additional peripheral device with the computer, often result in changes to the operating system and related files.

Software complexity presents yet another barrier to novices trying to interact with the Internet. Once a user has a personal computer up and running, the user generally must interact with software loaded on the hardware in order to dial up an Internet service provider. Once interfaced with a service provider, a user must then interact with the Internet through a web browser. To locate desired information, the user generally has to have a basic

understanding of how the Internet works and how the user's web browser operates within the Internet.

During the process of setting up a personal computer and interfacing with an Internet service provider and the Web, a number of problems may arise that can present overwhelming challenges to computing novices. For instance, incorrectly interfacing physical wire connections between components of a personal computer may result in an inoperable system and even damage to the personal computer. Also, changes to the operating system, such as can occur when software programs are installed on the computer's hard drive, can inadvertently alter the operation of the personal computer by, for instance, altering the computer's configuration system and autoexec files.

Another difficulty associated with personal computers is that they frequently use a long boot-up sequence to load complex operating systems and other software into RAM memory. This boot-up sequence generally takes an extended period of time and sometimes fails. In fact, modern personal computers loaded with conventional operating systems are often subject to inexplicable failures and freezes that are especially frustrating to non-technical users.

Once a user has set up a personal computer and arranged an interface with the Internet, the user must also overcome software related complexity. For instance, Internet service providers generally interface users through dial-up networking that requires the user to provide the computer with a telephone number and password for the Internet service provider. Once a connection is established, the user must generally operate a web browser to interact with the Internet through the Internet service provider portal. An uninitiated user tends to have

difficulty locating information of interest by either typing a URL, or searching for particular information in a World Wide Web directory or with a search engine. Further, although graphical displays tend to simplify Internet interaction, typical web pages nonetheless include an overwhelming amount of information. An uninitiated user may have difficulty identifying legitimate information of interest among the large number of advertisements and other information on a web page.

Even after a user identifies appropriate information, the user must have compatible software for downloading and viewing the information. For instance, web browsers may have a number of plug-ins that must be added to the browser for the browser to be compatible with certain information stored on the Web. These plug-ins typically must be downloaded as files to the user's computer and then loaded on the computer, typically in the hard drive, as an executable file.

Another software related complexity is the downloading and viewing of e-mails. For instance, e-mail may be supported by software loaded on a web portal or by a separate program on the user's personal computer. Users generally must understand e-mail addresses and some detail of the operation of the user's e-mail program in order to communicate with e-mail. When files or graphics are attached to e-mail messages, users must generally learn to navigate their computer's operating system to store the file or graphic and to find a compatible program within the personal computer for displaying the file or graphic.

SUMMARY OF THE INVENTION

Therefore a need has arisen for a dedicated Internet access device and method for interfacing with the Internet that reduces the complexities associated with Internet usage.

A further need has arisen for an Internet access device with a simplified hardware architecture which reduces the likelihood of user-induced errors during set-up and connection with the Internet.

A further need has arisen for an integrated service and hardware system that provides content delivery from the Internet to a user with a simplified software interface.

A further need has arisen for an integrated Internet access system and method which reduces the cost for Internet access.

In accordance with the present invention, a dedicated Internet access device and method for use are provided that substantially eliminate or reduce advantages and problems associated with previously developed devices and methods for interfacing with the Internet. A dedicated Internet access device has user profile information preloaded into programmable read only memory. The access device is then forwarded to the user so that the device will use the user profile information to automatically interface the user with the Internet when the user couples the access device to a communications medium and provides power to the access device.

More specifically, the present invention simplifies Internet access by a user through the integration of three major components, the Internet access device, a connection service, and a portal site designed to enhance the Internet experience through the access device. The Internet access device provides "plug and surf" simplified Internet access

by automatically connecting to the connection service when a user interfaces the access device with a telephone line and applies power to the access device. The connection service establishes an Internet connection and interfaces the user through the Internet with a predetermined portal site. The portal site operates as a funnel that gathers information from the Internet and a lens that focuses the information for each user of an access device on a user-by-user basis.

The Internet access device has the characteristics of a household appliance in that, when it is turned on, the Internet access device automatically establishes an Internet interface. The device has a power switch that, when activated, uses an embedded operating system and an embedded browser along with user specific profile information, all of which is stored in programmable read only memory, to initiate an Internet interface with minimal warm-up and connection lag time. In one embodiment, the portal site can automatically send information to the access device to update the software loaded in the programmable read only memory in a manner that is invisible to the user. For instance, the portal site can send a plug-in update for incorporation into the embedded browser of the access device. Alternatively, on initial power-up by a user, the device can contact the portal site, for instance through a toll-free number, so that user-specific profile information may be downloaded to the Internet access device. Thus, in such an embodiment, after contacting the portal site on initial power-up through a toll-free number, the internet access device uses a local number stored in the user profile information for subsequent connections to the Internet.

In one embodiment, the internet access device pre-loads internet content, effectively reducing waiting time for a user who requests the internet content. The Internet interface may be initiated by automatically contacting the access device from the portal site or by automatically contacting the portal site from the access device. For instance, the internet access device may interface with the portal site at predetermined time intervals such as time elapsed since the previous interface or at specific hourly, daily, weekly or other times. The time intervals and content may vary based upon the user profile information stored in the access device. For instance, if a user typically checks the news with the access device at a given hour, the user profile information in the access device may automatically initiate an Internet interface before the given time to update the news stored in the memory, such as RAM memory, of the access device. Similarly, the content updated may vary based on the user profile information, with the access device downloading predicted content that the access device or portal site predicts that the user will want to view.

In one embodiment, the Internet access device has an e-mail light to notify a user when the user has e-mail. The e-mail light can be included in a user activated button to allow a user to have one-push access to e-mail. The Internet access device may automatically connect with a portal at predetermined intervals to check if the user associated with the access device has mail waiting. Alternatively, the portal may contact the access device when the user has mail so that the access device illuminates the mail light. In yet another embodiment, the portal site may initiate contact with the access device to inform the user of a request for the user to engage in a

chat session, including a voice chat session. For instance, the portal site may call into the access device and initiate a ring or other noise to provide notice that a user interacting with the portal wants to chat with the user of the access device.

In yet another embodiment, the user profile information comprises user communication information that defines parameters for a user to communicate with predetermined others over the Internet. The user communication information may be stored in the PROM of the access device or at a portal site, and may include e-mail and chat information for supporting e-mail and chat communication between a user associated with the access device and that user's family and friends. The user communication information may be provided by the predetermined others for pre-loading before shipment of the access device to the user, or may be provide to the portal site for storage or for subsequent forwarding to the access device. Thus, "Papa" may, through the internet, pre-load his children's e-mails into an access device for shipment to "Granny" to simplify Granny's communication with her grandchildren.

The Internet access device includes a display, such as a flat panel display, that presents Internet information in a user-friendly portrait mode. The Internet access device provides the user with electronic channels representative of information collected from the Internet, and allows the user to select channels through either a keyboard interface or a remote control pointing device interface that is similar in operation to a television remote control. Alternatively, the Internet access device can bypass the portal site to allow the user to have direct access to the World Wide Web.

The connection service and portal are provided through one or more servers in communication with the World Wide Web and one or more Internet access devices. A presentation engine loaded on the server accepts information from the World Wide Web and processes the information for presentation to the Internet access device. The presentation engine interfaces with a content selection and collection engine, which organizes information gathered from the World Wide Web into topical categories. The presentation engine also accepts e-mail information and advertising information. The presentation engine then processes the information in cooperation with a style sheets data base and a user data base to format the information for client devices on a user-by-user basis. The presentation engine provides the formatted information to a visual tuner, which forwards the information to one or more Internet access devices in accordance with input from the user. The Internet access device has a direct interface to the presentation engine for supporting single touch e-mail.

The present invention provides a number of important technical advantages. One important technical advantage is supporting simplified Internet access by a user through an integrated Internet access device, connection service and portal site. Novice users will appreciate the "plug-and-surf" functionality of the Internet access device. This functionality is supported by preloading programmable read only memory of the Internet access device before the device is forwarded to the end user. Alternatively, this functionality may be supported with the swipe of a magnetic card provided with the access device or by updating the programmable read only memory of an access device through the internet. The preloaded device reduces complexity by

reducing the number of steps that a user has to perform before Internet access is available.

Another important technical advantage of the present invention is the reduced hardware complexity of the Internet access device. The reduced hardware complexity helps users avoid errors that frequently arise with more complicated personal computers. For instance, by limiting a user's ability to program the access device, such as by preconfiguration of the access device before shipment to the user, less user-dependent system errors are likely to arise. Similarly, by embedding operating system and browser software in PROM, the need for a hard drive is eliminated. Updates to software can instead be provided by reprogramming PROM over the Internet.

Another technical advantage of the present invention is that it reduces complexity associated with software for accessing the Internet. For instance, the embedded operating system and embedded browser automatically supports Internet access with minimal user inputs. By interfacing the Internet access device with a predetermined portal site that selects and collects information from the Internet, compatibility of the software is assured. For instance, if a user requests information in a format that is incompatible with the browser on the user's access device, the portal may recognize the incompatibility and reformat the data before sending the data to the access device. Alternatively, the portal site can detect the incompatibility, locate the software necessary for rendering the particular content, and download that software for installation on the access device along with the requested content.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIGURE 1 depicts a block diagram of the integrated Internet access provided by the present invention;

FIGURE 2 depicts an Internet access device, keyboard and pointing device;

FIGURE 3 depicts a block diagram of hardware components and a graphical user interface of the Internet access device;

FIGURE 3A depicts an exemplary graphical user interface of a channel guide;

FIGURE 3B depicts an exemplary graphical user interface of a CNN Web page;

FIGURE 4 depicts a World Wide Web page presentation for updating an address book associated with an internet access device;

FIGURE 5 depicts a flow diagram for initiating a chat session;

FIGURE 6 depicts a block diagram of software modules of the Internet access device, connection service and portal site; and

FIGURE 7 depicts a functional block diagram of the connection service and portal site software modules.

DETAILED DESCRIPTION OF THE INVENTION

Preferred embodiments of the present invention are illustrated in FIGURES, like numeral being used to refer to like and corresponding parts of the various drawings.

The Internet offers tremendous promise both as a means for distributing information and a means for supporting communication over long distances. The single greatest barrier that most users face to using the Internet is the complexity of establishing an Internet interface and finding appropriate or desired information from the Internet. Referring now to FIGURE 1, the block diagram depicts conceptual steps for simplifying a user's Internet access with a dedicated Internet access device 10, a connection server 12, a conceptual information lens 14, and a conceptual content funnel 16. Content funnel 16 and lens 14 operate in conjunction with server 12 to select and collect information content from the Internet and other sources, and to focus the information for presentation in a uniform and simplified format to a user at access device 10.

Each step depicted in FIGURE 1 reduces complexity for providing information content from the Internet to a user. A user simply powers up access device 10 and couples access device 10 to a communications medium to establish an Internet interface with connection service 12. Content funnel 16 and lens 14 then provide content in formats that are compatible with access device 10 and of a nature of interest to a preconfigured personal profile of a user associated with access device 10. Access device 10 can then display rich media Internet content with high resolution and excellent color rendition. Access device 10 provides reduced complexity and enhanced reliability due to

its focused design on a specific task of interfacing with compatible information from connection service 12.

To reduce the complexity of Internet usage for computer novices, access device 10 is designed to operate in a manner similar to that of conventional household appliances. For instance, access device 10 will quickly and easily perform its dedicated function of accessing the Internet and rendering a Web page when a user hits a button, similar to how a television will tune a television channel when turned on.

Referring now to FIGURE 2 an Internet access device 10, a keyboard 18, and a pointing device 20 are depicted. Internet access device 10 includes a computer display 22 oriented in portrait mode, as opposed to the landscape mode typically used in convention personal computers. In one embodiment, display 22 is an SVGA video display of 800 x 600 x 16 bit resolution, and may be a conventional cathode ray tube or flat panel display including a touch panel interface. The portrait orientation appeals to novice users who are used to reading books and newspapers. A power button 42 allows a user to power-up access device 10 and initiate an internet interface with the push of a single button. An e-mail light 46 illuminates to indicate that an e-mail awaits the user of access device 10, and, in one embodiment, incorporates a button to allow one touch access by the user to the e-mail. Thus, once a user has plugged access device 10 into power and a telephone line, access device 10 will operate for the user in a manner similar to other household appliances. The user simply turns it on and it works.

Access device 10 includes a conventional speaker system 24 and microphone 26 for outputting and accepting audio signals, a power cord 28 for providing electrical

power to the access device 10, and a telephone cord 30 for interfacing access device 10 with a user site telephone line. A USB port 48 enables the interfacing of standard peripherals to access device 10, and an Ethernet port 50 enables interfacing of a cable modem or local area network with access device 10. A magnetic card reader/writer 44 accepts magnetic cards having data for transfer to programmable read only memory (PROM) located within access device 10. Software and data files within access device 10 may be updated by inserting a magnetic card with updated information or by interfacing with the Internet to download appropriate files to the PROM.

Keyboard 18 and pointing device 20 may interface with access device 10 through an input output transmitter/receiver 32 that communicates with access device 10 through conventional means such as radio frequency or infrared transmission. Keyboard 18 includes a card swipe 34 designed to read data from magnetic cards such as credit cards. The magnetic card swipe simplifies the input of credit card information for E-commerce activities and other data particular to a given user. Pointing device 20 is similar to the mouse used with conventional personal computers, but includes various means for inputting data to access device 10, such as a scroll wheel 36, arrow pointer 38 and a number pad 40. Scroll wheel 36 enables a user to remotely scroll through data presented on display 22 by rotating a wheel. Arrow pointer 38 allows a user to remotely move the cursor around display 22, and number pad 40 allows a user to input channels for display.

Internet access device 10 is designed to provide a new user with an "out-of-box" experience similar to the experience of receiving, unpacking, setting up and using a

conventional household appliance. To initiate operation of access device 10, a new user simply plugs in power cord 28 and modem interface cord 30 and presses power button 42.

Access device 10 uses preloaded user profile information to establish an Internet connection for the user automatically when the access device 10 is interfaced with a communications medium and power is applied. For instance, a user may provide user profile information when ordering an access device by phone or over the Internet, and the profile information can then be automatically sent to and loaded into an access device before shipment to the user. Alternatively, user profile information may be stored in a magnetic card provided with access device 10 to the user, and then loaded on access device 10 through card reader/writer 44. Pre-loaded user profile information may include identification information for access device, and the user's name, address, phone number, age, gender, credit card information, interest key words, access frequency, access times, most recent downloaded information, etc. . . Further, once certain user profile information has been loaded, additional information may be determined and loaded, such as access information for the user, including the primary, a secondary and a toll-free number for the access device to dial, e-mail information such as an e-mail server, and chat information. Alternatively, the user profile information may include generic instructions, including identification information for the access device, the generic instructions for contacting a generic portal site so that upon initial contact, the generic portal site may automatically configure the access device with user profile information specific to the user associated with the access device.

The simplified hardware and software architecture of access device 10, as described in greater detail herein, allows a rapid boot sequence of less than three seconds and defaults to an Internet connection through a preloaded dialer without user intervention. Similar to a household appliance, access device 10 performs a singular dedicated function, connecting to the Internet, and reduces complexity associated with that function by automating necessary steps. A novice to the Internet simply plugs in and turns on access device 10 like an appliance to begin surfing the World Wide Web. If changes become necessary, software may be automatically downloaded from the Internet and loaded in the PROM of access device 10 such that the changes are made in a manner invisible to the user.

To track updates to the PROM of access device 10, a user configuration profile may be maintained for each portal site or each access device on its associated portal site. For instance, the user configuration profile may be stored in co-location with the user profile information. To download changes to a given access device 10, changes are enacted as modifications to the user configuration profile associated with the access device. When the access device next interfaces with its associated portal site, the modified parameters of the user configuration profile triggers the update to occur. For instance, a user configuration profile may indicate that updated versions of software modules resident on an access device are available. A software table of modules associated with the portal site may indicate the expected list of modules for a given access device. A comparison between the software table of modules and the modules loaded on the access device, for instance by comparing module names and version numbers or dates, enables the downloading of modified

modules from the portal site to the access device. The software table of modules may include pointers, such as a URL, to automatically direct the access device to download from an appropriate location.

One important advantage of the user configuration profile is that it provides a simplified means for flexible dynamic load balancing, fault tolerance and planned reconfigurations. For instance, the user configuration profile may include connectivity addresses and dial-up information for each access device. Initially, the dial-up information may direct the access device to contact a server through a toll-free 800 telephone number. By modifying a user configuration profile, changes to connectivity for the associated access device, such as changes to the dial-up number, may be effectuated. Thus, on initial connection, the user configuration file may alter the dial-up instructions loaded on an access device so that on its next connection the access device contacts a new server dial-up number. Similarly, dial-up numbers may be modified in response to load conditions, such as the number of dial-up attempts to one or more servers so that loads are balanced between servers, in response to failures of a server so that dial-ups are redirected from a failed server to a working server, and to enact planned reconfigurations such as moving users to a new mail server or moving service from one connection server site to another.

Internet access device 10 operates in two modes: an off-line mode and an on-line mode. In the on-line mode, access device 10 dialed into a service network through a portal site. In the off-line mode, the access device is disconnected from the network but continues to operate by

rendering content stored as local information in RAM cache memory. The distinction between the on-line and off-line modes of operation may be transparent to the user. Off-line operation is enhanced and kept current by periodically having access device 10 connect to a portal site to update local information stored in the cache memory of access device 10, to retrieve incoming mail, and to send outgoing mail. If, for instance, a user renders information stored in cache memory shortly after the information is downloaded to access device 10, the user will effectively view current information without having to wait for access device 10 to connect to a portal site and download the information.

An effective cache update policy, both in the on-line and off-line modes, is an important component to reducing latency for the user of an access device 10. Updates to the cache of an access device 10 by downloading information to the access device 10 from a portal site take into account the convenience of the user and the load on the portal site. For instance, updates may be timed to reduce interference with the user's telephone. Similarly, updates may be timed to balance congestion at the portal site and to maximize bandwidth usage. To meet these goals, an initial cache update schedule may have periodic updates, such as once a day, that occur within a set period of a time interval, such as one to three o'clock in the morning, with the time of each access device's update selected as a uniformly distributed random variable within the time interval to avoid having too many devices connecting to a given portal at the same time and overloading the network. The update schedule may be stored as part of user profile information for each access device, or may be stored as part of the user configuration profile on one or more portal sites associated with each access device.

To further enhance the effectiveness of cache updates, an adaptive cache update engine can modify the cache update schedule of access devices that interface with a given portal site based upon the activity of each access device and network conditions associated with the portal site. For instance, an activity log associated with each access device may be stored on each access device or the portal site associated with the access device. The activity log for a given access device may track user activity associated with the access device through a number of factors, such as key strokes, e-mail activity or browsing activity. The adaptive cache update engine analyzes the activity log to determine when to update the cache of an access device as well as to determine how best to update the access device base upon a prediction of the user's future activities. For instance, if a user reads mail more frequently than the user performs other activities, then the cache update schedule may update mail more frequently than it performs other activities. As one example, for one user of an access device, a cache update schedule may update mail twice daily, once in the morning and once at night, may update stock market information shortly after the stock market closes, and may update sports news shortly before the user goes to bed.

The cache update engine can significantly reduce latency in the on-line mode of operation by predicting the future information requests of the user of an access device and downloading the predicted information for storage in the cache of the user's access device. For instance, the cache update engine may comprise a neural network program that uses the activity log to predict future information requests, and instructs the downloading of the predicted future information requests. For instance, if a user

typically reads the CNN home page to review headlines and then goes to CNN*fn* page to read the business news, then the cache update engine may identify this pattern and update the cache with the CNN*fn* page when the update engine detects that the user has requested the CNN home page. In this example, the cache update engine could be associated with the user's access device, the portal site associated with the access device, or with the CNN server. Reduced latency and greater user satisfaction result when the user is able to render the CNN*fn* information without having to wait for the information to be transferred to the user's access device.

Referring now to FIGURE 3, a block diagram of access device 10 is depicted along with a graphical user interface presented by device 10 on flat panel display 22. Access device 10 is run with a simple computing architecture having a motherboard 52 that supports a processor 54, memory cache 56 and programmable read only memory ("PROM") 58.

Processor 54 may be an IBM compatible processor such as are available through Intel and Advanced Micro Devices, or similar type of processor that is capable of running a browser. Processor 54 may be an older and less expensive version of a conventional processor to reduce the cost of access device 10 as long as processor 54 can expeditiously handle advanced browser functions such as video chat.

PROM 58 stores an embedded operating system, including device drivers, and an embedded browser as well as user profile information to support operation of access device 10. When a user orders or purchases an access device 10, PROM 58 is preloaded with user profile information such as the user's name, address, phone number, credit card information, telephone number, and dialing information for

initiating Internet access with access device 10 for the purchasing user. Further, PROM 58 supports invisible updates to the operating system, browser, device drivers and other software. If an update is needed, access device 10 automatically contacts a predetermined portal through the Internet to obtain the update and load the update into PROM 58 in a manner that is invisible to the user. Updates may be automatically initiated during times of low usage, such as late evenings, or may occur during a user's connection to the Internet without an indication to the user.

Cache 56 is a conventional memory such as DRAM or SDRAM having adequate storage for maintaining the operating system and browser plus user profile information during operation of access device 10. When a user turns power off to access device 10, cache 56 maintains data with a trickle voltage received from power unit 60 to reduce the time needed to initiate operation of access device 10 at the next power up. In particular, the trickle voltage minimizes unit power-up delays by maintaining the embedded operating system and browser in active memory. A user need not be aware of the trickle voltage, but can eliminate the trickle voltage by unplugging access device 10.

Access device 10 includes additional hardware components for supporting an Internet interface. For instance a V.90 modem 62 provides dial up connections for access device 10, and an Ethernet card 64 with an RJ-45 jack supports cable modem interfaces. Access device 10 includes a universal serial bus port 48 and card 66 to support peripheral hook-up, such as a printer. A transmit/receive unit 68 supports communication with keyboard 18 and device pointer 20. In alternative embodiments, keyboard 18 and pointer 20 may be integrated

physically within access device 10 and hard wired to access device 10.

The graphical user interface depicted on flat panel display 22 illustrates how a user may interact with access device 10 to receive e-mail. A channel box 70 indicates that the graphical user interface is depicting channel 1, which shows the user his e-mail. Other channels available for the user include channel 2 for news, channel 3 for finance, channel 4 for weather and channel 5 for search. To select a channel, the user inputs the channel into pointing device 20 either as a channel number in number pad 40, by pointing with arrow pointer 38, or by scrolling with scroll wheel 36. Transmitter receiver 32 sends a signal to transmit receive module 68 that, together with processor 54, retrieves the desired information for display on flat panel display 22. In this way, access device 10 emulates the operation of a television appliance. Each channel may include several subchannels. For instance, when a user selects news channel 2, a graphical user interface may present the user with options for obtaining news, such as channels 21-29, with each channel providing a different news source or news topic. Figure 3A depicts an exemplary channel guide which a user may reference to locate relevant information. FIGURE 3B depicts an exemplary display of a CNN Web page which may be display if the user selects a news channel number for CNN.

The e-mail channel depicted in FIGURE 3 shows that the user can retrieve new e-mails or old e-mails saved on a server in communication with the user's access device. When a user has new e-mail, processor 54 sends a signal to illuminate mail light 46. Thus, when access device 10 is informed through the Internet that the user has new mail, mail light 46 illuminates to indicate to the user that the

user should check his e-mail channel. In one embodiment, access device 10 performs scheduled pulls from a predetermined server, during which access device 10 checks for e-mail and updates. In another embodiment, access device 10 accepts incoming data updates, such as by accepting a telephone call, to indicate that an e-mail or other information awaits the user. For instance, a server providing service to access device 10 can dial the modem 62 to establish an Internet connection and inform access device 10 of a waiting e-mail, resulting in processor 54 illuminating mail light 46.

As part of the preconfiguration of access device 10, a user-specific address book that contains address information for e-mail or chat may be pre-loaded into PROM with friends and family of the user associated with the access device. The address information may be entered and altered through a Web page accessible over the Internet. For instance, referring to FIGURE 4, a web page is depicted that allows a user and those approved by the user to initiate and alter address book information. Alterations to a user's address book are made through an address book server, such as an LDAP server, for secure storage on a portal site. In one embodiment, the user may screen changes made to the user's address book for acceptance or rejection by the user before the changes become effective.

In one alternative embodiment, access device 10 can also receive inputs indicating that the user of access device 10 is wanted for chat sessions or voice chat sessions, even if the user is not currently logged onto the internet. One current drawback to conventional chat applications is that a user must be on-line in order to detect that another user is interested in having a chat session. To establish a chat when one or more requested

members of the chat session are not on-line, the present invention sends messages through the telephone system as a notification to a requested member, and allows that member to decide whether or not to enter the chat session.

Referring now to FIGURE 5, at step 302, a user at an access device X requests a chat session with a user at an access device Y. At step 304, a portal site interfaced with access device X determines if access device Y is interfaced with the internet. If access device y is interfaced, then at step 306, a chat session is connected between access devices X and Y. If access device Y is not interfaced with the internet, then notice is sent to access device Y or its user through one of a number of available techniques.

At step 310, access device X disconnects from the portal site and, at step 312, initiates a call to the telephone number associated with access device Y. Access device Y detects the incoming call as a chat request, for instance by identifying the number of the originating call with caller ID, and informs the user of the chat request through, for instance, an audible sound or a message on the display of access device Y. The user of access device Y will know to check for chat message alerts when the user receives a single telephone ring, and can view the display as a chat message log to identify chat requests received over a predetermined period of time. In this manner, long-distance fees may be avoided. At step 314, access device X reconnects to its portal site to await notice as to whether or not access device Y has interfaced with the internet at step 316. If access device Y does interface with the internet, then at step 306 the chat session may be connected. If access device Y does not interface with the internet, for instance after a predetermined lapse of time,

then at step 318 access device X will indicate failure of the chat request to its user.

Alternatively, if at step 304 the portal site determines that access device Y is not interfaced with the internet, then the portal site may initiate notice to the user of access device Y of the chat request. The portal site may contact access device Y through a dial-up modem, or may send a request through the internet to another portal site that places a local telephone call to access device Y. Access device Y may issue notice to its user of the chat request as was described above. Alternatively, the telephone may be allowed to ring until the user answers so that the portal site may provide the user with an audible message of the chat request. For instance, the portal site may use voice creation and recognition software to inform the user of access device Y that, "User of access device X has requested a chat session." The user of access device Y may then join the chat session at step 306.

In one embodiment, internet access device 10 uses different caller ID information to distinguish between a plurality of phone call types, such as a voice call, a fax, a chat request, incoming mail, or new content on a specified channel of interest to the user of access device 10. An incoming call identification module ("CIM") 93 loaded on access device 10 detects the origination of the call and compares the origination against a known list of potential originations to map the call to a source application. For instance, a portal site associated with a given access device will use a "chat" originating number when contacting the access device for a chat session, and an "e-mail" originating number when contacting the access device for new e-mail notification. A call alert module ("CAM") 95 matches the application to a corresponding alert

mechanism. For instance, chat and e-mail alerts may provide a unique ring sound/tone, blinking light, or a voice that states "you have chat" or "you have e-mail." A call response module ("CRM") 97 will then match an application with an appropriate response to identification provided by the CIM. For instance, the CRM may provide a busy tone, initiate an e-mail download, initiate a chat session, provide a custom voice message for voice calls, or contact a server for content update.

Referring now to FIGURE 6, a block diagram depicts software modules of access device 10 and server 100. Access device 10 supports software storage in either flash PROM 58 or local cache 56. Access device 10 has device drivers 80 for operating hardware devices including a keyboard device driver 82, a communications link driver 84, a magnetic card swipe driver 86, a remote control driver 88, and a file system driver 90. Other device drivers may be included as appropriate for operating devices loaded in access device 10.

An embedded operating system module 92 cooperates with device drivers 80 to ensure proper operation of access device 10. Operating system module 92 can be conventional operating systems embedded in PROM 58 such as, the Linux operating system, WINDOWS, the disk operating system (DOS) or other basic operating systems. An embedded web browser module 94 and a real audio module 96 run on top of the operating system to support Internet interaction and playing of real audio files. Embedded web browser module 94 supports a web browser for interfacing with the Internet, including interfaces with HTML, CSS, SSL, Java Script and other Internet protocols. Real audio layer 96 cooperates with embedded web browser 94 to enable audio functions including streaming audio. Web browser 94

generally interfaces through channels provided by server 100, but may also use a web bypass 98 to support direct access to the World Wide Web.

To update a software module, such as adding a plug-in to embedded browser module 94, file information may be transferred through web browser 94 and written into flash PROM 58 with operating system module 92. This enables software such as browser software, operating systems software or device driver software, to be updated periodically without input or intervention by the user of access device 10.

Server 100 interfaces with access device 10 through the embedded web browser module 94, and performs the functions of connecting access device 10 to the Internet, collection and selection of information from the World Wide Web, and focusing of the information on the World Wide Web for the user of access device 10. A file system 102 of server 100 includes a conventional cache 104 to store real-time data, and files for storing cookies information 106, user profiles information 108, and user application data information 110. An LDAP module 112 interacts with cookies information 106 and user profiles information 108 to perform access management functions of allowing predetermined access devices to interact with server 100 and identifying information specific to each user. A POP/SMTP module 114 enables e-mail functions in conjunction with browser 94 of access device 10.

The communication of channel information from server 100 to access device 10 is performed with HTTP Proxy module 116. HTTP Proxy module 116 retrieves information from the World Wide Web 124 and reformats the information for presentation at access device 10 through web browser 94. The information is reformatted by format convert module

122, media convert module 120 and style mapping module 118. In addition, HTTP Proxy 116 may present applications to access device 10 using web applications module 124. For instance, applications may include address books for users to store e-mail and other address information, calenders and other helpful applications.

Referring now to FIGURE 7, a functional block diagram provides greater detail of the operation of server 100 to transfer data to access device 10. A presentation engine 130 communicates data to access device 10 through a virtual tuner 132. Presentation engine 130 also provides e-mail data directly to access device 10 through an e-mail interface 134. Virtual tuner 132 accepts channel request information from access device 10 and provides single topic channel information to access device 10 for display to a user. Virtual tuner 132 also supports direct World Wide Web interface for access device 10 through Web bypass 98.

In addition to transfer of requested channel information, virtual tuner 132 provides next-channel functionality to reduce the time needed to update new information sent to access device 10. More specifically, virtual tuner 132 predicts the next possible requests by access device 10 and sends the next channel information to access device 10 for storage in cache 56. If, in fact, a user requests the predicted next channel information, then the time needed to render the information is reduced since the information does not have to be downloaded from server 100 to access device 10.

Presentation engine 130 cooperates with a user database 136 and style sheet database 138 to prepare information for transfer to access device 10. User database 136 provides LDAP functionality by storing user profile information, access management information and

cookie management information on a user-by-user basis. User database 136 communicates active user information to an on-line user list 140 to support chat activities. Style sheets database 138 stores format information for topical channels and for specific users. For instance, news may have a style sheet similar to a newspaper format, and may be provided in enlarged fonts for specific users having poor eyesight. By comparison, weather information may be provided in a television format with active radar screen images and graphical icons to demonstrate forecasts.

Presentation engine 130 obtains information from an advertising engine 142, an e-mail engine 144 and a content selection and collection engine 146. Advertising engine 142 provides information from advertisers for presentation to users based on a number of factors including the channel requested by the user and the user's demographics. For instance, presentation engine 130 may insert advertising directed towards specific age groups based upon age information obtained from user database 136 for a specific user. E-mail engine 144 provides e-mail communication support to users through the e-mail channel as previously described.

Content selection and collection engine 146 accepts information from the World Wide Web and stores the information in topical groups such as Topic A 148. In one embodiment, content selection and collection engine 146 accepts XML data from predetermined sources, such as web sites that provide news or financial information, and provides the XML information from topical storage to presentation engine 130 for translation into HTML web pages according to style sheets stored in style sheet database 138. For example, predetermined sources of information may agree to periodically update content selection and

collection engine 146 with new information that updates the topical databases. Alternatively, content selection and collection engine 146 may actively search predetermined sites on the World Wide Web to locate desired information. In this manner, server 100 acts as a lens that focuses vast quantities of information most likely to be of interest to particular users and thus reduce the complexity of locating such information.

Although the present invention has been described in detail, it should be understood that various changes, substitutions and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A method for providing internet content to a user, the method comprising the steps of:

interfacing an internet access device with a portal site at predetermined intervals;

predicting the internet content that the user will request based on user profile information;

transferring the predicted internet content from the portal site to the access device; and

rendering the predicted internet content to the user.

2. The method of Claim 1 wherein the predicted internet content comprises e-mail.

3. The method of Claim 1 wherein the predicted internet content comprise news information.

4. The method of Claim 1 further comprising the step of altering the predetermined intervals for interfacing the access device with the portal site based on user behavior.

5. The method of Claim 1 wherein plural internet access devices interface with the portal site, each access device having a predetermined interval for interfacing with the portal site, the predetermined intervals having a random distribution to reduce the load on the portal site.

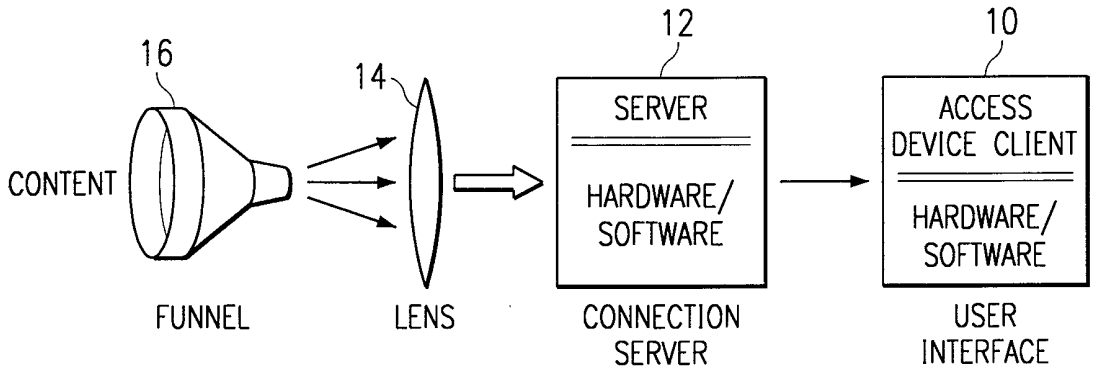

16
14
12
10
CONTENT
SERVER
HARDWARE/
SOFTWARE
ACCESS
DEVICE CLIENT
HARDWARE/
SOFTWARE
FUNNEL
LENS
CONNECTION
SERVER
USER
INTERFACE

FIG. 1

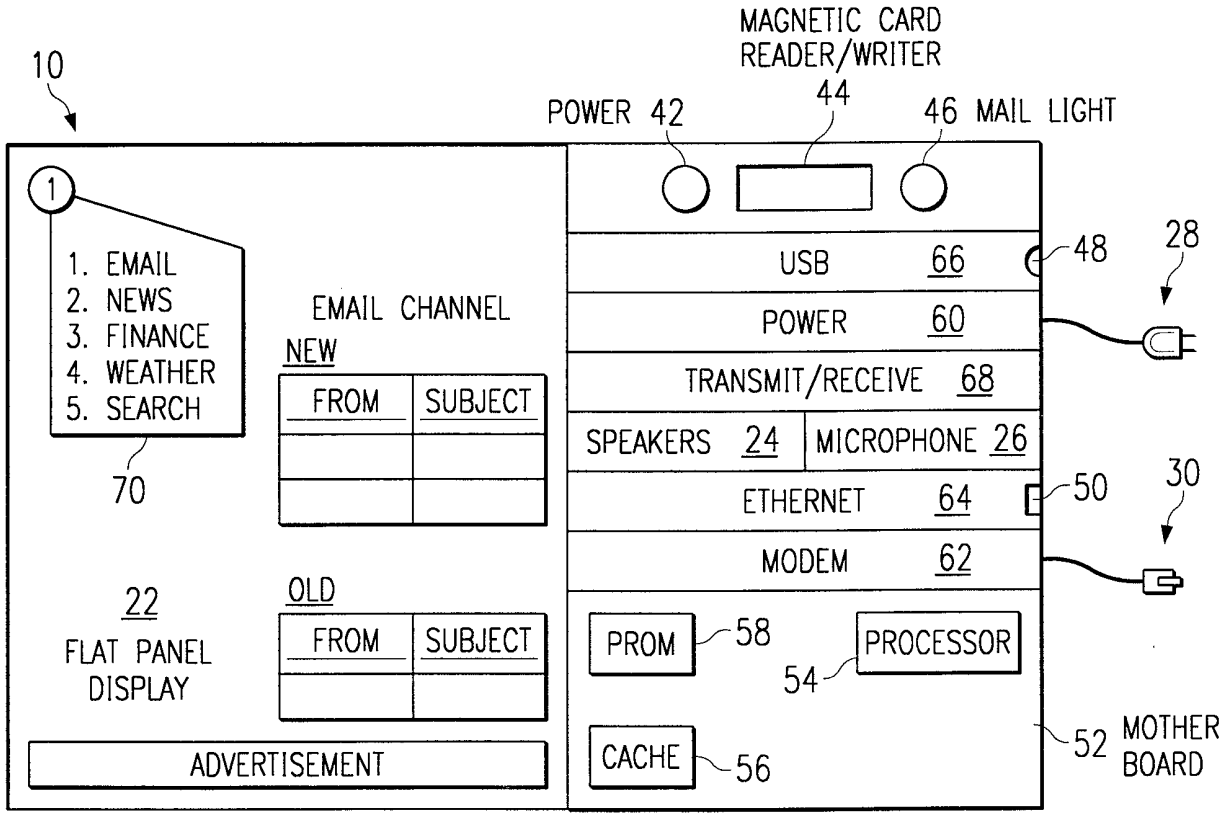

10
MAGNETIC CARD
READER/WRITER
44
POWER 42
46 MAIL LIGHT
1. EMAIL
2. NEWS
3. FINANCE
4. WEATHER
5. SEARCH
70
EMAIL CHANNEL
NEW
FROM
SUBJECT
OLD
FROM
SUBJECT
22
FLAT PANEL
DISPLAY
ADVERTISEMENT
USB 66
48
28
POWER 60
TRANSMIT/RECEIVE 68
SPEAKERS 24
MICROPHONE 26
ETHERNET 64
50
30
MODEM 62
PROM 58
PROCESSOR
54
CACHE 56
52 MOTHER
BOARD

FIG. 3

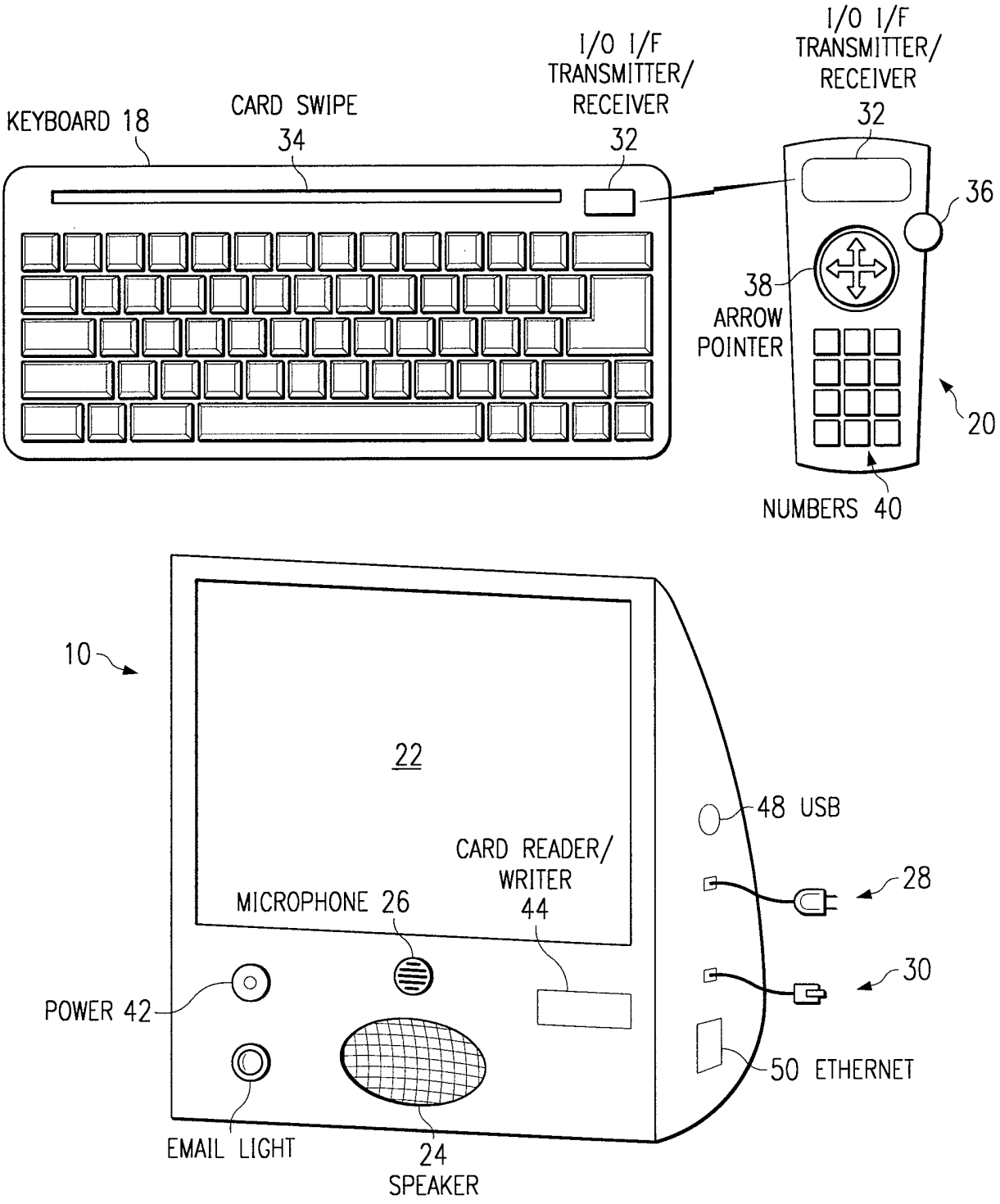
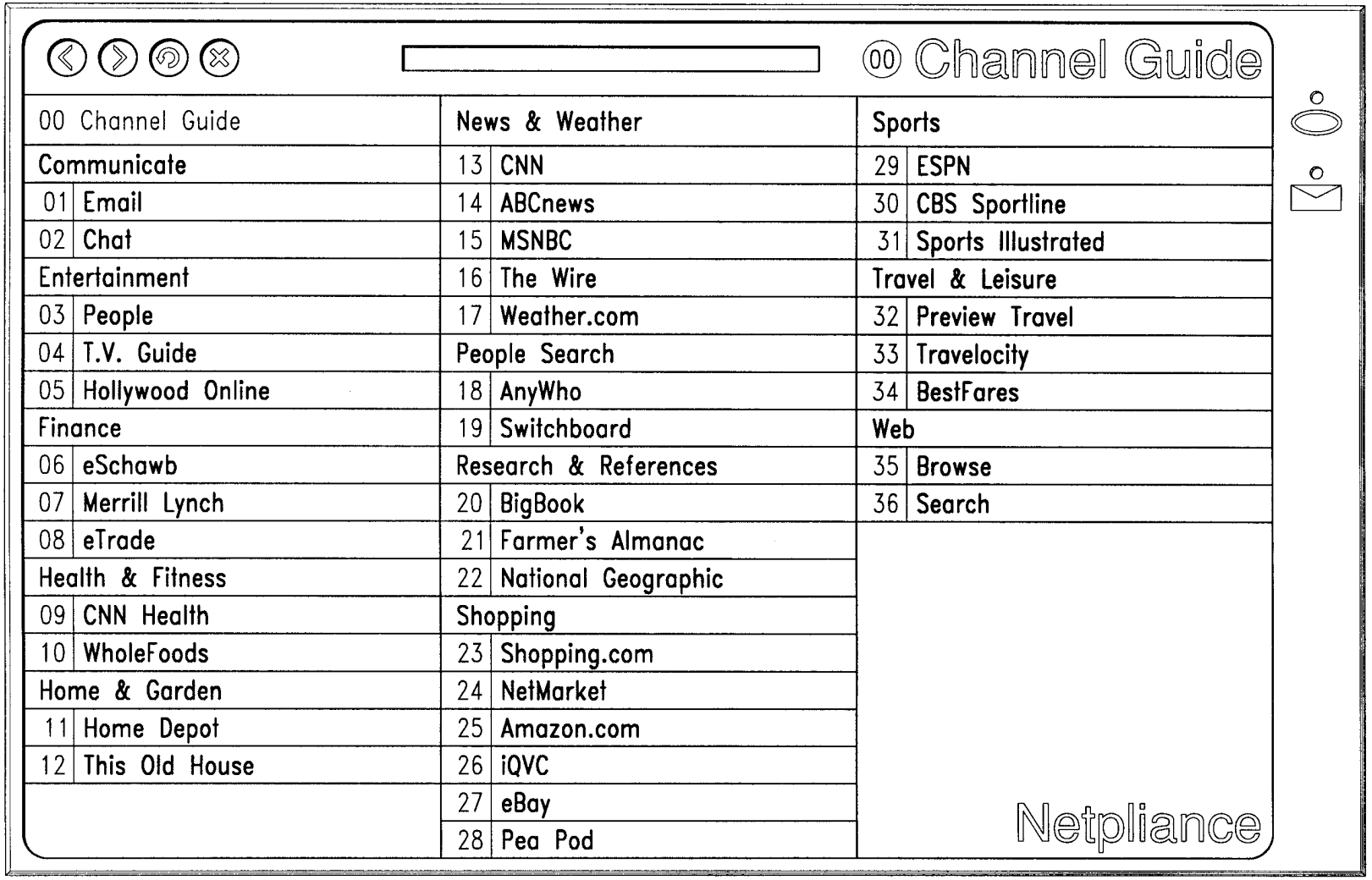

KEYBOARD 18
CARD SWIPE
34
I/O I/F
TRANSMITTER/
RECEIVER
32
I/O I/F
TRANSMITTER/
RECEIVER
32
36
38
ARROW
POINTER
20
NUMBERS 40
10
22
48 USB
CARD READER/
WRITER
44
MICROPHONE 26
28
30
POWER 42
50 ETHERNET
EMAIL LIGHT
24
SPEAKER

FIG. 2

FIG. 3A


00 Channel Guide
00 Channel Guide
Communicate
01 Email
02 Chat
Entertainment
03 People
04 T.V. Guide
05 Hollywood Online
Finance
06 eSchawb
07 Merrill Lynch
08 eTrade
Health & Fitness
09 CNN Health
10 WholeFoods
Home & Garden
11 Home Depot
12 This Old House
News & Weather
13 CNN
14 ABCnews
15 MSNBC
16 The Wire
17 Weather.com
People Search
18 AnyWho
19 Switchboard
Research & References
20 BigBook
21 Farmer's Almanac
22 National Geographic
Shopping
23 Shopping.com
24 NetMarket
25 Amazon.com
26 iQVC
27 eBay
28 Pea Pod
Sports
29 ESPN
30 CBS Sportline
31 Sports Illustrated
Travel & Leisure
32 Preview Travel
33 Travelocity
34 BestFares
Web
35 Browse
36 Search
Netpliance

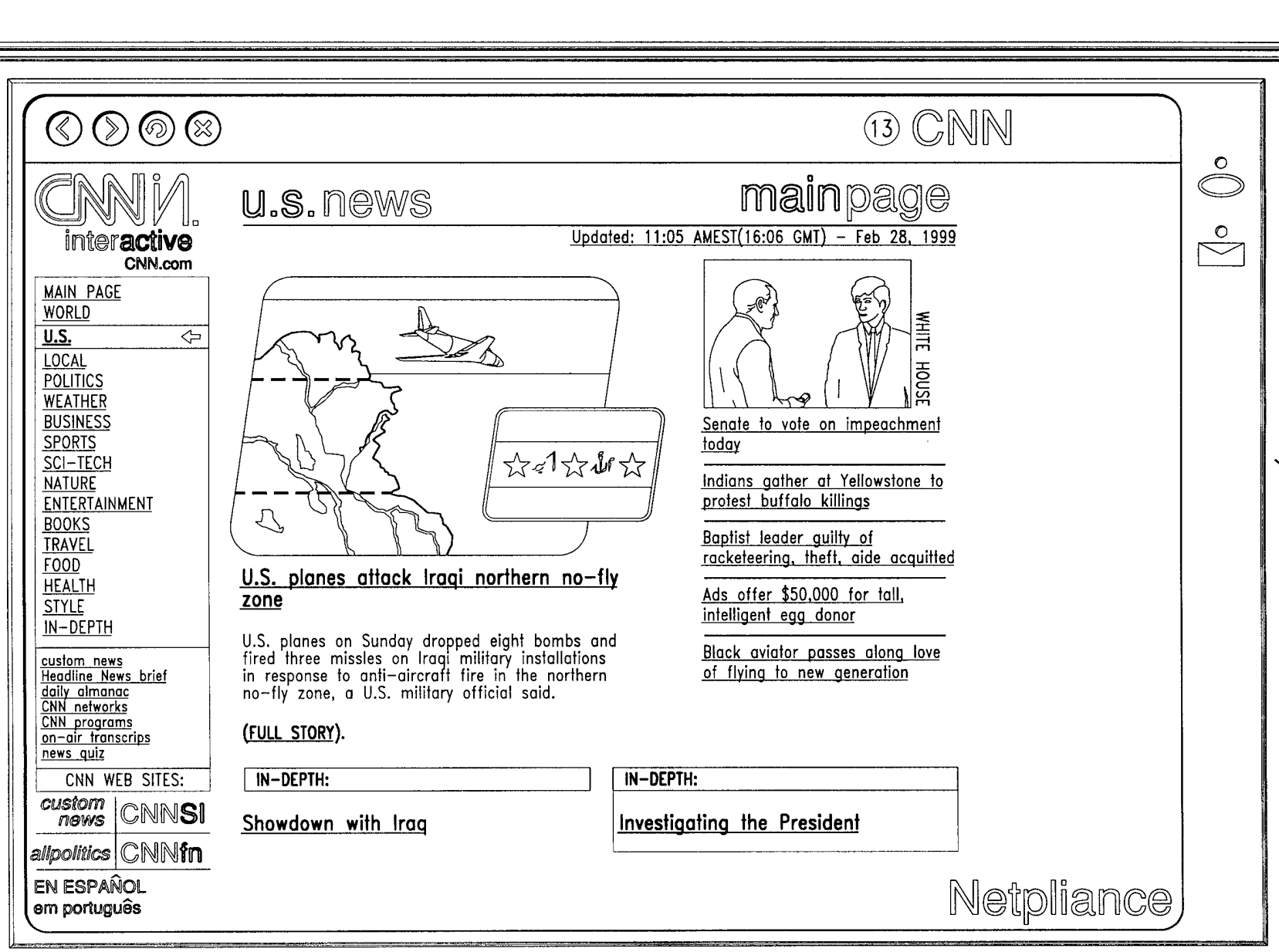

13 CNN
CNN interactive
CNN.com
u.s. news
main page
Updated: 11:05 AMEST(16:06 GMT) - Feb 28, 1999
MAIN PAGE
WORLD
U.S.
LOCAL
POLITICS
WEATHER
BUSINESS
SPORTS
SCI-TECH
NATURE
ENTERTAINMENT
BOOKS
TRAVEL
FOOD
HEALTH
STYLE
IN-DEPTH
custom news
Headline News brief
daily almanac
CNN networks
CNN programs
on-air transcrips
news quiz
CNN WEB SITES:
custom news
CNNSI
allpolitics
CNNfn
EN ESPAÑOL
em português
WHITE HOUSE
Senate to vote on impeachment today
Indians gather at Yellowstone to protest buffalo killings
Baptist leader guilty of racketeering, theft, aide acquitted
Ads offer $50,000 for tall, intelligent egg donor
Black aviator passes along love of flying to new generation
U.S. planes attack Iraqi northern no-fly zone
U.S. planes on Sunday dropped eight bombs and fired three missles on Iraqi military installations in response to anti-aircraft fire in the northern no-fly zone, a U.S. military official said.
(FULL STORY).
IN-DEPTH:
Showdown with Iraq
IN-DEPTH:
Investigating the President
Netpliance

FIG. 3B

Granny's Address Book

-Order Entry Web Page

Owner Info

Name:

Street:

City:

State:

Zip:

Alias:

Gender:

Age:

Helper Info

Can others add info to owner's personal address book?

o YES o NO

If YES, who will be responsible for managing the address book?

EMAIL ADDRESS

A URL will be mailed to the EMAIL address above along with an initial password to access the address book.

Are there names and EMAIL addresses that you would like to add now?

o YES o NO

If YES, Please use the following area to add contacts to the address book.

FIG. 4

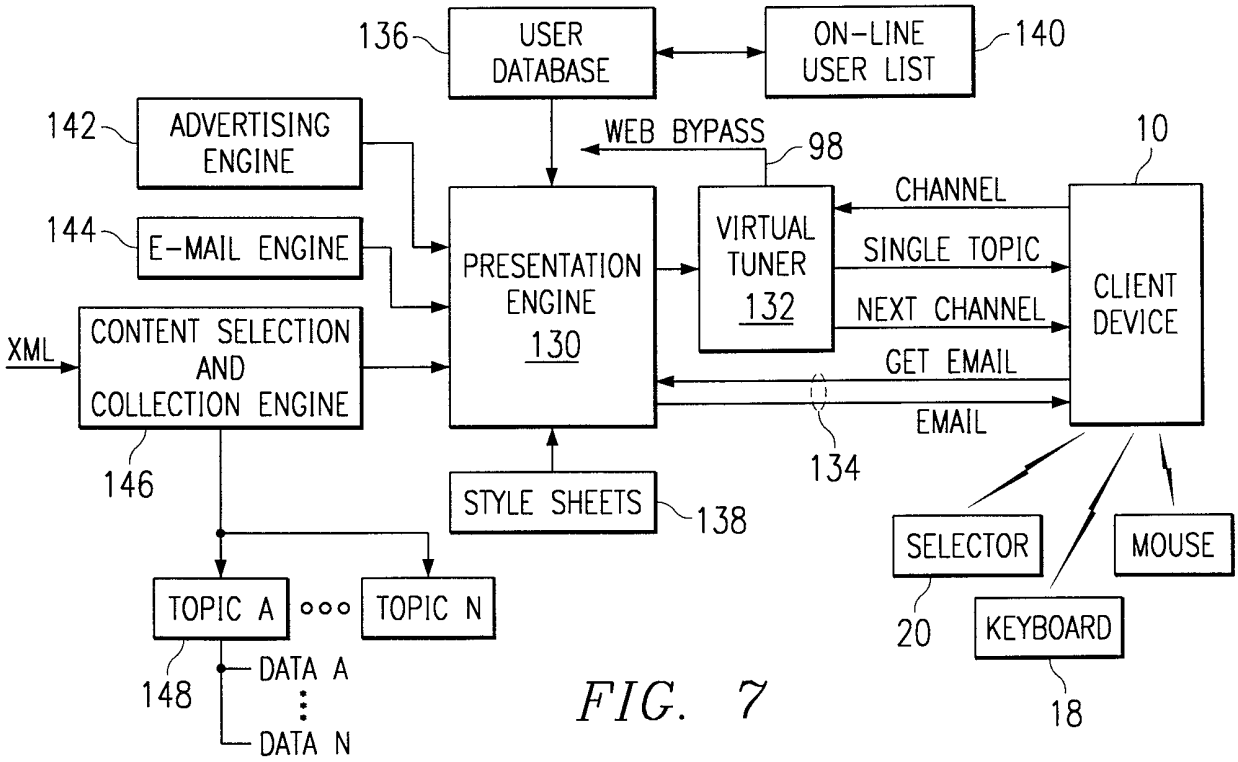


FIG. 7

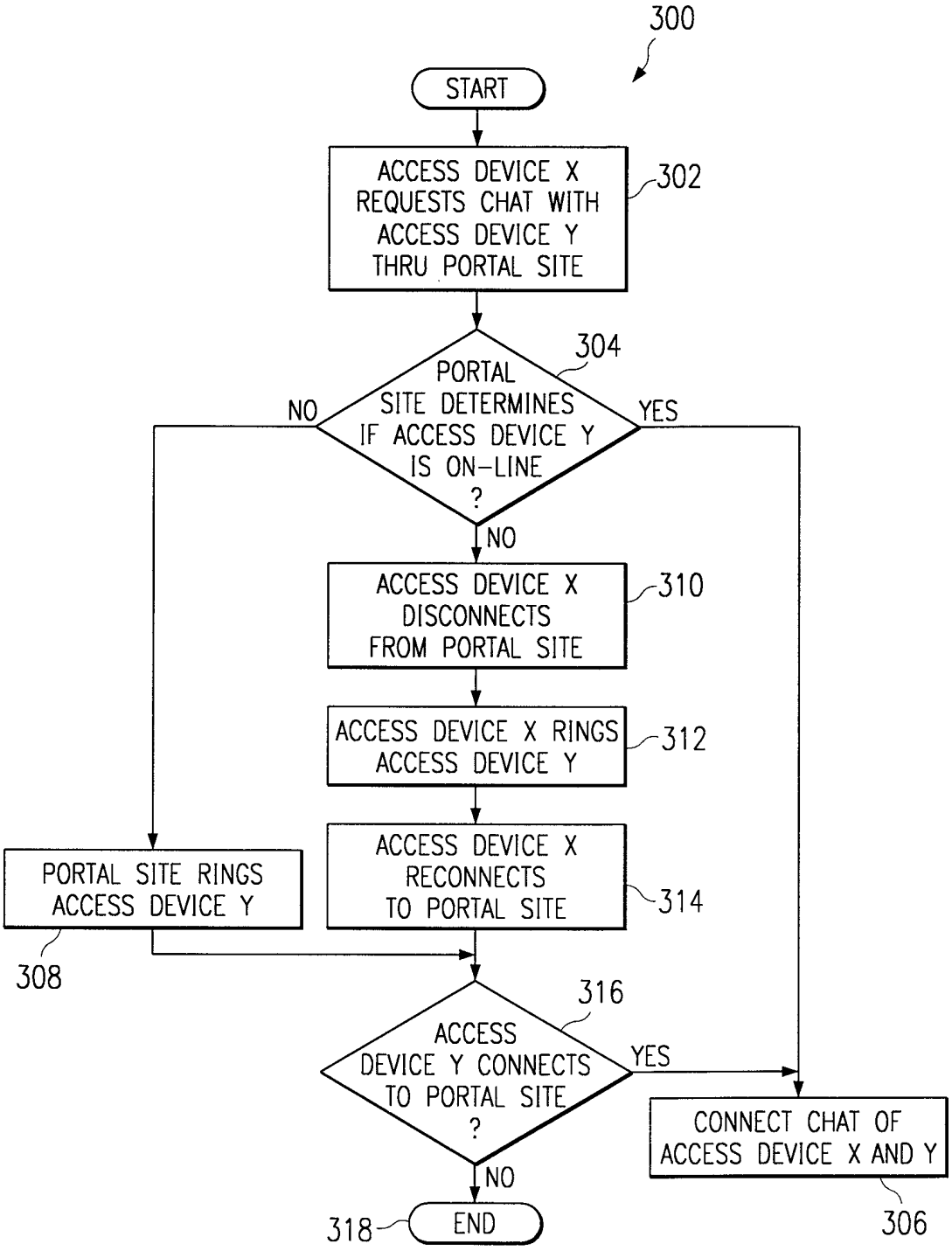

300
START
ACCESS DEVICE X REQUESTS CHAT WITH ACCESS DEVICE Y THRU PORTAL SITE
302
304
PORTAL SITE DETERMINES IF ACCESS DEVICE Y IS ON-LINE ?
NO
YES
NO
ACCESS DEVICE X DISCONNECTS FROM PORTAL SITE
310
ACCESS DEVICE X RINGS ACCESS DEVICE Y
312
PORTAL SITE RINGS ACCESS DEVICE Y
308
ACCESS DEVICE X RECONNECTS TO PORTAL SITE
314
316
ACCESS DEVICE Y CONNECTS TO PORTAL SITE ?
YES
NO
CONNECT CHAT OF ACCESS DEVICE X AND Y
306
318
END

FIG. 5

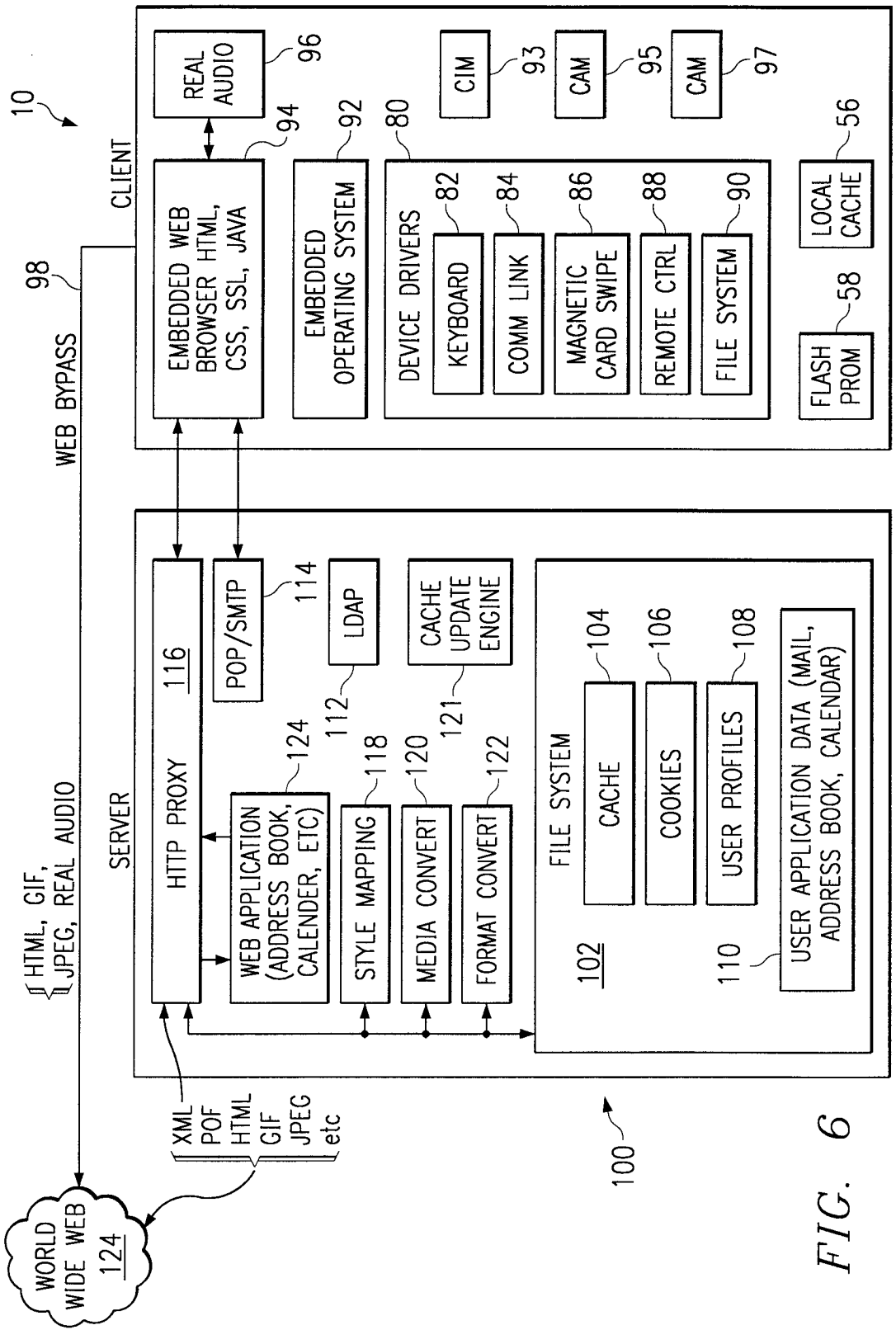

10
CLIENT
REAL AUDIO
96
94
92
80
CIM
93
CAM
95
CAM
97
56
EMBEDDED WEB BROWSER HTML, CSS, SSL, JAVA
EMBEDDED OPERATING SYSTEM
DEVICE DRIVERS
82
84
86
88
90
LOCAL CACHE
KEYBOARD
COMM LINK
MAGNETIC CARD SWIPE
REMOTE CTRL
FILE SYSTEM
FLASH PROM
58
98
WEB BYPASS
HTML, GIF, JPEG, REAL AUDIO
SERVER
HTTP PROXY
116
POP/SMTP
114
LDAP
112
CACHE UPDATE ENGINE
121
FILE SYSTEM
104
106
108
CACHE
COOKIES
USER PROFILES
102
110
USER APPLICATION DATA (MAIL, ADDRESS BOOK, CALENDAR)
WEB APPLICATION (ADDRESS BOOK, CALENDER, ETC)
124
STYLE MAPPING
118
MEDIA CONVERT
120
FORMAT CONVERT
122
XML
POF
HTML
GIF
JPEG
etc
WORLD WIDE WEB
124
100

FIG. 6