[0056] The Presence Server also communicates with the Position Determining Equipment (PDE), Home Location Register (HLR), Short Message Service Center (SMSC), and WAP gateway network elements in each of the wireless networks to which the PLIM system is connected. The PDE may query the Presence Server to determine the market in which a subscriber is operating. The Presence Server may extract wireless presence information from the HLR. The SMSC may query the Presence Server before attempting to deliver a short message to determine of the recipient's mobile phone is ON. The Presence Server provides wireless presence information to WAP-based IM clients for the "mobile buddy list."

[0057] In order for presence management to be more useful in everyday life, network presence preferably indicates more than simple ON or OFF information. Table 1 illustrates the different types of wireless presence that are supported by a Presence Server of a system according to the present invention.

TABLE 1

WIRELESS DEVICE STATUS	INTERPRETATION
OFF	Phone is OFF. Determined automatically on power down.
ON – Available	Phone is ON and the subscriber is available to be contacted.
ON – Voice Call	Phone is ON, but the subscriber is engaged in a voice call.
ON – WAP	Phone is ON and subscriber is using the WAP instant messaging application.
ON – *<user defined>*	The phone is ON. The subscriber's status has been manually set by the subscriber. Predefined settings include: • DND (do not disturb) • Busy • Not available • Meeting • Emergency Only The subscriber may also create arbitrary status indicators consisting of alphanumeric characters.

[0058] Likewise with the Internet, there are several variations of network presence. The PLIM system's Presence Server retrieves online presence from various IM servers (buddy list information) and makes it available to wireless subscribers on the WAP IM client application. Table 2 illustrates the different types of Internet presence that are supported by a Presence Server of a system according to the present invention.

TABLE 2

INTERNET STATUS	INTERPRETATION
Offline	Internet customer has not turned on, or logged into, the instant messaging client application on her PC.
Online - Available	Internet customer has turned on, or logged into, the instant messaging client application on her PC.
Online – *<user defined>*	The Internet customer is running the instant messaging application and has selected one of the status indicators (typical): • Away • Extended Away • Emergency Only • DND (do not disturb)

[0059] As IM moves into the wireless realm, presence information will undoubtedly become even more important. Using the status parsing as described above, presence information will be used for "availability management" in a world where people have multiple communication devices and can be accessed anywhere, anytime.

[0060] The IM-Anywhere Presence Server determines both Internet presence and wireless network presence, and makes this information available to entities on both networks. How presence is determined is explained as follows.

[0061] Determining Internet presence is straightforward: the Presence Server communicates peer-to-peer with IM servers. Internet presence information is made available to the Presence Server in the same way presence information is shared among IM clients worldwide. Currently, there is no uniform protocol for Internet-based instant messaging and presence, although an industry consensus is expected soon. The world's most common IM protocols are those used by AOL's Instant Messenger (AIM) and ICQ (also owned and controlled by AOL).

[0062] Determining wireless network presence is considerably more complex. Some of the key challenges are the following:

- The underlying communication protocols of TIA/EIA-41 wireless networks currently do not natively provide presence indicators;
- Accuracy is lost when unplanned network detachments occur, such as dead battery or roaming into analog service areas;
- Real-time electronic connections into operational wireless networks are needed;
- Wireless carriers are resistant to technical solutions that place a processing burden on operational network elements;
- Wireless carriers will allow only a small number of external connections into their networks.

[0063] The PLIM system Presence Server according to the present invention overcomes these challenges using novel techniques, and by offering a wide variety of options for connecting into wireless network elements. The Presence Server is able to inter-operate with network elements from all major equipment manufacturers as well as Signaling System 7 (SS7) bearer networks. Table 3 indicates a few of the general presence determination techniques employed by the PLIM system. Co-pending U.S. application no. 09/771,201 discusses several additional techniques that may be used in accordance with the invention for presence determination.

TABLE 3

CONNECTION TYPE	TECHNIQUE
Direct connection to HLR	Interface via SS7 ports, TCP/IP, or proprietary ports (if offered by HLR manufacturer). Both open and proprietary queries are utilized to infer presence.
SS7 network solution	Monitor the network's SS7 links and nodes for specific messages and combinations of messages that infer presence.

[0064] Using these methods, as applicable, the Presence Server retrieves presence and location information asynchronously or synchronously. In asynchronous mode, the Presence Server queries (polls) the HLR or SS7 nodes whenever an update is needed. In synchronous mode, the HLR or SS7 nodes are configured to send presence status changes

to the Presence Servers as they occur. In synchronous mode, subscriber presence information is "streamed" into the Presence Server (this is a "push" mechanism).

[0065] The Presence Server supports priority settings that allow presence updates to receive greater or lesser priority over other PLIM system traffic. Using an advanced prioritized event processing system, the PLIM system allows the wireless carrier to fine tune the Presence Server performance.

[0066] Even these sophisticated and proven techniques cannot provide accurate presence information in the event of an improper network detachment by the subscriber, i.e., the subscriber's battery dies. For these "corner condition" situations, the Presence Server employs heuristic techniques based on elapsed time and other conditions to infer the correct presence state.

[0067] Delivering of the presence information is another aspect of how the present invention operates. Presence information is made available to approved external users of the information through a secure Network Application Programming Interface (Network API). Approved users would appropriately include IM servers or unified messaging providers. The Network API allows both "pull" and "push" access by approved external users of the information.

[0068] An approved user can access presence information by subscribing to it. The user sends a subscribe request to the Presence Server using the Network API. If the subscribe request is approved, the Presence Server replies with a presence "atom" giving the current status of the wireless device. The Presence Server also agrees to notify the user each time the device's presence changes. The Presence Server will continue to notify the user of presence changes until the subscription has expired. If no expiration time is provided, the Presence Server assumes a default expiration period. If an expiration time of "zero" is provided, no subscription is created, and only a single presence atom is returned. This provides a user with a one-time presence fetch capability.

[0069] The integrated Location Proxy Server (LPS) of the PLIM system according to the present invention distributes real-time subscriber location information to platforms inside the wireless network and to third parties outside the network through the Network API. The LPS connects directly to a wireless carrier's Position Determining Equipment (PDE)

and Mobile Positioning Center (MPC). Using the Network API, the LPS makes location information available for both "push" and "pull" access by the platforms and third parties that require location information. As with the other integrated services in the PLIM system platform, the LPS utilizes the Privacy Management System and its associated database to ensure the privacy of subscriber location information.

[0070] The PLIM system LPS is responsible for retrieving, formatting and processing, and delivering location information to the platforms that require it. Some of these platforms are certainly located outside the network (e.g., Web URL, m-commerce merchant). On the other hand, some of these platforms (e.g., the IM Server, the Campaign Manager) are optionally located either inside the wireless carrier's network or outside it at a central gateway location, for example.

[0071] The LPS has four basic functions: (1) retrieving location information from the PDE, (2) retrieving location information from other network elements, (3) formatting and processing location information, and (4) delivering location information.

[0072] To retrieve location information from the PDE, the LPS has a secure, electronic connection to the PDE via an API. The API is accessible over TCP/IP and employs the J-STD-036 protocol. The PDE API supports both a one-time query from the LPS as well as continuous streaming of location updates to the LPS.

[0073] It may also be useful to retrieve location information from other sources. Networks which do not have PDE should have coarse-grain location information available in other network elements. For example, some HLRs and MSCs indicate a subscriber's current serving cell or sector. This information is retrievable by the PLIM system's LPS.

[0074] The LPS formats and processes location information received from the PDE or other network element into a format that is acceptable to the requesting platform. Final formats are useful in the form of (1) latitude-longitude pairs with associated circular probability error (CEP), (2) zip code, (3) city identifier, or (4) Geographic Markup Language (GML) code. In order to produce a final format location "atom," the LPS converts data from the PDE or network elements using geocoding techniques (i.e., convert sector ID into zip code). The wireless carrier must load network geography data, such as BTS locations, into the LPS database.

[0075] The LPS delivers location information to platforms outside the wireless network using the Network API. Location information can be provided in response to individual queries, or it can be streamed continuously to the external platforms. The LPS also provides location information to services inside the wireless network using TCP/IP messaging inside the carrier's firewall.

[0076] There are many scenarios under which the LPS provides location information to platforms inside and outside the wireless carrier's network. The following examples illustrate the two most common scenarios: subscriber-initiated location-sensitive Web browsing, and merchant-initiated mobile commerce.

[0077] Referring to **Fig. 2**, subscriber-initiated location-sensitive Web browsing is illustrated. The process is initiated when a wireless subscriber **210** uses a WAP browser to request **201** location-sensitive information (e.g., driving directions) from a Web service (URL) **220**. The WAP Gateway **136** automatically recognizes that location information is needed and queries **202** the PLIM system's LPS **114** for the most recent location information on the subscriber. The LPS verifies **203** that the privacy database **119** reflects that the subscriber has given permission for her location information to be provided to the Web service **220**. If current location information is not available, the LPS **114** queries **204** the PDE **130** to obtain it. Alternatively, the PDE **130** may already be configured to "stream" location updates into the LPS **114**. The LPS **114** provides **205** the subscriber's location information to the WAP Gateway **136**. The WAP Gateway **136** embeds the location information into the requested URL and forwards it **206** to the Web service **220**. A location-sensitive response from the Web service **220** is returned **207** to the subscriber **210** via the WAP Gateway **136**.

[0078] Referring to **Fig. 3**, merchant-initiated mobile commerce is illustrated. An approved merchant **320** with prior knowledge of a subscriber's phone number requests **301** the subscriber's current location information. The merchant **320** accesses the PLIM system's LPS **114** through the secure Network API **117**, supplying a user ID and password. The LPS **114** verifies **302** that the privacy database **119** reflects that the subscriber has given permission for the merchant **320** to receive this data. If current location information is not available, the LPS **114** queries **303** the PDE **130** to obtain it.

Alternatively, the PDE **130** may already be configured to "stream" location updates into the LPS **114**. The LPS **114** provides **304** the subscriber's information to the merchant **320**. The merchant uses this information to provide personalized content to the subscriber.

[0079] Referring again to Fig. 1, the LPS communicates with other components of the PLIM system platform as well as external network elements in the wireless network.

[0080] Within the PLIM system platform, the LPS communicates with the IM Server, the Campaign Manager, the Privacy Database, and the Network API. The IM Server queries the LPS for buddy location information to be displayed in the "mobile buddy list." The Campaign Manager queries the LPS to determine if a subscriber's location should trigger the delivery of a targeted mobile commerce message. The LPS queries the Privacy Database to ensure that the subscriber's permission has been received before providing location information to any requesting service.

[0081] The LPS also communicates with network elements in each wireless network it services, including the Position Determining Equipment (PDE) **130**, the Mobile Positioning Center (MPC) **138**, the WAP Gateway **136**, and other network elements. The LPS receives real-time location information from the PDE. The PDE must provide a secure API utilizing the J-STD-036 protocol. The LPS may receive location information indirectly via the MPC in some network architectures. The LPS provides subscriber location information on a permission-oriented basis to the WAP Gateway, which in turn forwards the location information to location-sensitive Web services requested by the subscriber. The LPS may obtain coarse-grain location information from other elements in the wireless network, such as the MSC or the HLR, depending on the equipment and configuration.

[0082] Location information is made available to approved external users of the information through the secure Network API. Approved users might include traditional merchants, e-commerce companies, mobile commerce companies, wireless gaming companies, and wireless advertising firms. The Network API allows both "pull" and "push" access by approved external users of the information.

[0083] In a manner analogous to that described above concerning presence information, an approved user can also access location information by subscribing to it. The user sends

a subscribe request to the LPS using the Network API. The subscribe request includes the desired level of location granularity. If the subscribe request is approved, the LPS replies with a location "atom" giving the current location of the wireless device. The LPS also agrees to notify the user each time the device's location changes. The LPS will continue to notify the user of location changes until the subscription has expired. If no expiration time is provided, the LPS assumes a default expiration period. If an expiration time of "zero" is provided, no subscription is created, and only a single location atom is returned. This provides a user with a one-time location fetch capability.

[0084] The PLIM system allows wireless carriers to offer their subscribers access to popular instant messaging services on their wireless devices. The features that have made instant messaging one of the Internet's most indispensable applications (i.e., sending and receiving instant messages in real-time, knowing when buddies are online, and knowing when buddies have their phones turned ON) are now available on wireless devices:

[0085] The IM Server allows wireless carriers to offer their subscribers access to popular, commercially available IM services such as AOL Instant Messenger, ICQ, MSN Messenger, Yahoo! Messenger, and others. Using their handheld devices, wireless subscribers are able to send and receive instant messages and buddy list information with other wireless subscribers and with Internet IM users. Likewise, Internet IM users are able send and receive instant messages and buddy list information with wireless subscribers.

[0086] For the wireless subscriber, instant messaging is provided either through a WAP client or through two-way SMS. In the WAP mode, the subscriber goes to a WAP page operated by her wireless carrier. This WAP IM client allows subscribers to read and compose instant messages, to create and manage buddy lists and group lists, and to observe real-time buddy status. Two-way SMS offers the same functionality through the standard SMS interfaces. Messages are read and composed using SMS, and buddy list updates may be provided as short messages. Web and Windows™ IM clients, where administrative functions such as buddy list creation and maintenance can be performed, augment both the WAP and the two-way SMS IM clients. The Web and Windows™ clients are optional for WAP users but required for SMS users, since SMS does not lend itself to administrative activities.

[0087] It is important to note that the term WAP is being used generically to refer to any wireless Internet protocol, including HDML and any future wireless Internet protocols that may be developed. The following examples are provided of some competing technologies that for the purposes of this patent will be referred to generically as WAP. For example, the Web content can be delivered as existing HTML Internet content for wireless devices as proposed by Spyglass' Prism technology or Japan's i-mode. As a further example, the content can be processed through a template model that reads existing HTML content and fits the data to a template optimized for various types of wireless phones such as the system proposed by Everypath.com. As another example, the data content can be delivered to a Palm Pilot or other PDA or handheld device that uses a proprietary protocol.

[0088] Messages and buddy list updates to and from the wireless clients (WAP and SMS) pass through the PLIM system's IM Server utilizing a conventional client-server communication process. The IM Server communicates with Internet-based IM services using server-to-server communication protocols. Although no standard server-to-server protocol has been adopted by the industry, and several known alternatives are useful, the use of Session Initiation Protocol (SIP) extensions is a preferred implementation, due to the maturity of the SIP protocol, the native support of presence information, and the decoupling of presence information from the message body. Of course, the IM Server may be satisfactorily implemented via any version of Instant Messaging and Presence Protocol (IMPP) that may eventually become a standard. The PLIM system is advantageously configured to have a flexible, template-driven interface to external IM servers, and it can readily adapt to changes in the protocol.

[0089] In the future, WAP and SMS may give way to new wireless operating systems, for example Compact HTML, or perhaps embedded IM and buddy list clients in wireless devices themselves. Because the IM Server may be implemented as infrastructure software, it is able to adapt to the changing protocols and operating systems with straightforward changes to its interface coder-decode templates. In effect, the IM Server is independent of the client platform used by the wireless subscriber.

[0090] For Internet IM users, sending messages and buddy list information to "mobile buddies" is as simple as creating a new entry in the buddy list indicating the buddy's

mobile name. For example, if a buddy's Internet name is **gstead**, a new entry should be created called **gstead-phone** or **gstead-pda**. The mobile buddy name is then associated with an Internet address that terminates at the IM Server. When messages are sent from the Internet user, they are received at the IM Server and routed to the wireless subscriber's device. IM clients are enhanced to indicate both Internet and mobile status for each buddy, eliminating the need to create separate entries for mobile buddies.

[0091] A Web client and a downloadable Windows™ IM client are provided for use on desktop computers. The Web client is accessible via standard Web browser, provides full messaging and buddy list capability, and provides full IM administration capabilities (buddy list admin, group list admin, password admin). The administrative settings apply to the two-way SMS client. The Windows™ client is substantially identical to the Web client, but runs as separate Windows™ application.

[0092] Wireless subscribers can access several different IM clients from their handheld devices, including a WAP client and a two-way SMS client. The WAP client is accessible via a wireless device's WAP browser and allows messages to be composed, sent, read, stored, saved, or deleted. The WAP client displays buddy list and buddy status, and allows buddies to be added or deleted. The WAP client also displays group lists, and allows group lists to be created, edited, and deleted. It is preferred that the WAP client be implemented using Wireless Markup Language (WML) for optimal display on wireless device. The WAP client should reside either on a Web server inside a wireless carrier's firewall, or behind the firewall of a PLIM system gateway site. A two-way SMS client utilizes standard two-way SMS to send and receive text messages, and buddy status updates (ON-OFF, online-offline) are sent via SMS. No administrative functions are provided in the two-way SMS client.

[0093] The WAP client provides some IM features which uniquely address the needs of wireless subscribers. Notification of successful delivery of an instant message to a wireless subscriber is provided, as is automatic retry of instant message delivery. When retry fails, the instant message is automatically re-routed to an appropriate email address. As required by the situation, message content is automatically reformatted (i.e., HTML to ASCII). Another helpful (if optional) feature is a library of predefined messages and

replies, saving the subscriber the time required to enter an alphanumeric message on the keypad (examples include: *Invitation to chat*, *Invitation to voice call*, *Yes*, *No*, *Why?*, *When?*, and *I'll call in 5 minutes*).

[0094] The IM clients provide a rich set of functions for creating and managing buddy lists and group lists. These functions are offered by the Web client and the Windows™ client, and partially by the WAP client, but they are not available using two-way SMS. Table 4 summarizes the buddy list and group list management capabilities of the clients.

TABLE 4

FUNCTION	AVAILABILITY	DESCRIPTION
Add Buddy	WAP client, Web client, and Windows™ client	• Enter Internet email address and IM service; or • Enter mobile IM address; or • Import from wireless PIM (if provided by wireless carrier) • Optional: request permission to receive wireless buddy's location information (if available from buddy's wireless carrier) • Receive authorization to add buddy (if required by buddy's IM service)
Edit Buddy Info	WAP client, Web client, and Windows™ client	• Change address and/or IM service • Request permission to receive buddy's location information (if available from wireless carrier) • Cancel receipt of buddy's location information
Remove Buddy	WAP client, Web client, and Windows™ client	• Remove Internet or wireless buddy from buddy list
Buddy List Display	WAP client, Web client, and Windows™ client	*Status Information (Online, Offline, ON, OFF)* • Internet and wireless buddy status will be displayed using information provided by buddy's IM service • For wireless buddies who are OFF, last time ON will be displayed *Wireless Buddy Location Information* • Location information may be manually queried (if it was requested and authorized at the time the buddy was added) • Last manually retrieved location will be

FUNCTION	AVAILABILITY	DESCRIPTION
		displayed (if authorized by buddy) *Buddy List Sort Options* • All online or ON buddies, followed by all offline or OFF buddies • Alphabetical Order
Group Lists Display	WAP client, Web client, and Windows™ client	• Sort all group names alphabetically • View member of one group sorted (i) alphabetically or (ii) all online or ON followed by all offline or OFF
Search Buddy List	Web client and Windows™ client	• By name • By interests
Search IM Server	Web client and Windows™ client	• By name • By interests
Create Group	Web client and Windows™ client	• Create group as host • Assign a name to the group • All members of the group have access to the group
Add Member to Group	Web client and Windows™ client	• Add existing buddy from buddy list • Enter Internet email address and IM service; or • Enter mobile IM address; or • Import from wireless PIM (if provided by wireless carrier) • Optional: request permission to receive wireless member's location information (if available from member's wireless carrier) • Receive authorization to add member to group (if required by member's IM service)
Remove Member from Group	Web client and Windows™ client	• Only the group host or the member herself may remove a member from a group

[0095] In order for privacy to have real meaning in the implementation of this invention, each wireless subscriber who activates instant messaging capabilities is required by the IM clients to use the PLIM system's Privacy Management System to establish her opt-in permission, preferences, optional personal information, and optional interest lists. Wireless subscribers use the Privacy Management System to establish their availability and to establish rules for sharing presence and location information. A subscriber may update these settings many times each day, or they may never change. It is entirely up to

the subscriber to perform her personal presence management. The Privacy Management System is an integrated component of the PLIM system platform, and can be accessed directly from any of the IM clients.

[0096] The IM Server communicates with other components of the IM-Anywhere platform as well as external network elements in the wireless network.

[0097] Within the PLIM system platform, the IM Server communicates with the Presence Server, the Location Proxy Server, the Privacy Database, and the Network API. The IM Server queries the Presence Server to determine if a subscriber's phone is ON or OFF so that accurate "mobile buddy list" information is available for the IM clients. When an IM client requests the location of a buddy, the IM Server sends query to the Location Proxy Server, which responds with the buddy's location information. The IM Server queries the Privacy Database to ensure that buddy list add requests, group list add requests, and location information requests and are authorized. Instant messages and buddy list updates are sent to, and received from, external IM services using the Network API.

[0098] The IM Server also communicates with the Short Message Service Center (SMSC) and WAP Gateway network elements in each of host wireless networks it services. The IM Server sends and receives instant text messages through the SMSC. The SMSC provides a successful delivery notification to the IM Server, if the IM client requested such a notification. The IM Server sends messages, buddy list status information, and administrative information to the WAP IM client, which is in turn accessed by the subscriber via the WAP Gateway.

[0099] One of the most advantageous features of the PLIM system is its ability to offer merchant-initiated mobile commerce. Approved merchants, retailers, e-commerce companies, wireless advertising agencies, and others (collectively, "merchants") can use the PLIM system to obtain information about subscriber presence and location, as well as send messages and e-coupons to the subscriber. The enormous promise of m-commerce revenue will not be realized until this capability is widely available. The alternative – waiting for the subscriber to initiate a transaction – doesn't take advantage of the impulse buying opportunity and is built on unrealistic expectations of wireless device usage.

[00100] At least three models for m-commerce have emerged to date. According to the first model, the merchant creates a WAP-enabled Web site with content or shopping opportunities for wireless subscribers. The Web site does not provide location-sensitive content. The wireless subscriber uses a WAP browser to visit the Web site and request content or conduct a transaction.

[00101] According to the second model, the merchant has an independent account with the wireless subscriber (for example, a stock trading account). Through this independent account, the merchant has private information about the subscriber, including her mobile phone number. The merchant determines the subscriber's presence or location information using a Network API, and then delivers a message directly to the subscriber using email or some other WAP or SMS message delivery service.

[00102] According to the third model, the merchant does not know the subscriber's identity or mobile phone number. The merchant would like to send a message or e-coupon to all subscribers with a particular set of interests. Moreover, the merchant would like to send the message or e-coupon only when the subscriber has her phone turned ON and is near the merchant's retail store.

[00103] These models range from completely subscriber-initiated (the first model) to completely merchant-initiated (the third model). The PLIM system is structured to solve the prior art challenges that block widespread use of the second and third models, which are incidentally the most commercially promising of the three. The Network API and the Campaign Manager represent access points by which merchants can initiate personal, relevant, location-specific transactions with wireless subscribers.

[00104] The Campaign Manager automates the delivery of targeted messages and e-coupons to wireless subscribers. The Campaign Manager is useful for merchants who: (i) do not know the identity of their prospective customers, but are interested in targeting specific interest groups, or (ii) may know the identity of their prospective customers, but do not have the communications infrastructure to deliver messages to those customers. The Campaign Manager identifies a group of target subscribers based on interests and permissions, and delivers messages or e-coupons to those subscribers only when certain location, presence, and timing criteria are met.

[00105] The Campaign Manager is administered by the wireless carrier and is only available to merchants who have entered into agreements with the carrier. The creation and execution of a campaign may be highly automated, or may be administered manually, depending on the desires of the wireless carrier and the complexity of the campaign.

[00106] A contact campaign is advantageously structured to have the following elements: a campaign definition, campaign dimensioning, campaign execution, and campaign reporting.

[00107] The merchant provides, either electronically through a Web interface, or to a sales representative, campaign definition parameters, such as (i) target interest areas or a list of known mobile device numbers, (ii) the message or e-coupon, (iii) the start date and time, and duration, of campaign, and (iv) any conditions that must be satisfied to trigger the delivery of a message or e-coupon to a subscriber. Such conditions may include presence, location, day of week, and time of day.

[00108] Concerning campaign dimensioning, the Campaign Manager queries the Privacy Database to determine the number of accessible subscribers who: (i) match the interest areas, and (ii) have given permission to receive messages from the merchant. Based on the number of accessible subscribers matching the merchant's criteria, the merchant may decide to proceed with the campaign or, alternatively, to widen or narrow the campaign criteria.

[00109] When the campaign is executing, the Campaign Manager monitors each target subscriber. As soon as the merchant's criteria are satisfied for a given subscriber, the Campaign Manager delivers the merchant's message or e-coupon using WAP or SMS.

[00110] At the conclusion of the campaign, the Campaign Manager produces a report that indicates the total number of targeted subscribers, the total number of targeted subscribers for whom the campaign criteria were satisfied and a message was delivered, and the total number of successful and unsuccessful message delivery attempts.

[00111] The Campaign Manager performs sophisticated and computational intensive calculations during the campaign execution stage. A campaign may target as few as 10,000 or as many as 1 million or more subscribers. The Campaign Manager must

monitor each of the subscribers throughout the duration of the campaign to determine if the message delivery criteria have been triggered. Some criteria are known beforehand, such as the subscriber's interests. Other criteria, such as presence and location, must be monitored in real-time. Location poses a special complexity, since the subscriber's distance from a merchant may need to be computed.

[00112] Merchants who wish to conduct a message campaign must work closely with the wireless carrier to configure the campaign. The Campaign Manager provides a Web interface through the Network API. Using this interface, merchants can define and dimension campaigns, and submit them to the wireless carrier for approval and execution. This highly automatic method is appropriate for small to medium scale campaigns, for campaigns with simple message delivery criteria, and for repeat campaigns.

[00113] The PLIM system operator (e.g., a wireless carrier, or a central gateway facility) may elect to work personally with merchants to manually define, dimension, and launch campaigns. In this scenario, a representative of the operator meets with the merchant and enters the campaign information into the Campaign Manager using the Web interface herself.

[00114] The Campaign Manager communicates with other components of the PLIM system platform as well as external network elements in the wireless network.

[00115] Within the PLIM system platform, the Campaign Manager communicates with the Location Proxy Server, the Presence Server, the Privacy Database, and the Network API. The Campaign Manager receives subscriber location updates via the LPS. The Campaign Manager receives subscriber presence updates via the Presence Server. The Campaign Manager queries the Privacy Database during the campaign dimensioning stage to build a list of accessible subscribers whose interest profiles and permissions make them viable candidates for receiving a message. The Campaign Manager offers a Web interface for creating, dimensioning, and launching campaigns. The Web interface is accessed through the Network API.

[00116] The Campaign Manager also communicates with the Short Message Service Center of any wireless networks it services. The Campaign Manager delivers messages to

subscribers via the SMSC. The Campaign Manager also receives message delivery confirmations from the SMSC, which it uses when creating its campaign report.

[00117] The PLIM system platform includes a powerful Privacy Management System that safeguards personal subscriber information across each of the integrated services. Through a flexible opt-in interface, the Privacy Management System allows wireless subscribers to carefully manage their "wireless personas" so that services such as wireless instant messaging and merchant-initiated mobile commerce become welcome – even indispensable – wireless Internet applications.

[00118] Just as the PLIM system enables the delivery of targeted, timely, and personal information, it also ensures that private information is protected and that subscribers do not receive unwanted, intrusive external contacts. The Privacy Management System includes a secure database of subscriber identities, personal interest information, and permissions. This database is queried in real-time before personal information is provided to any external entity, and before any messages are delivered to the subscriber. The subscriber can access the Privacy Management System through the Web or through a WAP device at any time to modify their personal information.

[00119] The Privacy Management System is, in effect, a gatekeeper between the private information needed to make Internet services personal and relevant, and the vast world of merchants and messaging services who desire access to the subscriber. A description of the features and interworking of the Privacy Management System follows.

[00120] The centerpiece of the Privacy Management System is a Web interface where wireless subscribers provide personal information and establish the conditions under which they are willing to be contacted by outside parties. The information provided by the subscriber in the Privacy Management System is stored in a relational database that is part of the PLIM system platform. If the wireless carrier has separate databases that include partial information about its subscribers (i.e., basic identity, interests), this information can be loaded directly into the Privacy database rather than re-entered by the subscriber.

[00121] The Privacy Management System allows a "supervisor mode," in which a subscriber's supervisor has the ability to control all aspects of the subscriber's account. This feature is useful for corporate wireless plans. Accordingly, there are three classes of

information collected and stored by the Privacy Management System: (i) identity information, (ii) personal information and interests, and (iii) privacy management information.

[00122] Privacy management information describes the rules under which private information can be distributed, and the conditions under which a subscriber is willing to receive a targeted message. Table 5 describes the basic elements of privacy management available in the PLIM system.

TABLE 5

PRIVACY CONTROLS	OPTIONS
May we tell others that your wireless device is ON or OFF?	• No. • Yes. • Yes, but only the parties on the *<include list>*. • Yes, all parties except those on the *<exclude list>*. For those parties for whom the answer is yes, which shall we indicate (check only one): • ON or OFF only • ON + status of the phone (idle, voice call, WAP mode) • ON + *<user-defined status>* (please select from predefined list, or enter 14* alphanumeric)
May we tell others your location to within 100 meters?	• No. • Yes. • Yes, but only the parties on the *<include list>*. • Yes, all parties except those on the *<exclude list>*.
May we tell others what zip code you are in?	• No. • Yes. • Yes, but only the parties on the *<include list>* (automatically includes all approved parties on the 100 meter list). • Yes, all parties except those on the *<exclude list>* (automatically includes all approved parties on the 100 meter list).
May we tell others what city you are in?	• No. • Yes. • Yes, but only the parties on the *<include list>* (automatically includes all approved parties on the zip code and 100 meter lists). • Yes, all parties except those on the *<exclude list>* (automatically includes all approved parties on the zip code and 100 meter lists).
Please indicate your IM	For each IM service supported by the wireless carrier:

PRIVACY CONTROLS	OPTIONS
preferences.	• Checkbox to indicate the subscriber has an account with the service; for each IM service checked by the subscriber: o Provide IM address, screen name, account number o Indicate preference for day or week, time of day o Indicate preference for content type o Indicate preference by send ID
Are you willing to receive messages from outside parties?	• No. • Yes. • Yes, but only the parties on the *<include list>*. • Yes, all parties except those on the *<exclude list>*. • Yes, but only messages which are relevant to all of the following (as indicated by checkboxes): o Specific interest o General interests o Income level o Education level o Birthday o Gender • Yes, but only the parties on the *<include list>* and only messages which are relevant to all of the following (as indicated by checkboxes): o Specific interest o General interests o Income level o Education level o Birthday o Gender • Yes, all parties except those on the *<exclude list>* and only messages which are relevant to all of the following (as indicated by checkboxes): o Specific interest o General interests o Income level o Education level o Birthday o Gender
Please indicate which time of the day you do not wish to receive messages.	• Units of one hour. Multiple contiguous or non-contiguous.
Please indicate which days of the week you do not wish to receive	• Checkboxes for each day of the week.

PRIVACY CONTROLS	OPTIONS
messages.	
Is there a limit to the number of instant messages you are willing to receive?	• Please check only one: o Maximum messages per hour: (indicate quantity) o Maximum messages per day: (indicate quantity)
Is there a limit to the number of promotional messages you are willing to receive?	• Please check only one: o Maximum messages per hour: (indicate number) o Maximum messages per day: (indicate quantity)

[00123] The *<include list>* and *<exclude list>* may include (i) predefined organizations selected by the wireless carrier, (ii) user-provided URLs, (iii) individuals identified by email or IM address. The wireless carrier has the ability to permanently exclude organizations (by URL) at its discretion. As to the user defined status indicators, the system automatically provides the following pre-defined status indicators: DND (do not disturb), Busy, Not Available, Meeting, Emergency Only. The system operator may add additional pre-defined status indicators if desired. As an optional service to the subscriber, it is possible to synchronize message blocking with external calendar programs, for example those provided by the wireless carrier's PIM.

[00124] Subscribers can access the Privacy Management System via secure Web or WAP interface. The expectation is that subscribers will use the Web interface for first-time configuration, and then use the WAP page for incremental or daily updates.

[00125] The subscriber determines which companies are allowed to received her presence and location information, and which companies may send a message. The company names shown on this screen are dynamically generated from a database. The PLIM system operator has complete control over the company names that appear (or do not appear) during the configuration process. Importantly, the subscriber may select times and days of the week when she is unwilling to receive messages.

[00126] The WAP interface to the Privacy Management System provides the same capabilities as the Web interface, and populates the same Privacy Database inside the PLIM system.

[00127] The Privacy Management System has a direct interface to the PLIM system's Privacy Database, as well as the ability to import data, via the System Management Module, from other databases inside the wireless carrier's network. The following illustration highlights the Privacy Management System, Privacy Database, and System Management Module as they relate to the PLIM system and its external environment.

[00128] Information provided to the Privacy Management System is loaded directly into the PLIM system's Privacy Database. The Privacy Database is accessed by all of the PLIM system integrated services, as described above.

[00129] The PLIM system also has a management module that allows the system operator to import relevant information directly into the Privacy Database, eliminating the need for data re-entry by the subscriber. Examples of the type of information a wireless carrier might elect to import directly into the Privacy Database include: (i) subscriber identities (i.e., name, wireless phone number, email address), (ii) links to subscriber PIM contents (i.e., calendar, contact lists), and (iii) links to previously entered interest information (i.e., news, traffic).

[00130] The PLIM system provides a standardized, secure Network API for external systems to exchange messages and signaling information with a wireless network. These external systems (which might include IM Servers, merchants, unified messaging providers, Internet content providers, wireless advertising firms, and wireless gaming service providers) are provided with an interface around which they can develop automated applications. For the wireless carrier, each of these entities represents both a source of value to subscribers as well as a source of revenue through bi-lateral business arrangements.

[00131] The Network API utilizes standard protocols and best-in-class security controls to prevent unauthorized access to wireless network elements. The PLIM system platform acts as a firewall to the wireless network elements, protects the privacy of subscribers, and ensures that external requests for information do not place an unacceptable load on operational network elements.

[00132] The PLIM system platform also creates a database of Transaction Detail Records which log every activity at the Network API, allowing the carrier to meter and audit usage for financial purposes.

[00133] The Network API (Network API) present an secure socket layer TCP/IP interface to external systems. External systems access the API through the steps of: (i) sending a properly encrypted login request, (ii) providing an authorized login ID and password (provided by the wireless carrier), and (iii) selecting an Network API service and beginning communications.

[00134] Table 6 shows how the Network API provides six separate services, or points of entry, for external systems.

TABLE 6

SERVICE	DESCRIPTION	PROTOCOL
Instant Messaging	IM Server to server communications: messages, presence, buddy list administration	IMPP
Inter-carrier messaging	SMS between different wireless networks	SMTP, SMPP
Presence	Non-IM requests for presence information	IMPP
Location	Requests for location information	IMPP with extensions
Campaign manager	Campaign creation, dimensioning, and launch	Web
Privacy Management System	Updates to the Privacy Management System	Web, WAP

[00135] The IM Server communicates with Internet-based IM services using server-to-server communication protocols. Several alternative protocols are under consideration by the IETF for a new Instant Messaging and Presence Protocol (IMPP). *See* RFCs 2778 and 2779. Thus, no standard server-to-server protocol has been adopted by the industry, at this time. Of course the PLIM system can be effectively operated according to any of the known protocols, however the preferred protocol is SIP extensions. SIP extensions is preferred due to the maturity of the SIP protocol; the native support of presence information; and the decoupling of presence information from the message body. In any case, the PLIM system has a flexible, template-driven interface to external IM servers, and is readily adaptable to changes in the protocol.

[00136] The IMPP interface allow external services to subscribe to both presence and location information. An approved external sends a subscribe request to the Network API. If the subscribe request is approved, the PLIM system sends a reply and agrees to notify the external service each time the device's presence or location changes. The PLIM system continues to notify the user of changes until the subscription has expired. If no expiration time is provided, the PLIM system assumes a default expiration period. If an expiration time of "zero" is provided, no subscription is created, and only a single reply is returned. This provides a service with a one-time fetch capability.

[00137] The PLIM system allows wireless subscribers to send SMS messages to subscribers on other wireless networks that support SMS. Messages originating in a network serviced by a PLIM system platform are directed from the SMSC to the PLIM system. The PLIM system routes the message to its destination network using SMPP (if direct access to the destination SMSC is possible) or otherwise using SMTP.

[00138] Multiple levels of security shield the Network API. The requirement of subscriber permission represents one level of security. The privacy database will not release information unless the subscriber's permissions and other restrictions are 100% satisfied.

[00139] Database security is a second level of security. All subscriber data is stored in an database, which provides internal security and encryption. For example, Oracle's Advanced Security Option provides industry standard checksum and encryption algorithms to ensure the privacy of the data transmitted over the network. Oracle also provides encryption on all system User IDs and passwords.

[00140] A third level of security is provided by user authentication via login IDs and passwords. A fourth level of security is provided by data encryption via a secure socket layer. A fifth level of security is network security that can be implemented via isolated subnets.

[00141] As a sixth layer of security, a firewall protects against: denial of service attacks such as Ping of Death, SYN flooding, Land attack, and IP Spoofing. Periodic firewall software updates ensure ongoing protection. A seventh level of security is physical

security , which is ensured by locating the PLIM system hardware in a well-protected, trusted facility.

[00142] The are two aspects to service provisioning: wireless subscriber provisioning, and external service provisioning for merchants who desire access to the PLIM system through the Network API.

[00143] After the PLIM system is deployed in a wireless carrier's network, current subscribers may register for the service. The registration process allows the subscriber to activate wireless instant messaging as well as establish permissions for the release of personal information to merchants and other external services. The initial registration process requires special identity authentication. Future access to the system is granted through a standard login process.

[00144] Referring to **Fig. 4**, an initial registration process for effecting subscriber provisioning is illustrated. The initial registration process is accomplished via Web or WAP interfaces. For initial service registration, the subscriber accesses the PLIM system through a hyperlink from the operator's Web page **401**. The hyperlink leads the subscriber to the front end of the PLIM system Privacy Management System **402**, where she provides basic identity information, including her name and mobile phone number **403**. After providing this information, the subscriber is automatically directed to a Web screen informing her that an electronically generated password is being sent to her phone as a text message **404**, and that she will not be granted further access to the system until she logs in using the new password. This system, known as Portal User Session Handling (PUSH), provides an acceptable level of confidence that only the owner of the wireless device will be establishing privacy controls for the device.

[00145] Referring to **Fig. 5**, a preference selection process for effecting subscriber provisioning is illustrated. Once the subscriber has received her initial password, she may login to the Privacy Management System **501**, **502**, where she will now have full access to the system. Here she may opt-in to wireless instant messaging and mobile commerce services, as well as establish her personal interests and communications preferences **503**.

[00146] Referring to **Fig. 6**, an updating process for maintaining subscriber provisioning is illustrated. At any time after a subscriber has registered, she can access the Privacy

Management System **601** through the Web or WAP interface to update her permissions and preferences **602**.

[00147] The essential task of merchant provisioning is to provide approved merchants with accounts IDs, passwords, and connectivity information (i.e., IP address, encryption key).

[00148] According to an exemplary embodiment, the software architecture of the PLIM system utilizes two primary software subsystems: stack processors and database processors.

[00149] Stack processors initiate and manage communications between the system databases and external entities, such as wireless network elements and services. In addition, the stack processors handle all message routing and protocol translation. Once a stack processor receives a message, the message is translated from its native protocol into an internal object that can be handled by the database stored procedures. Protocol translation is performed using a custom translation engine, supported by message syntax templates. This allows new protocols to be integrated quickly, without need for new coding. The stack processors also enable message prioritization by the wireless carrier: messages from certain sources, for example presence updates from the HLR, may be assigned a higher priority level in the stack queuing algorithm than messages from other network elements.

[00150] The stack processors implement a communications system that provides software redundancy. Stack processes run in either a "distributed n" mode or a "master-slave" mode. A distributed n mode is used for computationally intensive operations that benefit from running in parallel across a distributed network. These processes have built-in redundancy and fail-over algorithms. If one process or machine dies, the transactions for that process are automatically distributed among the remaining machines. A master-slave mode is used for operations that are not computationally intensive and do not benefit from running on a distributed network. In this mode, two copies of the process run on separate machines. One acts as either the "master" or the "slave" for a given transaction. If one process dies or the machine fails, all transactions are automatically routed to the remaining process.

[00151] The database processors operate on a shared disk model in which all processors share all the data in the database. There is logically and physically only one database. This architecture allows for adding or substituting processors and storage devices to increase system performance without having to reconfigure the database. The architecture also enables flexible load balancing. Since all nodes have access to all the data, incoming connections and tasks can be evenly spread across all nodes.

[00152] The PLIM system is advantageously implemented using the Oracle Parallel Server technology, bundled with Sun's Solaris clustering capabilities, to provide wireless carriers with a widely deployed and proven solution. Oracle is currently the only carrier-class database platform that offers true parallel server capability, an essential component of the PLIM shared disk model. Oracle Parallel Server greatly enhances the scalability and high-availability capabilities of Oracle8*i* by combining the benefits of cluster scalability and availability with single system management capabilities. Clustered systems for database applications are fully exploited in Oracle Parallel Server to deliver a number of benefits.

[00153] One benefit is the protection from system failures due to high availability. Users can distribute database workloads across a cluster of servers and utilize all CPU and cluster memory resources to process application tasks. If one node fails, users can still access the database via other nodes in the cluster. The database automatically reconfigures to provide near continuous database processing, shielding users from system failures.

[00154] Another benefit is improvement in system performance due to cluster scalability. Oracle Parallel Server in Oracle8*i* sets a new standard for scaling applications with cluster load balancing and Cache Fusion technology, becoming a highly effective solution for increasing application throughput and system availability. Cache Fusion uses modern cluster interconnects to reduce disk I/O and exploits emerging high bandwidth, low latency interconnects to provide increased scalability.

[00155] A further benefit is a reduction in management costs provided by single system manageability. Single System View cluster management capabilities deliver perform-once-and-replicate-everywhere features and enable management of clusters as a single

entity. By managing a single cluster database, repetitive tasks across servers can be consolidated into single management operations and automatically replicated across servers.

[00156] A PLIM system according to the present invention may be physically implemented a number of ways, but two specific exemplary system implementations are discussed: carrier specific and gateway.

[00157] Referring to **Fig. 7**, a carrier specific PLIM server implementation is illustrated. The PLIM server **704** is connected (at least virtually, if not in a directly physical way) for dedicated service of a single wireless carrier's network **702**. The PLIM server **704** is connected to the wireless network **702** it serves, as well as to the Internet **700** and to like PLIM servers **714**, **724** serving other wireless carriers **712**, **722** so as to facilitate availability of presence and location information between networks. Subscribers **731**, **733** and registered merchants **741**, **743** access the PLIM server **704** via the Internet **700**.

[00158] Referring to **Fig. 8**, a PLIM system implemented as a centralized gateway is illustrated. Any subscriber **831**, **833**, or any participating merchant entity **841**, **843** may access the PLIM gateway **804** via the Internet **800**. The PLIM gateway **804** is non-invasively connected to the wireless networks **802**, **812**, **822** of any consenting wireless carriers to facilitate availability of presence and location information. The PLIM gateway **804** connects to the HLR, MPC, SMSC, WAP gateway, and PDE (as applicable) of each of the wireless networks **802**, **812**, **822**.

[00159] Concerning implementation examples, reference is made to the Invertix Corporation brochure "IM-Anywhere™ System Description" to be published subsequent to the filing of this application, a copy of which is filed herewith. The "IM-Anywhere™ System Description" brochure is incorporated by reference herein, in its entirety, for all purposes.

[00160] The PLIM gateway offers a potent value proposition to the Internet services that utilize its data, as well as the wireless carriers that participate in the PLIM gateway.

[00161] The Internet services (for example, m-commerce companies, instant messaging providers, and unified messaging providers) are revenue-producing customers of the PLIM

gateway. These customers are enjoying unprecedented levels of growth and opportunity. M-commerce, in particular, is expected to grow from $140 million revenues worldwide in 2000 to more than $100 billion by 2004. Already, more than 1 billion messages per month are being delivered in wireless networks worldwide.

[00162] For m-commerce, messaging, and other Internet service providers, the PLIM gateway offers "one stop shopping" for real-time information about wireless subscribers, regardless of the host network. In addition, the gateway offers value-added service such short messaging with return receipt, as well as an electronic Campaign Manager. The electronic Campaign Manager allows targeted messages to be delivered to wireless subscribers only when certain conditions pertaining to presence, location, and profile have been satisfied.

[00163] Additionally, wireless carriers are becoming Internet Service Providers, and wireless itself is recognized as the new face of the Internet. Wireless carriers worldwide are struggling with Internet content and m-commerce for customer ownership, and carriers do not wish to see their airtime rates decline while others reap the rewards of m-commerce transactions. As a result, some carriers have entered into bi-lateral agreements with major Internet companies to create "walled gardens" of content for their customers. But m-commerce is growing at a rate that does not scale with bi-lateral agreements, and carriers will require a new business model in order to participate fully.

[00164] Customer ownership battles are a natural and predictable outcome of content distribution. For example, if a wireless customer has an E*Trade™ account, does the carrier own the customer or does E*Trade™ own the customer? Carriers can sidestep the debate by recognizing that they are the undisputed owners of information about their customers, such as presence, location, and profile information. This type of information, which is more akin to signaling than content, has tremendous value to providers of Internet services as well as traditional retailers. The PLIM gateway offers carriers the opportunity to generate revenue from this type of information, with the potential of selling the same piece of information many times.

[00165] For wireless carriers, the PLIM gateway is a cost-free method of generating new revenue. The PLIM gateway is an electronic "consignment shop" where wireless carriers

can sell information about their subscribers. The PLIM gateway is a non-exclusive service, allowing carriers to continue to build bi-lateral relationships at will. As a sweetener, the gateway provides participating carriers with a Web-enabled software application that allows individual subscribers to set permissions and preferences related to the distribution of their personal information. In effect, the PLIM gateway acts a spam filter for subscribers, ensuring that their information is provided in strict accordance with their stated permissions and preferences.

[00166] Mobile commerce according to the present invention may be practiced without including the privacy management aspect to control access to subscribers. However the privacy management aspect provides important additional functional advantages that represent further advances over the prior art.

[00167] Referring to **Figs. 9** and **10**, a system for network optimization and performance measurement, according to a further embodiment of the present invention is illustrated. As previously discussed, the present invention allows more efficient use of network resources because of its rich features. For example, the knowledge of presence information allows the sending of SMS messages only when the user's handset is ON. This results in more efficient network resource utilization allowing a network operator to make more money with the same amount of resources. Likewise, the organization of an m-commerce campaign which strategically targets the most receptive users requires significantly less network resources than a poorly designed campaign which delivers messages to a large untargeted group of users.

[00168] The examples cited above are somewhat passive in that they help optimize the network without actually measuring the network performance first and then making modifications to the network in order to optimize performance. This more active approach to network optimization involving performance measurement followed by optimization is already performed by many network operators by using drive test teams. This entails sending teams of skilled (and expensive) technicians and engineers to drive throughout the network coverage area with special equipment which uses the network resources (for example, by making test calls) while logging location and performance information. This

collected data is post-processed and used to modify the network in order to optimize performance.

[00169] Unfortunately, this technique is very expensive and only provides a limited amount of data. For example, if the drive test is performed on one day and then a component of the network fails a week later, the resulting degradation in network performance may not be detected for a long time. This will result in poorer network performance and, consequently, less customer satisfaction. What is needed is a way to perform the drive test (or equivalent network measurement) without using a special drive test team. Optimally, the measurement should be taken by devices that are regularly using the network during standard network operation.

[00170] **Fig. 9** shows a system for network optimization and performance measurement. The system includes a wireless network **902** and several wireless devices such as a wireless handset **904**, wireless PDA **906**, and a wireless intelligent device **908**, just to name a few examples. Each of the wireless devices **904**, **906**, and **908** includes associated location and performance information **924**, **926**, and **928**, respectively. The wireless devices **904**, **906**, and **908** are simply customer devices that are used on the network during regular operation. These devices can report their location information and performance information, such as RSSI, BER, FER, SQE, and the like, on a periodic basis to wireless network **902** where it can be stored in a database and post-processed. This allows standard users on the wireless network **902** to replace the drive test teams. This will produce better data since more devices can now be used to more frequently measure the network performance. Additionally, it eliminates the need to buy special drive test equipment and hire drive test teams.

[00171] The wireless devices **904**, **906**, and **908** can be used as drive test tools in a variety of ways. For example, Layer 3 information that provides performance information can be monitored for specific wireless devices along with location information. The location information can be generated in a variety of ways such as those disclosed in U.S. provisional application no. 60/268,977. In the alternative, the wireless devices **904**, **906**, and **908** can be modified with special embedded firmware that reports the location and performance information. As another alternative, wireless devices such as Java handsets

can be used with a special application running in the background that reports location and performance information.

[00172] In contrast to the system of **Fig. 9** that shows wireless devices that automatically report location and performance information, **Fig. 10** shows a system for network optimization in which the user manually reports location and performance information. The system includes a wireless network **912** and several wireless users such as a wireless handset user **914**, wireless PDA user **916**, and a wireless intelligent device user **918**, just to name a few examples. Each of the wireless users **914**, **916**, and **918** includes associated location and performance information **934**, **936**, and **938**, respectively. The wireless users **914**, **916**, and **918** are simply customers that use the network during regular operation. The wireless network operator can set up a system to allow the user to immediately report problems such as dropped calls, blocked calls, or poor signal quality. This system may be referred to as the Customer Report Card (CRC) since it allows the user to point out network problems in real time and report them to the network operator. The advantage of manual reporting, rather than automatic reporting, is that the amount of reported data is greatly reduced and is only reported when there is a true network problem.

[00173] There are a variety of ways to implement the CRC system. The operator can have a special reporting phone number with menus and prompts similar to current PBX answering systems. Alternatively, the operator can have a special reporting phone number with a voice to text system that logs the results. As another alternative, the network operator can have a WAP or SMS based system that provides a menu for logging the problem. These are just a few examples of techniques for implementing the CRC.

[00174] Although Figs. 9 and 10 show a system that can be seamlessly integrated with the PLIM system that was previously described, it is clear to those of ordinary skill in the art that the active network optimization systems described above are not dependent on the PLIM system and can be implemented independently.

[00175] The present invention has been described in terms of preferred embodiments, however, it will be appreciated that various modifications and improvements may be made to the described embodiments without departing from the scope of the invention.

WHAT IS CLAIMED IS:

1. A computing platform for facilitating communications for wireless subscribers of a wireless network, the computing platform comprising:

a presence module maintaining data concerning network presence of the wireless subscribers;

a location proxy module maintaining location data concerning physical location of the wireless subscribers;

an instant messaging module connected to provide instant messaging service for the wireless subscribers utilizing the data concerning network presence; and

a campaign manager module connected to provide commercial message transmission to one or more of the wireless subscribers selected based on at least one of the data concerning network presence and the data concerning physical location, wherein the wireless subscribers are provided with instant message service and mobile commerce service.

2. The computing platform for facilitating communications of claim 1, further comprising:

a privacy database containing records of data permission settings corresponding to individual ones of the wireless subscribers;

wherein the wireless subscribers are selected to be provided commercial message transmission based further on the data permission settings of the privacy database.

3. The computing platform for facilitating communications of claim 1, wherein the presence module additionally maintains data concerning network presence of non-wireless instant messaging subscribers.

4. A network gateway for collecting presence information and location information concerning wireless subscribers of plural wireless networks, and for facilitating instant messaging and mobile commerce, the network gateway comprising:

a presence module maintaining data concerning network presence of the wireless subscribers;

a location proxy module maintaining location data concerning physical location of the wireless subscribers;

an instant messaging module connected to provide instant messaging service for the wireless subscribers utilizing the data concerning network presence; and

a campaign manager module connected to provide commercial message transmission to one or more of the wireless subscribers selected based on at least one of the data concerning network presence and the data concerning physical location, wherein the wireless subscribers are provided with instant message service and mobile commerce service.

5. The network gateway of claim 4, further comprising:

a privacy database containing records of data permission settings corresponding to individual ones of the wireless subscribers;

wherein the wireless subscribers are selected to be provided commercial message transmission based further on the data permission settings of the privacy database.

6. The network gateway of claim 4, wherein the presence module additionally maintains data concerning network presence of non-wireless instant messaging subscribers.

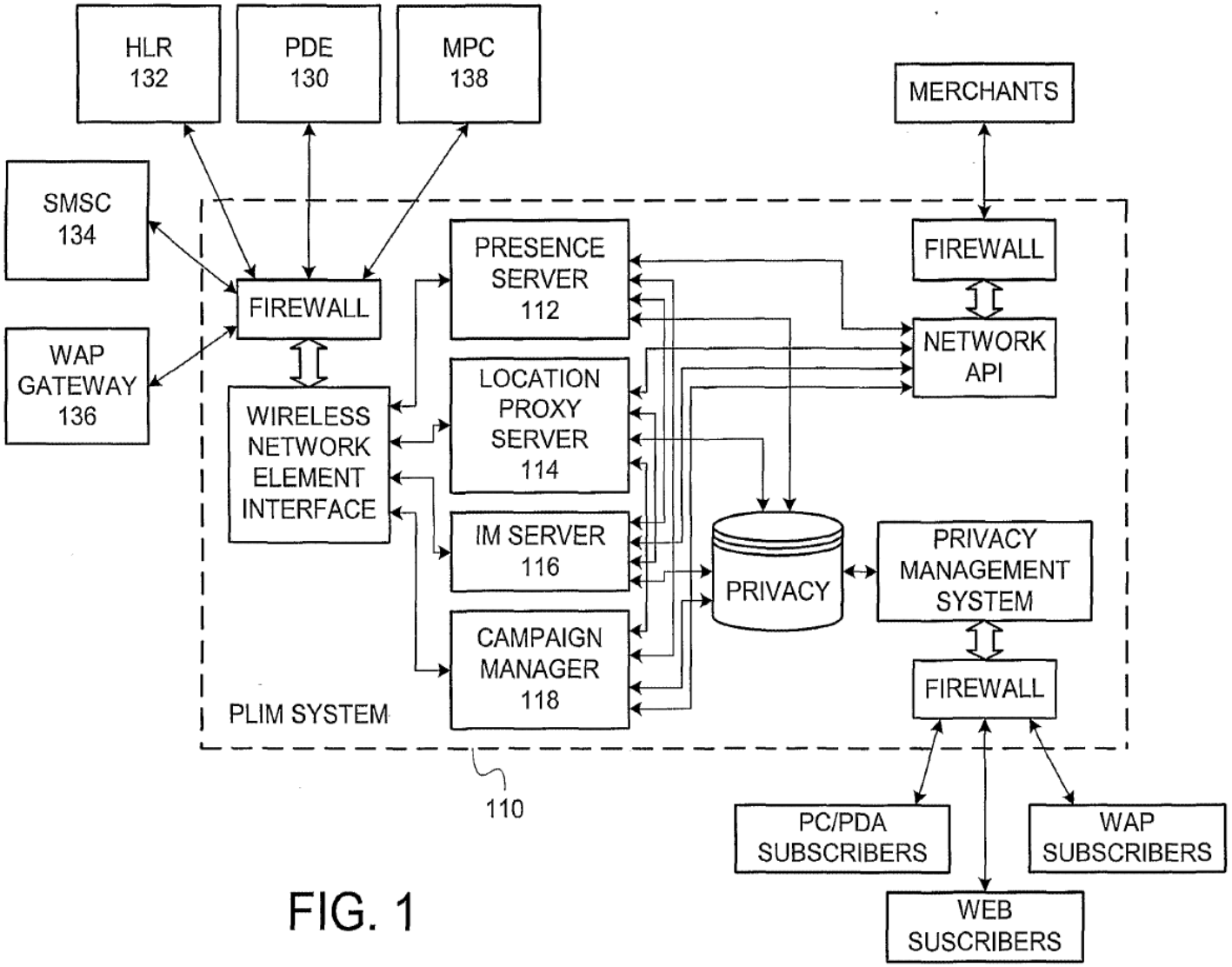
7. A process for conducting mobile commerce, the process comprising:

receiving current location information concerning a mobile subscriber from position determining equipment associated with a wireless network;

receiving current network presence information concerning the mobile subscriber from a home location register associated with the wireless network;

maintaining profile and permissioning information concerning the mobile subscriber in a privacy database; and

transmitting to the subscriber personalized commercial content based on the profile and permissioning information concerning the mobile subscriber, and at least one of the subscriber's current location information and the subscriber's current presence information.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PDE
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MERCHANTS
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WIRELESS
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ELEMENT
INTERFACE
LOCATION
PROXY
SERVER
114
IM SERVER
116
PRIVACY
PRIVACY
MANAGEMENT
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CAMPAIGN
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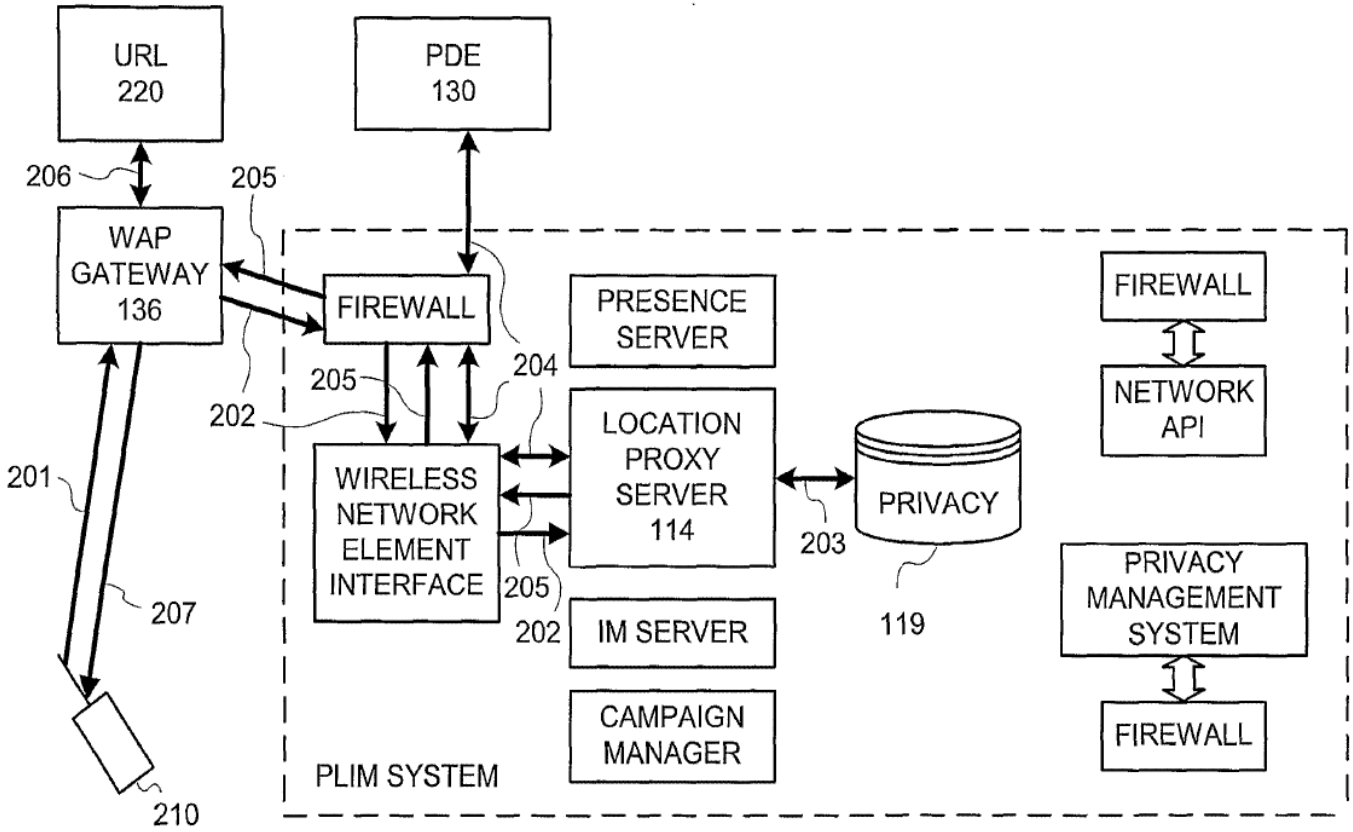
FIG. 1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NETWORK
ELEMENT
INTERFACE
PRIVACY
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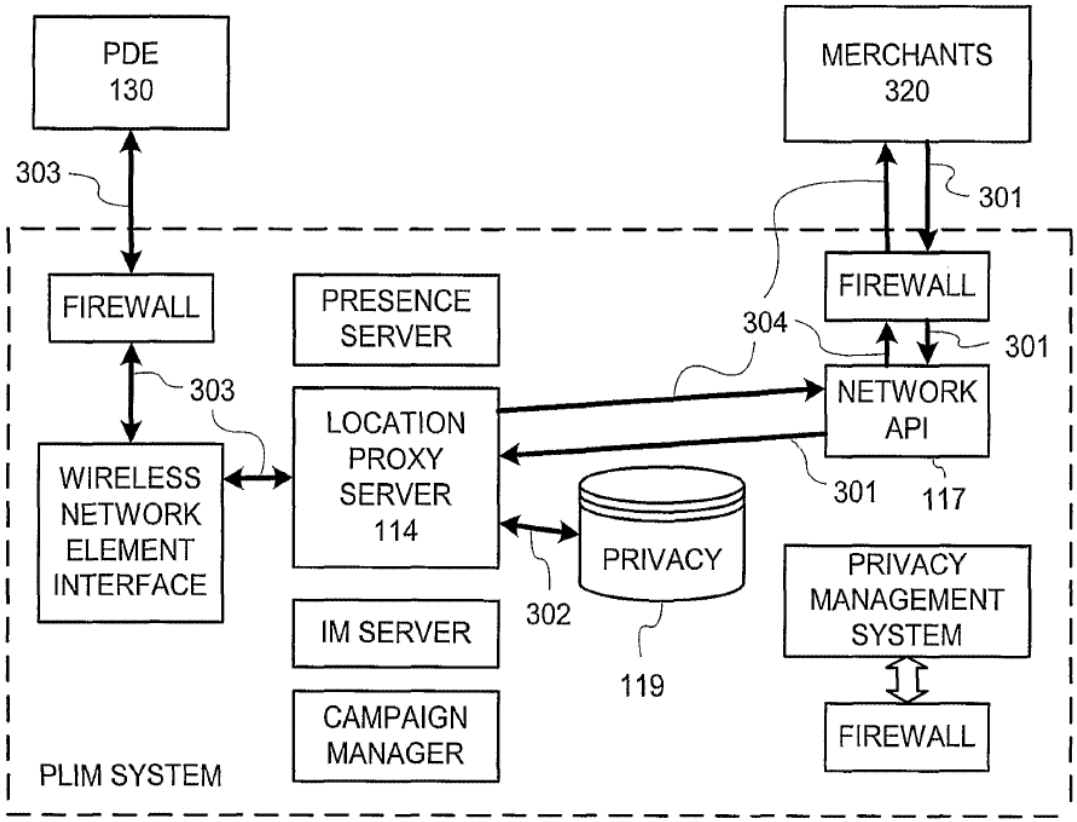
FIG. 2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MERCHANTS
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SERVER
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NETWORK
API
WIRELESS
NETWORK
ELEMENT
INTERFACE
301
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FIREWALL
PLIM SYSTEM

FIG. 3

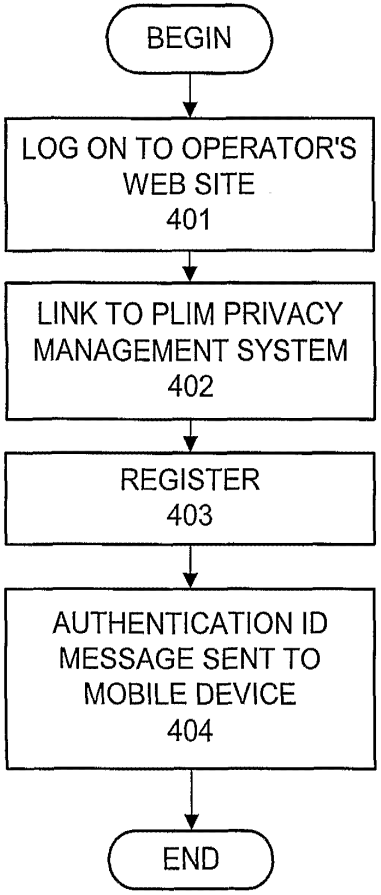


FIG. 4

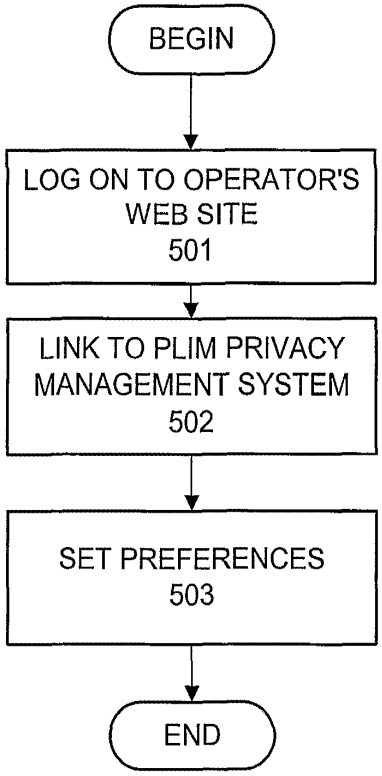


FIG. 5

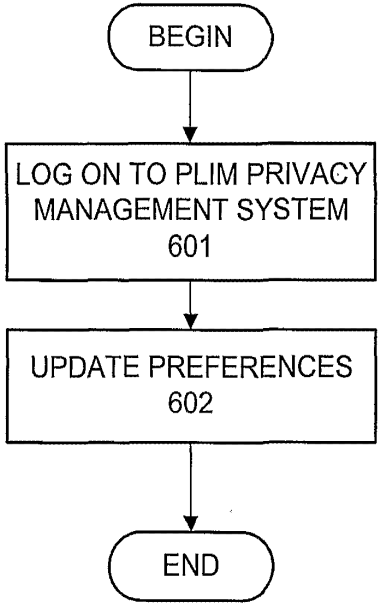
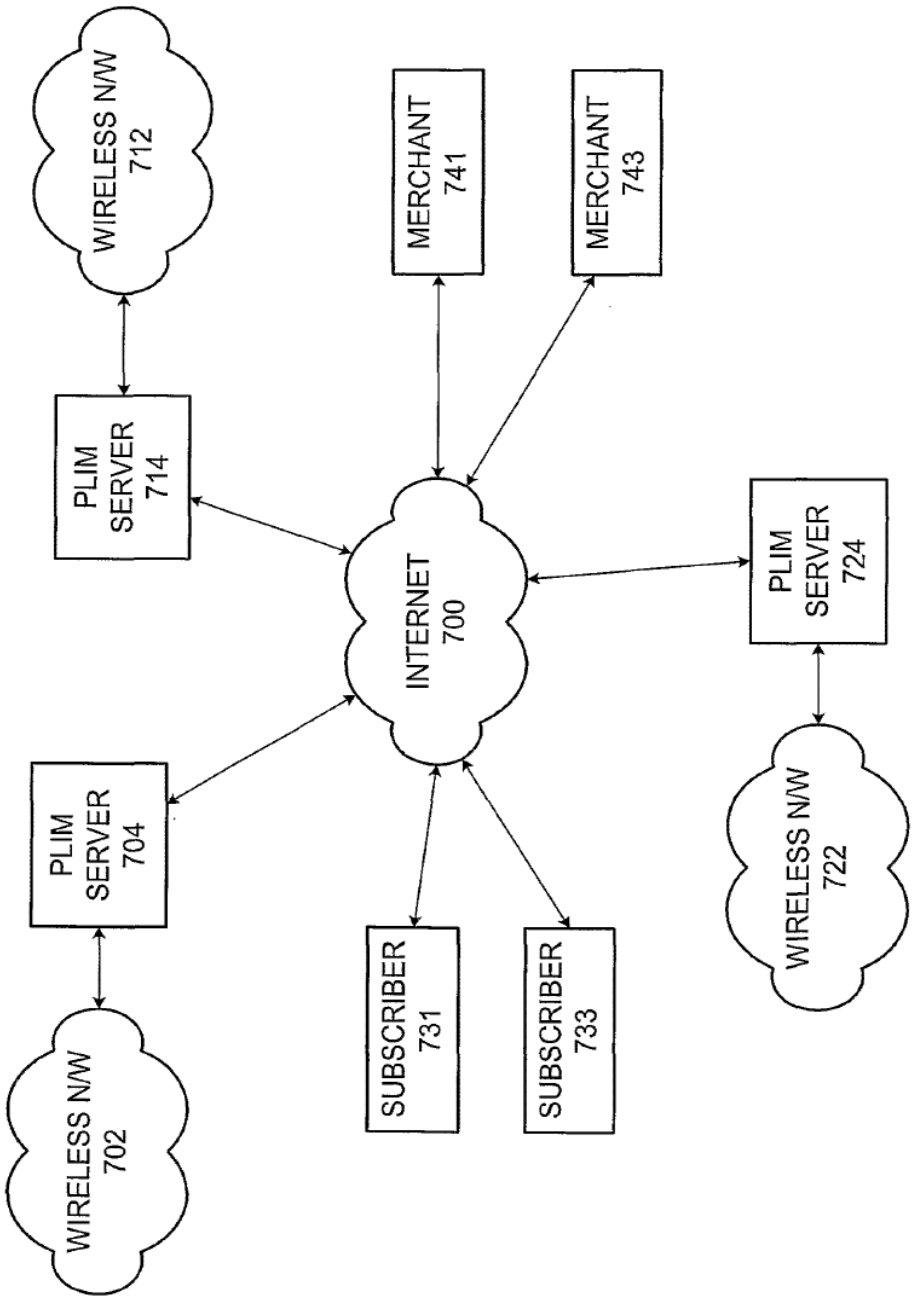


FIG. 6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MERCHANT 743
PLIM SERVER 714
INTERNET 700
PLIM SERVER 724
PLIM SERVER 704
SUBSCRIBER 731
SUBSCRIBER 733
WIRELESS N/W 722
WIRELESS N/W 702

FIG. 7

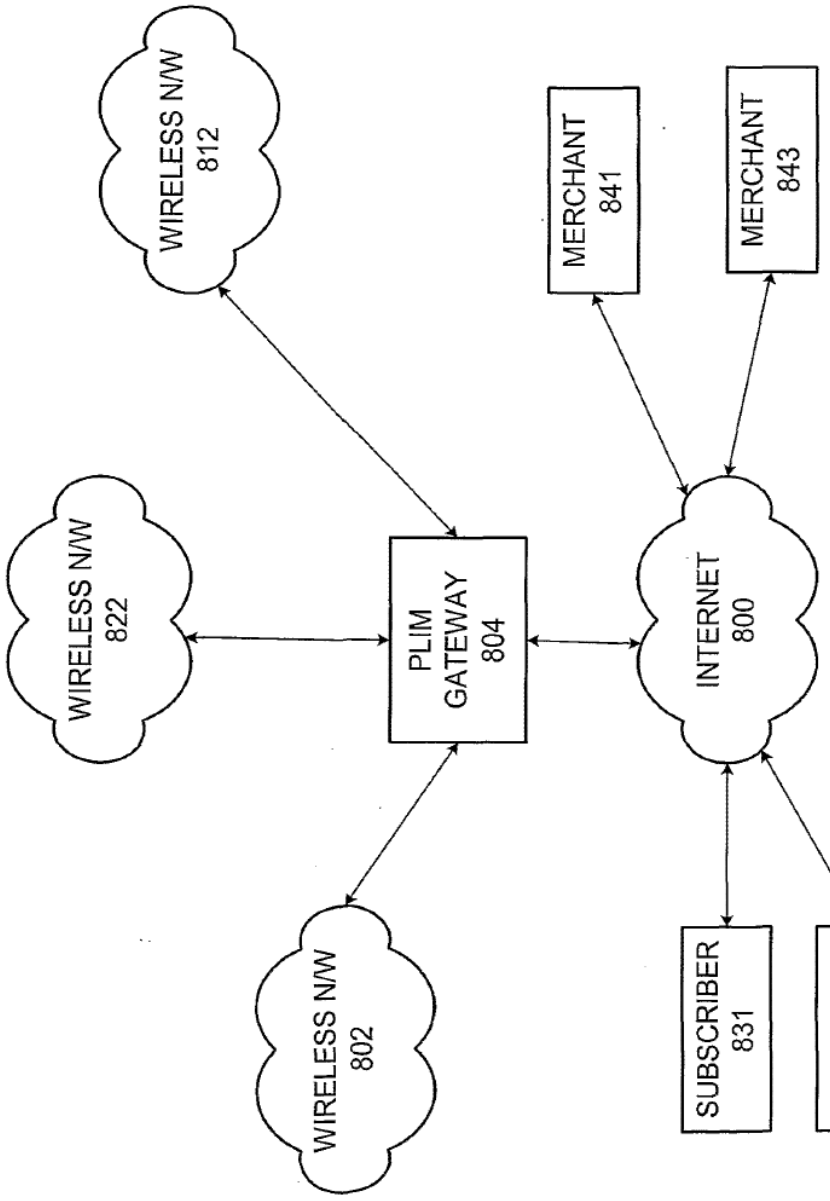
WIRELESS N/W
812
WIRELESS N/W
822
WIRELESS N/W
802
PLIM
GATEWAY
804
INTERNET
800
MERCHANT
841
MERCHANT
843
SUBSCRIBER
831
SUBSCRIBER
833

FIG. 8

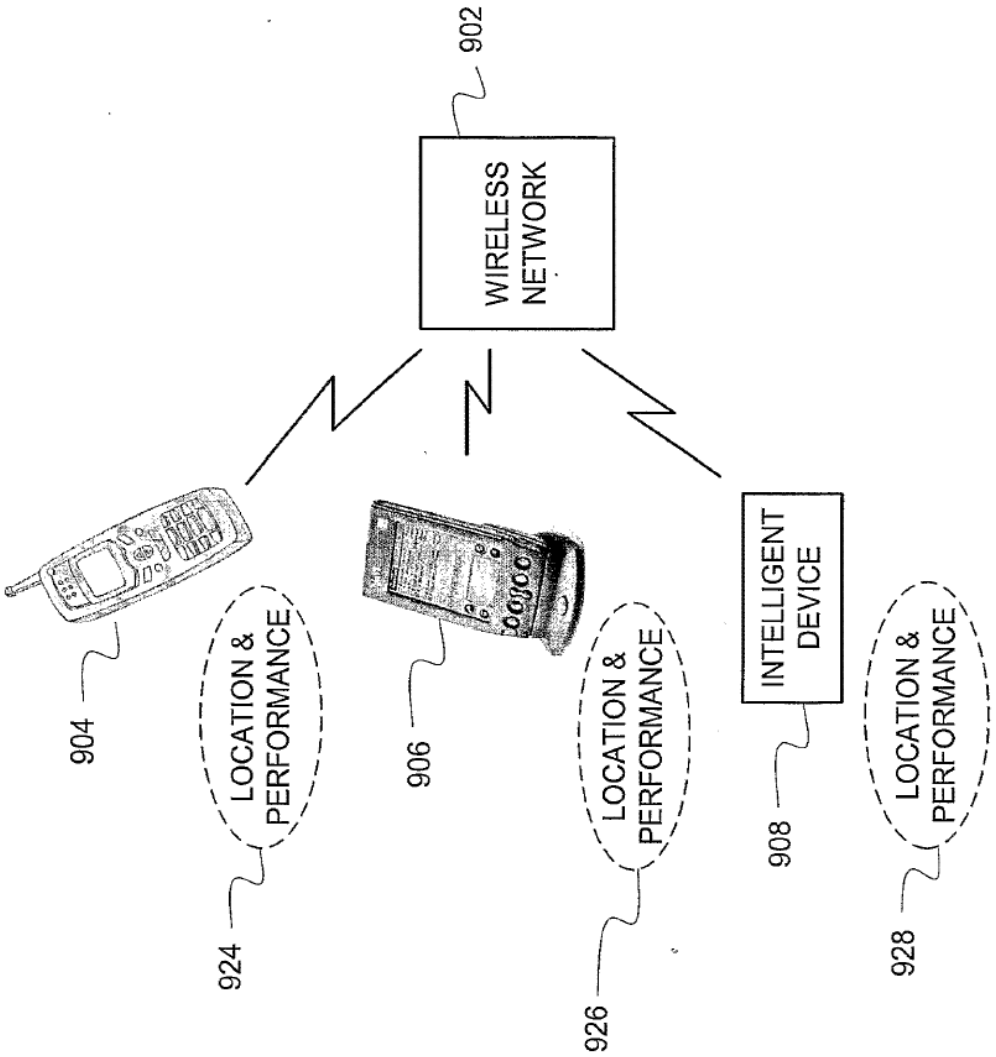
902
WIRELESS NETWORK
904
LOCATION & PERFORMANCE
924
906
LOCATION & PERFORMANCE
926
908
INTELLIGENT DEVICE
LOCATION & PERFORMANCE
928

FIG. 9

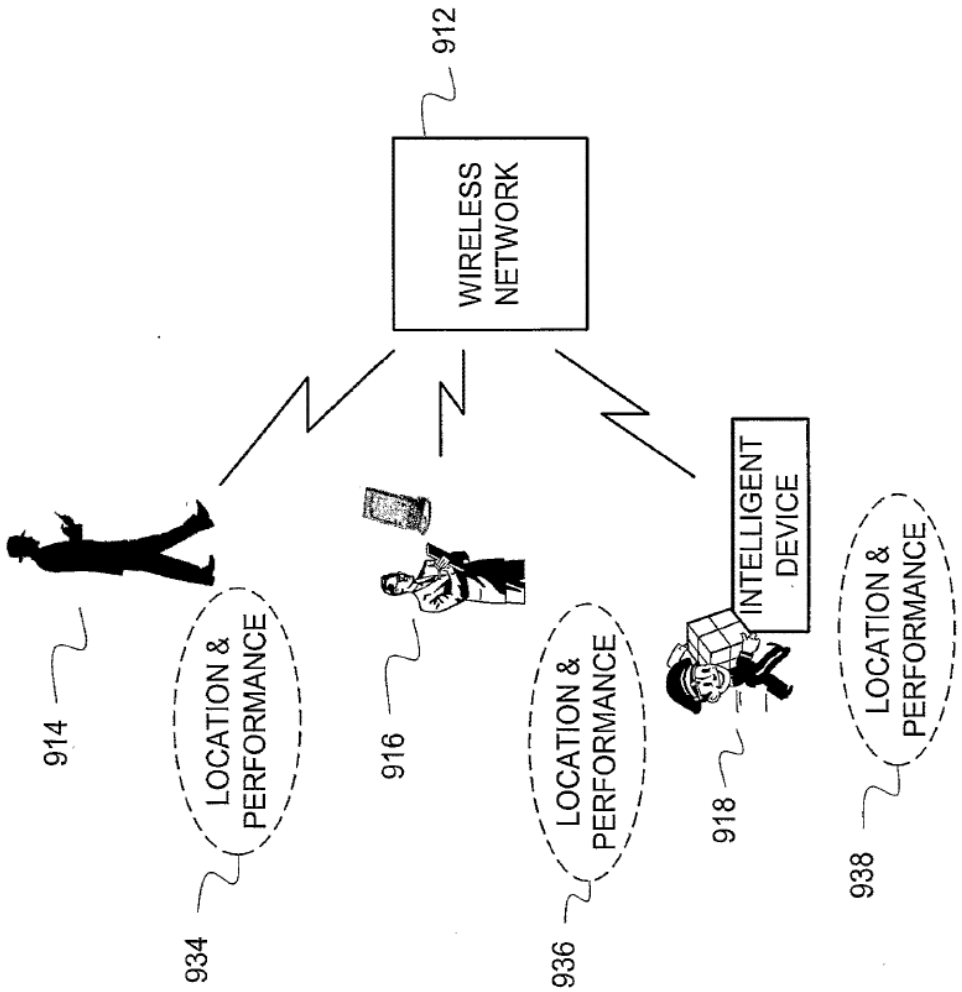
912
WIRELESS NETWORK
914
916
918
INTELLIGENT DEVICE
934
LOCATION & PERFORMANCE
936
LOCATION & PERFORMANCE
938
LOCATION & PERFORMANCE

FIG. 10

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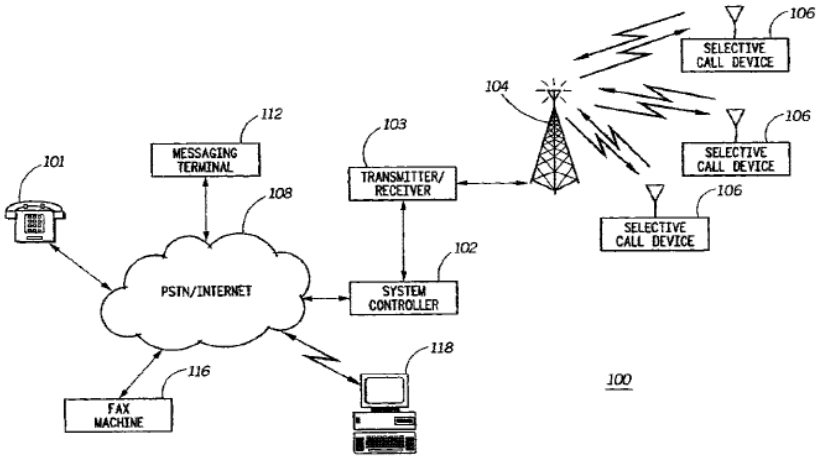
(54) Title: METHOD FOR INDICATING A DELINQUENT RESPONSE TO A MESSAGE FROM A SELECTIVE CALL DEVICE



(57) Abstract: A two-way selective call device (106) for determining if a response was received to a message transmitted to a designation device including at least one switch (216) to construct the message having at least an identifiable character. An address book designates at least one destination device (106, 112, 116, 118) and a selector (216) selects a destination device (106) of the at least one destination device (106, 112, 116, 118) to receive the message. A transmitter (222) transmits the message to the destination device (106) and a timer (302) measures a first predetermined time. A processor (206) coupled to the receiver (204) monitors received messages during the first predetermined time period to determine when a response to the message was received and an output device (208, 212, 214) indicates when the response from the at least one identified destination device was not received within the first predetermined time period.

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METHOD FOR INDICATING A DELINQUENT RESPONSE TO A MESSAGE FROM A SELECTIVE CALL DEVICE

Field of the Invention

This invention relates in general to communication systems, and more specifically to a method for indicating a delinquent response to a message from a selective call device.

Background of the Invention

There are many types of communication systems in operation today (including two-way selective call systems) that provide message, data, and voice information. The communication subscriber units, e.g., two-way selective call devices or two-way subscriber devices, utilize sophisticated receiver/transmitter architectures and signaling formats that have been optimized to provide both high receiver sensitivities and excellent battery saving capabilities. With the proliferation of two-way selective call devices, users have become accustomed to and comfortable with using these two-way subscriber devices to transmit and request time critical information that can have, for example, enormous economical or other significant benefits to the users.

Currently, selective call devices have various types of alerts to indicate, e.g., the receipt of a message. Other types of alerts are: the "reminder alert" which is used to indicate to the user that a received message has not been read, the "content sensitive alert" which is used to provide an indication to the user that certain keywords were found within a received message, and the "message read alert" which is used to indicate to the sender of a message that a message was read.

When a user of a two way subscriber device sends a message soliciting a response, a question, or a request to another user, the user has to remember: 1) that a message containing a question was sent, 2) who was the recipient of the message containing the question, and 3) whether a response was received from that recipient. This task becomes even more burdensome when a user sends numerous questions or requests to multiple devices. Under this condition, the user could

easily forget that a response was never received, and in this fast paced world where information is critical for economical or other critical needs, the user who forgets that a response is delinquent or was never received, may be unable to execute on critical time sensitive events that could be of great significance to the user.

Therefore, what is needed, in a two-way device or selective call device, is a method for alerting or reminding a user that an answer or a response is delinquent to a question or a message that was previously sent soliciting a response.

Brief Description of the Drawings

FIG. 1 is an electrical block diagram of a communication system in accordance with the preferred embodiment of the present invention.

FIG. 2 is an electrical block diagram of a two-way selective call device according to the preferred embodiment of the present invention.

FIG. 3 an electrical block diagram of the DSP/controller according to FIG. 2.

FIG. 4 is a flow diagram illustrating a method for indicating a delinquent response to a message in accordance with the preferred embodiment of the present invention.

Description of a Preferred Embodiment

Referring to FIG. 1, an electrical block diagram of a two-way selective call or radio communication system 100 is shown in accordance with the preferred embodiment of the present invention. The two-way selective call communication system 100 comprises a system controller 102 coupled or connected through a conventional public switched telephone network (PSTN) or internet 108 by conventional telephone links or other high data rate link suitable for such use. It can be appreciated that the communication system 100 can be coupled to other networks, e.g., satellites, microwaves or any other wireless or wireline communication system or protocol. Coupled to the PSTN/internet 108 are message-input devices, e.g., conventional telephone 101, a facsimile machine 116, a messaging terminal 112, and/or a computer 118 for sending and receiving electronic mail (email) or other electronic messages to, e.g., an email address. The

communication system 100 preferably operates in accordance with the ReFLEX™ protocol, which is one of the FLEX® family of protocol standards. The system controller 102 oversees the operation of at least one radio frequency (RF) transmitter/receivers 103, through one or more communication links which, e.g., are twisted-pair telephone wires, which additionally can include RF, microwave, or other high quality audio communication links. The system controller 102 encodes and decodes inbound and outbound addresses into formats that are compatible with landline message switch computers. The system controller 102 also functions to encode and schedule outbound messages, which can include such information as analog voice messages, digital alphanumeric messages, graphics type data, and response commands, for transmission by the radio frequency (RF) transmitter/receivers 103 to a plurality of preferably two-way selective call devices 106 or two-way subscriber units 106. The system controller 102 further functions to decode inbound messages, including unsolicited and response messages received by the radio frequency transmitter/receivers 103 from the plurality of two-way selective call devices 106. It can be appreciated by one of ordinary skill in the art that selective call devices 106 are able to operate on multiple frequencies and multiple protocols.

An example of an outbound alphanumeric message intended for a selective call device 106 is an alphanumeric selective call message entered from the messaging terminal 112, a selective call device 106, computer 118, telephone 101 or FAX machine 116. An example of an outbound analog message intended for a selective call device 106 is a voice message entered from the telephone 101 or another selective call device 106. Examples of response messages are acknowledgments or demand response messages. An acknowledgment, e.g., is an inbound message transmitted by or from a selective call device 106 that can indicate a successful reception of an outbound message, an answer to a question, a response, or a request for information to the communication system. The inbound and outbound messages are included in outbound radio signals transmitted from, and inbound radio signals received by, respectively, a

conventional antenna 104 coupled to the radio frequency transmitter/receiver 103.

It should be noted that the system controller 102 is capable of operating in a distributed transmission control environment that allows mixing conventional cellular, simulcast, satellite, or other coverage schemes involving a plurality of radio frequency transmitter/receivers, conventional antennas, for providing reliable radio signals within a geographic area as large as a worldwide network. Moreover, as one of ordinary skill in the art would recognize that the telephonic and selective call device communication system functions can reside in separate system controllers that operate either independently or in a network fashion. Each of the selective call devices 106 assigned for use in the radio communication system 100 has at least one address assigned to the communication system 100 which is a unique selective call address. The selective call address enables the transmission of a message to and from the system controller 102 only to the addressed selective call device 106.

Referring to FIG. 2, an electrical block diagram of a selective call device is shown in accordance with the preferred embodiment of the present invention. It will be appreciated that the selective call device 106 is one of several types of radios or portable wireless devices, including two-way selective call devices, pagers, cellular radio telephones, conventional mobile radios, Personal Digital Assistants (PDAs) or conventional trunked mobile radios that have a data terminal attached thereto, or which optionally have data terminal capability for accessing the internet or intranet. Each of the selective call devices 106 assigned for use in the radio communication system 100 has an address assigned thereto which is unique to the selective call device 106. The address enables the transmission of a message from the system controller 102 to be received only by the addressed or designated selective call device 106, and identifies messages and responses received at the system controller 102 from the selective call device 106. Furthermore, each of one or more of the selective call devices 106 can have a unique telephone number assigned thereto, the telephone number being unique within the PSTN/internet 108 (FIG. 1). When the system controller 102 receives

an inbound message from a selective call device 106, the system controller 102 establishes communication and checks by well known techniques if the requesting selective call device 106 is a valid subscribing unit within the communication system 100.

The selective call device 106 (e.g., a two-way selective call device) can initiate or transmit an inbound signal in response to the receipt of a message from the communication system 100 from, e.g., another selective call device. The outbound signal from, e.g., the system controller can be received on any signaling protocol, preferably the ReFLEX protocol. The selective call device 106 comprises an antenna 202 that provides a radio frequency (RF) carrier signal to a receiver 204. The receiver 204 generates a recovered signal suitable for processing by a digital signal processor ("DSP") or controller 206 in a manner well known to one of ordinary skill in the art. The DSP 206 performs functions such as encoding and decoding messages and controlling the operation of the selective call device 106 well known to one of ordinary skill in the art. The DSP 206 processes received signals to decode the address and compares the decoded address with one or more predetermined addresses contained in a memory, for example, a codeplug 218 or any other programmable read-only-memory (PROM). When the addresses are the same or substantially similar, the user is alerted that a signal has been received either by an audio alert (e.g., a speaker or transducer) 212, a tactile alert (e.g., a vibrator) 214, or an indication on a display 208. The received signal can also include optional message data directed to some selective call device 106. Also, if the selective call device 106 includes an optional voice output, recovered audio components of the received RF signal may be presented. For a message selective call device, the recovered message is stored in a memory 220 for subsequent presentation by an output device which for example is the display 208. The output device will automatically, or when manually selected by switches 216, present the message, such as by displaying the message on the display 208. The switches 216 also can be used a selector for designating a message as a message to which a response is requested. An external clock 224 can be optionally coupled to the digital signal processor 206 that provides clock signals to determine a count

down period or predetermined time periods. In conjunction with the external clock 224, e.g., a predetermined value can be stored in a volatile or non-volatile memory, e.g., the memory 220 to perform timer functions. The controller 206 preferably decreases the count or predetermined value in memory. When that value reaches zero or some predetermined threshold, the user is alerted that the response or answer to his or her message or question is delinquent or has not been received, the details of which will be disclosed below.

According to the preferred embodiment of the present invention, a user of a selective call device 106 preferably the Motorola PagerWriter™ 2000 two-way selective call device can form, create, generate, or compose a message by using a keyboard (not shown), switches 216, or pre-stored messages in memory ("canned message"). The message is sent preferably to another selective call device 106 and includes a request for a response to the message or the message itself can be in the form of a question. It is preferred to include at least one special character within the message, preferably the question sign ("?") to enable a "no response" or "delinquent response" notification or alerting feature, the details will be discussed below. Preferably, the message is modulated by the DSP 206 and encoded in a manner well known in the art. The inbound message is then encoded by the DSP/controller 206 and passed to a transmitter 222 for transmission by the antenna 202. A power switch 210 performs battery saving functions well known to one of ordinary skill in the arts.

The digital signal processor 206 of FIG. 2 can be implemented with a microcomputer or processor as shown in FIG. 3. FIG. 3 is an electrical block diagram of a microcomputer-based decoder/controller suitable for use in the selective call device 106 of FIG. 2. As shown, the microcomputer or DSP 206 preferably comprises a series microcomputers, such as manufactured by Motorola, Inc., which includes an on-board display driver 314. The microcomputer 206 includes an oscillator 318 that generates timing signals utilized in the operation of the microcomputer 206 and for varying the countdown or predetermined value to determine when an answer or response was not received or is delinquent. A crystal, or crystal oscillator (not shown) is coupled to the inputs of the oscillator

318 to provide a reference signal for establishing the microcomputer timing. A timer/counter 302 couples to the oscillator 318 and provides programmable timing functions that are utilized in controlling the operation of the receiver or the processor. The crystal, the oscillator 318, and timer/counter 302 are used to set the clock cycles to enable the DSP to, e.g., decrease the count value. A RAM (random access memory) 304 is utilized to store variables derived during processing, as well as to provide storage of message information or the timer values for setting the predetermined time for a response or an answer. A ROM (read only memory) 306 stores the subroutines that control the operation of the receiver or the processor. The oscillator 318, timer/counter 302, RAM 304, and ROM 306 are coupled through an address/data/control bus 308 to a central processing unit (CPU) 310 that performs the instructions and controls the operations of the microcomputer 206. According to the preferred embodiment of the present invention, the oscillator 318, the timer/counter 302, and RAM 304 which via the bus 308 coupled to the CPU 310 comprises one example of the hardware necessary for storing a predetermined value in RAM 304, and providing predetermined time for a response or answer. The CPU retrieves the predetermined value from RAM 304, and varies (e.g., decreases) it. When the predetermined value reaches zero or some predetermined value, the CPU 310 enables an alert to indicate that a response is delinquent or has not been received during the predetermined period of time. It is understood by one of ordinary skill in the art that instead of decreasing the count, the value could be increased.

The demodulated data generated by the selective call device 106 is coupled into the microcomputer 206 through an input/output (I/O) port 312. The demodulated data is processed by the CPU 310, and when the received address is the same as stored within the code-plug memory which couples into the microcomputer through, for example an I/O port 313, the message, if any, is received and stored in RAM 304. Recovery of the stored message and selection of the predetermined destination address are provided by the switches that are coupled to the I/O port 312. The microcomputer 206 then recovers the stored message and directs the information over the data bus 308 to the display driver

314 which processes the information and formats the information for presentation by a display 208 (FIG. 2) such as an LCD (liquid crystal display). At the time a selective call device's address is received, the alert signal is generated which can be routed through the data bus 308 to an alert generator 316 that generates the alert enable signal which is coupled to the audible alert device that was described above. Alternatively, when the vibrator alert is selected, as described above, the microcomputer 206 generates an alert enable signal which is coupled through data bus 308 to the I/O port 313 to enable generation of a vibratory, or silent alert. Switch inputs are received by the I/O port 312 via the data bus 308. The switch inputs are processed by the CPU 310. Specifically, the CPU 310 retrieves the address of the selective call base station from RAM 304 and in conjunction with the timer counter 302 and the oscillator 318, the CPU 310 generates the inbound signal which is passed via the data bus 308 to the transmitter.

The battery saver operation is controlled by the CPU 310 with battery saving signals which are directed over the data bus 308 to the I/O port 312 which couples to the power switch 210. Power is periodically supplied to the receiver to enable decoding of the received selective call device address signals and any message information, which are directed to the selective call device 106. Specifically, when the selective call device 106 begins decoding the selective call signal, the receiver is powered by the power switch 210. When the selective call information is received and stored, the microcomputer or DSP 206 sends a signal to the power switch 210 to disable power to the receiver 204 and enable power to the transmitter for transmitting the inbound signal.

Referring to FIG. 4, a flow diagram is shown illustrating a method for indicating a delinquent or no response to a message in accordance with the preferred embodiment of the present invention. The initialization process for start-up is performed, step 400. Preferably, the user of the selective call device 106 constructs, generates, forms, or writes a message in the form of a question or for soliciting a response, step 402. It is preferable for the message to include at least one identifiable or a special character to enable a "no response" or a "delinquent response" alert, step 404. The preferred special character is the "?" character. The

position of the special character, e.g., "?" in the message or question is not critical, but for grammatical purpose is best placed at the end of the message or question. It is appreciated that any character including numbers, letters, Greek alphabet, or icons can be used as the special character or as a receipt request icon. It is, however, desirable to make it convenient to the users to include or to remember the symbol for the special character. Alternately in step 404, the message can be uniquely identified without using the special character. This can be accomplished using well known techniques such as using switches 216 to select a mode in the selective call device 106 which enables the "no response" or "delinquent response" alert for messages constructed by the user.

In determining the addressee(s) of a message or question, the user preferably uses an address book application stored in the selective call device 106 well known to those skilled in the art to designate a destination or designated device, step 406. The designated or destination device could be the address of another selective call device 106, a computer 118 with an email account, a FAX machine 116 and any other addressable device, or all of or a combination thereof. The address book is scrolled through until the desired address is reached and selected. By selecting the desired address from the address book, the address is appended to, included, or associated with the message. It is appreciated that a designated recipient having the designated or destination device can have more than one address in the address book because the recipient can have, e.g., a pager, a cellular telephone, a fax machine, and a computer. The sender must therefore choose the desired address to send his/her message or question. Once the address is appended to the message, the message can be sent to the designated recipient, step 408. The DSP/controller 206 preferably under the operation of a software routine checks and determines if the special character, e.g., ("?") is present in the message to be transmitted or if the message is uniquely identified, step 410. It is appreciated that the message can be sent with or without the special character. If the message did not include the special character or was not uniquely identified, the process ends, step 412. On the other hand, if the special character is present or the message is uniquely identified, the user name and/or address of the recipient and all the

related delivery addresses (e.g., pager, cellphone, facsimile, or email) that was previously stored in the address book are retrieved and stored in a special memory location, step 414.

After the message or question is transmitted and confirmed as being received by preferably the system controller 102, a timer in the selective call device is started to determine a predetermined time in which a response is to be received, step 416. This timer could be user settable and could be set to 10 minutes, for example. The DSP then begins to monitor any received messages to determine if and when a response or answer is received, step 418. The ReFLEX protocol allows for a selective call device 106 to determine whether a received message from another selective call device 106 is a reply to a message sent by the designated selective call device 106. This can be accomplished by identifying a reply message different from an unsolicited message. In this way, the selective call device 106 can determine if a received message is a reply or response to a message or question sent in step 408 or if a received message is an unsolicited message which may or may not be sent in response to a question or message sent in step 408. In step 420, the DSP checks if a message is received during the predetermined time period from the destination device identified in step 406 or alternately from any one of the plurality of destination devices assigned to the recipient of the message as described previously. This allows the recipient of the message to respond with any one of the devices available for use (selective call device 106, computer 118, FAX machine 116, etc.) and not just the device that originally received the message or question. If not, the DSP 206 checks if the predetermined time has expired (timer =0), step 422. If not, the process continues to monitor received messages, step 418. Otherwise, if the timer is zero (the predetermined time has expired), the "no response" or delinquent response is generated to inform or alert the user that a response was not received or is delinquent, step 424. Returning to step 420, when a message is received during this time period and the identification of the sender's device (selective call device address, email account number, etc.) is the same or is from one of the addresses listed or stored in the special memory location (address, email account number, etc.) of the designated recipient, the user

is prompted to determine if the selective call device 106 should continue to monitor the received messages (e.g., was the question was properly answered), step 426. At step 428, if the user indicates that the selective call device 106 should continue to monitor received message (an unsatisfactory or incomplete response), the current timer is reset, step 432, and a new time period is started, step 416. If, on the other hand, the question was appropriately answered, the user will indicate that the selective call device should stop monitoring the received message, step 428, and the process ends, step 430.

In this way, a "no response" or a "delinquent response" alerts the user that a response or answer was not received within a predetermined time period. The user may seek an alternative source or can extend time for a response or set a new time depending on the urgency or the user's request. The "no response" or "delinquent response" alerts the user to prevent the user from inadvertently failing to realized that a timely response was not received and to prevent a time critical event from passing without the user realizing.

Additionally, the preferred special character "?" can be used to select the value of the timer in step 416. For example, if the user constructs a message containing a single "?", the timer of step 416 could be set to 10 minutes, for example. However, if the user constructs a messages containing two special characters e.g. "??", the timer of step 416 could be set to 20 minutes (10 minutes per special character). This allows the user to selectively allow more response time for specific requests or questions.

In summary, in a two-way selective call device, a method for indicating a delinquent response includes the steps of generating a message having an identifiable character being addressed to a destination device; sending the message including the identifiable character to the destination device; setting a predetermined time for a response to the message including the identifiable character; monitoring received messages to determine when the response to the message including the identifiable character is received; and indicating that the response to the message including the identifiable character was not received within the predetermined time.

The step of indicating indicates when a response to the message including the identifiable character was received within the predetermined time, and the step of generating further comprises the steps of identifying a recipient of the message including the identifiable character; selecting an address from one or more addresses in an address book; and storing the one or more addresses of the recipient in a special memory. A user is prompted as whether to continue monitoring the received messages when the response is received on an address that is different from the address of destination device but is same as an address of the one or more addresses stored the special memory.

What is claimed is:

CLAIMS

1. In a two-way selective call device, a method for indicating a delinquent response, comprising the steps of:

generating a message including an identifiable character being addressed to a destination device;

sending the message to the destination device;

setting a predetermined time for a response to the message;

monitoring received messages to determine when the response to the message is received; and

indicating that the response to the message was not received within the predetermined time.

2. The method according to claim 1 wherein the step of indicating indicates when a response to the message was received within the predetermined time.

3. The method according to claim 1 wherein the step of generating further comprises the steps of:

identifying a recipient of the message;

selecting an address from one or more addresses in an address book; and

storing the one or more addresses of the recipient in a special memory.

4. The method according to claim 3 further comprises the step of monitoring received messages to determine when a message is received from any one of the one or more addresses stored in the special memory.

5. The method according to claim 4 further comprises the step of prompting a user whether to continue monitoring the received messages when a message is received on an address that is different from the address of the destination device but is same as an address of the one or more addresses stored the special memory.

6. The method according to claim 5 further comprises the steps of:

setting a second predetermined time period if a user elects to continue monitoring the received messages;

monitoring the received messages for a message during the second predetermined time period; and

determining whether a message from an address of an at least one address was received during the second predetermined time period.

7. The method according to claim 6 further comprises the step of indicating a response to the message was not received within the second predetermined time period.

8. The method according to claim 1 wherein the step of generating further comprises a step of including at least one "?" as the identifiable character.

9. The method according to claim 1 further comprises the step of sending the message including the identifiable character to the destination device.

10. A two-way selective call device for determining when a response was not received to a message transmitted to an at least one destination device, comprising:

at least one switch for constructing the message including an at least one identifiable character;

an address book for designating the at least one destination device;

a selector for selecting a destination address of the at least one destination device to receive the message;

a transmitter for transmitting the message to a destination device;

a timer for measuring a first predetermined time;

a processor coupled to a receiver for monitoring received messages during the first predetermined time to determine if a message is received; and

an output device for indicating when a message from the at least one destination device was not received within the first predetermined time.

11. The two-way selective call device according to claim 10 wherein:

the timer is started for a second predetermined time period if a user elects to continue monitoring receiving messages; and

the processor determines whether a message from the at least one destination device was received during the second predetermined time period.

12. The two-way selective call device of claim 11 wherein the output device indicates that a message from the at least one destination device was not received within the second predetermined time period.

13. The two-way selective call device according to claim 12 wherein the destination device comprises any one of a portable wireless device, a computer having an electronic mail address and a facsimile machine.

14. The two-way selective call device according to claim 10 wherein the at least one identifiable character comprises at least one "?".

15. The two-way selective call device according to claim10 wherein each one of a more than one "?"designates a predetermined time period for monitoring received messages.

16. In a portable wireless device, a method of determining when a response to a message is delinquent, comprising the steps of:

generating a message;

identifying an at least one destination device;

selecting the at least one destination device to receive the message;

designating the message as requiring a response;

transmitting the message to the at least one destination device;

setting a time period during which the response to the message is to be received;

monitoring messages being received during the time period; and

indicating when the response to the message was not received within the time period from the at least one destination device.

17. The method according to claim 16 wherein the step of indicating indicates when the response from the at least one destination device was received within the time period.

18. The method according to claim 16 further comprises the step of prompting a user whether to continue monitoring messages in response to a received message from the at least one destination device within the time period.

19. The method according to claim 18 wherein the step of setting further comprises:

setting a second time period if a user elects to continue the step of monitoring received messages; and

determining whether the response from an at least one identified destination device was received during the second time period.

20. The method according to claim 19 wherein the step of indicating indicates when message from the at least one destination device was not received within the second time period.

21. The method according to claim 16 wherein the step of designating a message as requiring a response comprises selecting an icon designated as a receipt response icon.

22. The method according to claim 16 wherein the step of designating a message as requiring a response further comprises including at least one "?" within the message.

23. The method according to claim 16 wherein the step of designating a message as requiring a response comprises selecting a switch for indicating when the response to the message is received.

24. The method according to claim 16 wherein the step of identifying identifies a recipient having more than one destination device to receive the message.

25. The method according to claim 24 wherein the step of indicating indicates when a message from the recipient was not received within the time period.

106
SELECTIVE CALL DEVICE
104
106
SELECTIVE CALL DEVICE
112
103
MESSAGING TERMINAL
TRANSMITTER/ RECEIVER
101
108
106
SELECTIVE CALL DEVICE
102
PSTN/INTERNET
SYSTEM CONTROLLER
118
116
FAX MACHINE
100

FIG. 1

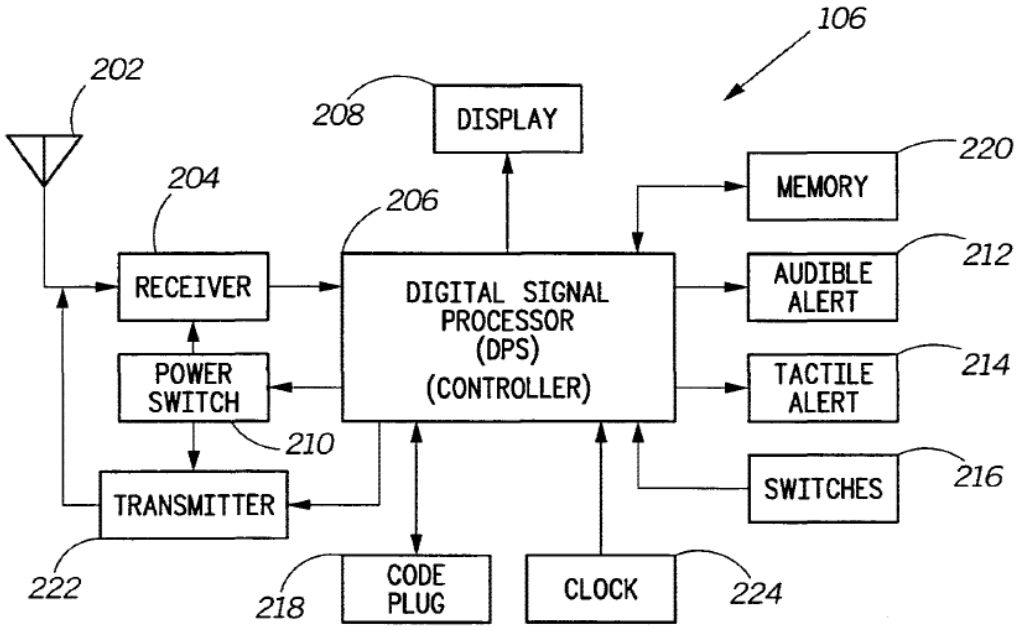
106
202
208
DISPLAY
220
MEMORY
204
206
RECEIVER
DIGITAL SIGNAL PROCESSOR (DPS) (CONTROLLER)
212
AUDIBLE ALERT
POWER SWITCH
214
TACTILE ALERT
210
SWITCHES
216
TRANSMITTER
222
218
CODE PLUG
CLOCK
224

FIG. 2

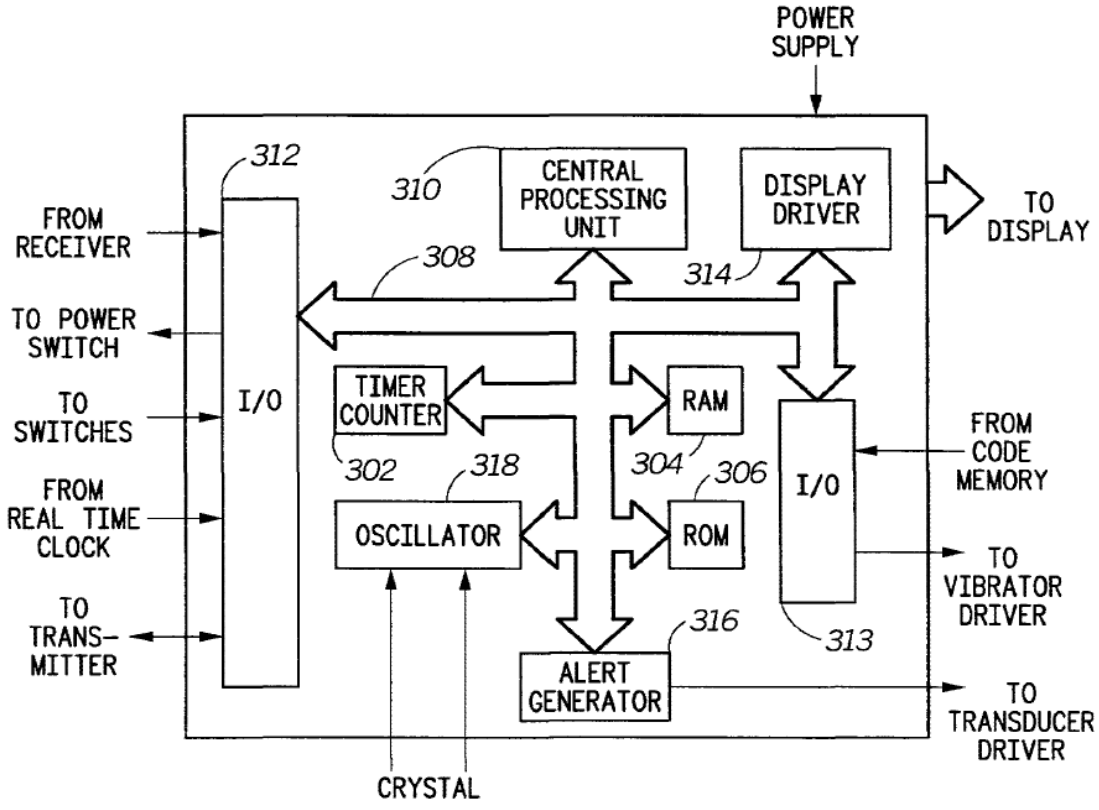
POWER SUPPLY
312
310
CENTRAL PROCESSING UNIT
DISPLAY DRIVER
TO DISPLAY
FROM RECEIVER
308
314
TO POWER SWITCH
I/O
TIMER COUNTER
RAM
TO SWITCHES
FROM CODE MEMORY
FROM REAL TIME CLOCK
302
318
304
306
I/O
OSCILLATOR
ROM
TO VIBRATOR DRIVER
TO TRANS-MITTER
316
313
ALERT GENERATOR
TO TRANSDUCER DRIVER
CRYSTAL
206

FIG. 3

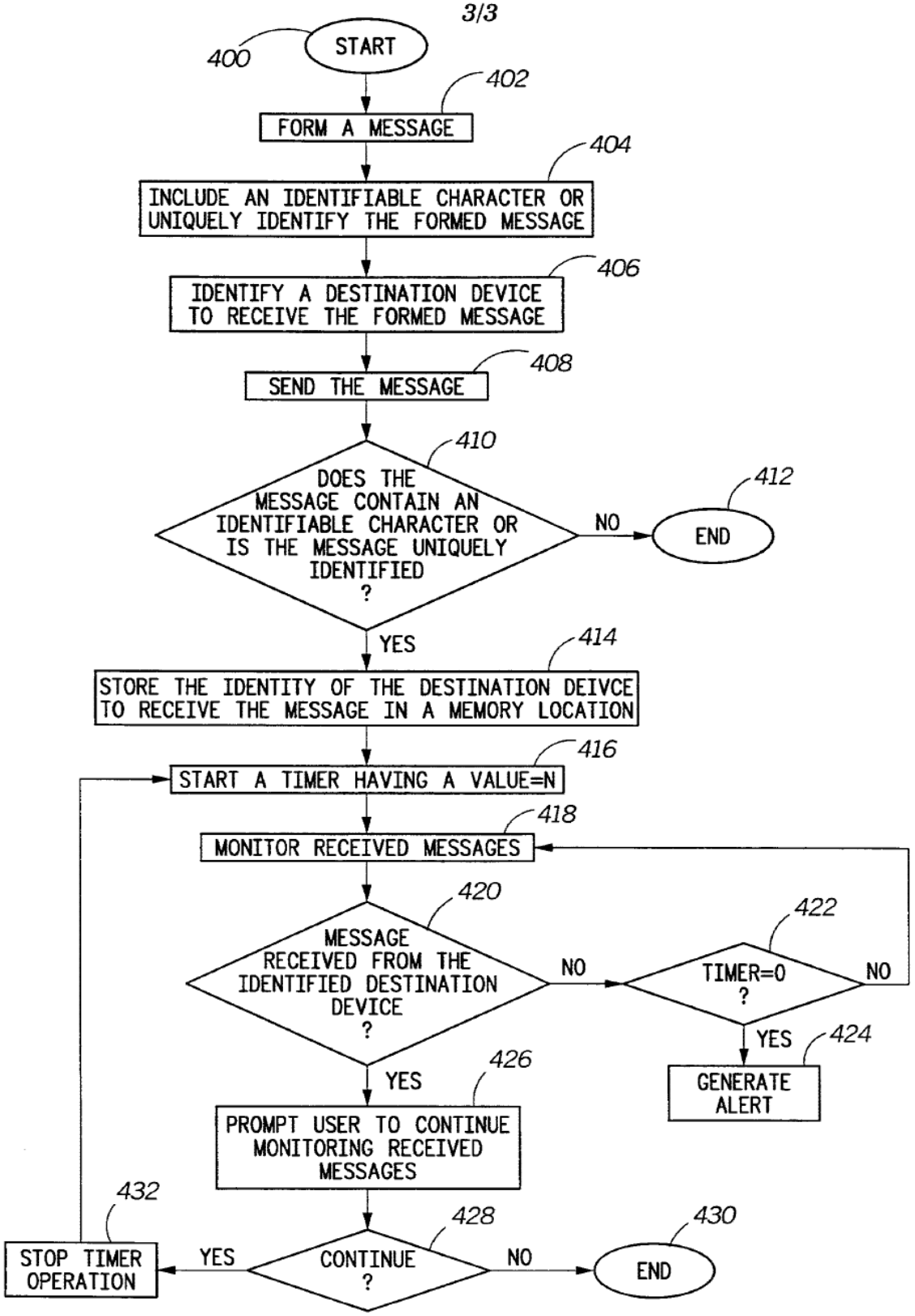
400
START
402
FORM A MESSAGE
404
INCLUDE AN IDENTIFIABLE CHARACTER OR UNIQUELY IDENTIFY THE FORMED MESSAGE
406
IDENTIFY A DESTINATION DEVICE TO RECEIVE THE FORMED MESSAGE
408
SEND THE MESSAGE
410
DOES THE MESSAGE CONTAIN AN IDENTIFIABLE CHARACTER OR IS THE MESSAGE UNIQUELY IDENTIFIED ?
NO
412
END
YES
414
STORE THE IDENTITY OF THE DESTINATION DEIVCE TO RECEIVE THE MESSAGE IN A MEMORY LOCATION
416
START A TIMER HAVING A VALUE=N
418
MONITOR RECEIVED MESSAGES
420
MESSAGE RECEIVED FROM THE IDENTIFIED DESTINATION DEVICE ?
NO
422
TIMER=0 ?
NO
YES
424
GENERATE ALERT
YES
426
PROMPT USER TO CONTINUE MONITORING RECEIVED MESSAGES
428
CONTINUE ?
NO
430
END
YES
432
STOP TIMER OPERATION

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/26498

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04Q 7/00, 7/24; H04L 1/18
US CL :340/311.1, 313, 825.44; 455/31.3; 714/748, 749

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 340/311.1, 313, 825.44; 455/31.3; 714/748, 749

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,940,963 A (GUTMAN et al) 10 July 1990, see entire document.	1-25
Y	US 5,526,401 A (ROACH, Jr. et al) 11 June 1996, see entire document.	1-25
Y	US 5,920,576 A (EATON et al) 06 July 1999, see entire document.	1-25

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 15 NOVEMBER 2000	Date of mailing of the international search report 27 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer YVES DALENCOURT Telephone No. (703) 308 - 8547

Form PCT/ISA/210 (second sheet) (July 1998) ★

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(31) 2001366108 (32) 30.11.2001 (33) JP

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G06F 17/60

(52) UK CL (Edition V)
H4T TBLX
H4L LEUG

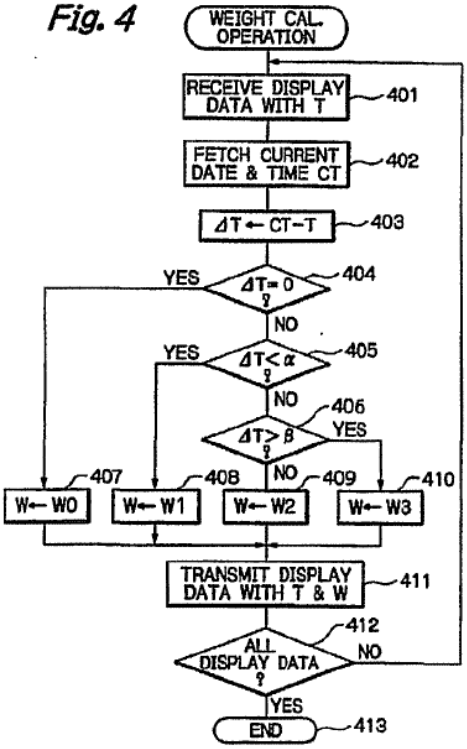
(56) Documents Cited
GB 2353679 A

(58) Field of Search
UK CL (Edition V) H4L, H4T
INT CL[7] G06F
Other: Online: WPI, EPODOC, JAPIO, TDB

(54) Abstract Title
Prioritising time-stamped data

(57) In a method for displaying time-stamp associated data, the difference ΔT between the current data and time CT and the time-stamp T of the time-stamp associated data is calculated 403. Then, a weight W is calculated 404-410 in accordance with the difference. Finally, the time-stamp associated data is displayed 411-412 with a display mode, e.g. background color, which is changed in accordance with the weight (Figure 6 not shown). The method is applicable to a mobile telephone or a personal digital assistant PDA.

Fig. 4



GB 2 384 150 A

Fig. 1

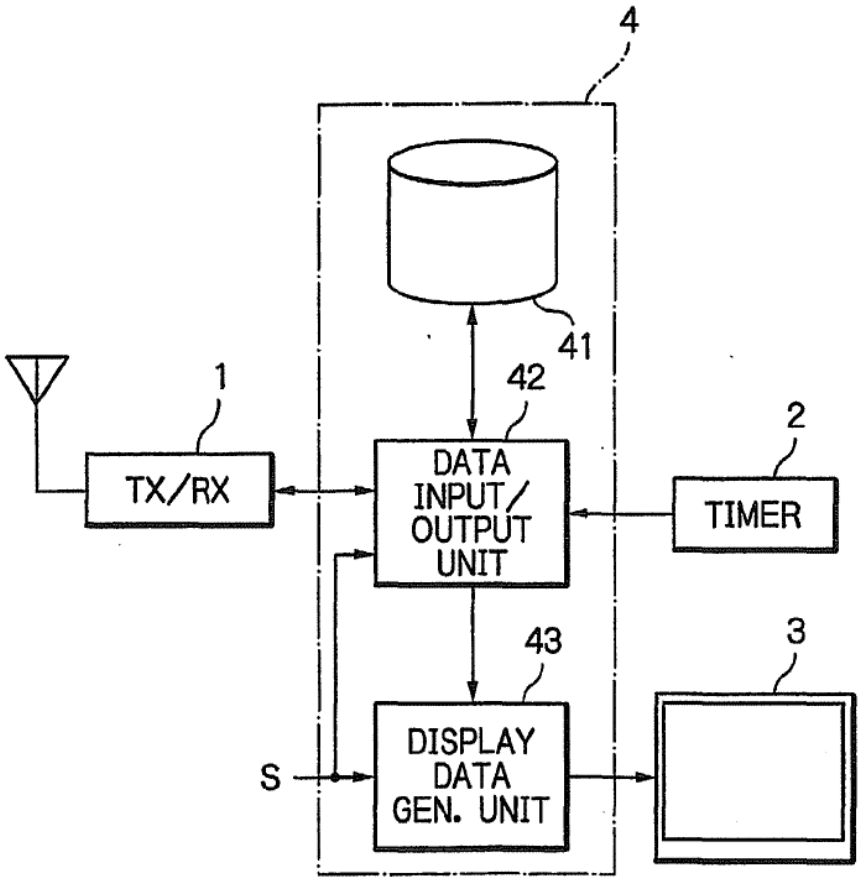

4
41
42
1
2
TX/RX
DATA INPUT/ OUTPUT UNIT
TIMER
43
3
S
DISPLAY DATA GEN. UNIT

Fig. 2

DATE/ TIME	SENDER/ DESTINATION	TITLE
April 1 12 : 14pm	Squid	More Light
May 2 1 : 30pm	To : Squid	Re : More Light
May 7 3 : 30pm	Dvorak	Love Wonder
May 10 10 : 00pm	**TOMTOM**	**IDOLINE=WAR MANUAL**

Fig. 3

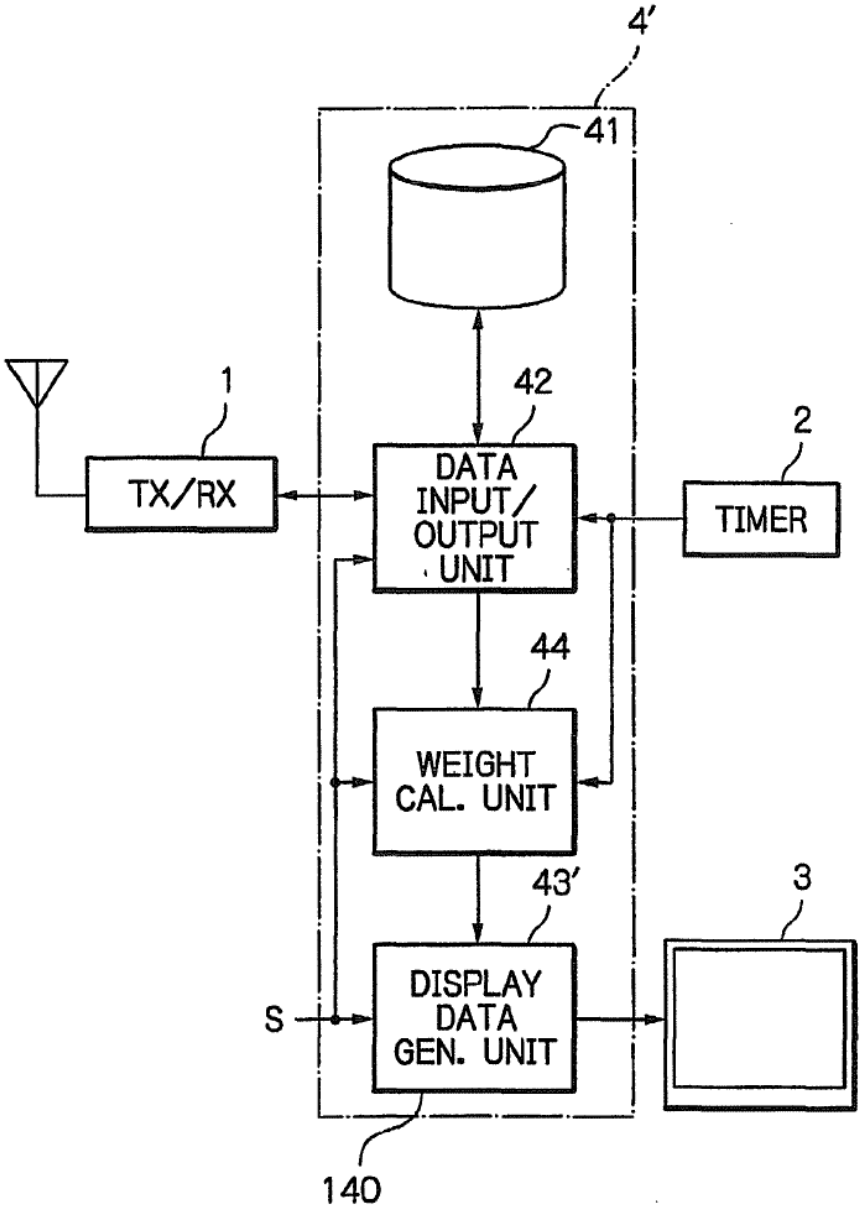

4'
41
1
42
2
TX/RX
DATA INPUT/ OUTPUT UNIT
TIMER
44
WEIGHT CAL. UNIT
43'
3
S
DISPLAY DATA GEN. UNIT
140

Fig. 4

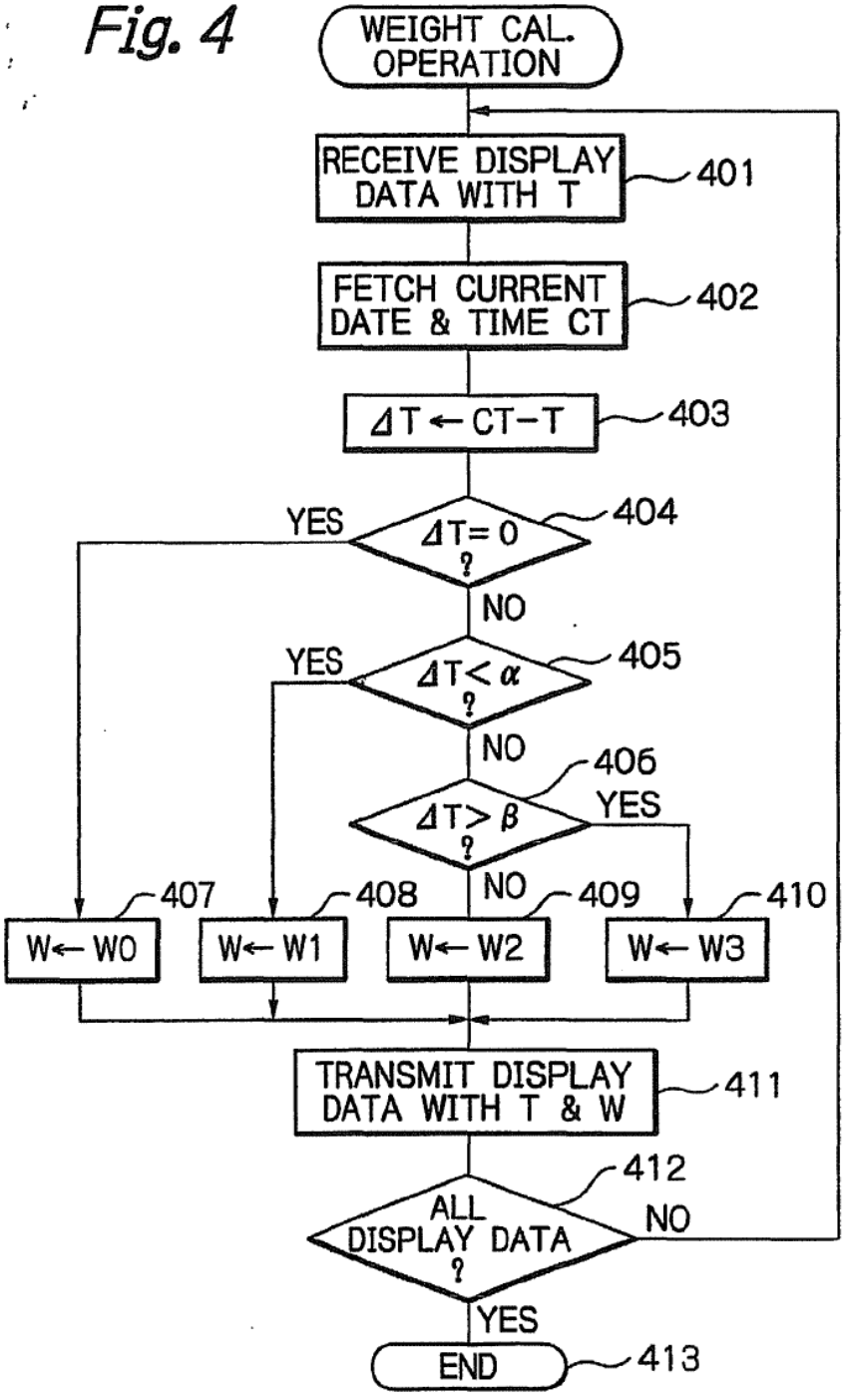

WEIGHT CAL. OPERATION
RECEIVE DISPLAY DATA WITH T
401
FETCH CURRENT DATE & TIME CT
402
ΔT ← CT−T
403
ΔT= 0 ?
404
YES
NO
ΔT< α ?
405
YES
NO
ΔT> β ?
406
YES
NO
407
408
409
410
W← W0
W← W1
W← W2
W← W3
TRANSMIT DISPLAY DATA WITH T & W
411
ALL DISPLAY DATA ?
412
NO
YES
END
413

Fig. 5

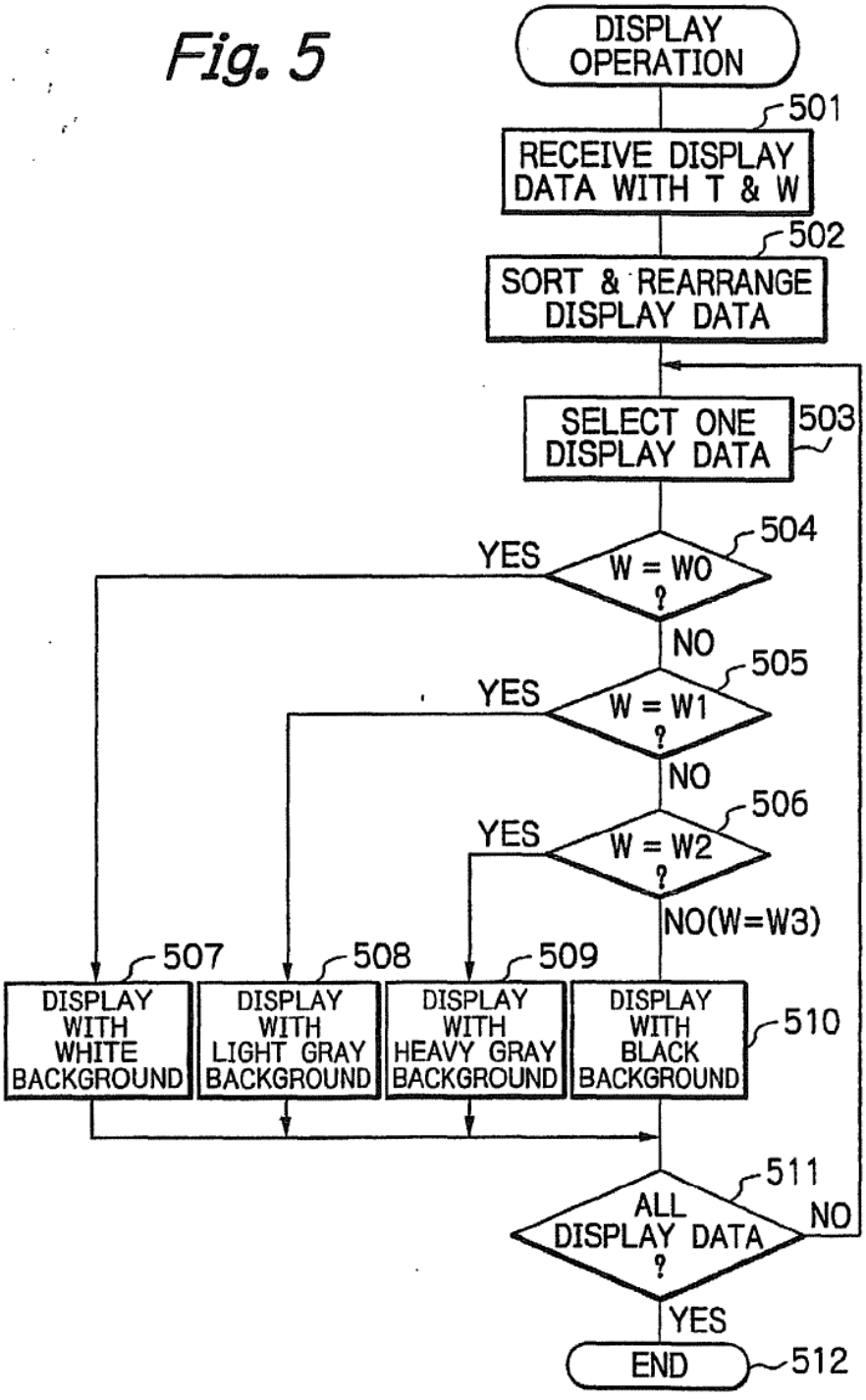

DISPLAY OPERATION
501
RECEIVE DISPLAY DATA WITH T & W
502
SORT & REARRANGE DISPLAY DATA
SELECT ONE DISPLAY DATA
503
504
W = W0 ?
YES
NO
505
W = W1 ?
YES
NO
506
W = W2 ?
YES
NO(W=W3)
507
508
509
DISPLAY WITH WHITE BACKGROUND
DISPLAY WITH LIGHT GRAY BACKGROUND
DISPLAY WITH HEAVY GRAY BACKGROUND
DISPLAY WITH BLACK BACKGROUND
510
511
ALL DISPLAY DATA ?
NO
YES
END
512

Fig. 6

DATE/ TIME	SENDER/ DESTINATION	TITLE
April 1 12 : 14pm	Squid	More Light
May 2 1 : 30pm	To : Squid	Re : More Light
May 7 3 : 30pm	Dvorak	Love Wonder
May 10 10 : 00pm	**TOMTOM**	**IDOLINE=WAR MANUAL**

Fig. 7

DATE/ TIME	SENDER/ DESTINATION	TITLE
April 1 12:14p	Squid	More Light
May 2 1:30pm	To: Squid	Re: More Light
May 7 3:30pm	Dvorak	Love Wonder
May 10 10:00pm	**TOMTOM**	**IDOLINE=WAR MANUAL**

Fig. 8

DATE/ TIME	SENDER/ DESTINATION	TITLE
April 1 12:14pm	Squid	More Light
May 2 1:30pm	To: Squid	Re: More Light
May 7 3:30pm	Dvorak	Love Wonder
May 10 10:00pm	**TOMTOM**	**IDOLINE=WAR MANUAL**

METHOD FOR DISPLAYING TIME-STAMP ASSOCIATED AND WEIGHTED DATA AND MOBILE STATION USING THE SAME

BACKGROUND OF THE INVENTION

The present invention relates to a method for displaying time-stamp associated data and a mobile station such as a mobile telephone and a personal digital assistant (PDA) using such a method.

Generally, in a prior art mobile station, received mail data, transmission mail data and preserved mail data are associated with time-stamps, and such time-stamp associated mail data are stored in a storing unit. When displaying the time-stamp associated mail data, the time-stamp associated mail data are sorted and rearranged in an ascending order on a data-and-time basis in accordance with the time-stamps thereof. This will be explained later in detail.

In the above-described mobile station, however, it is difficult to intuitively determine how old each of the displayed mail data is. Particularly, when only a part of the mail data to be displayed are displayed or when a single mail data is displayed, it is quite difficult to intuitively determine how old the displayed mail data is.

SUMMARY OF THE INVENTION

According to the present invention, in a method

for displaying time-stamp associated data, a difference between a current data and time and the time-stamp of the time-stamp associated data is calculated. Then, a weight is calculated in accordance with said difference. Finally, the time-stamp associated data is display with a display mode which is changed in accordance with the weight.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more clearly understood from the description set forth below, as compared with the prior art, with reference to the accompanying drawings, wherein:

Fig. 1 is a block circuit diagram illustrating a prior art mobile station;

Fig. 2 is a diagram showing an example of the data displayed on the display unit of Fig. 1;

Fig. 3 is a block circuit diagram illustrating an embodiment of the mobile station according to the present invention;

Fig. 4 is a flowchart showing the operation of the weight calculating unit of Fig. 3;

Fig. 5 is a flowchart showing the operation of the display data generating unit of Fig. 3;

Fig. 6 is a diagram showing an example of display image of the display unit of Fig. 3;

Fig. 7 is a diagram showing another example of display image of the display unit of Fig. 3; and

Fig. 8 is a diagram showing a still other example of display image of the display unit of Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Before the description of the preferred embodiment, a prior art mobile station will be explained

with reference to Figs. 1 and 2.

In Fig. 1, which illustrates a prior art mobile station, the mobile station is constructed by a transceiver unit 1, a timer 2 for generating the current data and time, a display unit 3, and a control unit 4 provided between the transceiver unit 1, the timer 2 and the display unit 3.

The control unit 4 is constructed by a microprocessor which includes a storing unit 41, a data input/output unit 42 and a display data generating unit 43.

For example, when mail data is received by the transceiver unit 1, the data input/output unit 42 reads the current data and time from the timer 2 and stores the mail data associated with the current date and time in the storing unit 41. That is, time-stamp associated mail data is stored in the storing unit 41. On the other hand, when mail data is to be transmitted, the data input/output unit 42 reads the current data and time from the timer 2 and stores the mail data associated with the current data and time in the storing unit 41.

When a display indicating signal S is input by the user, the data input/output unit 42 and the display data generating unit 43 are operated to display a list of mail data as shown in Fig. 2 on the display unit 3. That is, the data input/output unit 42 reads all the mail data stored in the storing unit 41 and transmits them to the display data generating unit 43. Then, the display data generating unit 43 sorts the mail data and rearranges them in an ascending order on a data-and-time basis. Finally, the display data generating unit 43 displays the sorted and rearranged mail data on the display unit 3. Note that unread received mail data is represented by thick characters to attract the user's attention.

In the mobile station of Fig. 1, however, since

the displayed mail data are uniform except for unread mail data, it is difficult to intuitively determine how old each of the displayed mail data as shown in Fig. 2 is. Particularly, when only a part of the mail data to be displayed are displayed or when a single mail data is displayed, it is quite difficult to intuitively determine how old the displayed mail data is.

In Fig. 3, which illustrates an embodiment of the mobile station according to the present invention, the control unit 4 of Fig. 1 is modified to a control unit 4'. That is, in the control unit 4', display data generating unit 43 of Fig. 1 is modified to a display data generating unit 43' and a weight calculating unit 44 is added.

The weight calculating unit 44 calculates a weight W for each of the displayed mail data in accordance with a difference between the data and time of each of the displayed mail address and the current data and time of the timer 2. In this case, the larger the difference, the larger the weight W.

The display data generating unit 43' sorts the mail data and rearranges them in an ascending order on a data-and time basis in the same way as the display data generating unit 43 of Fig. 1. Additionally, the display data generating unit 43' changes the display modes of the displayed mail data in accordance with the weight W thereof.

The operation of the weight calculating unit 44 of Fig. 3 is explained next with reference to a flowchart of Fig. 4. Note that the flowchart of Fig. 4 is started by inputting a display indicating signal S by the user.

First, at step 401, one display data with a time-stamp T is read from the storing unit 41 via the data input/output unit 42.

Next, at step 402, the current data and time CT

is read from the timer 2.

Next, at step 403, a difference ΔT between the current data and time CT and the time-stamp T is calculated, i.e.,

$$\Delta T \leftarrow CT - T$$

In this case, the time component of ΔT is rounded. Otherwise, the time components of CT and T are rounded in advance.

Next, at step 404, it is determined whether or not ΔT is 0 day; at step 405, it is determined whether or not ΔT is smaller than a predetermined value $\alpha (> 0)$; and at step 406 , it is determined whether or not ΔT is larger than a predetermined value $\beta (> \alpha)$. For example, α is 7 days and β is 30 days.

When $\Delta T = 0$, the control proceeds to step 407 which causes a weight W to be W0.

When $0 < \Delta T < \alpha$, the control proceeds to step 408 which causes the weight W to be W1 (> W0).

When $\alpha < \Delta T < \beta$, the control proceeds to step 409 which causes the weight W to be W2 (> W1).

When $\Delta T \geqq \beta$, the control proceeds to step 410 which causes the weight W to be W3 (> W2).

The control at steps 407, 408, 409 and 410 proceed to step 411 which transmits the display data with the time-stamp T and the weight W to be display unit 43'.

Step 412 repeats the control at steps 401 through 411 for all the data to be displayed.

The routine of Fig. 4 is completed by step 413.

The operation of the display data generating unit 43' of Fig. 3 is explained next with reference to a flowchart of Fig. 5. Note that the flowchart of Fig. 5 is also started by inputting a display indicating signal S by the user.

First, at step 501, the display data generating

unit 43' receives all the display data with the time-stamps T and the weight W from the weight calculating unit 44.

Next, at step 502, all the display data are sorted and rearranged in an ascending order on a data-and-time basis.

Next, at step 503, one of the display data is selected.

Next, at step 504, it is determined whether or not the weight W of the selected display data is W0; at step 505, it is determined whether or not the weight W of the selected display data is W1; and at step 506, it is determine whether or not the weight W of the selected display data is W2.

When W = W0, the control proceeds to step 507 which displays the selected data with the time-stamp T with a white background (see: item 4 of Fig. 6).

When W = W1, the control proceeds to step 508 which displays the selected data with the time-stamp T with a light gray background (see: item 3 of Fig. 6).

When W = W2, the control proceeds to step 509 which displays the selected data with the time-stamp T with a heavy gray background (see: item 2 of Fig. 6).

When W = W3, the control proceeds to step 510 which displays the selected data with the time-stamp T with a black background (see: item 1 of Fig. 6).

Step 511 repeats the control at steps 503 through 510 for all the display data.

Thus, the flowchart of Fig. 5 is completed by step 512.

In the above-described embodiment, although the background brightness of display data is changed in accordance with the weight W thereof, the background color of display data can be changed in accordance with the weight W. Also, the thickness degree of characters of display data

can be changed in accordance with the weight W thereof as shown in Fig. 7. Further, the size of characters of display data can be changed in accordance with the weight W as shown in Fig. 8. Further, the inclination degree of characters of display data can be changed in accordance with the weight W thereof. Further, two or more of the background brightness, the background color, the thickness degree, the size and the inclination degree can be changed in accordance with the weight W. In any display mode, the latest data is most-visibly displayed.

As is seen from the foregoing, in the preferred embodiment the weight is non-linearly related to the difference ΔT.

As explained hereinabove, according to the present station, since the background brightness of displayed data or the like is changed in accordance with how old the displayed data is, it is intuitively determined how old the displayed data is.

CLAIMS

1. A method for displaying time-stamp associated data comprising the steps of:

calculating a difference (ΔT) between a current data and time (CT) and the time-stamp (T) of said time-stamp associated data;

calculating a weight (W) in accordance with said difference; and

displaying said time-stamp associated data with a display mode changed in accordance with said weight.

2. The method as set forth in claim 1, wherein said display mode is a background brightness of said displayed time-stamp associated data.

3. The method as set forth in claim 1, wherein said display mode is a background color of said displayed time-stamp associated data.

4. The method as set forth in claim 1, wherein said display mode is a thickness degree of characters of said displayed time-stamp associated data.

5. The method as set forth in claim 1, wherein said display mode is a size of characters of said displayed time-stamp associated data.

6. The method as set forth in claim 1, wherein said display mode is an inclination degree of characters of said displayed time-stamp associated data.

7. The method as set forth in claim 1, wherein said display mode is a combination of at least two of a background brightness of said displayed time-stamp associated data, a background color of said displayed time-stamp associated data, a thickness degree of characters of said displayed time-stamp associated data, a size of characters of said displayed time-stamp associated data and an inclination

degree of characters of said displayed time-stamp associated data.

8. A method for displaying time-stamp associated data with a display mode in accordance with the time-stamp of said time-stamp associated data.

9. A mobile station comprising:

a storing unit (41);

a data input/output unit (42) for writing time-stamp associated data in said storing unit and reading said time-stamp associated data from said storing unit;

a weight calculating unit (44) for receiving said time-stamp associated data from said storing unit via said data input/output unit to calculate a weight in accordance with a difference (ΔT) between a current data and time (CT) and the time-stamp (T) of said time-stamp associated data; and

a display data generating unit (43') for receiving said time-stamp associated data with said weight to display said time-stamp associated data with a display mode changed in accordance with said weight.

10. The mobile station as set forth in claim 9, wherein said display mode is a background brightness of said displayed time-stamp associated data.

11. The mobile station as set forth in claim 9, wherein said display mode is a background color of said displayed time-stamp associated data.

12. The mobile station as set forth in claim 9, wherein said display mode is a thickness degree of said displayed time-stamp associated data.

13. The mobile station as set forth in claim 9, wherein said display mode is a size of characters of said displayed time-stamp associated data.

14. The mobile station as set forth in claim 9,

wherein said display mode is an inclination degree of characters of said displayed time-stamp associated data.

15. The mobile station as set forth in claim 9, wherein said display mode is a combination of at least two of a background brightness of said displayed time-stamp associated data, a background color of said displayed time-stamp associated data, a thickness degree of characters of said displayed time-stamp associated data, a size of characters of said displayed time-stamp associated data and an inclination degree of characters of said displayed time-stamp associated data.

16. The mobile station as set forth in claim 9, being a mobile telephone.

17. The mobile station as set forth in claim 9, being a personal digital assistant.

18. A method for displaying time-stamp associated data, substantially as herein described with reference to Figs. 3 - 8 of the drawings.

19. A mobile station substantially as herein described with reference to Figs. 3 - 8 of the drawings.

Application No: GB 0228076.6 **Examiner:** Joe McCann
Claims searched: All **Date of search:** 9 May 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	All	GB 2353679 (IBM) - see whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[V]:

H4T;H4L

Worldwide search of patent documents classified in the following areas of the IPC[7]:

G06F

The following online and other databases have been used in the preparation of this search report :

Online: WPI, EPODOC, JAPIO, TDB

(12) UK Patent Application (19) GB (11) 2 350 746 (13) A

(43) Date of A Publication 06.12.2000

(21) Application No 0007395.7

(22) Date of Filing 27.03.2000

(30) Priority Data
(31) 11082482 (32) 25.03.1999 (33) JP

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(72) Inventor(s)
Takahiro Nobukiyo

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100 Grays Inn Road, LONDON, WC1X 8AL,
United Kingdom

(51) INT CL[7]
H04L 12/54 // H04L 12/58

(52) UK CL (Edition R)
H4K KOD4
H4P PQA

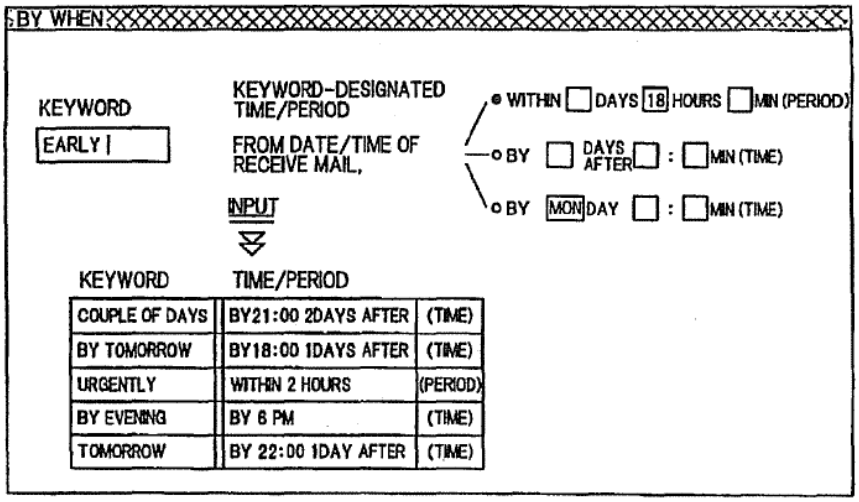
(56) Documents Cited
JP 110004251 A JP 080180004 A JP 8180004 PAJ ABSTRACT AND WPI ABSTRACT ACCESSION NO. 1996-375898 JP11004251 PAJ ABSTRACT AND WPI ABSTRACT ACCESSION NO. 1999-127844

(58) Field of Search
UK CL (Edition R) H4K KOD4 , H4P PQA
INT CL[7] H04L 12/54 12/58
ONLINE: WPI, PAJ, EPODOC

(54) Abstract Title
E-mail reply deadline calculation

(57) An email-reception indication device has an email-reception confirming section for confirming whether an email is received by a mail server or not; a reply judging section for judging whether an email the reception of which is confirmed by the email-reception confirming section includes a content to require a reply or not; a designated reply time/ period calculating section for calculating a reply deadline by which a reply email has to be sent in response to an email judged as requiring sending of a reply by the reply judging section; and a reply-status indicating section for informing the receiver of email of the reply deadline calculated by the designated reply time/period calculating section.

FIG.3



GB 2 350 746 A

FIG. 1

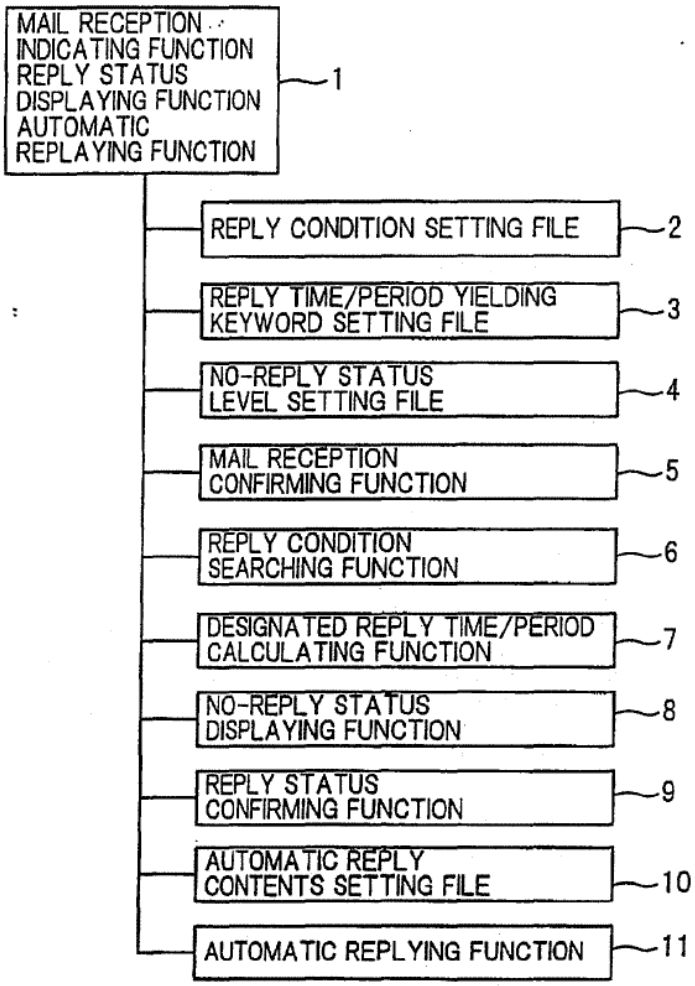

MAIL RECEPTION INDICATING FUNCTION REPLY STATUS DISPLAYING FUNCTION AUTOMATIC REPLAYING FUNCTION
1
REPLY CONDITION SETTING FILE
2
REPLY TIME/PERIOD YIELDING KEYWORD SETTING FILE
3
NO-REPLY STATUS LEVEL SETTING FILE
4
MAIL RECEPTION CONFIRMING FUNCTION
5
REPLY CONDITION SEARCHING FUNCTION
6
DESIGNATED REPLY TIME/PERIOD CALCULATING FUNCTION
7
NO-REPLY STATUS DISPLAYING FUNCTION
8
REPLY STATUS CONFIRMING FUNCTION
9
AUTOMATIC REPLY CONTENTS SETTING FILE
10
AUTOMATIC REPLYING FUNCTION
11

FIG. 2

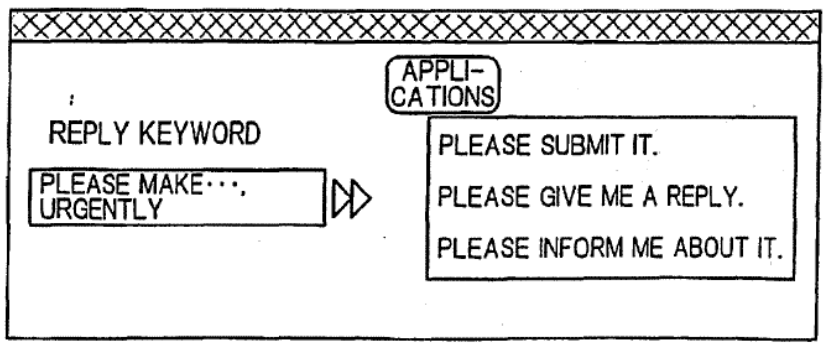
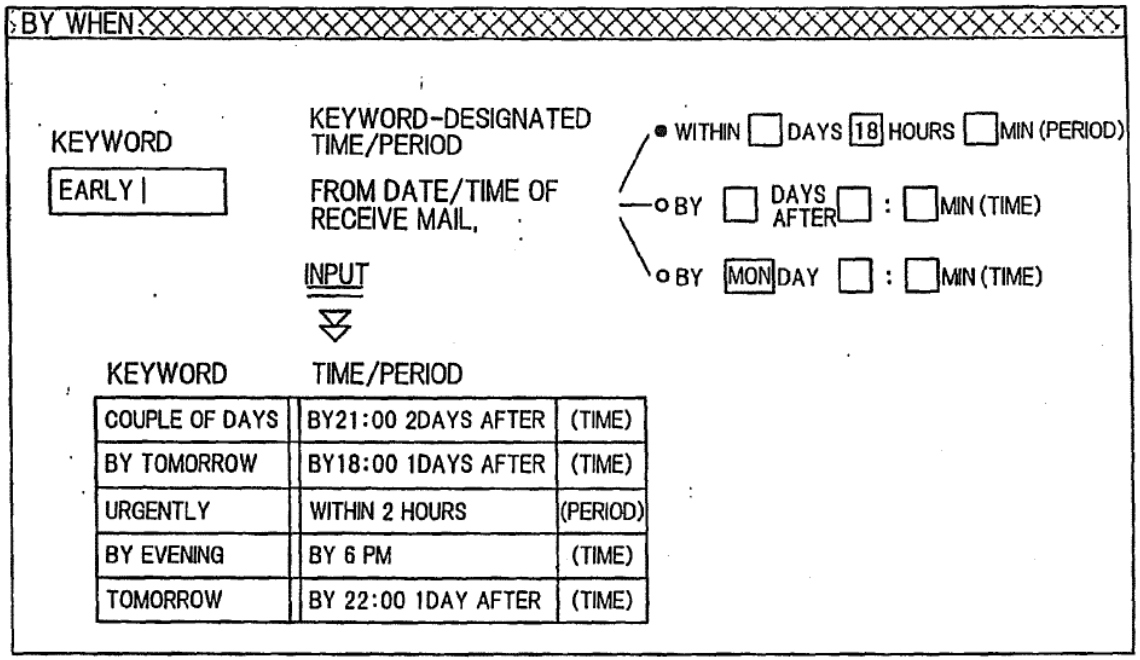

APPLI-CATIONS
REPLY KEYWORD
PLEASE MAKE···, URGENTLY
PLEASE SUBMIT IT.
PLEASE GIVE ME A REPLY.
PLEASE INFORM ME ABOUT IT.

FIG.3



KEYWORD	TIME/PERIOD	
COUPLE OF DAYS	BY21:00 2DAYS AFTER	(TIME)
BY TOMORROW	BY18:00 1DAYS AFTER	(TIME)
URGENTLY	WITHIN 2 HOURS	(PERIOD)
BY EVENING	BY 6 PM	(TIME)
TOMORROW	BY 22:00 1DAY AFTER	(TIME)

FIG.4

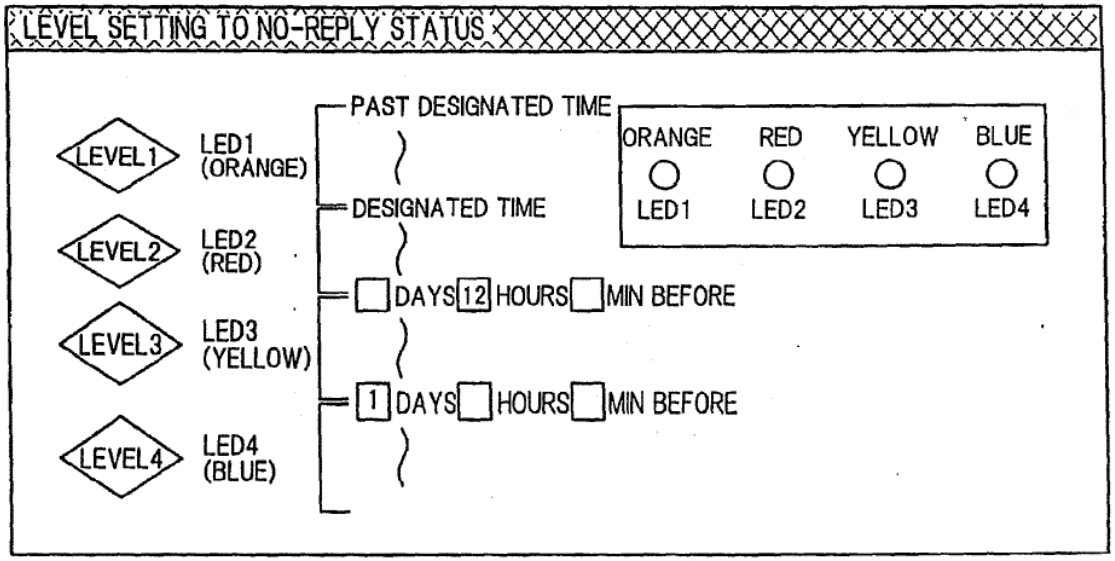

LEVEL SETTING TO NO-REPLY STATUS
LEVEL1
LED1 (ORANGE)
LEVEL2
LED2 (RED)
LEVEL3
LED3 (YELLOW)
LEVEL4
LED4 (BLUE)
PAST DESIGNATED TIME
DESIGNATED TIME
DAYS 12 HOURS MIN BEFORE
1 DAYS HOURS MIN BEFORE
ORANGE
RED
YELLOW
BLUE
LED1
LED2
LED3
LED4

FIG.5

THIS IS △△ OF □□ TRADE COMPANY.

I'M SORRY MY REPLY TO YOUR
E-MAIL IS LATE.
IN CASE OF URGENT WORK/REQUEST,
PLEASE MAKE CONTACT
TO OUR COMPANY.
REGARDS

FIG.6

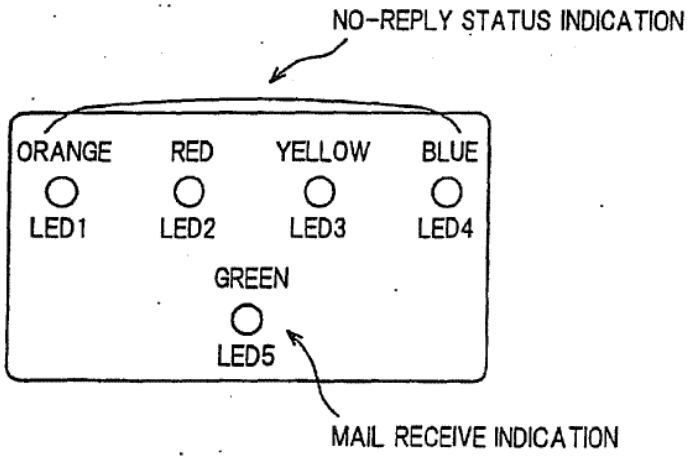


FIG. 7

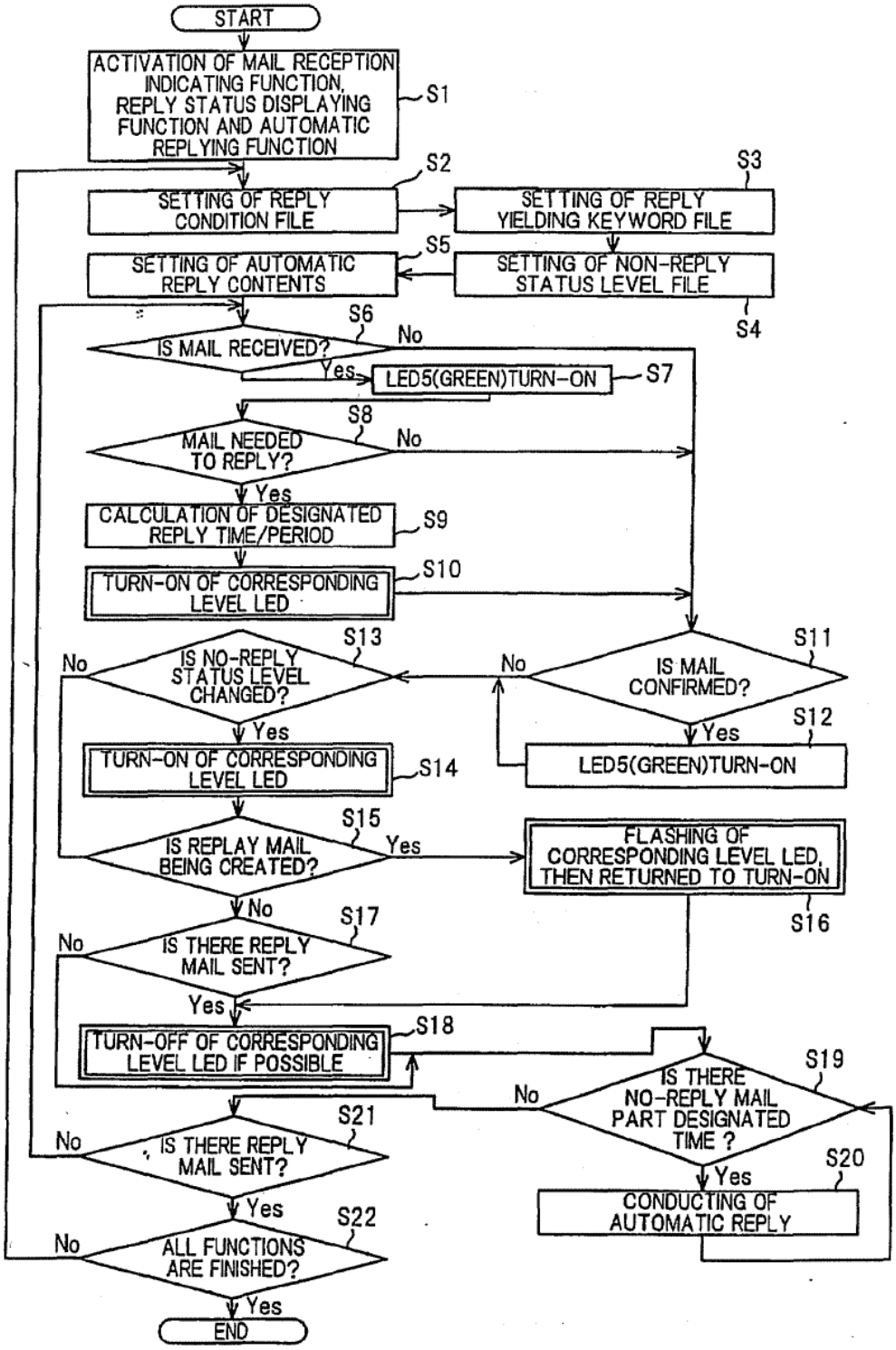

START
ACTIVATION OF MAIL RECEPTION INDICATING FUNCTION, REPLY STATUS DISPLAYING FUNCTION AND AUTOMATIC REPLYING FUNCTION
S1
SETTING OF REPLY CONDITION FILE
S2
SETTING OF REPLY YIELDING KEYWORD FILE
S3
SETTING OF AUTOMATIC REPLY CONTENTS
S5
SETTING OF NON-REPLY STATUS LEVEL FILE
S4
IS MAIL RECEIVED?
S6
No
Yes
LED5(GREEN)TURN-ON
S7
MAIL NEEDED TO REPLY?
S8
No
Yes
CALCULATION OF DESIGNATED REPLY TIME/PERIOD
S9
TURN-ON OF CORRESPONDING LEVEL LED
S10
IS NO-REPLY STATUS LEVEL CHANGED?
S13
No
Yes
IS MAIL CONFIRMED?
S11
No
Yes
LED5(GREEN)TURN-ON
S12
TURN-ON OF CORRESPONDING LEVEL LED
S14
IS REPLAY MAIL BEING CREATED?
S15
Yes
No
FLASHING OF CORRESPONDING LEVEL LED, THEN RETURNED TO TURN-ON
S16
IS THERE REPLY MAIL SENT?
S17
No
Yes
TURN-OFF OF CORRESPONDING LEVEL LED IF POSSIBLE
S18
IS THERE NO-REPLY MAIL PART DESIGNATED TIME ?
S19
No
Yes
CONDUCTING OF AUTOMATIC REPLY
S20
IS THERE REPLY MAIL SENT?
S21
No
Yes
ALL FUNCTIONS ARE FINISHED?
S22
No
Yes
END

FIG.8

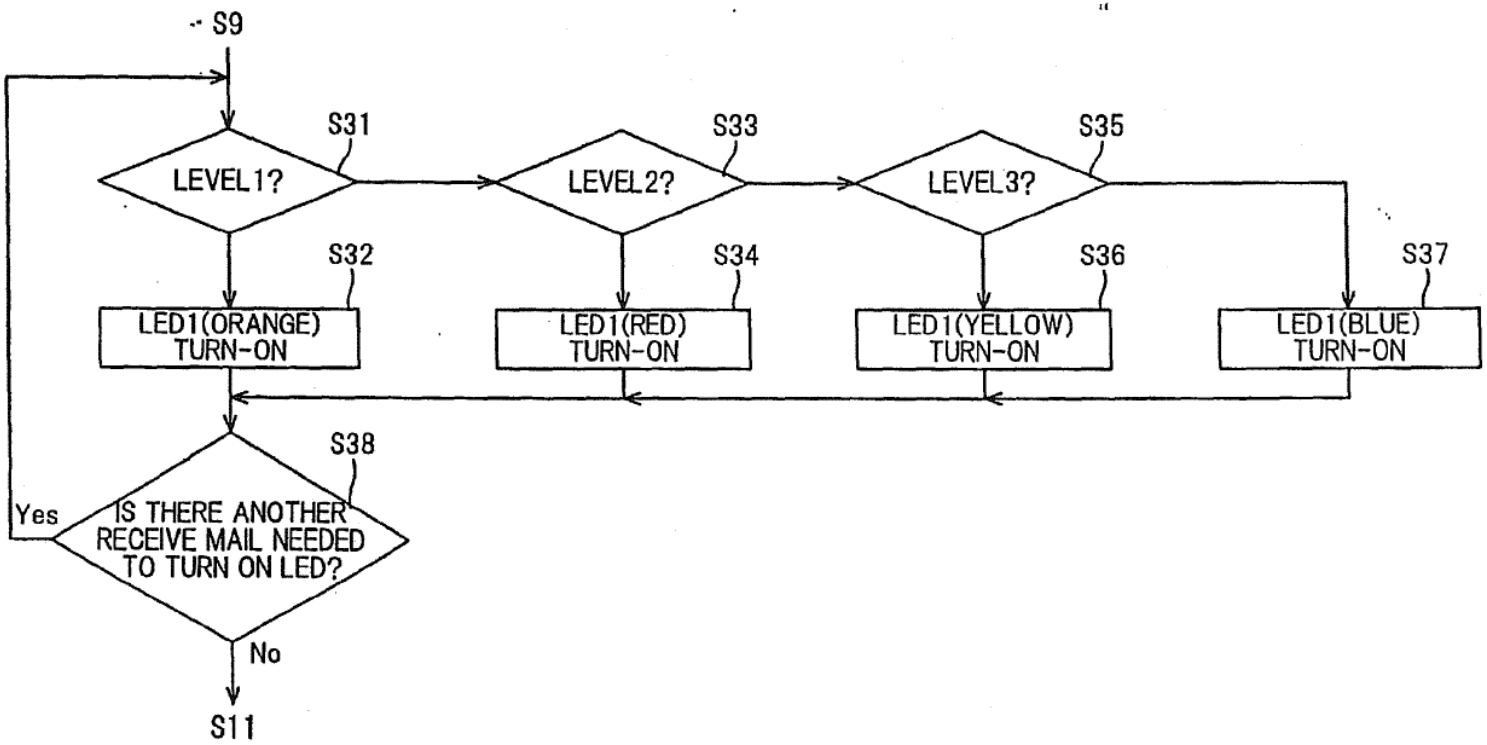

S9
S31
LEVEL1?
S33
LEVEL2?
S35
LEVEL3?
S32
LED1(ORANGE) TURN-ON
S34
LED1(RED) TURN-ON
S36
LED1(YELLOW) TURN-ON
S37
LED1(BLUE) TURN-ON
S38
IS THERE ANOTHER RECEIVE MAIL NEEDED TO TURN ON LED?
Yes
No
S11

FIG.9

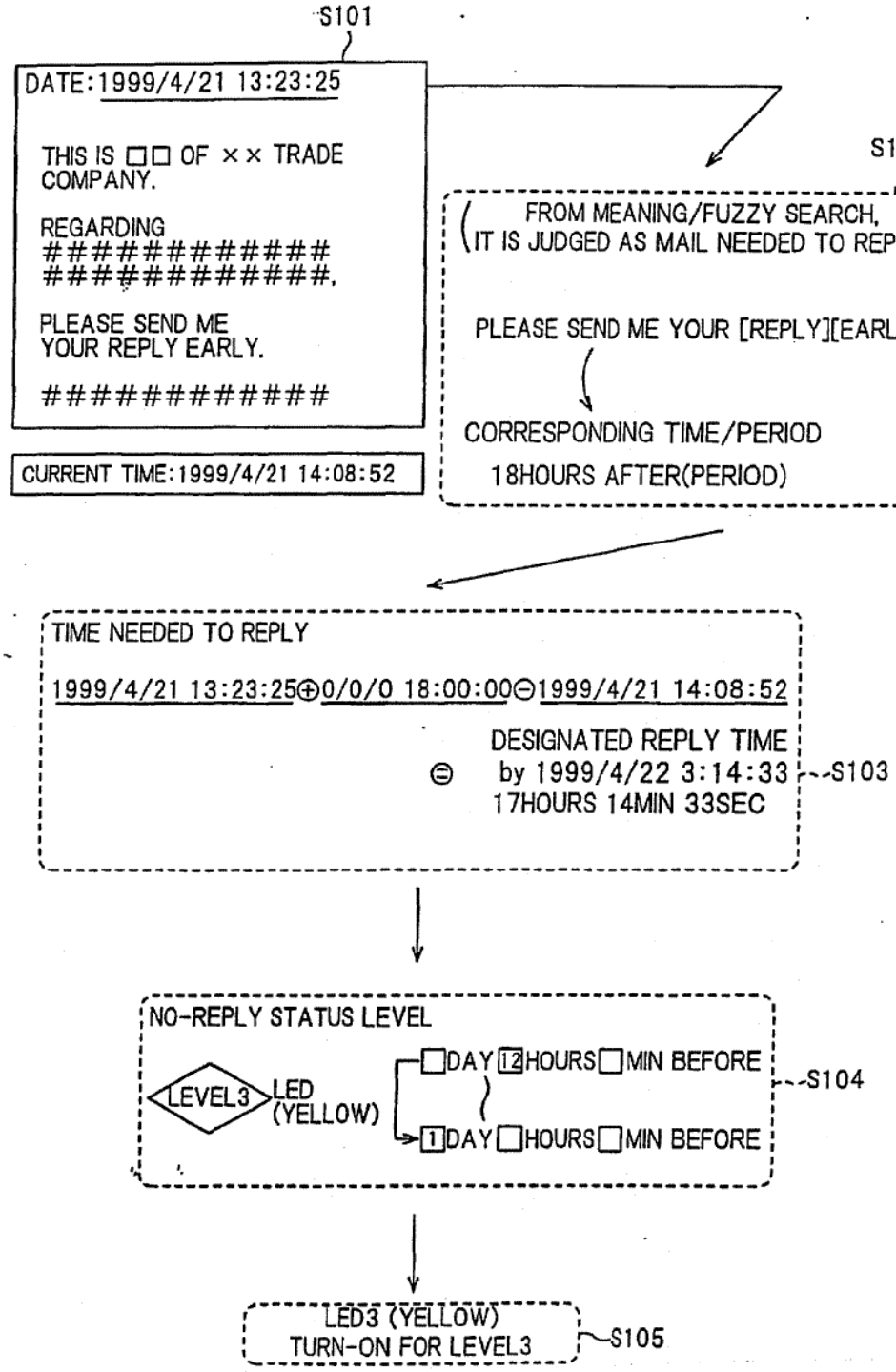
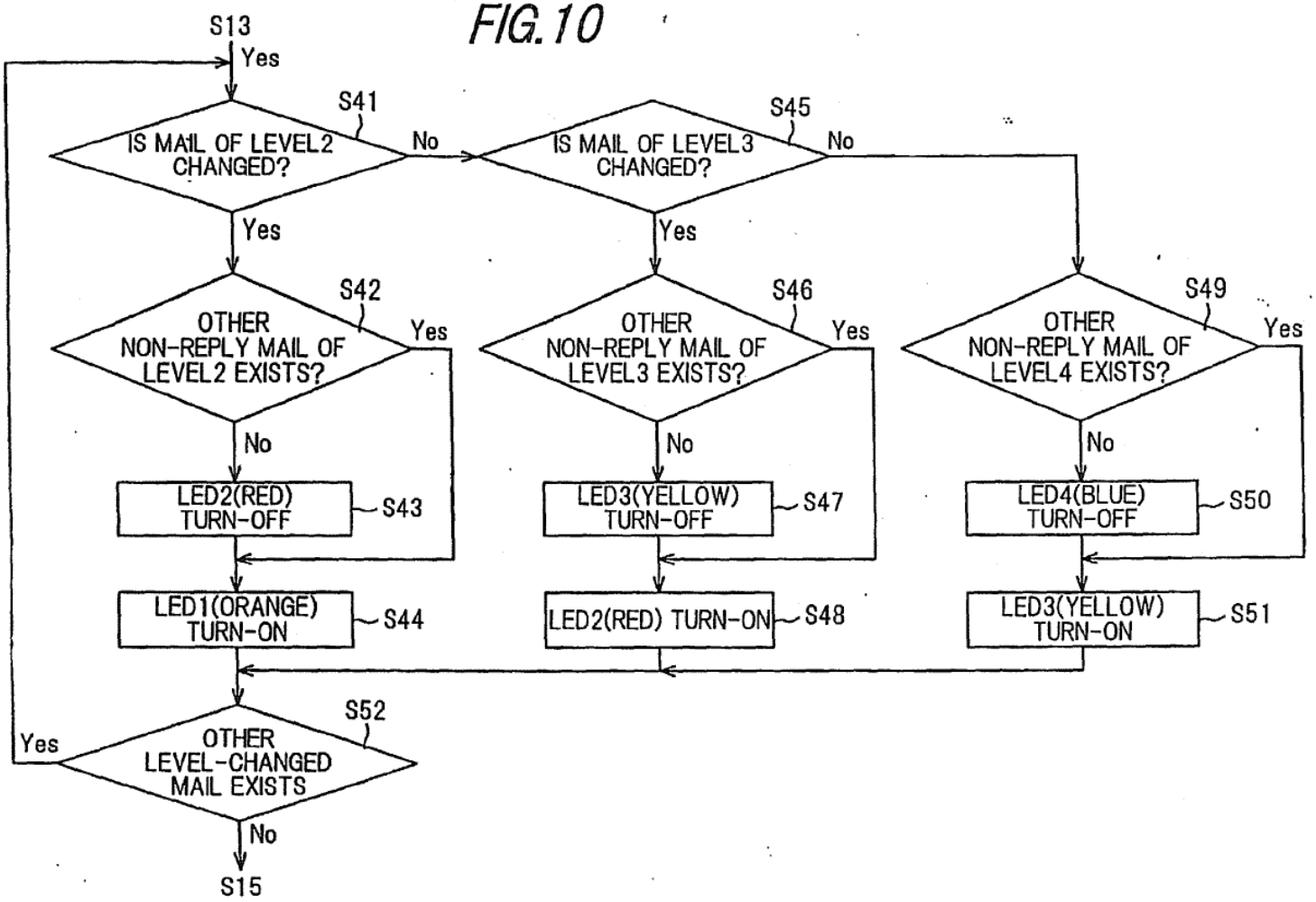

S101
DATE:1999/4/21 13:23:25
THIS IS □□ OF ×× TRADE COMPANY.
REGARDING
##########
##########.
PLEASE SEND ME YOUR REPLY EARLY.
##########
CURRENT TIME:1999/4/21 14:08:52
S102
FROM MEANING/FUZZY SEARCH, IT IS JUDGED AS MAIL NEEDED TO REPLY.
PLEASE SEND ME YOUR [REPLY][EARLY].
CORRESPONDING TIME/PERIOD
18HOURS AFTER(PERIOD)
TIME NEEDED TO REPLY
1999/4/21 13:23:25⊕0/0/0 18:00:00⊖1999/4/21 14:08:52
⊖ DESIGNATED REPLY TIME by 1999/4/22 3:14:33
17HOURS 14MIN 33SEC
S103
NO-REPLY STATUS LEVEL
LEVEL3
LED (YELLOW)
□DAY 12HOURS□MIN BEFORE
1DAY□HOURS□MIN BEFORE
S104
LED3 (YELLOW) TURN-ON FOR LEVEL3
S105

FIG. 10


S13
Yes
S41
IS MAIL OF LEVEL2 CHANGED?
No
S45
IS MAIL OF LEVEL3 CHANGED?
No
Yes
Yes
S42
OTHER NON-REPLY MAIL OF LEVEL2 EXISTS?
Yes
S46
OTHER NON-REPLY MAIL OF LEVEL3 EXISTS?
Yes
S49
OTHER NON-REPLY MAIL OF LEVEL4 EXISTS?
Yes
No
No
No
LED2(RED) TURN-OFF
S43
LED3(YELLOW) TURN-OFF
S47
LED4(BLUE) TURN-OFF
S50
LED1(ORANGE) TURN-ON
S44
LED2(RED) TURN-ON
S48
LED3(YELLOW) TURN-ON
S51
S52
Yes
OTHER LEVEL-CHANGED MAIL EXISTS
No
S15

8/13

FIG. 11

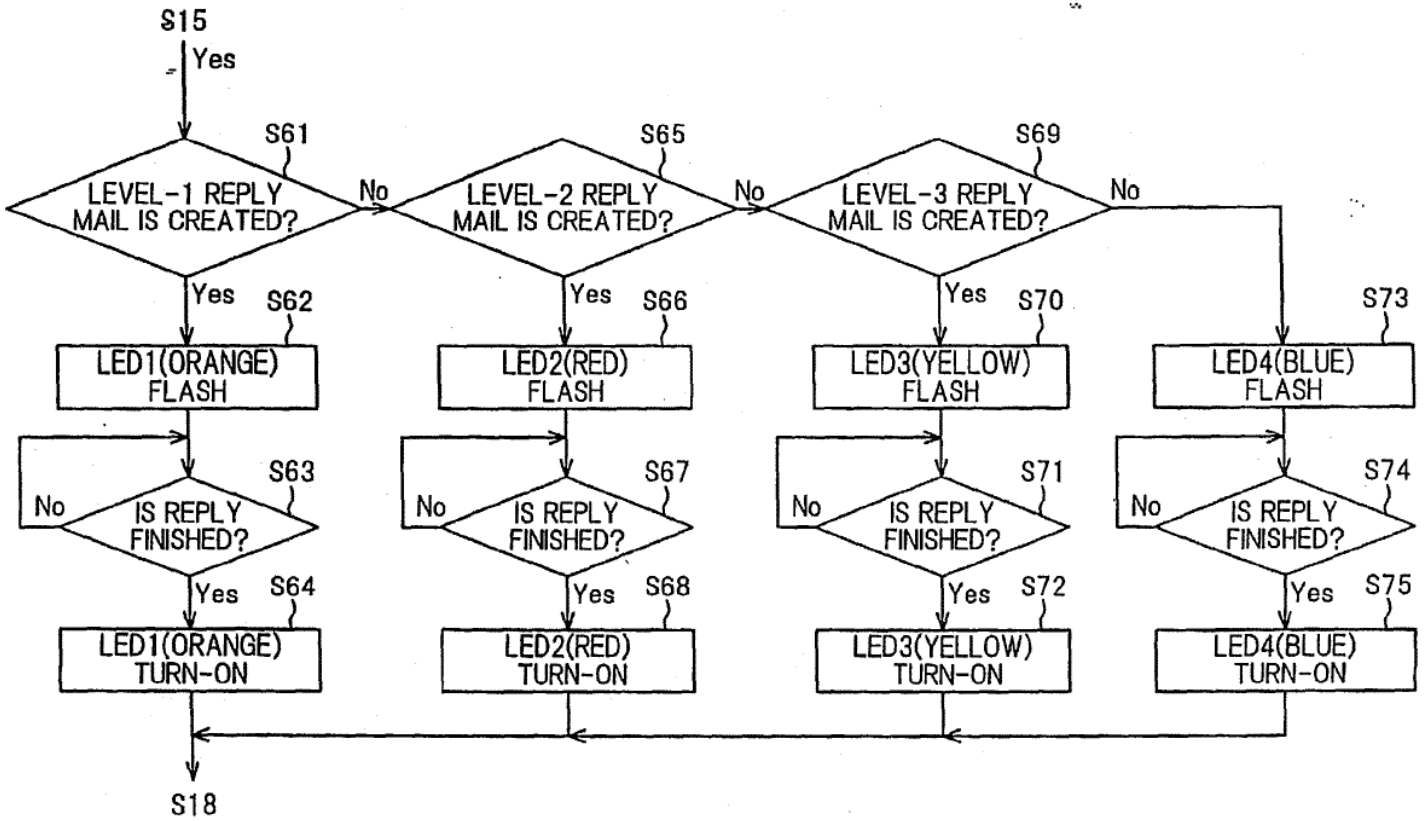

S15
Yes
S61
LEVEL-1 REPLY MAIL IS CREATED?
No
S65
LEVEL-2 REPLY MAIL IS CREATED?
No
S69
LEVEL-3 REPLY MAIL IS CREATED?
No
Yes
S62
LED1(ORANGE) FLASH
Yes
S66
LED2(RED) FLASH
Yes
S70
LED3(YELLOW) FLASH
S73
LED4(BLUE) FLASH
S63
No
IS REPLY FINISHED?
S67
No
IS REPLY FINISHED?
S71
No
IS REPLY FINISHED?
S74
No
IS REPLY FINISHED?
Yes
S64
LED1(ORANGE) TURN-ON
Yes
S68
LED2(RED) TURN-ON
Yes
S72
LED3(YELLOW) TURN-ON
Yes
S75
LED4(BLUE) TURN-ON
S18

FIG. 12

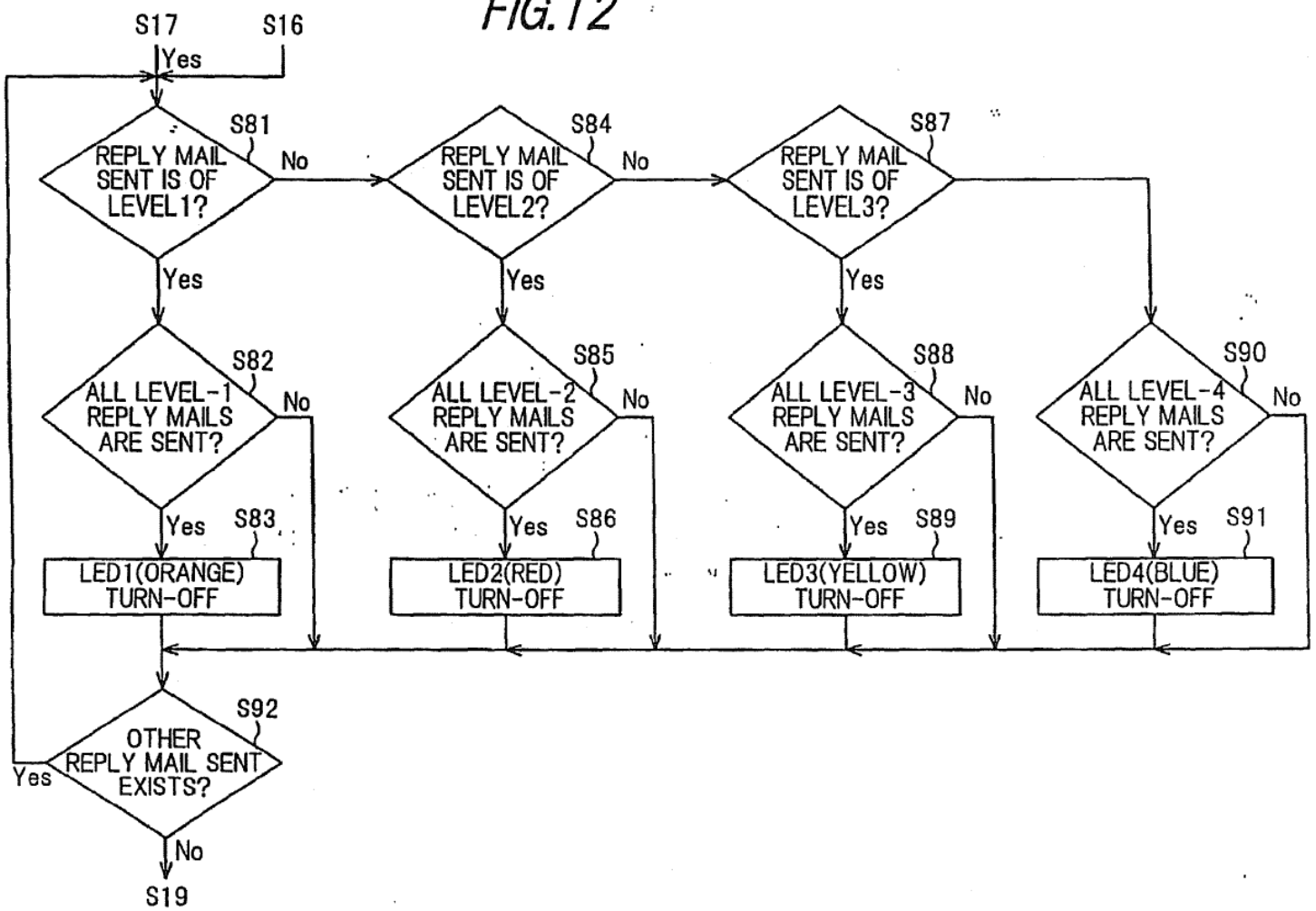

S17
S16
Yes
S81
REPLY MAIL SENT IS OF LEVEL1?
No
S84
REPLY MAIL SENT IS OF LEVEL2?
No
S87
REPLY MAIL SENT IS OF LEVEL3?
Yes
Yes
Yes
S82
ALL LEVEL-1 REPLY MAILS ARE SENT?
No
S85
ALL LEVEL-2 REPLY MAILS ARE SENT?
No
S88
ALL LEVEL-3 REPLY MAILS ARE SENT?
No
S90
ALL LEVEL-4 REPLY MAILS ARE SENT?
No
Yes
S83
Yes
S86
Yes
S89
Yes
S91
LED1(ORANGE) TURN-OFF
LED2(RED) TURN-OFF
LED3(YELLOW) TURN-OFF
LED4(BLUE) TURN-OFF
S92
OTHER REPLY MAIL SENT EXISTS?
Yes
No
S19

FIG. 13

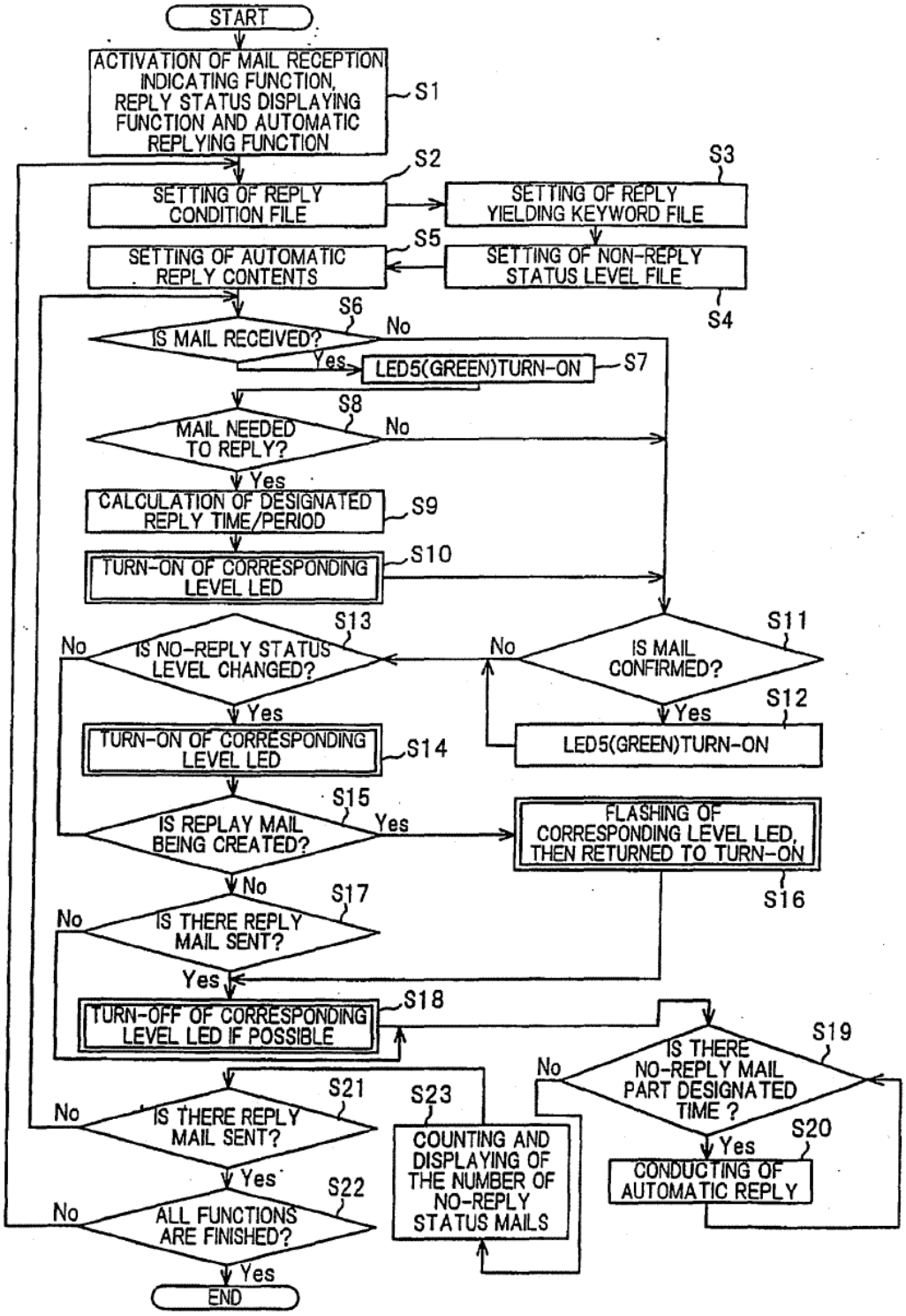
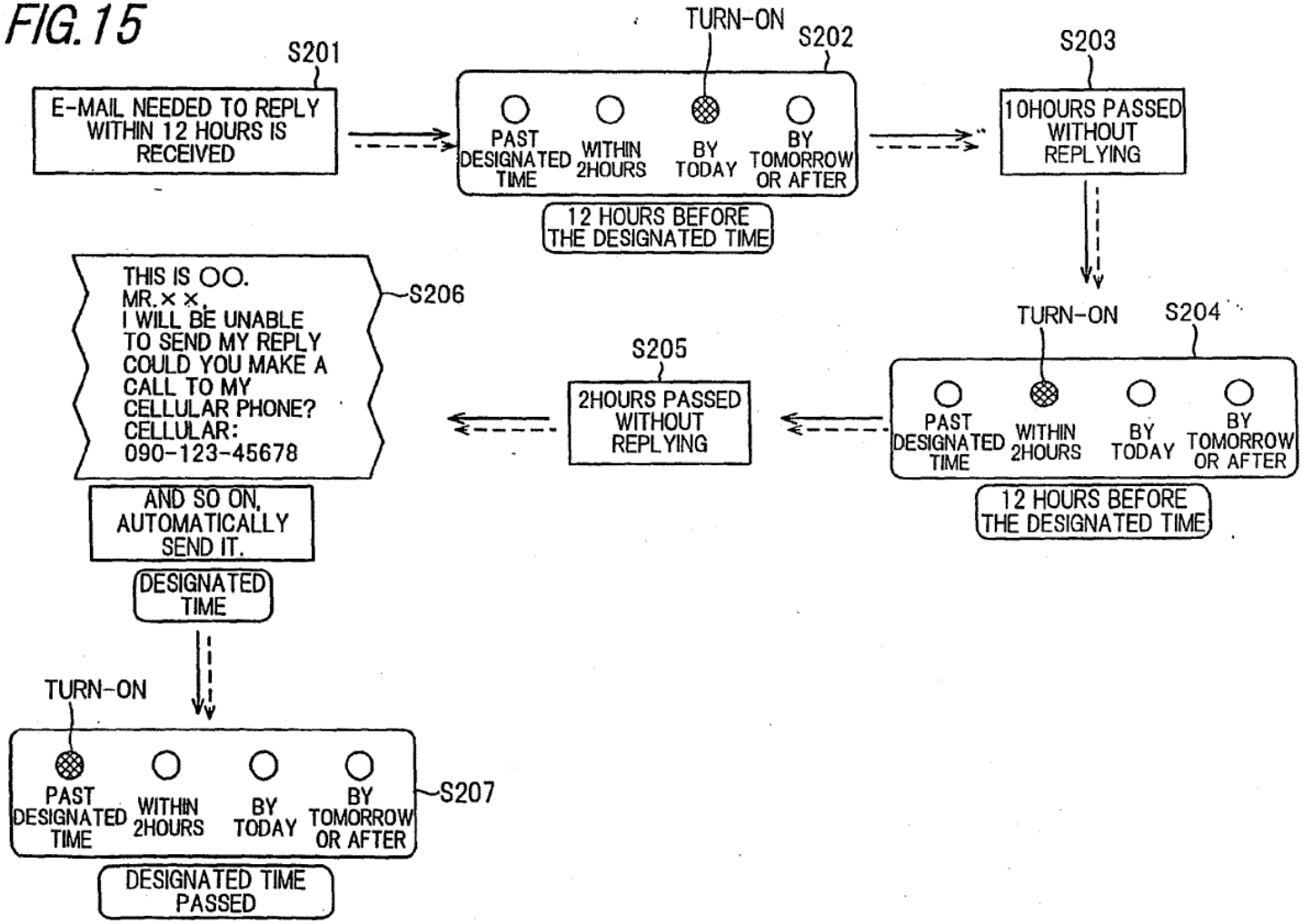

START
ACTIVATION OF MAIL RECEPTION INDICATING FUNCTION, REPLY STATUS DISPLAYING FUNCTION AND AUTOMATIC REPLYING FUNCTION
S1
SETTING OF REPLY CONDITION FILE
S2
SETTING OF REPLY YIELDING KEYWORD FILE
S3
SETTING OF AUTOMATIC REPLY CONTENTS
S5
SETTING OF NON-REPLY STATUS LEVEL FILE
S4
IS MAIL RECEIVED?
S6
No
Yes
LED5(GREEN)TURN-ON
S7
MAIL NEEDED TO REPLY?
S8
No
Yes
CALCULATION OF DESIGNATED REPLY TIME/PERIOD
S9
TURN-ON OF CORRESPONDING LEVEL LED
S10
IS MAIL CONFIRMED?
S11
No
Yes
LED5(GREEN)TURN-ON
S12
IS NO-REPLY STATUS LEVEL CHANGED?
S13
No
Yes
TURN-ON OF CORRESPONDING LEVEL LED
S14
IS REPLAY MAIL BEING CREATED?
S15
Yes
FLASHING OF CORRESPONDING LEVEL LED, THEN RETURNED TO TURN-ON
S16
No
IS THERE REPLY MAIL SENT?
S17
No
Yes
TURN-OFF OF CORRESPONDING LEVEL LED IF POSSIBLE
S18
IS THERE NO-REPLY MAIL PART DESIGNATED TIME ?
S19
No
Yes
CONDUCTING OF AUTOMATIC REPLY
S20
IS THERE REPLY MAIL SENT?
S21
No
Yes
COUNTING AND DISPLAYING OF THE NUMBER OF NO-REPLY STATUS MAILS
S23
ALL FUNCTIONS ARE FINISHED?
S22
No
Yes
END

FIG. 14

LED FOR SEGMENT DISPLAY

NUMBER OF NO-REPLY STATUS MAILS	LED DISPLAY
NONE	
ONE	
TWO	
⋮	⋮
NINE	
TEN	

FIG. 15


S201
E-MAIL NEEDED TO REPLY WITHIN 12 HOURS IS RECEIVED
TURN-ON
S202
PAST DESIGNATED TIME
WITHIN 2HOURS
BY TODAY
BY TOMORROW OR AFTER
12 HOURS BEFORE THE DESIGNATED TIME
S203
10HOURS PASSED WITHOUT REPLYING
TURN-ON
S204
PAST DESIGNATED TIME
WITHIN 2HOURS
BY TODAY
BY TOMORROW OR AFTER
12 HOURS BEFORE THE DESIGNATED TIME
S205
2HOURS PASSED WITHOUT REPLYING
S206
THIS IS ○○.
MR.××,
I WILL BE UNABLE TO SEND MY REPLY
COULD YOU MAKE A CALL TO MY CELLULAR PHONE?
CELLULAR:
090-123-45678
AND SO ON, AUTOMATICALLY SEND IT.
DESIGNATED TIME
TURN-ON
PAST DESIGNATED TIME
WITHIN 2HOURS
BY TODAY
BY TOMORROW OR AFTER
S207
DESIGNATED TIME PASSED

EMAIL-RECEPTION INDICATION DEVICE AND METHOD

FIELD OF THE INVENTION

This invention relates to a device and method for indicating reception of email, and more particularly to, a device and method for indicating reception of email while administering and classifying the received email.

BACKGROUND OF THE INVENTION

Conventional email-reception indication devices or methods are used as, e.g. administering function received emails. However, the conventional email-reception indicator was designed to indicate only reception of email. Therefore, without confirming the contents of email, it was impossible to judge whether email requiring a reply existed in the received emails. Some email-reception indication systems for solving this problem have been suggested.

Japanese laid-open Patent Application No. 6-237269 (1994) discloses an email system (hereinafter referred to as 'prior art 1'), which has a technical field similar to that of this invention. In prior art 1, it is intended to manage data items sufficiently about the deadline and information of each reply email.

Japanese laid-open Patent Application No. 7-162452 (1995) discloses an email system (hereinafter referred to as 'prior art 2') in which email-opening deadline information attached to email is used to prevent the email from being left as it is

or to prevent the validity of email from being lost.

Japanese laid-open Patent Application No.8-180004 (1996) discloses an email system (hereinafter referred to as 'prior art 3') that enables the email-receiving side to check the contents of email and to automatically prompt the user to do the reply operation. For the purpose of checking the contents of email, it is provided with some keywords stored in a keyword table to signify the request of answer or reply to email. The contents of received email are searched based on the keywords, and it is checked whether the same word as one of the keywords exists.

Japanese laid-open Patent Application No. 10-28131 (1998) discloses an email system (hereinafter referred to as 'prior art 4') that is, besides managing data items about the deadline and information of each reply email, provided with a function such that an email cannot be deleted until a reply email is sent.

Japanese laid-open Patent Application No. 10-269283 (1998) discloses an information management device (hereinafter referred to as 'prior art 5') that in case of scheduled notification email, the schedule is automatically adjusted and the reply email is sent automatically.

Japanese laid-open Patent Application No. 10-269154 (1996) discloses an email-reception indication system (hereinafter referred to as 'prior art 6') that is provided with a telop-display condition setting file, inquiring about the reception of email to a email server periodically, by conducting the

full-text search by using a file when a email is received; information concerned is extracted from an email matching the search criteria, and a telop is displayed on the display.

However, the prior art described above has some problems described below.

First, unless the monitor is turned on, it cannot be known that an email requiring sending of a reply is received. In the conventional system in which the monitor displays a telop to indicate the reception of email, the monitor has to be always turned on, if the receiver of email is to read the telop.

Second, it cannot be known by which emails require sending of a reply. Even if an important keyword selected by the receiver is input, a notification made reflecting the current time is not issued. Therefore, a telop displayed on the monitor or the contents of received email requires to be read in detail in order to know the time deadline by which a reply must be sent.

Third, even when a telop to be displayed on the monitor is confirmed by the receiver of email, it can result in a email not being sent until past the deadline by which the email requires the email to be sent. This is because, in addition to the second problem, it is not provided with a function for managing the deadlines of reply email. Therefore, the receiver of mail has to read a telop displayed on the monitor, calculate the deadline, and keep it in mind.

Also, of prior arts 1 to 6 above, prior art 1 is limited to the management of contents about the deadline or information

of each reply email. Prior art 2 is limited to the setting up of email-opening deadline information to prevent the received email from being left as it is. Prior art 3 is limited to the keyword search, where a fuzzy content search is not conducted. Prior art 4 is limited to the secure management of a reply transmission to an email received. Prior art 5 is limited to the automatic information management of a reply transmission to scheduled notification email. Prior art 6 is limited to the inquiry management to the mail server about the existence of received email.

Thus, in prior arts 1 to 6, the automatic fuzzy content search in the email is not realized. Therefore, any of the conventional email-reception indication systems (devices or methods) does not offer a sufficient management of reply email.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the preferred embodiments of the invention to provide an email-reception indication device that offers a sufficient management of reply email by an automatic fuzzy content search in received email.

According to the invention, an email-reception indication device, comprises:

an email-reception confirming means for confirming whether an email is received by an email server;

a reply judging means for judging whether an email, the reception of which is confirmed, includes a content requiring a reply;

a designated reply time/period calculating means for calculating a reply deadline by which a reply email has to be sent in response to an email judged as requiring sending of a reply by the reply judging means; and,

a reply-status indicating means for informing the receiver of email of the reply deadline calculated by the designated reply time/period calculating means.

Therefore, this device can confirm whether a received email requires sending of a reply, or, in case of a received email requiring sending of a reply, it can confirm by when or by which day the reply email has to be sent, instead of the receiver. Thus, the receiver can save the troublesome work that the receiver has to check all the contents of received email.

Also, the device may further have:

an automatic reply means for sending a reply email automatically when an email is in no-reply status even past the reply deadline; and,

a text storing means for storing in advance an email text to be sent by the automatic reply means into a file.

Therefore, when the receiver has no time to send a reply for some reason, the device can send automatically an email text made in advance by the receiver to inform the sender of being unable to send a reply.

Also, the device may have:

a word/phrase storing means for storing in advance a word/phrase to be referenced in conducting the judgement and

calculation by the reply judging means and the designated reply time/period calculating means into a file.

Therefore, the selection of email requiring sending of a reply can be automatically conducted instead of by the receiver keeping track himself. Also, by when or by which day the reply email has to be sent can be automatically calculated instead of by the receiver keeping track himself.

Also, the device may have:

a time-period setting means for assigning a time period between the reception of email and the reply deadline that is set in advance by the receiver of email to a word stored into the word storing means and for storing the assigned word into a file.

Therefore, the remaining time period by the reply deadline to be predetermined by timekeeping of the receiver himself can be detected automatically.

Also, the device may have the reply-status indicating means that is composed of multiple LEDs that indicate stepwise a remaining time period by the reply deadline to be calculated by the designated reply time/period calculating means to the receiver.

Therefore, the device can indicate by when or by which day the reply email has to be sent and how many hours remain by the reply deadline. Thus, the receiver can always confirm the information/status of received email even when the power of a monitor in a terminal device is turned off.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 1 is a block diagram showing an email-reception indication device in a preferred embodiment according to the invention, wherein a composition of a unit for email-reception indicating function, reply status displaying function and automatic replying function is shown,

FIG. 2 is an illustration showing a setting image of a reply condition setting file in FIG.1,

FIG. 3 is an illustration showing a setting image of a reply , time/period yielding keyword setting file in FIG. 1,

FIG. 4 is an illustration showing a setting image of a no-reply status level setting file 4 in FIG. 1,

FIG. 5 is an illustration showing a text example in a automatic reply contents setting file 10 in FIG. 1,

FIG. 6 is an illustration showing an example of LED composition for the display of mail-reception indication and no-reply status indication,

FIG. 7 is a flow chart showing an operation example in the embodiment of the invention,

FIG. 8 is a flowchart showing in detail step S10 in FIG.7,

FIG. 9 is an illustration showing an operation example in the embodiment in a case that a mail requiring to send a reply is received and the indication of mail-reception at corresponding level is then conducted,

FIG.10 is a flowchart showing in detail step S14 in FIG.7,

FIG.11 is a flowchart showing in detail step S16 in FIG.7,

FIG.12 is a flowchart showing in detail step S18 in FIG.7,

FIG. 13 is a flowchart showing an operation example in another preferred embodiment of the invention,

FIG. 14 is an illustration showing an example of count and display operation in the other embodiment, and,

FIG. 15 is an illustration showing an example of email-reception indication in the embodiments of the invention

DESCRIPTION OF THE PREFERRED EMBODIMENTS

An email-reception indication device and method in the preferred embodiments according to the invention will be explained below referring to FIGS. 1 to 15.

FIG. 1 shows the basic functions of an email-reception indication device in the preferred embodiment according to the invention. In FIG. 1, a composition of unit 1 for email-reception indicating function, reply status displaying function and automatic replying function is shown. As shown in FIG. 1, the unit 1 for email-reception indicating function, reply status displaying function and automatic replying function is composed of a reply condition setting file 2, a reply time/period yielding keyword setting file 3, a no-reply status level setting file 4, a email-reception confirming function section 5, a reply condition searching function section 6, a designated reply time/period calculating function section 7, a no-reply status displaying function section 8, a reply status confirming

function section 9, an automatic reply contents setting file 10, and an automatic replying function section 11.

Of the function sections above, the reply condition setting file 2 is a file to set a keyword database used to judge whether a received email requires sending of a reply when the email is received.

FIG. 2 shows an example of a setting image in the reply condition setting file 2. In FIG. 2, keywords for detecting an email requiring a reply are set, and, based on the keyword, it is searched whether a received email has contents requiring a reply. Meanwhile, the reply condition setting file 2 is predefined as a database, in which keywords can be newly added, deleted and altered.

The reply time/period yielding keyword setting file 3 is a database setting file for keywords used to calculate time or a period by or by the end of which a reply email needs to be sent, from data/time of a received email, which is an email requiring sending of a reply.

FIG. 3 shows an example of a setting image in the reply time/period yielding keyword setting file 3. Herein set are keywords about designated time/period to specify by when to send a reply, and a time/period into which such keywords are con-verted. Although in this embodiment "early" is input, even such an ambiguous word or phrase is set a particular time according to time sense of each receiver. Thereby, ambiguous words can be converted into parameters as to time, and therefore the display of reply mail status and the support of

replying to match with individual time sense are available. Meanwhile, the reply time/period yielding keyword setting file 3 is predefined as a database, in which keywords can be newly added, deleted and altered.

The no-reply status level setting file 4 is a setting file for assigning a level to indicate to which status the current time belongs comparing with the designated reply time, at intervals of arbitrary period.

FIG. 4 shows an example of a setting image in the no-reply status level setting file 4. The definition time for each level is set so that the remaining time before the designated time to send a reply email can be indicated by LED to be turned on according to each level.

The mail-reception confirming function section 5 is a function section which confirms periodically whether a receive email exists to the mail server.

The reply condition searching function section 6 is a function section which searches whether a received email coincides with the reply condition based on the database of the reply condition setting file 2, i.e., whether the received email requires sending of a reply. In the search of the received email, existing Japanese meaning/fuzzy search applications are used.

The designated reply time/period calculating function section 7 is a function section which calculates designated time/period of reply email from the current time of a terminal device and the search results of header information and

contents of received email, based on the database of the reply time/period yielding keyword setting file 3. In the recognition and conversion of word/phrase about time/period in a receive mail, existing Japanese meaning/fuzzy search applications are used.

The no-reply status displaying function section 8 is a function section which compares the calculation result of the designated reply time/period calculating function section 7 with the levels set by the no-reply status level setting file 4, turning on a LED corres-ponding to a designated reply time to indicate the reception of an email requiring sending of a reply at each level, turning on a LED until the reply email has been sent, and turning on a LED corresponding to the remaining time when no-reply status continues. Also, it has a function that flashes (flashes on and off) a LED on the level of the corresponding no-reply status during the preparation of reply email.

The reply status confirming function section 9 is a function section which confirms whether a reply email to a received email has been sent or not.

The automatic reply contents setting file 10 is a file for setting reply contents to be sent automatically. FIG.5 shows a text example of the automatic reply contents setting file 10. In FIG.5, shown is a text that a receiver of email informs the sender of mail that he cannot send a reply.

The automatic replying function section 11 is a function section which automatically sends an email that informs the

sender of being unable to send a reply, if there is an email in no-reply status even when the designated reply time passes away.

As shown in FIG.6. five LEDs are used to indicate the reception of an email requiring sending of a reply, and to display the no-reply status. The four upper LEDs (LED1 to LED4) indicate a level of no-reply status, and the lower LED (LED5) indicates reception of mail.

F1G.7 is a flow chart showing the operation of this embodiment, where steps S1 to S22 are taken as an example of procedure.

At first, the unit 1 for mail-reception indicating function, reply status displaying function and automatic replying function is booted (step S1). Then, the reply condition setting file 2 is set (step S2) as shown in FIG. 2, the reply time/period yielding keyword setting file 3 is set as shown in FIG. 3 (step S3), the no-reply status level setting file 4 is set as shown in FIG.4 (step S4), and the automatic reply contents is set while adding, deleting or altering each database (step S5).

Then, it periodically confirms to the mail server whether received email exists. When a received email exists (step S6/Yes), LED5 (green) as an email reception indication (step S7). Further, when an email requiring sending of a reply is found in the received email (step S6/Yes), it is calculated by when the email has to be sent and how many hours remain at the current time (step S9), and a LED corresponding to a level of

remaining reply time is turned on so as to indicate that an email requiring sending of a reply is received (step S10). Then, it proceeds to step S11. When no email is received (step S6/No) or when it is judged that a received email does not require sending of reply (step S8/No), it directly proceeds to step S11.

FIG. 8 is a flow chart showing in detail step S10. Namely, in comparing the calculation result on step S9 and times set by the no-reply status level setting file 4, if the email requiring a reply is at level 1 of no-reply status (step S31/Yes), then LED1 (orange) is turned on (step S32), and then it proceeds to step S38. Also when the email requiring a reply is at one of levels 2 to 4, it is processed similarly (steps S33 to S37). On step S38 it is searched whether another email requiring sending of a reply is received. If another email requiring a reply is received (step S38/Yes), it returns to step S31. If there is no email requiring to reply (step S38/No), then it proceeds to step S11. Thus, when two or more emails requiring a reply are received, step S38 does not yield "No" at one time and therefore the flow chart in FIG.8 is repeated.

FIG. 9 shows a processing flow from the reception of an email requiring a reply to the indication of reception at each level. If an email is received (step S101), the meaning search and fuzzy search of the received email are conducted (step S102). If it is judged that the received email requires the sending of a reply, a time period is detected from keywords

useful to calculate the reply time/period (step S102). Then, a designated reply time is calculated from the search results, and it is judged that the received email is at level 3 (step S104). Thus, LED3 (yellow) is turned on (step S105).

On step S11 in FIG. 7, it is searched whether the email contents are confirmed by the receiver. If confirmed (step S11/Yes), LED5 (green) for email-reception indication is turned off (step S12), and then it proceeds to step S13. If the received email is not confirmed (step S11/No), then it proceeds to step S13 while leaving LED5 (green) turned on.

On step S13, it is judged whether the level of email in no-reply status is changed. If changed (step S13/Yes), a LED before the change is turned off and a LED after the change is turned on (step S14), then it proceeds to step S15. If not changed (step S13/No), it directly proceeds to step S15.

FIG. 10 is a flowchart showing in detail step S14. Namely, if an email in no-reply status of level 2 is changed (step S41/Yes) and other email in no-reply status of level 2 does not exist (step S42/No), then LED (red) is turned off (step S43) because no email of level 2 exists. Then, LED1 (orange) is turned on (step S44), and it proceeds to step S52. If other email in no-reply status of level 2 does exist (step S42/Yes), then it proceeds to step S44 while leaving LED (red) turned on because the email in no-reply status of level 2 is left. Then, LED1 (orange) is turned on, and it proceeds to step S52. Also in case of level 3 and level 4, the change of no-reply status level is conducted similarly (steps S45 to

S51).

On step S52, it is searched whether the other email needed to change the level of no-reply status exists. If it exists (step S52/Yes), it returns to step S41 again. If it does not exist (step S52/No), it proceeds to step S15. Thus, when two or more emails needed to change the level of no-reply status are received, step S52 does not yield "No" at one time and therefore the flow chart in FIG. 10 is repeated. Meanwhile, level 1 that means the status past the designated reply time is not subject to the change of level.

On step S15 in FIG.7, it is judged whether a reply email is curently being created currently. If created (step S15/Yes), LED corresponding to the level of email created is flashed (flashed on and off) and then returns to the turn-on after sending the reply email (step S16). Then, if a LED to the level of the reply email sent is allowed to turn off, it is turned off (step S18), then it proceeds to step S19. If not created (step S15/No), if there is a reply email sent already (step S17/Yes), and if LED to the level of the reply email sent is allowed to turn off, then it is turned off (step S18), then it proceeds to step S19. If there is no reply mail sent already (step S17/No), it directly proceeds to step S19.

FIG.11 is a flow chart showing in detail step S16. Namely, if a reply email of level 1 is being created (step S61/Yes), LED1 (orange) is flashed (step S62), after the reply is finished (step S63/Yes), LED1 (orange) returns to the turn-on again (step S64), then it proceeds to step S18. While the

reply is not finished (step S63/No), step S63 is repeated. Also in case of a reply mail of level 2 to 4, the procedure is conducted similarly (steps S65 to S75).

FIG. 12 is a flow chart showing in detail step S18. Namely, if a reply email sent is of level 1 (step S81/Yes) and if there is no reply email of level 1 (step S82/Yes), LED1 (orange) is turned off (step S83), then it proceeds to step S92. Then, if other reply mail of level 1 remains (step S82/No), it proceeds to step S92 while leaving LED1 (orange) turned on. Also when a reply mail sent is of level 2 to 4, the procedure is conducted similarly (steps S84 to S91).

On step S92, it is searched whether another email sent exists. If it exists (step S92/Yes), it returns to step S81 again. If it does not exist (step S92/No), it proceeds to step S19. Thus, when two or more emails sent already exist, step S92 does not yield "No" at one time and therefore the flow chart in FIG. 12 is repeated.

On step S19 in FIG.7, it is searched whether a mail past the designated reply time exists. If it exists (step S19/Yes), the automatic reply function section turns on, and notifies the sender of mail of being unable to send a reply (step S20). Then, it returns to step S19 again, and then it is searched whether another mail past the designated reply time exists. If does not exist (step S19/No) it proceeds to step S21. When two or more no-reply status emails past the designated reply time exist, steps S19 and S20 are repeated. Also, the automatic reply function section sends only one reply for one

no-reply status mail. Namely. it does send an email informing the sender of mail of being unable to send a reply only once.

On step S21, it is searched whether all reply emails are sent. If the reply of all emails requiring sending of a reply is finished (step S21/Yes), then it is determined whether all the functions are to be finished (step S22). If it is determined to be finished (step S22/Yes), all the functions are finished. If it is not determined to be finished (step S22/No), it returns to step S2 again. Also, if the reply of all emails requiring sending of a reply is not finished (step S21/No), it returns to step S6.

Another embodiment according to the invention is explained below.

FIG. 13 is a flow chart showing the other preferred embodiment of the invention in which a function of counting and displaying the number of no-reply status emails is added to the embodiment in FIG. 7.

The function of counting and displaying the number of no-reply status emails is inserted between step S19 and step S21. Namely, if there is no email past the designated reply time (step S19/No), the number of no-reply status emails is counted and displayed (step S23), then it proceeds to step S21.

FIG. 14 shows a format for the number count and display. Namely, a LED that can be applied to the segment display is provided. If there is no no-reply status email, the LED is turned off. If one to nine no-reply status emails exist, the number is displayed by the LED. Also, if ten no-reply status

emails exist, "F" is displayed by the LED. For the processing of step S23, the reply status confirming function section 9 and the no-reply status displaying function section 8 are used.

When an email is received, the meaning search and fuzzy search to the full text are conducted, and it is searched whether the received mail requires sending of a reply. Also, when an email requiring sending of a reply is received, it is calculated by when the reply email has to be sent, and designated reply time is calculated by using the results of meaning search and fuzzy search to the full text. For the meaning search and fuzzy search to the full text, a keyword database, which can be newly added, deleted and altered optionally by the receiver, is provided in advance.

If it is judged that the received email is needed to send a reply, a LED is turned on so as to inform that an email requiring sending of a reply is received. Also, the LED stays on until the reply email is sent, and after the reply is finished, it turns off. The indication in reception of email requiring a reply is such as "past the designated reply time", "two hours before the designated reply time", "by today" and "by tomorrow or after". Thus, levels based on the remaining time period by the designated reply time are set, and multiple LEDs are used to indicate each of the levels. Also, when no-reply status continues, an LED corresponding to the remaining time period is turned on.

If the receiver of email does not send a reply after the designated reply time, then a reply email to inform the e-mail

sender of being unable to send a reply is sent automatically.

FIG. 15 illustrates an example of display in operation. First, when an email requiring sending of a reply is received (step S201), it is detected that an email requiring sending of a reply is received, the designated reply time/period is calculated, a LED is turned on so as to indicate reception at each level (step S202). Then, if time elapses in no-reply status, the turn-on of an LED as reception indication is switched to a no-reply status level corresponding to the remaining time period until the designated reply time (steps S203 to S205). When it comes to the designated reply time in no-reply status, it informs the sender of email of being unable to send a reply (step S206). Finally, in this example, a LED to indicate that it is past the designated reply time is turned on (step S207), since the no-reply status continues even past the designated reply time.

Although the invention has been described with respect to specific embodiments for complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modification and alternative constructions that may occur to one skilled in the art which fairly fall within the basic teaching here is set forth.

Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

The text of the abstract filed herewith is repeated here

as part of the specification.

An email-reception indication device has a email-reception confirming section for confirming whether an email is received by a mail server or not; a reply judging section for judging whether an email the reception of which is confirmed by the mail-reception confirming section includes a content to require a reply or not; a designated reply time/period calculating section for calculating a reply deadline by which a reply email has to be sent in response to an email judged as requiring to send a reply by the reply judging section; and a reply-status indicating section for informing the receiver of email of the reply deadline calculated by the designated reply time/period calculating section.

What is claimed is:

1. An email-reception indication device, comprising:

an email-reception confirming means for confirming whether an email is received by a email server;

a reply judging means for judging whether an email, the reception of which is confirmed, includes a content requiring a reply or not;

a designated reply time/period calculating means for calculating a reply deadline by which a reply email has to be sent in response to an email judged as requiring sending of a reply; and,

a reply-status indicating means for informing the receiver of the email of the reply deadline.

2. An email-reception indication device, according to claim 1, further comprising:

an automatic reply means for sending a reply email automatically when an email is in a no-reply status past the reply deadline; and,

a text storing means for storing in advance an email text to be sent by said automatic reply means into a file.

3. An email-reception indication device, according to claim 1, further comprising:

a word/phrase storing means for storing in advance a word/phrase to be referenced in conducting the judgement and

calculation by said reply judging means and said designated reply time/period calculating means into a file.

4. An email-reception indication device, according to claim 1, further comprising:

a time-period setting means for assigning a time period between the reception of email and the reply deadline that is set in advance by the receiver of email to a word stored into said word storing means and for storing the assigned word into a file.

5. An email-reception indication device, according to claim 1, wherein:

said reply-status indicating means is composed of multiple LEDs that indicate stepwise a remaining time period by the reply deadline to be calculated by said designated reply time/ period calculating means to the receiver.

6. An email-reception indication method, comprising:

an email-reception confirming step to confirm whether an email is received by a mail server;

a reply judging means step to judge whether an email the reception of which is confirmed in said email-reception confirming step includes a content requiring a reply;

a designated reply time/period calculating step to calculate a reply deadline by which a reply email has to be sent in response to an email judged as requiring a reply; and,

a reply status indicating step to inform the receiver of email of the reply deadline calculated in said designated reply time/period calculating step.

7. An email-reception indication method according to claim 6, further comprising:

an automatic reply step to send a reply email automatically when an email is in no-reply status past the reply deadline; and,

a text storing step to store in advance an email text to be sent in said automatic reply step into a file.

8. An email-reception indication method, according to claim 6, further comprising:

a word/phrase storing step to store in advance a word/phrase to be referenced in conducting the judgement and calculation in said reply judging step and said designated reply time/period calculating step into a file.

9. An email-reception indication method, according to claim 6, further comprising:

a time-period setting step to assign a time period between the reception of email and the reply deadline that is set in advance by the receiver of email to a word stored in said word storing step and to store the assigned word into a file.

10. An email-reception indication method, according to

claim 6, wherein:

said reply-status indicating step is conducted using multiple LEDs that indicate stepwise a remaining time period by the reply deadline to be calculated in said designated reply time/period calculating step to the receiver.

11. An email-reception indication device substantially as herein described with reference to and as shown in the accompanying drawings.

12. An email-reception indication method substantially as herein described with reference to and as shown in the accompanying drawings.

The Patent Office

INVESTOR IN PEOPLE

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Claims searched: 1 to 12 **Date of search:** 2 October 2000

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): H4P (PQA) H4K (K0D4)

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Other: ONLINE: WPI, PAJ, EPODOC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	JP8180004 (CASIO COMPUTER CO LTD), PAJ abstract and WPI abstract Accession No. 1996-375898	X: 1,3,6 and 8 Y: 2 and 7
X	JP11004251 (HITACHI LTD), PAJ abstract and WPI abstract ACCESSION No. 1999-127844	2 and 7

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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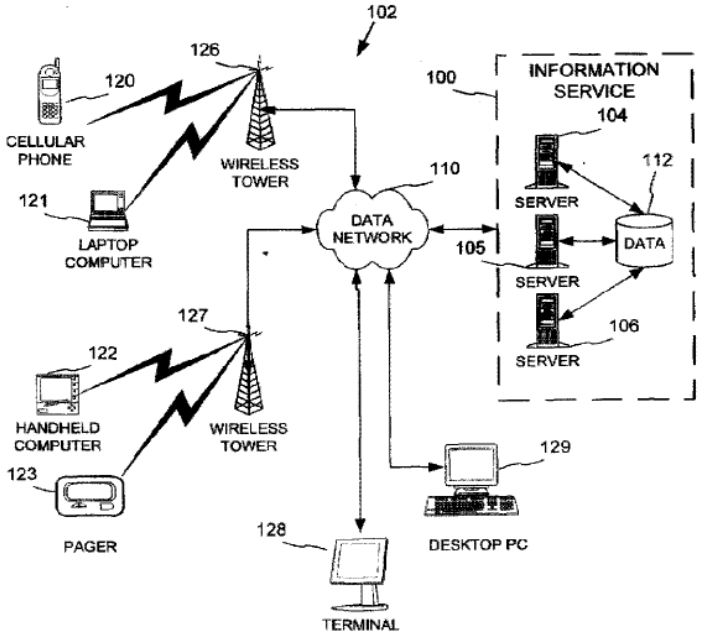
(54) Place-specific buddy list services

(57) An information service provides search and notifications to inform when certain people (e.g., friends, family, business contacts, etc.) are nearby so as to facilitate communications with those people. Users may define lists of people whose locations may be tracked by positioning equipment based on personal communications/computing devices carried by the people. The information service processes this people and place data to identify those of the listed people that are in the user's vicinity, and provide notifications and user-initiated search results informing the user such as via the user's personal communications/computing device.

FIG. 1



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Description

TECHNICAL FIELD

[0001] This invention relates to communications and messaging systems and services, and more particularly to such systems and services to facilitate communication based on location and inter-relationships of people.

BACKGROUND AND SUMMARY

[0002] Wireless telecommunications in the form of pagers, cell phones and their supporting communications networks have led to changes in the ways that people meet, socialize and communicate. The market penetration of cell phones in parts of Europe has resulted in cell phone ownership being a norm, rather than an exception. This circumstance has lead to changes in the ways that people, particularly the young, arrange to meet for social interaction. It is now common, for example, that a person will initially contact a friend or friends via cell phone, and after inquiring of each other's present location, mutually decide on an intermediate meeting place (such as a coffee shop, restaurant, mall or park) for further in-person social interaction. By contrast, prior means of communication did not support such ad-hoc, spontaneous meeting and gathering. In-person meetings previously might depend upon chance encounters of friends in public places, prior arrangement (e.g., via voice mail, message on a bulletin board, etc.), exhaustive searching (e.g., visiting or telephone calling several locations where the friend(s) are routinely found), etc.

[0003] Yet, current mobile telecommunications technologies still do not adequately facilitate people's social interaction. The just-described initiating of in-person meetings via cell phone is limited in that the friend or friends called may be geographically distant (e.g., in a remote part of the community, or even "out-of-town") or otherwise occupied, while other friends not called may be immediately available and "just-around-the-corner." This lack of information results in many missed opportunities for in-person social interaction. Further, this one-to-one cell phone calling requires an exponentially increasing number of interactions as the group size increases.

[0004] Other known telecommunications technologies also fail to focus on or solve this problem of facilitating opportunities for in-person meeting. For example, several companies now provide instant messaging services on the Internet (e.g., the MSN Messenger of Microsoft Corporation, ICQ, the AOL Instant Messenger of America Online, Inc., Yahoo Messenger, etc.). These instant messaging services facilitate communications via private Internet "chat" (i.e., exchange of instantaneous person-to-person text messages over the Internet). The users first construct lists of other users who have mutually agreed to participate in instant messaging with each other. The users also are required to download and install a client software program on their computers used for Internet access. Upon the computer logging on to the Internet, this client software program notifies an instant messaging server operated by the providing company that the respective user is on the Internet. A user can also set an availability indicator, e.g., to indicate she is "on the phone." The users are then notified by the instant messaging server which users on their lists are "on-line" and available for instant messaging "chat." More generally, users are alerted to the on-line state of their friends, e.g. which are "online", "busy" or "on the phone." Although useful for promoting communications between remotely located users of the Internet, these instant messaging services also fail to facilitate opportunities for in-person meeting.

[0005] Also available is a match-making device, called the "Lovegety." This key-chain suspended, egg-shaped device comes in male (blue) and female (pink) versions, and can be set to any of three modes indicating its user's desire for "talk," "karaoke," or "get2" (i.e., romance). When opposite gender models come within transmission range (i.e., about 15 feet), the devices emit an audible alarm. Also, if the two models are set to the same mode (such as, both on "talk" mode), the devices flash green. Again, the Lovegety fails to adequately facilitate opportunities to socialize in-person with friends and others known to you.

[0006] The present invention is directed towards providing user-contextual information services based on place and people via mobile telecommunications devices, such as to facilitate in-person social interaction with those that the user has established relationships. In an embodiment of the invention-described herein, a place-specific buddy list service is an information service provided to users on a data communications network, which may be a wireless telecommunications network accessed by users from mobile personal information devices such as cell phone, pager, personal digital assistant (PDA), notebook computer, handheld computer, or other mobile personal embedded networked computing and/or telecommunications device - although other access devices and communications mediums also can be used. The information service processes information as to the people with whom the user has established relationships and the location of those people as reported by their mobile personal devices, so as to then provide place-specific people notifications to the user as well as user-initiated search results. The notifications and search results may take the form of an audible alarm, voice, textual display, or graphical display, among others.

[0007] In one alternative of the invention, the information service tracks a people/place state for each user, which contains a set of people (e.g., other users) and information of their locations (which also may include other "presence" information, such as availability and visibility). Preferably the set of people has the form of a buddy list, which is a list of other users that are known

to the user and have mutually consented to be added to each other's buddy lists. The information service also tracks a location state for each user, such as by having each user's mobile device report that user's location to the information service. As any user moves location, the information service updates that user's location state, and also updates any people/place states whose set of users includes the moved user. When any user's people/place state changes, the information service generates a state change event which may trigger notifications to the user.

[0008] In another alternative, the user can set rules and/or parameters to control when notifications are generated based on a change event to the user's people/place state. For example, a user may set a proximity parameter designating that notifications are provided only when the other users on his or her buddy list are within a certain proximity (e.g., within a same building complex, within a certain number of miles or kilometers, etc.). As further examples, the user may set rules or parameters to enable or disable notifications, such as to prevent interruption when the user is in a meeting, involved in a task, etc.

[0009] In still another alternative, the user can set rules and/or parameters to control when information of the user's location is allowed to change other users' people/place states or result in notifications to such other users. For example, a user can set a "visibility" parameter to either a "visible" value which enables information of the user's location to change other users' people/place states, or an "invisible" value in which the user's location is not revealed in notifications to other users.

[0010] In yet another alternative, the user can segregate the other users tracked in his or her people/place state into separate subsets, such as subsets of family, friends, business contacts, co-workers, etc. Further, the user can set the rules and/or parameters that control notifications to also be based on the subset of the other user who moved. For example, the user may set a rule to receive people/place notifications as to business contacts and co-workers at certain times (e.g., during business hours), or as to family and friends at other times (e.g., evenings and weekends).

[0011] In another alternative, the system can use default rules and/or observation of user behavior to infer the user's situation and preferences.

[0012] In a further alternative, the user can define various modes consisting of a set of rules and/or parameters controlling the place-specific buddy list service, and set their mobile device to apply a selected one of the modes. For example, the user might define a social mode where notifications as to anyone on their buddy list within a larger proximity are received and the user is visible to others; a business mode in which only notifications of their business contacts and co-workers in the same building are received and the user is visible to only their business contacts and co-workers, and a private mode in which the user is visible to only a select subset of other users.

[0013] In still a further alternative, the information service can measure the location of users and their proximity based on geographical coordinates, such as may be provided by a global positioning system. Alternatively, the information service can measure location and proximity based on a place naming schema or place names registry, which may be hierarchical. This place naming registry preferably is authoritatively managed by a registry provider.

[0014] In yet a further alternative, the information service can apply default rules and/or parameters as to state change events, notifications and alerts based upon the user's location or other place-specific context. For example, default rules can be applied in a movie theatre, conference room, etc. to disallow notifications via audible alarms; or on an airplane to disallow radio transmission of the state change events, notification or alerts to the user's device during take-off and landing procedures.

[0015] In another alternative, the information service can be operated and provided by an entity as part of a business venture, which may generate revenue from such operation based on usage fees, subscription fees, advertising fees such as for delivery of commercial promotions along with the information service notifications and alerts, or promoting auxiliary services that generate revenue along with the information service operation.

[0016] Additional features and advantages will be made apparent from the following detailed description of the illustrated embodiment which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Figure 1 is a block diagram depicting a communications system in which a place-specific buddy-list information service according to one embodiment of the invention operates.

Figure 2 is a conceptual block diagram of search and notification operations provided by the place-specific buddy-list information service of Figure 1.

Figure 3 is a block diagram depicting a data structure for representing a people and place state within the place-specific buddy-list information service of Figure 1.

Figure 4 is a data flow diagram of a search operation of the place-specific buddy-list information service of Figure 1.

Figure 5 is a data flow diagram of a notification operation of the place-specific buddy-list information service of Figure 1.

Figure 6 is a block diagram of a basic configuration of a computer may be used to run the information service of Figure 1.

Figure 7 is a diagram of computers that provide an

authoritative names registry and proximity-based search engine for use in the place-specific buddy-list information service of Figure 1.

Figure 8 is a listing of dimensions in the authoritative names registry of Figure 7.

Figure 9 is a listing of a name registered under a dimension of the authoritative names registry of Figure 7.

Figure 10 is a diagram of a hierarchical organization of names in a dimension of the authoritative names registry of Figure 7.

Figure 11 is a view of a user interface screen display on the client device of Figure 7, with which a user can initiate a proximity-based search.

DETAILED DESCRIPTION

[0018] In the following detailed description, one implementation of a user-contextual information service based on place and people via mobile telecommunications devices according to the invention is embodied in a place-specific buddy-list information service. The place-specific buddy list information service supports searches based on people and place, and provides notifications or alerts also based on people and place. For example, the place-specific buddy list service provides notifications and alerts to a user that other users enumerated in the user's buddy list are within a given or selected proximity to the user, so that a spontaneous in-person meeting or like social interaction can then be arranged.

[0019] With reference to Figure 1, the place-specific buddy list information service 100 in an operating environment 102 of an illustrated embodiment of the invention is implemented in server application software run on a server computer or group of servers 104-106 connected on a distributed data communications network 110. The information service 100 tracks users of the information service and their locations in a people/place database 112. The information service 100 also may track locations of other place-specific resources (e.g., other data services, controllable devices, merchants offering particular products in a certain venue, etc.) on the data communications network, so as to provide auxiliary information as to these other place-specific resources along with the place-specific buddy list information. Some of this information may be obtained from third parties.

[0020] Users of the information service 100 access the information service from mobile personal networked computing or telecommunications devices 120-123, such as cell phones, personal digital assistants, handheld and laptop computers, electronic book or tablets, smart cards, electronic badges, and etc. Preferably, these mobile devices communicate with the information service on the data communications network 110 through a wireless networking and communications system (e.g., including wireless transmission/reception towers 126-127). The mobile devices 120-123 and information service can use standard data networking protocols for data communications on the network 110, such as TCP/IP, HTML, XML, HTTP, DNS, LDAP, and/or others. Alternatively, the data communications network also can encompass data communications technologies that may not provide constant or mobile wireless connections. In one alternative, the data communications network can use a short-range wireless technology, such as Bluetooth (which provides a point-to-point connection), for communicating the information service notifications (for example, to discover others on the user's buddy list in a large conference room). In another alternative, the user may intermittently connect on the data communications network and information service, such as use of a smartcard on a web kiosk 129 to access and receive notifications from the information service, where the user would only be connected and networked with the information service for the duration of the user's session at the kiosk.

[0021] The personal mobile data communications devices 120-123 and/or the data communications network 110 also are equipped with location detecting capability to determine the locations of the individual personal mobile devices, so as to thereby infer the position of their users. This location detection capability can be provided by equipping the individual personal mobile data communications devices 120-123 with a Global Positioning System (GPS) receiver, which detects the personal mobile communications device's location based on signals transmitted from GPS transmitters. Alternatively or additionally, the data communications network 110 can include equipment to determine the personal mobile data communications devices' locations by performing a triangulation process (or like location determination) based on the strength of the data communications or other signal transmitted from the personal data communications devices and received at nearby wireless towers 126-127. Alternatively or additionally, the user may provide location information by direct input, for example by entering (by speech, text, or bar-code or other machine readable data scanning) an intersection or venue name or other location-identifying information.

[0022] The locations of the personal mobile data communications devices 120-123 are reported to or polled by the information service 100, which uses this information to track the location of the devices' users in the people/place database 112. The personal mobile data communications devices' locations can be reported to the information service at periodic intervals, or alternatively may be reported whenever the location changes by a significant threshold amount. The interval and/or threshold amount are parameters that may vary depending on the design criteria of the application, or system. Alternatively, the locations can be reported to the information service in response to polling by the information service.

[0023] The information service 100 processes the information as to the users and their locations stored in

the people/place database 112 so as to respond to search queries and provide alerts or notifications of changes. The users preferably can submit search queries and/or subscribe to alerts/notifications from their personal mobile data communications devices 120-123. Alternatively and/or additionally, the users may submit search queries and subscriptions from other computing and/or telecommunications devices connecting to the data communications network 110, which may include personal computers, telephones, and like stationary devices as well as mobile devices. For example, a user can submit a request using a personal computer to receive notifications on their mobile device (such as a pager) that users on his or her buddy list are nearby.

[0024] With reference now to Figure 2, the information service 100 is implemented using an inference engine 200. The inference engine 200 is realized in software running on the server computers 104-106 (Figure 1), and utilizing the people/place information in the database 112 (Figure 1). The inference engine 200 operates to infer which resources 210 (i.e., principally people, both individuals and groups, but also locale-specific data, services, devices, and etc.) tracked by the service may be of interest to a user given that user's "place context" 220 (i.e., the user's location, but also optionally including other place-specific information such as whether the place is the user's home or place of work, etc.). The inference engine 200 processes information from the people/place database 112 to produce these inferences for both user-initiated searches and notifications triggered by events other than user requests (e.g., change in location of the user or of people on the user's buddy list). The resulting inferences are then conveyed to the user, preferably to a client software application on the personal mobile data communications device of the user.

[0025] As shown in Figure 2 for example, the three users A, B and C are considered to be part of the resources 210 tracked by the inference engine 200 for drawing inferences. Each of these users A-C also has a place context 220. The place context is a set of attributes based on a user's location; along with information of the user's location, the attributes may include user persona/task/preferences/etc., applicable social circle, available devices, networks and services and so on. A particular user may have more than one concurrent place context, e.g. as a parent with children in a mall and as an employee working on a particular project in a city in a particular sales region. Based on the place context of a user who is the subject of a search or notification, the inference engine operates to determine or identify other resources that are nearby according to a proximity measure. When the user A is at home for example, the inference engine determines that the user C who also at home with user A is nearby, and identifies the user C as a nearby resource in response to the search query or in a notification to the user A. The inference engine may also identify other resources relevant to the user in the particular place context, such as a place-specific data file 212 (which may be a text, audio, image or video, such as of a message left for the user upon arrival at the place), service, device, database 214, etc. As the user A then moves location into public places, his or her place context changes, such that the inference engine infers other resources are nearby (e.g., user B, data file 216, and database 218). The inference engine then returns the inferred resources as results to a search query or in notifications.

[0026] The users' place contexts and the resources preferably are identified to the information service 100 and its inference engine 200 by a set of values or attributes. These attributes include at least the identity of the user (or resource), and of the user's (or resource's) location. Additionally, other attributes relating to place and the user/resource can be included, such as to identify group(s) of people (e.g., a buddy list), relationship (e.g., family, friend, co-worker, client, etc.), an activity or event that takes place at the location or in which the person participates, purpose or role that the place serves for the person (e.g., home, work or public place), and etc. These attributes conceptually define a point or range of points in a multi-dimensional space 240, 241 that the inference engine can use to measure proximity of the resources (including individuals and groups) to a user's current place context, such as by distance in the conceptual space 240, 241. (The dimensional space of the user and of the resources is, in effect, a single space, where the user's context is a resource to another user.) Because the multi-dimensional space 240, 241 includes dimensions other than just physical space, this measurement of proximity in terms of distance in the conceptual multi-dimensional space is based also on the other attributes of the resources and user place context in addition to geographical location. In one embodiment, this set of attributes can be a set of names from a multi-dimensional authoritative names registry, such as described more fully below.

[0027] With reference now to Figure 3, the information service 100 (Figure 1) maintains data in the database 112 (Figure 1) for drawing the proximity inferences depicted in Figure 2. In a preferred embodiment, this data takes the form of a per-user, people/place state 300. The people-place state 300 includes a set of database records maintained for a user of the information service 100. This data set includes a user record 302, one or more buddy lists 310, 311, and place context records 320-324 of listed individuals (or groups).

[0028] The user record 302 stores data representing a user of the information service 100, such as the user A of Figure 2, about whom the inference engine will draw place and people-specific inferences for searches and notifications. The user record 302 includes place context data 304 for the user, and links to any buddy lists 310-311 that have been defined for the user. As described above, the information service 100 updates the user's place context data when new location information

is reported for the user based on position sensing equipment in the user's personal mobile data communications device, or in the communications network.

[0029] The buddy lists 310, 311 enumerate a set of people (e.g., other users) about whom the user desires to be informed by the information service 100. The buddy lists preferably are created via a process involving an exchange of text messages between the user and each person on the buddy list, in which the people consent to the information service providing their place-specific information to the user. Preferably, the user can organize people into multiple groups (e.g., with multiple buddy lists, or alternatively by adding a classification attribute to each person), such as lists of friends, co-workers, family, clients/customers, etc.

[0030] The people/place state 300 further includes place context data 320-324 for the people on the user's buddy lists 310, 311. The people's place context data indicates their location, and possibly other place-related attributes (e.g., type of locale, such as work, public place, airplane, which may allow for further place-specific processing for notifications and searches by the information service). Again, the information service 100 updates the people's place context data whenever changes are reported, such as from positioning equipment on the people's personal mobile data communications devices or the communication network.

[0031] Preferably, the information service implements the described people/place state 300 using distributing computing with a publish/subscribe eventing model. For example, a presence server for the user's "buddy C" receives location updates from the buddy C's mobile device or other location tracking method, and provides the buddy C place context data 322. The computer that maintains the people/place state 300 of the user A (which may be resident on another server of the information service 100, or on the user A's personal mobile data communications device or other client computer) subscribes to receive notifications of this buddy C place context data 322 from the buddy C's presence server. When a change to the buddy C's location or other presence information (e.g., availability) occurs, the buddy C presence server sends a notification to all that have subscribed, including to the user A. This then updates the buddy C place context 322 in the user A people/place state 300, which may result in alerts being presented to the user A.

[0032] With reference to Figure 4, the information service 100 provides a user-initiated search operation-400. In the search operation 400, the locations of the user (e.g., person A) and those on the user's buddy list (s) (e.g., people B, C and D) are first tracked (as indicated at 401) in the people/place state data 300 in the database 112 of the information service. When desired, the user can then submit (at 402) a search query to the information service 100, such as by entering a query or activating an application software feature that uses the search query on the user's personal mobile data communications device. The submitted query can include parameters to control the query scope, such as which people (e.g., friends or co-workers) to include in the search, the proximity threshold, etc. Upon the user initiating the search operation via the query submission, the information service 100 processes the people/place state data 300 at 403, 404 to determine which of the people B-D on the user's buddy list(s) are within a selected proximity of the user (e.g., people B and C in Figure 4). The information service 100 at 405 finally returns results of the search operation to the user.

[0033] With reference now to Figure 5, the information service 100 also supports notification operations 500. In a notification operation, the locations of the user and those on the user's buddy list(s) again are tracked in the people/place state data 300 associated with that user in the database 112. Upon an update to the people/place state data 300 in which the relative locations of the user and/or those on the user's buddy list(s) change, the information service 100 determines which people are in the user's proximity based on the notification parameters at 502, and then formulates and transmits a notification message to the user at 503 (i.e., to the user's personal mobile data communications device for appropriate presentation to the user). With reference again to Figures 4 and 5, the information service 100 preferably supports a variety of service parameters 550 to control the people and place-based information provided by the information service in searches and notifications. These parameters can be designated explicitly by the user, or alternatively provided implicitly. For example, one or more parameters can be implicitly set based on the activity in which the user is currently engaged as specified in the user's electronic calendar, so that notifications can be providedon different bases for a business meeting as opposed to a church or club social. As another example, default parameters can be provided for different locations, such that notifications are provided on a different basis in a movie theatre, than in a shopping mall or library. Further, the system can infer default parameters for the notifications based on observation of user behavior, which system inferences can be implemented as described by E. Horvitz, A. Jacobs, D. Hovel, Attention-Sensitive Alerting, Proceedings of UAI '99, Conference on Uncertainty and Artificial Intelligence, July 1999, pp. 305-313. The parameter settings for a user can be stored by the information service 100 in the database 112, or alternatively can be stored in a "cookie" or like client-side storage in the user's personal mobile data communications device or can be stored as settings for a client software application (such as may provide a graphical user interface to the user for accessing the information service from a client device).

[0034] One such parameter sets a proximity threshold within which people (or other resources 210 of Figure 2) are to be considered proximate to the user by the information service for purposes of responding to a search or providing notifications. This proximity parameter can

have the form of a geographic distance threshold, e.g., a radius in miles or kilometers, within which the people or resources must be located to be considered in proximity to the user. In alternative embodiments of the information service, the information service can employ a database or databases of detailed place information (e.g., place data 570), so as to allow proximity parameters, such as same city/town/neighborhood, same venue, same building, same room, and the like. With such alternative proximity parameters, the information service 100 considers the people or resources to be in the user's proximity if the place database information indicates their locations are within the scope indicated by the parameter.

[0035] Preferably, the information service supp that different people have different proximity thresholds. This applies both the degree to which a user discloses their location to others, and the relevance of another's location relative to the user. In the first case, a user may provide very accurate information to trusted individuals (e.g. location to 10 meter resolution to family members) and less accurate data to others (e.g. simply the city where one is located to a co-worker). In the second case, a user may only be interested in notification of the location of a person they see frequently if that person within a block or so, whereas they may wish to be notified if a close friend who lives in another country happens to be in the same city as the one they currently find themselves in.

[0036] The information service preferably also supports visibility parameters, which control when a person's location is available to be included in search response or notifications. The person would set the visibility parameters to be either visible or not visible to a particular user or group of users. For example, the person B in Figures 4 and 5 could select to be not visible to the user (person A) even though they would be sufficiently nearby for the person B to otherwise be included in the user's search responses or notifications. Further, by setting the visibility parameter for different groups of people, the person could elect to have the information service inform some groups of his or her contacts about his or her proximity, while not informing others (e.g., visible to co-workers and clients, but not visible to friends).

[0037] The information service further supports a parameter for the user to disable and enable notifications from the information service 100. In Figure 5 for example, the user could set this parameter to disable notifications when at work, and later set the parameter to re-enable the notifications when in a public place. Further, the information service preferably supports notification enablement parameters for groups of people, so as to allow the user to enable notifications for one group of people on his or her buddy list while disabling notifications as to another group (e.g., enabling notifications as to friends, while disabling co-worker and client notifications). In the notification 500 illustrated in Figure 5 for example, the user A could enable notifications from a group including person B, while disabling notifications from another group including person C, such that the information service in this instance only informs the user A of person B's proximity.

[0038] Further, the information service 100 (Figure 1) preferably also supports system-defined or user-defined modes, in which a combination of the above-described parameter settings are effective. For example, the user could define an "at work" mode, where the user is visible to and enables notifications about co-workers and clients within a narrow proximity threshold, but is not visible to and disables notifications about the user's friends. As another example, the user could define a "social" mode, where the user is visible to and enables notification about all persons on the user's buddy list(s) within a broader proximity threshold. The user can then change easily between various combinations of parameter settings by selecting among the defined modes. These modes also can be stored for the information service as the service parameters 550 in the database 112, or in client-side storage.

[0039] Additionally, the information service 100 (Figure 1) preferably supports scheduling of the parameter settings 550 by a user, where the user can designate when (e.g., times of the day or week) parameter settings are to be effective. For example, the user A could designate that the "at work" mode is to be effective during work hours Monday through Friday, whereas the "social" mode is to be effective on evenings and weekends.

[0040] With reference still to Figures 4 and 5, the information service 100 also supports place-dependent parameter settings 560. Depending upon the user's location, the information service may impose particular place-specific notification and search parameter settings. For example, the place-specific parameter settings for a movie theatre or library could prohibit users' personal mobile data communications devices from giving audible alerts of notifications (e.g., only vibration, visual or other silent alert), and altogether disallowing notifications and searches when the user is on an airplane. Large venues such as a public park or stadium may provide a wide proximity threshold setting as by default, whereas a smaller default proximity threshold may be imposed for small venues (e.g., inside a restaurant). Venues that apply entry control (e.g. a ballpark) may require the service to apply a hierarchical filter on proximity, i.e. a friend that is physically close but outside the ballpark may not qualify as being sufficiently close for the purposes of meeting since they cannot rendezvous. This place-specific parameter settings can be stored by the information service with the place data 570 in the database 112. Alternatively, the place-specific parameter settings can be accessed from a server computer specific to the place, such as may be provided by a property owner or like.

[0041] The place-specific buddy list service 100 of Figure 1 can be applied to a variety of different usage scenarios. In one use scenario, the information service

facilitates spontaneous in-person meeting and social interaction. While the user goes about their normal activities, such as running errands or shopping, the information service provides notifications to the user when people on the user's buddy list come within a proximity scope of the user. The user can then contact the person, such as via cell phone, pager, other electronic messaging, or even orally to arrange for an immediate rendezvous. The information service thus provides the electronic equivalent of the fictitious "sixth sense," by informing the user when their friends, associates or other contacts are just-around-the-corner. In some use scenarios, the search results and notifications with information that people enumerated on a user's buddy list are located in proximity to the user can be provided to a permitted third party or agent.

[0042] In a further use scenario, the information service 100 can be used to locate people. For example, a parent can initiate a search with the information service to assure that his or her child remains nearby. Alternatively, the information service can provide information in addition to proximity or non-proximity, such as actually detailing the location of a person or persons on the user's buddy list. In an example use of this alternative service, the parent also can locate the child who is "out with friends" via the search on the information service.

[0043] In another use scenario, the information service provides notifications to a user at a desktop machine 129 (or their personal mobile data communications device or etc.) if a sufficient number of friends are clustered in a particular place. For example, a user may decide to leave work and go to a basketball court if and when more than four of her friends have arrived there.

[0044] The information service 100 also has application to facilitating "commuter group talk." In this use scenario, the information service tracks a group of people who habitually travel in geographical proximity as a place-specific buddy list. For example, this group can be commuters who share a same commute path (e.g., are stuck in a same traffic jam every work day morning), or retirees that migrate year-to-year to a same sunbelt get-away for the winter months. The information service provides notifications when people in such a group are geographically proximate, so that the users can then join in group talk or chat communications, such as via a cell phone "party line" or "teleconferencing," via radio, other multi-party mobile voice communications, text messaging or other multi-party communications. The group can have a pre-arranged teleconference that can be joined upon receiving notification from the information service that others in the group are nearby. Alternatively, the information service can provide a link to a multi-party communications session (e.g., a teleconference phone number, radio channel, Internet URL, or like) that can be used by the recipient to join in the group talk. In some embodiments, a talk mediator or host (such as may be employed by the provider of the information service, or carrier of the cell phone or radio-based teleconferencing session) leads discussion among the participants in the commuter group talk. The cell phone or radio-based teleconferencing carrier or provider thus may sponsor commuter group talk facilitated by the information service so as to promote usage of the provider's communications network.

[0045] The above-described information service can be operated as a business under various revenue plans. This includes as a subscription or usage-based service, in which the user pays for use of the service. Alternatively or in addition, the information service may derive advertising revenue, such as for providing advertising messages or promotions in combination with the search responses and notifications. For example, the information service can announce a nearby advertiser (such as a restaurant, coffee shop or book store) in combination with a notification that a person on the user's buddy list is nearby, and may also provide a coupon or other promotion by the advertiser. These advertisements can be targeted according to a user profile or user-specified preferences, so as to advertise a nearby vegetarian restaurant to a vegetarian user or a coffee shop to a coffee drinker. Also, the information service can be operated as a platform enhancement (typically free to the user) that adds value to a "platform" product or service that is purchased by the user, such as a hardware product (e.g., the user's personal mobile data communications device 120-123 of Figure 1), software (e.g., operating or application software for the user's personal mobile data communications device), data communications service (e.g., for cell phone, Internet or other communications service on the data communications network 110 of Figure 1 or other related communications network), or media or content source (e.g., an Internet "portal" site). In addition, information from the information service can be consumed by other information services to enhance information provided to such other information services' users, such as under a revenue sharing arrangement, license fee, or other arrangements. Also, the information service operator can charge a fee to third party service providers for being listed in a particular venue.

Operating Environment

[0046] Figure 1 illustrates an example of a suitable operating environment 102 in which the invention may be implemented. The operating environment is only one example of a suitable operating environment and is not intended to suggest any limitation as to the scope of use or functionality of the invention. As described above, the illustrated operating environment comprises server computers 104-106, data communications network 110, database 112, and mobile data communications devices 120-123. A variety of other well known computing systems, devices, environments, and/or configurations also are suitable for use with the invention, which include personal computers, handheld computers, laptop computers, handheld or palmtop computers, wearable comput-

ing devices, electronic books, tablets, smart cards, devices or products with embedded computing capability, broadcast media receivers and other consumer electronics products, network computers or terminals, server computers, minicomputers, mainframe computers, distributed computing environments that include any of the above systems or devices, wireless local area networks, cell phone networks, pager networks, radio and television communication networks, cable networks, satellite communications networks, broadband data communications networks, the Internet, and like others.

[0047] The invention has been described in the general context of computer-executable instructions, such as program modules, executed by one or more computers or other devices. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Typically, the functionality of the program modules may be combined or distributed as desired in various embodiments.

[0048] With reference to Figure 6, an exemplary computer 600 in the operating environment 102 (such as used for the servers 104-106 or mobile devices 120-123) typically is configured to include a processing unit 602 (e.g., a microprocessor or microcontroller) and system memory 604. Depending on the exact configuration and type of computing device, the system memory may be volatile (such as RAM), non-volatile (such as ROM, flash memory, etc.) or some combination of the two. Additionally, the computer 600 may also have mass or secondary storage (removable 606 and/or non-removable 607) such as magnetic or optical disks or tape. Similarly, the computer 600 may also have input devices 610 such as a keyboard, pointing device, microphone, etc., and/or output devices 612 such as display, speaker, printer, force-feedback, etc. The computer 600 also typically includes network connections to other devices, computers, networks, servers, etc. using either wired or wireless media. Alternatively, the system components of a computer may in fact be embodied in a distributed computing system. For example, a terminal device may incorporate input and output devices to present only the user interface, whereas processing component of the system are resident elsewhere. A phone may present web pages that are constructed on a remote server from data resident on a database server somewhere else again.

[0049] The various computers (including embedded computing devices) in the operating environment 102 (Figure 1) typically include at least some form of computer readable media. Computer readable media can be any available media that can be accessed by the computer. By way of example, and not limitation, computer readable media may comprise computer storage media and communication media. Computer storage media includes volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information such as computer readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer. Communication media typically embodies computer readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any information delivery media. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of any of the above should also be included within the scope of computer readable media.

Authoritative Multi-Dimensional Names Registry

[0050] With reference now to Figure 7, the illustrated implementation of the invention has an authoritative names registry 810 and a proximity-based search engine 812 that provide a proximity measure for use by the information service 100 (Figure 1) within an operating environment 800 that includes a client device 802 and a variety of devices 804 and services 805 accessible to the client device 802 via a computer network 808 (e.g., the Internet and its associated computer networks, or other computer network with large number of interconnected computing devices). The devices 804 and services 805 can include embedded computing devices and their services, interconnected via the network 808. The services 805 also can include any variety of services that can be made available over the computer network, including services to provide access to information, online shopping, communications, entertainment and etc.

[0051] The authoritative names registry 810 and the proximity-based search engine 812 also reside on computers that are connected to the computer network 808. Although illustrated in Figure 7 as residing on a single computer each, the authoritative names registry 810 and proximity-based search engine preferably are each deployed over a server cluster, group of mirrored server computers, or otherwise distributed over a group of computers in order to service a heavy load of service requests from large numbers of users.

[0052] The authoritative names registry 810 contains a database that represents a registry of names, which is used to define proximity of the devices 804 and services 805 to the client device 802 and its user. This database can further represent a mapping of individual of the names to an address (e.g., an IP address), that can

be used to access a resource over the computer network. This resource preferably is a data or executable file, such as an XML format file (possibly with associated XSL style sheet), a COM object, an HTML format file, a Java applet, or like resource, that describes and/or interacts with an item denoted by the name. In other words, the structured data or executable code defines a protocol for interaction with the device and activation of the device's operational functions. However, the names of the registry 810 need not map to a resource in all cases. Access to the device protocol can be controlled using cryptographic security, such as well-known access control techniques based on private/public key cryptography (e.g., RSA, PGP or like cryptography).

[0053] The authoritative names registry 810 also implements a name look-up service. Given a name, this name look-up service determines whether the name is indeed registered in the authoritative names registry 810, and resolves the name to its mapped address on the computer network 808 (if mapped to an address). Preferably, the name look-up service conforms to the Internet standard domain name service (DNS) for look-up of an Internet domain name. A client name look-up request is made using the UDP or TCP protocol to a names registry server. The names registry servers of the authoritative names registry 810 generally are organized in a hierarchy to maintain separate portions of the names in the authoritative names registry. The client's name look-up request can be passed upwards within this hierarchy until reaching the names registry server pertinent to the name look-up request. [For more information on DNS, see C. Partridge, Mail Routing And the Domain System, IETF, RFC 974 (January 1986)].

[0054] With reference now to Figure 8, the authoritative names registry 810 has a number of dimensions 850 in which names are organized. These dimensions include devices, services, networks, venues, spaces, people, processes, and events. The organization of names within these dimensions establishes a taxonomy or categorization of items denoted by the names, so as to represent relationships between items according to these dimensions. More specifically, these dimensions conceptually form a multiple dimensional proximity space, which can be used to measure and assess proximity of the devices 804 and services 805 in a search. Each of the names dimensions forms a conceptual axis in this multiple dimensional space. Thus, each of devices, services, networks, venues, spaces, people, processes, and events is an axis of the conceptual proximity space. A set of related names from each of the dimensions designates a point in the conceptual proximity space. With two such sets of names, a proximity distance can be calculated in the conceptual proximity space (e.g., as the square root of a sum of the squares of the differences between the sets in each dimension). In practice, a proximity distance can be calculated between sets that don't include a name in each dimension. The proximity distance in the multiple-dimensional, conceptual proximity space provides a measure of proximity for proximity networking operations in the illustrated implementation of the invention.

[0055] The particular names dimensions of the illustrated implementation are chosen to represent factors found to be highly relevant to measuring proximity of the devices 804 and services 805 in a pervasive networking, such as the people A-C and resources 212, 214, 218 of Figure 2. These factors include factors closely related to geographical proximity, such as the venues and spaces dimensions. But, the chosen names dimensions also represent non-geographical factors such as relationships of devices, services, networks, people, processes and events. Further, even the venues and spaces represent more than simply geographical distance, but also relate to conceptual organizations of geographical space. For example, a room in a building and a sidewalk outside the building may be separated by only a few feet of geographical distance. However, the names denoting these locations in the spaces dimension of the authoritative names registry can be organized (such as by a hierarchical structuring of names in the spaces dimension) to reflect that the room is conceptually more related (proximate) to other rooms in the building than to the geographically nearby sidewalk outside.

[0056] More particularly, the names in the devices dimension of the authoritative names registry 810 denote devices with embedded computing capability that are accessible on the computer network, such as the embedded computing device 100 or the various devices described above in the computing environment 102 of Figure 1. The names in the services dimension pertain to services that are available over the computer network 808, such as information services, on-line shopping and other commercial services, entertainment, and the like, as well as individual operations that may be performed by an embedded computing device that is-connected to the computer network 808. The names in the networks dimension relate to networks (interconnected group or systems), such as computer networks, communications networks, distribution networks, transportation networks, etc., as well as their constituent parts. The names in the venues and spaces dimensions relate to geographical places or locations, and may also include virtual locations. Venues are locations that comprise aggregations of individual places, such as a sports arena, convention center, mall or the like. Spaces are individually identifiable places, that may or may not form part of a venue. The names of the people dimension relate to people and units that group people collectively, such as families, couples or other organizations. The names in the processes dimension relate to business or other organizational processes or protocols, such as orders, invoices, requests, notices and other forms or protocols with which business and other activities of the organization are conducted. The events dimension's names relate to occasions, happenings or activities in which people participate, such as meetings, conferences,

sports games, theatrical presentations, concerts, and the like, which generally have an associated time and place of occurrence (such as may be denoted in the venues or spaces dimension). Although the dimensions are designated in the illustrated implementation with the terms, "devices, services, networks, venues, spaces, people, processes, and events," alternative implementations can designate these conceptual dimensions using other terms (e.g., the term "locations" or "places" instead of "spaces"). Alternative implementations also can include fewer or additional dimensions than those described for the illustrated registry.

[0057] With reference now to Figure 9, an exemplary name 860 in the devices dimension consists of a sequence of words 861-866 separated by periods as delimiters. The words are organized right to left in order of increasing specificity. More particularly, the right-most word is the most general and denotes the devices dimension. Words progressing to the left reflect narrower sub-categories under the broad devices dimension. Many such sub-categories can exist under each dimension of the authoritative names registry 810 (Figure 7).

[0058] With reference to Figure 10, the structure of words that form the exemplary name 860 (Figure 9) reflect a hierarchical organization 880 of names within the device dimension. Each of the words 861-866 corresponds to a node 881-886 in this hierarchical organization 880. The hierarchical organization 880 groups these nodes in successive levels 891-896 which correspond to the successively more specific subcategorization within the devices dimension. In the illustrated implementation, the initial level or levels of the devices dimension hierarchy define generic types of devices. For example, the names "camcorder" and "digital-video" at levels 892 and 893 designate generic types of an embedded computing device. Examples of additional generic device types that may be registered at the initial level 892 under the devices dimension include camera, speaker, set-top, VCR, coffee-maker, clock, telephone, and other generic device types of the many varieties of embedded computing devices in a pervasive computing environment, such as the environment 102 of Figure 1. At levels beneath a generic device type name in the hierarchy 880, device specific-names can be registered, such as names of a particular make or manufacturer, model, sub-model, and even serial number or serial number range.

[0059] The names within the dimensions of the authoritative names registry 810 (Figure 7) can be organized hierarchically as shown in Figures 9 and 10. Alternatively, the names in a dimension of the registry can have a non-hierarchical organization, e.g., simple flat list, directed graph, or others.

[0060] With reference again to Figure 7, the proximity-based search engine 812 provides a search service, which uses the authoritative names registry 810 to assess proximity of the devices 804 and services 805 relative to the client device 802. The proximity-based search engine uses a set of names associated with the client device 802 as implicit search terms to qualify an explicit search query submitted from the client device 802, as well as to assess proximity of people and resources for the information service 100 of Figure 1. These implicit search terms can include a name for the client device 802 within the devices dimension, a name of the client device's user in the people dimension, a name in the event dimension of an event at which the client device is used, a name in the venues and spaces dimensions of the client device's location, etc. As described above, such a set of names designates a point in the conceptual proximity space.

[0061] Figure 11 shows an exemplary user interface display on the client device 802 (Figure 7) with which its user submits a search query to the proximity-based search engine 812. The user chooses a proximity-based search by selecting a radio button 902 marked "neighborhood." The user also enters explicit search terms in a text box 904, and then clicks on a button 906 labeled "go." This submits a search query that incorporates the text in the text box 904 as explicit search terms, which also is qualified by the set of names from the authoritative names registry 810 that are associated with the client device 802 (or use thereof).

[0062] With reference again to Figure 7, the devices 804 and services 805 preferably each include an XML description file. The XML description file is a structured file having parts designated by tags. These tags are used to designate attributes of the device 804 or service 805 described. In the illustrated implementation, the attributes can include names in the authoritative names registry. The names designated in the XML description file of a device or service also form a set to designate a point in the conceptual proximity space represented by the authoritative names registry. The proximity-based search engine 812 calculates the relative distance of this point from the point designated by the client device's names set in the multiple dimensioned, conceptual proximity space to produce a measure of the proximity of the device or service from the client device 802.

[0063] The proximity-based search engine 812 uses the proximity measure to qualify the user's explicit search query. For the explicit search terms of the query, the proximity-based search engine 812 employs conventional search techniques, such as may be based on automated indexing of unique words encountered in the device or service's XML description file, or manual editor categorization of the devices 804 and services 805. The proximity-based search engine 812 can apply the proximity measure to pare down the results of the explicit search query, such as to exclude results not within a proximity threshold. Alternatively, the proximity-based search engine 812 can apply the proximity measure to order the results of the explicit search query by proximity, so that the most proximate results are presented at higher priority.

[0064] The set of names for the client device 802 also

can be derived from an XML description file of the client device 802. This approach works well for attributes of the devices that tend to remain static, such as the name of the client device 802 itself. However, other attributes such as for the venues, spaces, events and even people can change. For these dimensions, the illustrated implementation can look up an XML description related to known names, such as using the name look-up service of the authoritative names registry. For example, the client device 802 may first determine the name in the authoritative name registry of the user from a user attribute in its own XML description file (which may change depending on who is logged onto the client device). The client device 802 then uses the user's name to retrieve an XML description file (or other information) of the user. This information for user may include a calendar that indicates an events dimension name, venues dimension name and spaces dimension name for an event that the user is scheduled to attend. The client device 802 can then include these names as implicit search terms when the user submits an explicit search query to the proximity-based search engine 812.

[0065] Additionally, the proximity-based search engine 812 supports a proximity-based inverse search. In the user interface 900 of Figure 11, the user can designate such inverse search by selecting the radio button 908 labeled "inverse search." In the inverse search, the proximity-based search engine 812 monitors the proximity of the devices 804 and services 805 that meet the explicit search terms, and generates an alert or notification to the client device when any such devices come within the proximity of the client device. This can be used at a convention, for example, to receive an alert when a particular person (who is wearing a name badge embedded computing device) enters a particular meeting or convention center room.

[0066] Referring still to Figure 7, the authoritative names registry 810 is managed by an authority, which is a trusted business or organization accountable to the users of the registry and search engine service. The authority performs the necessary function of resolving disputes in ownership of names in the authoritative names registry, and secures the authoritative names registry from unauthorized alteration, fraud or other possible attacks. The authority also administers registration of names in the various dimensions, and preferably operates the authoritative names registry to maintain essentially continuous operation. In the illustrated implementation, the authority administers at least registration of names at a first level below each dimension (e.g., the level 892 of Figure 10). Names at levels under a registered first level name in the hierarchy can be administered, in turn, by the registered owner of the name, such as by providing an appropriate name look-up service.

[0067] The authority in the illustrated implementation manages the authoritative names registry 810 as a business process. In this business process, the authority charges recurring registration fees to register a name in a dimension of the authoritative names registry. The authority can charge such registration fees for one or more levels in a hierarchically organized dimension, and alternatively can subcontract administration of names below a given level of the dimension to registrants of the names on that level. Additionally, the authority charges usage fees for use of the name look-up service and the proximity-based search service. This usage fee generally is charged to the user of the client device 802 or of a service that employs the authoritative names registry for proximity assessment. Alternatively, the usage fee can be charged back to the registrant (at any level) of a name upon access for either the name look-up service or proximity-based search service for a user.

[0068] In particular with respect to the devices dimension of the names registry, the authority in the illustrated implementation provides generic device type names at initial levels (e.g., levels 892, 893) of the devices dimension in the authoritative names registry, which are not registered to nor charged registration fees to any registrant. However, the authority registers specific device type names at a level (e.g., level 894) that appear under a generic device type name to registrants (such as a device manufacturer, and charges recurring (e.g., on an annual or other periodic basis) registration fees to the registrants. The registrant owns the specific device type name, and provides the device-specific XML or COM object file on the computer network that is accessed with the name. The authority may also charge registration fees to the registrant for registering additional names at lower levels (e.g., 895-896) under such first device-specific name in the devices dimension hierarchy 880. Alternatively, the registrant owning a specific device type name can be permitted to register such lower level device specific names without further charge, and provide its own names registry services for such lower level device specific names.

[0069] Having described and illustrated the principles of our invention with reference to an illustrated embodiment, it will be recognized that the illustrated embodiment can be modified in arrangement and detail without departing from such principles. It should be understood that the programs, processes, or methods described herein are not related or limited to any particular type of computer apparatus, unless indicated otherwise. Various types of general purpose or specialized computer apparatus may be used with or perform operations in accordance with the teachings described herein. Elements of the illustrated embodiment shown in software may be implemented in hardware and vice versa.

[0070] In view of the many possible embodiments to which the principles of our invention may be applied, it should be recognized that the detailed embodiments are illustrative only and should not be taken as limiting the scope of our invention. Rather, we claim as our invention all such embodiments as may come within the scope and spirit of the following claims and equivalents thereto.

Claims

1. In a data communications network having a plurality of mobile personal information devices and at least one server computer, a method of providing a place-and-people based information service run on the at least one server computer to users operating the mobile personal information devices, comprising:

   defining for a user of the information service a list of people;
   receiving reports of locations of the mobile personal information devices operated by the user and by the listed people;
   determining based on the reported locations which of the listed people are within a specified proximity of the user; and
   transmitting information identifying which of the listed people are within the specified proximity of the user to the user's mobile personal information device.

2. The method of claim 1 further comprising transmitting the information in response to a search request submitted by the user.

3. The method of claim 1 further comprising:

   detecting that the determination of which of the listed people are within a specified proximity of the user has changed as a result of any of the reports of locations; and
   transmitting the information in response to the detecting.

4. The method of claim 1 wherein the specified proximity is user controlled via setting a user-specified proximity parameter.

5. The method of claim 1 further comprising:

   maintaining visibility parameters per each of the listed people; and
   omitting to identify those of the listed people whose visibility parameter is set to not visible from the transmitted information.

6. The method of claim 1 further comprising:
   user-controllably setting a notification enabling parameter to disable the transmitting the information to the user's mobile personal information device.

7. The method of claim 1 further comprising:

   defining for the user a plurality of groups of the listed people;
   designating for the user to receive the information of a subset of the groups; and
   excluding those of the listed people not in the designated subset from identification in the transmitted information.

8. A place-specific buddy list service system operated on server computers of a distributed data communications network for access from personal data communications computers, the system comprising:

   a database maintaining a people/place state for a user of the service, the people/place state enumerating at least one group of people also using the service and locations of such people;
   a people location tracker operating responsive to reports of the location of the people to update the people/place state; and
   an inference engine operating to process the people/place state to infer which of the people are in the user's proximity, and to generate a notification for the user having information identifying the people inferred to be in the user's proximity.

9. The system of claim 8 further comprising an eventing engine operating responsive to a change in the people/place state to cause the inference engine to process the inference and generate the notification.

10. The system of claim 8 further comprising a search engine operating responsive to a user-initiated search request to cause the inference engine to process the inference and to cause the notifier to generate the notification.

11. The system of claim 8 wherein the inference engine infers which people are in the user's proximity and generates the notification in accordance with a set of parameters, including a visibility parameter associated with a person enumerated in the people/place state, the inference engine operating to exclude the person when the visibility parameter is set to a not visible value.

12. The system of claim 8 wherein the inference engine infers which people are in the user's proximity and generates the notification in accordance with a set of parameters, including a proximity scope parameter to control a scope within which the people are considered to be in the user's proximity.

13. The system of claim 8 wherein the inference engine further operates to infer resources other than the people are in the user's proximity, and to include information of such other resources in the notification.

14. The system of claim 8 wherein the inference engine

infers which people are in the user's proximity and generates the notification in accordance with a set of parameters, the inference engine responding to user selection of one of a plurality of user-defined modes specifying settings of the parameters to apply the parameter settings specified in the user-selected mode.

15. The system of claim 14 wherein the parameters comprise a visibility parameter controlling whether the user is to be included for purposes of generating notifications to other people using the system, a proximity scope parameter controlling a scope within which the people are considered to be in the user's proximity, and people selection parameter designating a subset of the at least one group of people to include in the notification to the user.

16. The system of claim 8 wherein the inference engine infers which people are in the user's proximity and generates the notification in accordance with a set of parameters, the value of at least one of the parameters varying by place.

17. The system of claim 8 wherein the inference engine infers which people are in the user's proximity and generates the notification in accordance with a set of parameters, the value of at least one of the parameters varying by time.

18. A computer-readable medium having programming carried thereon of an information service providing notifications as to proximity of listed persons, the carried programming comprising:

program code operating responsive to user control to manage a listing of persons;
program code operating responsive to place-detecting equipment to track locations of the user and the listed persons;
program code operating to process the tracked locations and identify those of the listed persons whose locations correlate with that of the user in accordance with settings of a plurality of parameters; and
program code operating to provide information of the identified persons to the user.

19. The computer-readable medium of claim 18 wherein the carried programming further comprises:

program code operating to apply parameter settings specific to a place in which the user is located to the identification of those of the listed persons whose locations correlate with that of the user.

20. The computer-readable medium of claim 18 wherein the carried programming further comprises:

program code operating to apply parameter settings specific to an activity in which the user is engaged to the identification of those of the listed persons whose locations correlate with that of the user.

21. The computer-readable medium of claim 18 wherein the carried programming further comprises:

program code operating to apply parameter settings specified per a time schedule to the identification of those of the listed persons whose locations correlate with that of the user.

22. The computer-readable medium of claim 18 wherein the carried programming further comprises:

program code operating responsive to user selection of a subset of the listed persons to limit the identification of those of the listed persons whose locations correlate with that of the user to the user-selected subset.

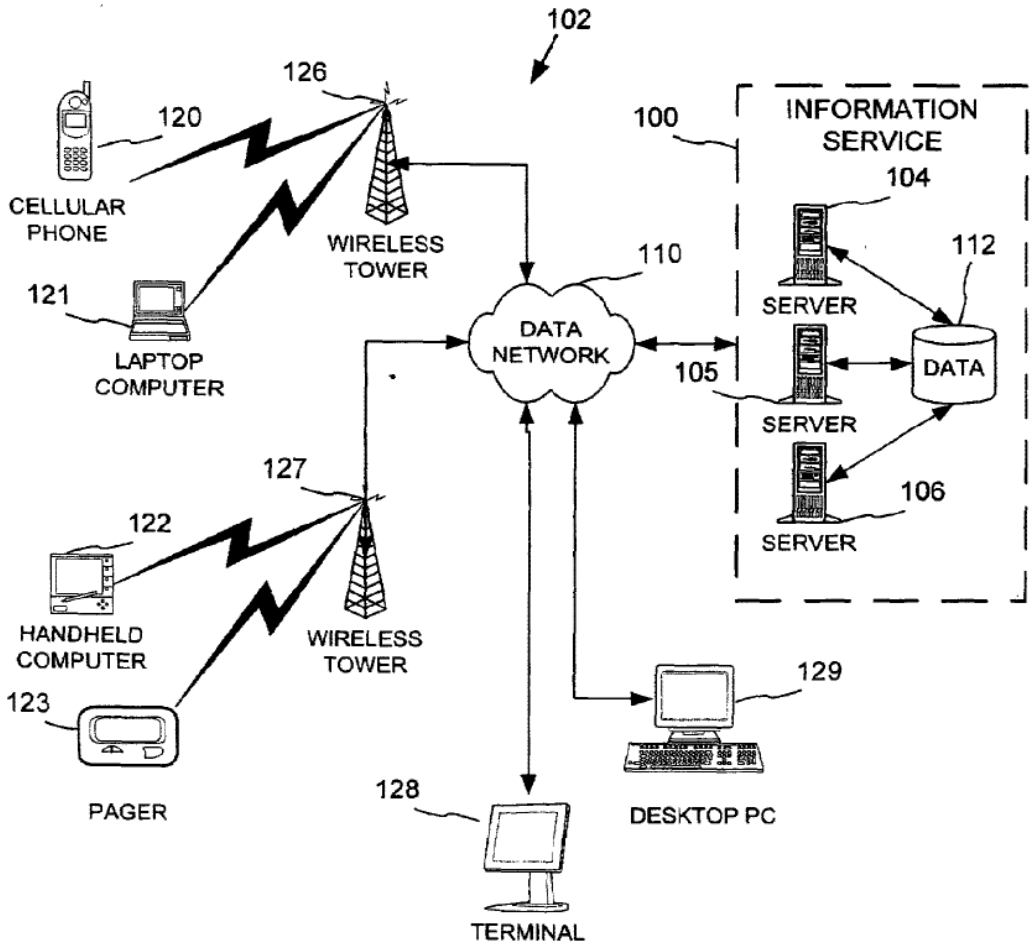
23. The computer-readable medium of claim 18 wherein the carried programming further comprises:

program code operating responsive to setting of a visibility parameter for a person as not visible to exclude the person from the identification of those of the listed persons whose locations correlate with that of the user.

24. A method of facilitating group communications, comprising:

storing data defining a group of persons and their locations;
continually updating the data with persons' current locations;
continually processing the data to identify at least one subset of the group whose locations correlate to within a given proximity;
providing notifications to those in the at least one subset, the notifications including a reference to a group communications medium session for use by an individual in the at least one subset to establish a connection to the session.

FIG. 1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WIRELESS TOWER
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INFORMATION SERVICE
104
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LAPTOP COMPUTER
DATA NETWORK
SERVER
DATA
105
SERVER
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HANDHELD COMPUTER
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129
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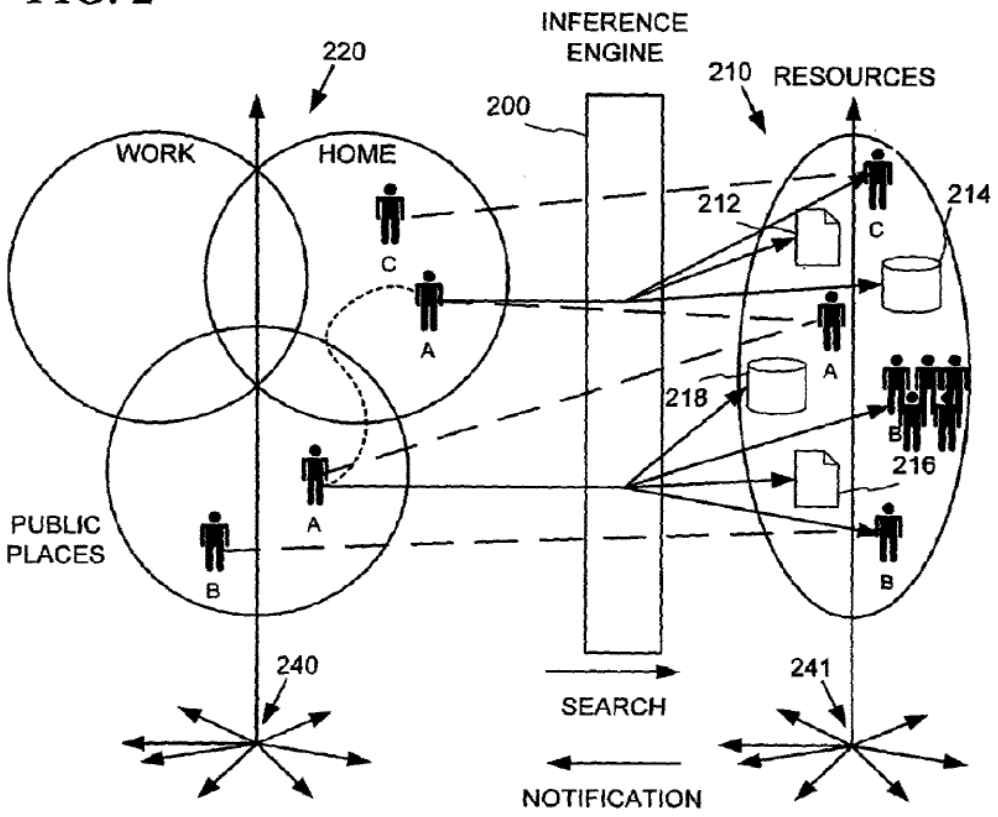
PAGER
128
DESKTOP PC
TERMINAL

FIG. 2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RESOURCES
200
WORK
HOME
212
214
C
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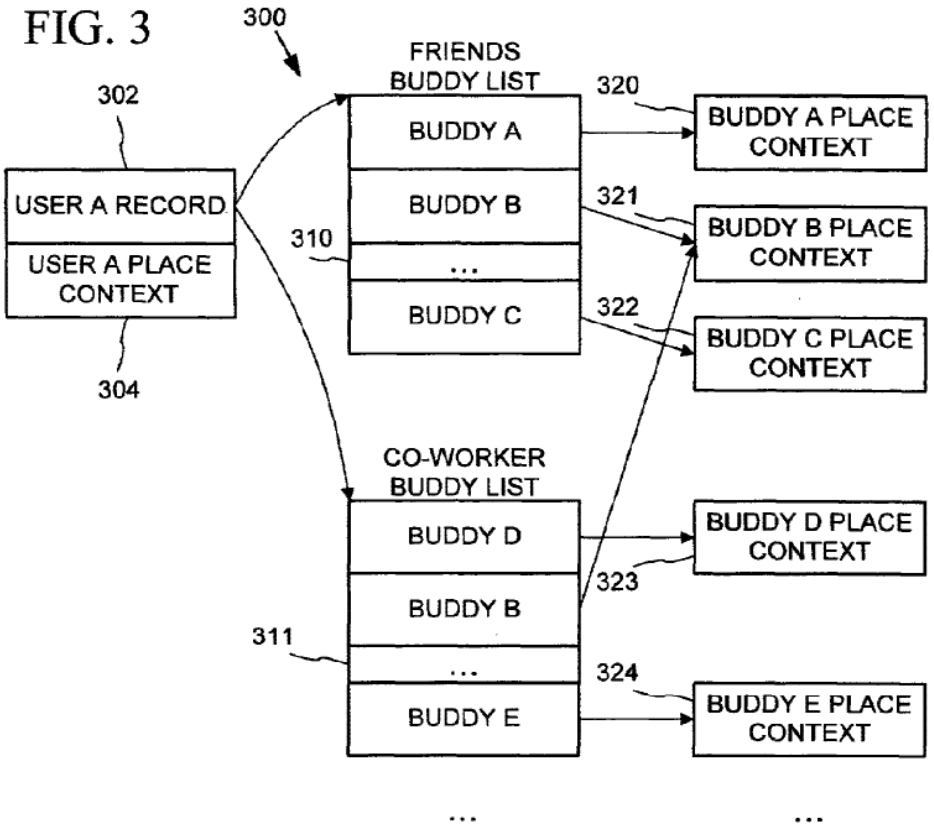
PUBLIC PLACES
A
B
B
240
241
SEARCH
NOTIFICATION

FIG. 3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302
USER A RECORD
USER A PLACE CONTEXT
304
BUDDY A
BUDDY B
...
BUDDY C
310
320
BUDDY A PLACE CONTEXT
321
BUDDY B PLACE CONTEXT
322
BUDDY C PLACE CONTEXT
CO-WORKER BUDDY LIST
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BUDDY B
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BUDDY D PLACE CONTEXT
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BUDDY E PLACE CONTEXT

FIG. 4

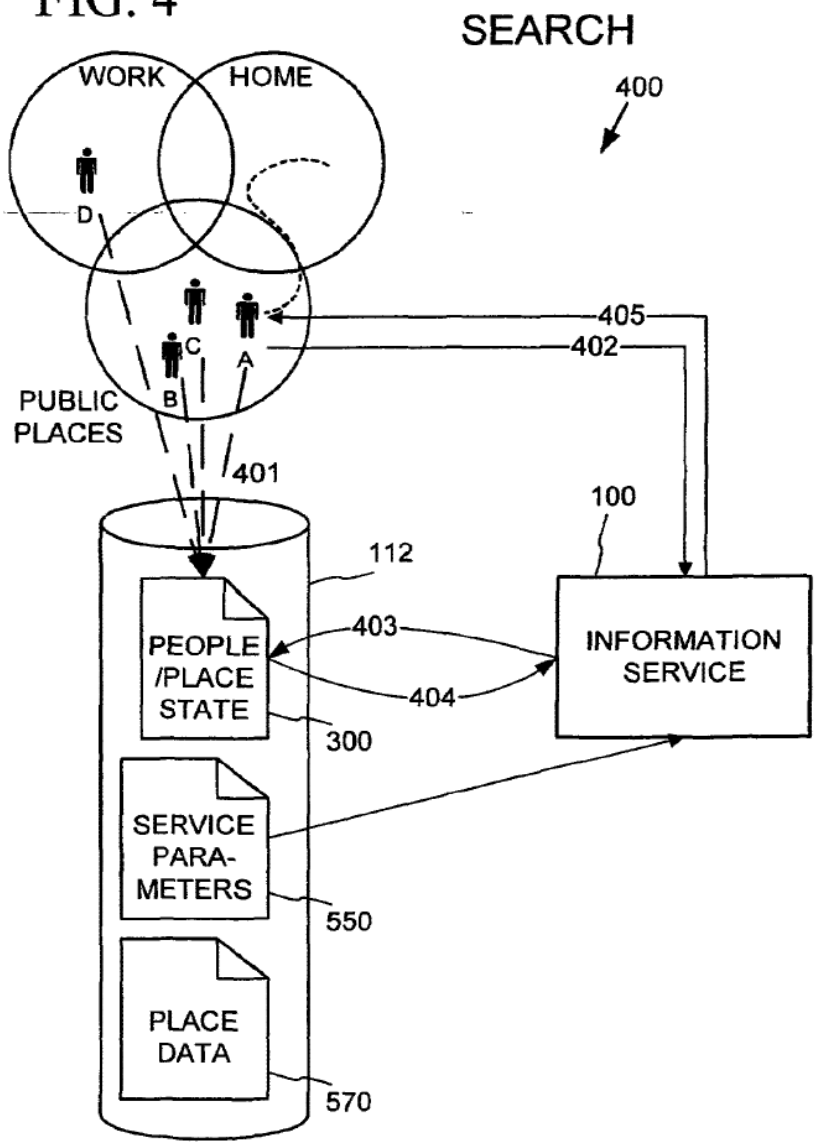
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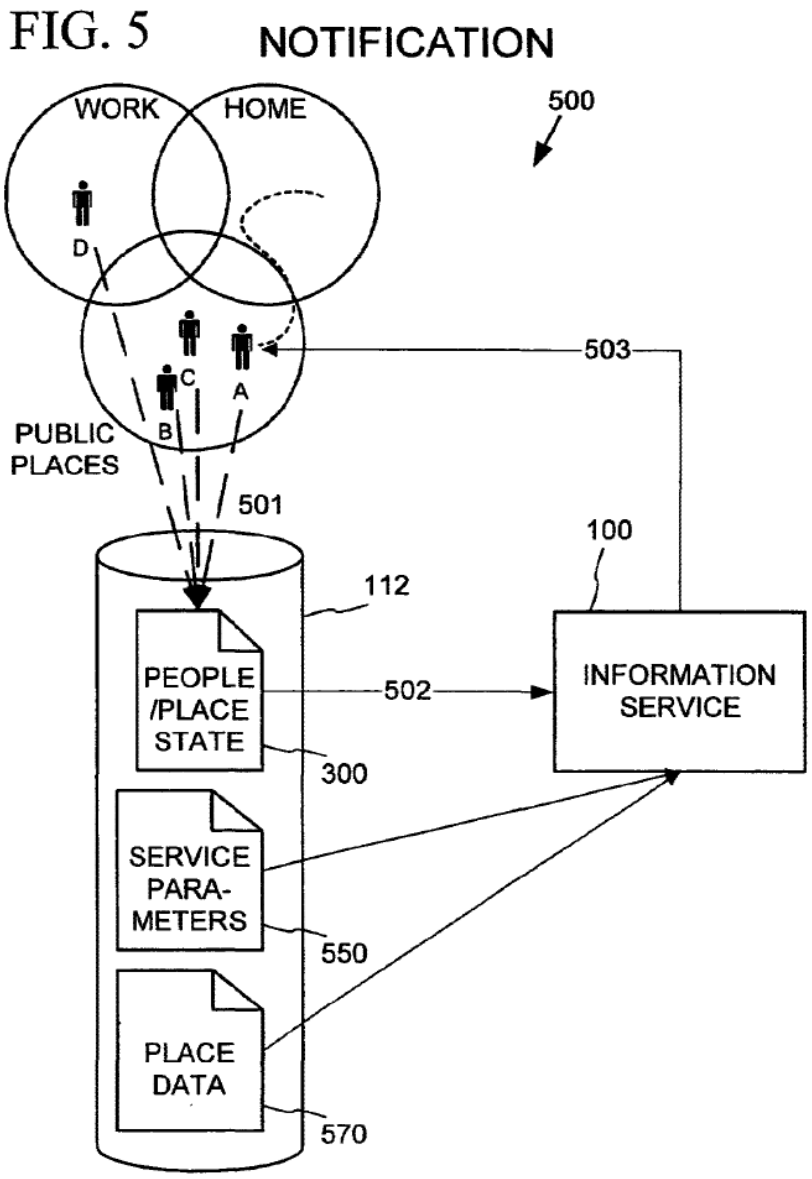
FIG. 5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SERVICE PARA-METERS
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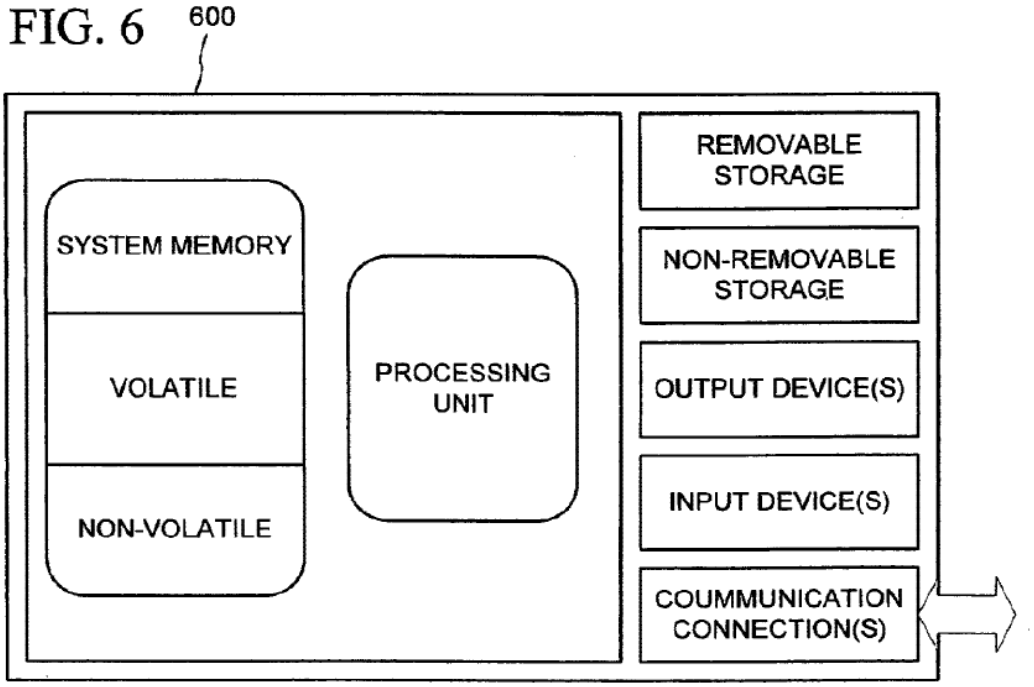
FIG. 6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NON-VOLATILE
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NON-REMOVABLE STORAGE
OUTPUT DEVICE(S)
INPUT DEVICE(S)
COUMMUNICATION CONNECTION(S)

FIG. 7

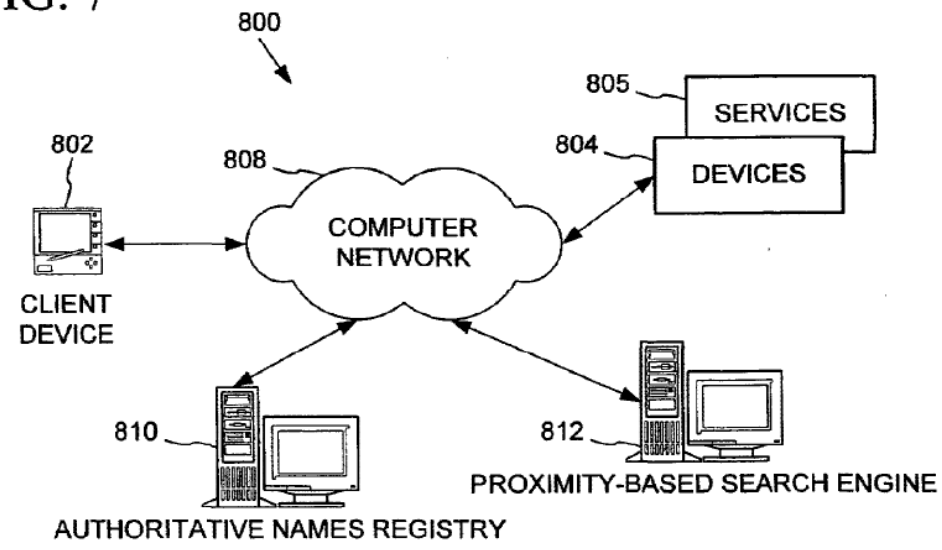


FIG. 8

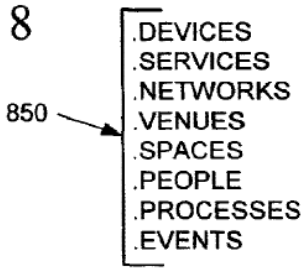


FIG. 9

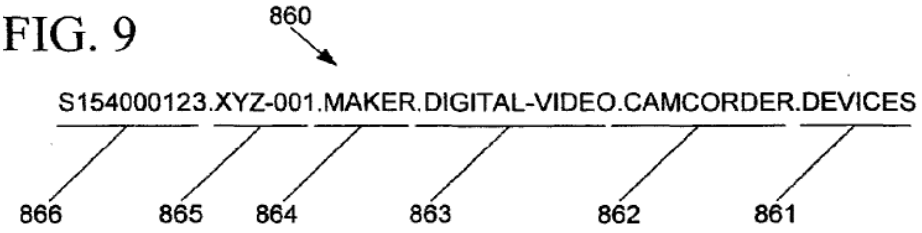
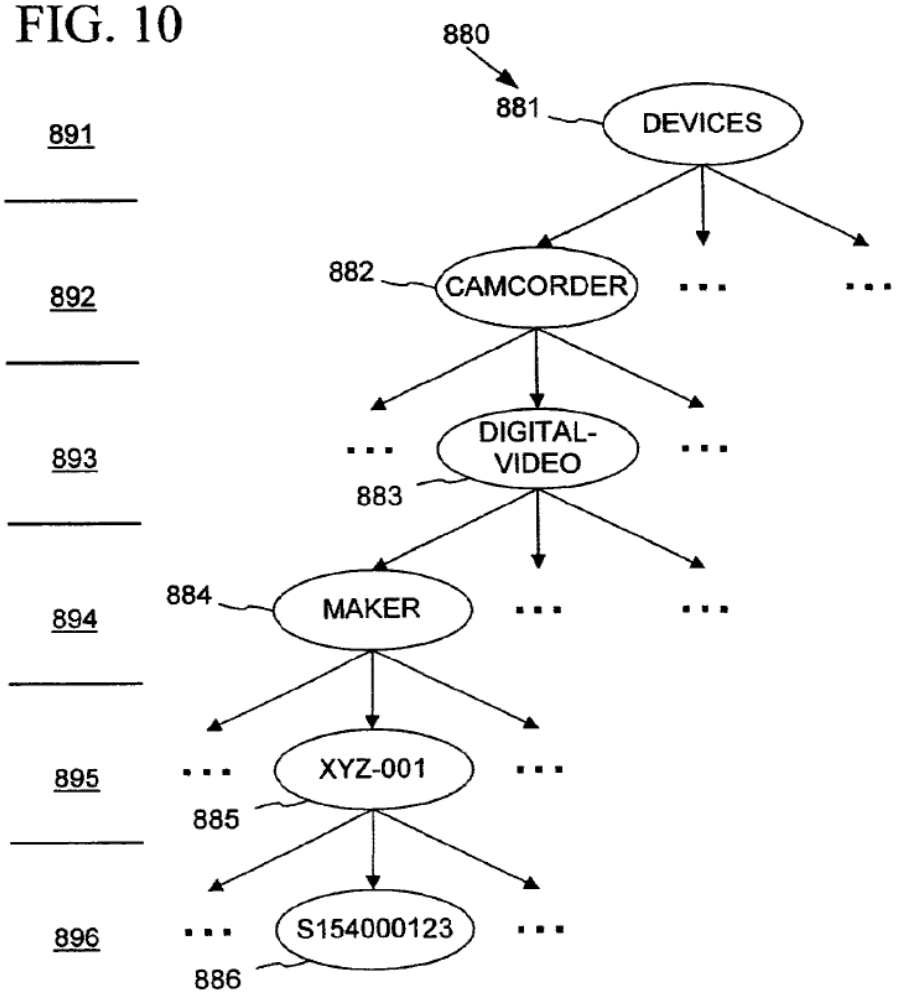


FIG. 10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VIDEO
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MAKER
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S154000123
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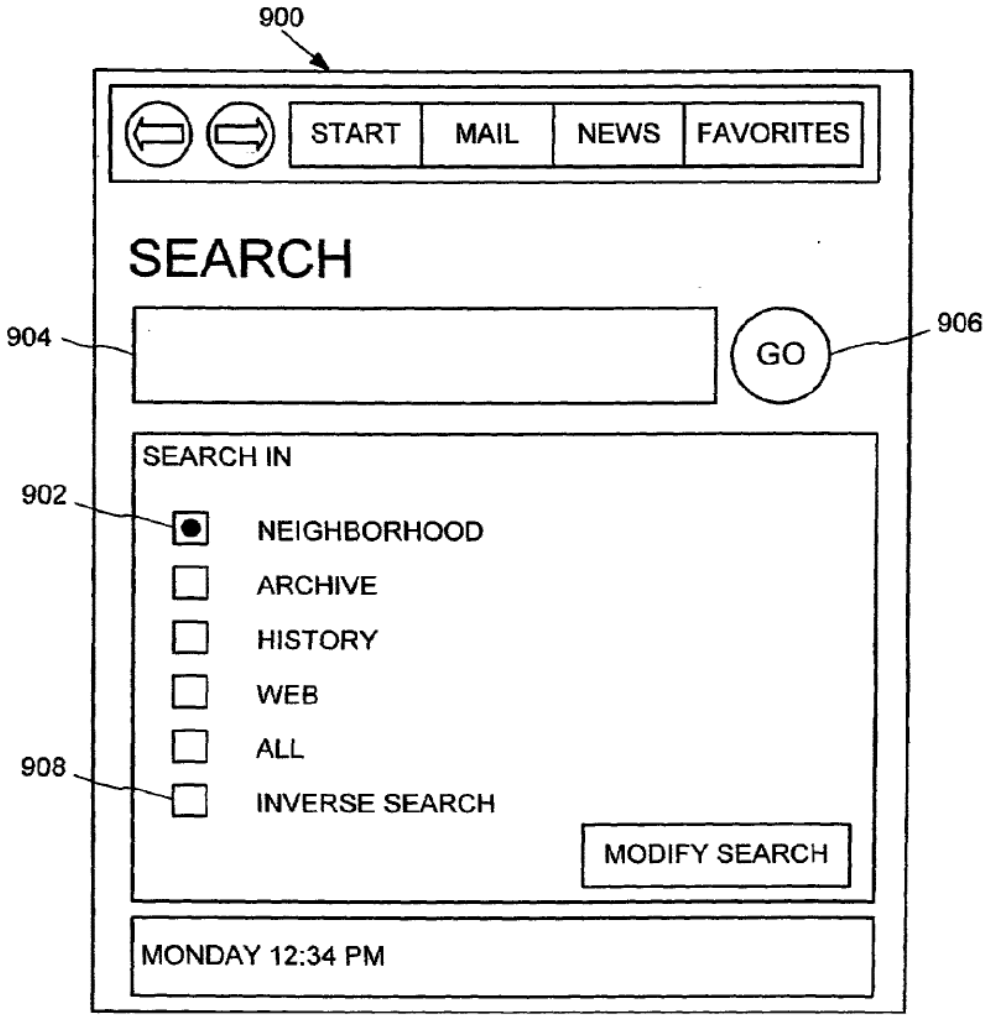
FIG. 11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FAVORITES
SEARCH
904
GO
906
SEARCH IN
902
NEIGHBORHOOD
ARCHIVE
HISTORY
WEB
ALL
908
INVERSE SEARCH
MODIFY SEARCH
MONDAY 12:34 PM

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 11 8148

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 00 22860 A (DEGNBOL JANUS FRIIS) 20 April 2000 (2000-04-20) * page 2, line 10 - page 3, line 33 * * page 5, line 1 - line 5 * * page 6, line 1 - page 7, line 9 * * page 9, line 31 - page 10, line 3 * * page 10, line 16 - line 23 * * page 11, line 5 - line 15 * * page 12, line 18 - line 30 * * page 14, line 7 - line 11 * * page 17, line 5 - line 10 *	1-24	H04Q7/22 H04L29/06

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H04Q
H04L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 October 2001	Vaskimo, K

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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P : intermediate document

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 11 8148

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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02-10-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0022860 A	20-04-2000	AU 6188299 A	01-05-2000
		WO 0022860 A1	20-04-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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European Patent Office
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(11) EP 0 743 762 A2

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(22) Date of filing: **17.05.1996**

(84) Designated Contracting States:
FR GB

(30) Priority: **17.05.1995 JP 117583/95**

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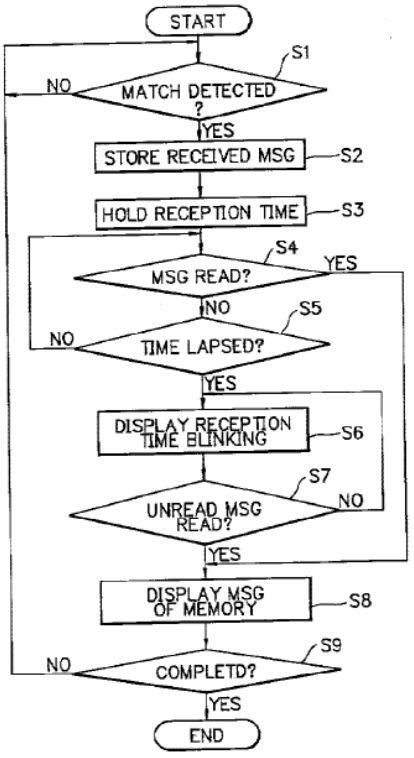
London WC1X 8AL (GB)

(54) Radio paging selective receiver with display for notifying presence of unread message

(57) A current time is displayed in a normal fashion (14a) on a display (14) which is operative for displaying a received message, as it is read from a memory (44), and which is controllable to display in a different fashion (14b) from the normal fashion (14a) a reception time of a received message that has been stored in the memory (44), without being read, for a longer time than predetermined.

FIG. 2



EP 0 743 762 A2

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2.13.8/3.4

Description

The present invention generally relates to a radio paging selective receiver (hereafter sometimes "pager") with a display function, and particularly, to a pager including a memory for storing a received message and a display for displaying a read message from the memory and notifying a presence of an unread message in the memory.

A typical pager with a display function has a memory for storing a received message and a display for displaying the message, as it is read from the memory by an intended operation of a carrying person.

Such the pager is implemented to be responsive to a reception of the message, for notifying the carrying person of the reception of message in a various manner, e. g. by vibrations of a vibrator, sounds from a speaker and information on a light emitting diode (hereafter "LED").

The carrying person may incidentally be unaware of the notification of reception so that the stored message may be left as it is unread.

In consideration of such the case, the Japanese Patent Application Laid-Open Publication No. 4-29424 has disclosed a pager with a display function, in which a periodical clock alarm was given by using a particular beep frequency or display pattern different from a normal beep frequency or display pattern to notify a carrying person of a presence of an unread message.

Therefore, unless the clock alarm function was set on, the function of notifying the presence of unread message remained ineffective until the carrying person performs a power-on operation or a message display operation.

Still less, even if the notifying function was effective, the clock alarm was no more than for a current time so that the carrying person could not know the time at which the unread message had been received.

The present invention has been conceived with such points in mind.

The present invention seeks to provide a radio paging selective receiver with a display function permitting both a presence and a reception time of an unread message to be notified irrespective of whether a clock arlarm function is set on or not.

An aspect of the present invention provides a radio paging selective receiver comprising clock means for defining a current time, radio means for receiving a transmitted signal to provide a received signal, signal processing means for processing the received signal to provide a received message, the signal processing means being cooperative with the clock means to define a reception time of the received message and a time difference between the reception time and the current time, memory means for storing the received message and the reception time, display means for displaying the current time in a first fashion, the display means being cooperative with the signal processing means for displaying the received message, as it is read from the memory means, decision means responsive to a larger value of the time difference than a predetermined value for concluding that the received message is an unread message, and control means responsive to a presence of the unread message for controlling the display means to display the reception time, as it is read from the memory means, in a second fashion different from the first fashion.

According to the above aspect of the invention, a current time is displayed in a normal fashion on a display which is operative for displaying a received message, as it is read from a memory, and which is controllable to display in a different fashion from the normal fashion a reception time of a received message that has been stored in the memory, without being read, for a longer time than predetermined.

Therefore, a radio paging selective receiver with a display function is permitted to notify both a presence and a reception time of an unread message irrespective of whether a clock arlarm function is set on or not.

According to a preferred embodiment of the present invention, the displayed reception time flickers in the second fashion.

According to another embodiment of the invention, the display means in the second fashion has an inverted brightness with respect to the first fashion.

According to another embodiment of the invention, the radio paging selective receiver further comprises beep means for beeping out a reception of the received message for a time interval equivalent to said predetermined value.

According to another embodiment of the invention, the radio paging selective receiver further comprises detection means responsive to the received signal for detecting a communicatable zone of the radio paging selective receiver to provide a detection signal, and the control means is responsible for the detection signal to be respond to the presence of the unread message for controlling the display means to display the reception time.

The objects, features and advantages of the present invention will become more apparent from consideration of the following detailed description, in conjunction with the accompanying drawings, in which:

Fig. 1 is a block diagram of a pager with a display function according to an embodiment of the invention:

Fig. 2 is a flow chart of actions of the pager of Fig. 1; and

Fig. 3 is an illustration of a current time and a reception time, as they are displayed on the pager of Fig. 1 in different fashions from each other.

There will be detailed below an embodiment of the invention with reference to the accompanying drawings.

Fig. 1 shows a block diagram of a pager with a display function according to an embodiment of the invention.

The pager of Fig. 1 comrises an antenna 1, a radio section 2 connected to the antenna 1, a waveform shaping circuit 3 connected to the radio section 2, and a decoder 4 connected to the radio section 3.

The decoder 4 includes an alarm controller 41, a synchronization circuit 42 connected to the waveform shaping circuit 3, an address correlator 43 connected to the synchronization circuit 42, a message memory 44 connected to the address correlator 43, an unread message discriminator 45 connected to the message memory 44, an unread message reception time display controller 46 connected to the unread message discriminator 45, and a power distributable paging controller 40 connected to the respective components 41 to 46 of the decoder 4 and the radio section 2 and waveform shaping circuit 3.

The pager of Fig. 1 further comprises a clock circuit 5 connected to the alarm controller 41 and the paging controller 40, an electrically erasable programmable read only memory (hereafter "EEPROM") 6 connected to the paging controller 40, an LED driver 7 controlled by the paging controller 40 for driving an LED 8, a speaker driver 9 controlled by the paging controller 40 for driving a speaker 10, a vibrator driver 11 controlled by the paging controller 40 for driving a vibrator 12, a liquid crystal display (hereafter "LCD") driver 13 controlled by the paging controller 40 for driving an LCD 14, a quartz oscillator 15 for supplying a reference clock to the paging controller 40, and a pushbutton switch 16 connected to the paging controller 40.

In the pager of Fig. 1, a transmitted radio signal is received by the antenna 1 and input therefrom to the radio section 2, where it is amplified and demodulated to be input to the waveform shaping circuit 3, where it is converted into a digital signal as a sequence of bits to be processed in the decoder 4.

The digital signal is input to the synchronization circuit 42, which is operative in synchronizm with the reference clock for clocking out a destination address part of the digital signal to the address correlator 43, where it is correlated with an own address of the pager that has been written in the EEPROM 6 and is read therefrom.

If the correlator 43 detects a match between the destination and own addresses, then a memory region designation signal is sent therefrom to the message memory 44, and a subsequent message part of the digital signal is clocked out as a received message from the synchronization circuit 42 to the paging controller 40, when a current time is input from the clock circuit 5 to the paging controller 40, where it is recognized as a reception time of the received message.

The received message and the reception time are stored in a designated region of the message memory 44.

Upon completion of such signal receiving actions, the paging controller 40 outputs effective or ineffective control signals to the LED driver 7, speaker driver 9 and vibrator driver 11, as required for causing the LED 8 to blink, the speaker 10 to beep and/or the vibrator 12 to vibrate, thereby notifying a carrying person of a reception of the message to the own pager.

The carrying person ordinarily responds to such reception notification, by operating the pushbutton switch 16 to have the paging controller 40 read the received message and the reception time from the message memory 44 and control the LCD driver 13 so that the LCD 14 displays the read message and reception time.

Concurrently with the switch operation, the reception notifying actions of the LED 8, speaker 10 and/or vibrator 12 are stopped.

Unless the pushbutton switch 16 is operated, the reception notifying actions are repeated for a predetermined time (10 sec to 15 sec), i. e. until a time difference between the reception time and the current time exceeds a preset value.

The pushbutton switch 16 is employable to generate a combination or sequence of on-off signals for voluntarily setting up a paging mode of the pager, an updated current time of the clock circuit 5, and a power saving mode for keeping a pager battery 47 at a minimum rate of power consumption by holding alive at least the quartz oscillator 15, pushbutton switch 16, clock circuit 5, LCD driver 13, LCD 14 and part of internal circuits of the paging controller 40 for backing up necessary members to permit a resetting to the paging mode.

The paging mode may permit the notification of message reception to be effected by a voluntary combination of a blinking of the LED 8, a beeping of the speaker 10 and/or vibrations of the vibrator 12.

The LCD driver 13 is always controlled by the paging controller 40 so that the LCD 14 normally displays a current time defined by the clock circuit 5, in a normal fashion 14a (Fig. 3) in which the time is displayed in black on a blank white (silver) base, without flickering.

The paging controller 40 supervises a working state of each associated circuit.

When the time difference between the reception time and the current time has reached the preset value, the unread message discriminator 45 is controlled to check if the stored message in the message memory 44 have been read together with the reception time thereof. In the case the stored message has been read, a read flag is set therefor.

If the stored message has not yet been read from the message memory 44, the discriminator 45 sets an unread flag on the message and outputs an unread message detection signal to the unread message reception time display controller 46, which responds thereto to output a reception time display control signal to the paging controller 40.

The paging controller 40 is responsive to the reception time display control signal, for reading from the message memory 44 the reception time of the stored message that has the unread flag set thereon and for contolling the LCD driver 13 so that the LCD stops displaying the current time and starts displaying the read

reception time at the same place in a particular fashion 14b (Fig. 3) in which the time is displayed in white (silver) on a reversed (black) blank basse in a flickering manner, with an increased tendency to inform the carrying person of the reception of message, i. e., of a presence of the unread message.

The paging controller 40 enters the power saving mode when the pushbutton switch 16 is so operated or if the radio section 2 (or the synchronizing circuit 42) is kept static for a predetermined time without receiving a transmitted signal from an associated paging network, such as when the carrying person has gone out of a communicatable zone of the paging network.

In the power saving mode, at least both the unread message discriminator 45 and the unread message reception time display controller 46 are kept off so that the LCD 14 does not display the reception time of unread message.

The power saving mode can be manually reset to the paging mode by operating the pushbutton switch 16, or may be automatically reset thereto when the radio section 2 receives a transmitted signal from the paging network, as the signal includes a network identifier, or when the synchronizing circuit 42 receives a digital signal from the waveform shaping circuit 3, or alternatively when the address correlator 43 detects a match between destination and own addresses.

The circuit members 41, 43, 45 and 46 may each comprise a program file to be read and executed by the paging controller 40.

There will be described a basic paging mode of the pager of Fig. 1.

Fig. 2 shows a flow chart of actions of the pager.

At a step S1, a radio signal received by the antenna 1 is input to the decoder 4 via the radio section 2 and the waveform shaping circuit 3.

The address correlator 43 correlates a destination address of the input signal with an own address of the pager. If a match is detected therebetween, the flow goes to a subsequent step S2.

At the step 2, a message is received by the paging controller 40, which concurrently receives a current time from the clock circuit 5, as a reception time of the received message.

The received message is stored in the message memory 44.

At a step S3, the reception time also is stored in the same memory region as the received message.

Concurrently, the paging controller 40 outputs effective or ineffective control signals to the LED driver 7, speaker driver 9 and vibrator driver 11, as required for causing the LED 8 to blink, the speaker 10 to beep and/or the vibrator 12 to vibrate in accordance with a setting of the paging mode, notifying a carrying person of the reception of the message.

The carrying person may operate the pushbutton switch 16 to have the paging controller 40 read the received message and the reception time from the message memory 44.

Concurrently with the switch operation, the reception notifying actions of the LED 8, speaker 10 and/or vibrator 12 are stopped.

At a step S4, it is checked if the stored message is read.

If the pushbutton switch 16 is operated, it is concluded that the message is read, so the flow goes to a setp S8, where the LCD driver 13 is controlled so that the LCD 14 displays the read message and reception time.

In the case the switch 16 is not operated, it is concluded that the message is not read, so the flow goes to a step S5.

The step S5 checks if a predetermined time has lapsed after the reception of message, i. e., if the time difference between the reception time and a current time is larger than a preset value.

If the predetermined time has lapsed, the stored message is deemed as an unread message, so the flow goes to a step S6, where the LCD driver 13 is controlled so that the LCD displays the reception time of the unread message in a flickering manner, as described.

The reception time of the unread message keeps flickering, until the pushbutton switch 16 is operated to display the unread message together with the reception time.

Unless the predetermined time has lapsed at the step S5, the flow to the step S4.

At a step S7, it is checked if the unread message is read.

In the case the unread message is read, the flow goes to the step S8.

Unless the unread message is read at the step S7, the flow goes to the step S6.

A step S9 checks if a preset paging process is completed.

If it is completed, the flow goes to an end. It it is not, the flow goes to the step S1.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by those embodiments but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

Each feature disclosed in the specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

In summary there is disclosed apparatus in which a current time is displayed in a normal fashion (14a) on a display (14) which is operative for displaying a received message, as it is read from a memory (44), and which is controllable to display in a different fashion (14b) from the normal fashion (14a) a reception time of a received message that has been stored in the memory (44), without being read, for a longer time than predetermined.

Claims

1. A radio paging selective receiver comprising:

   clock means (5) for defining a current time;
   radio means (1, 2) for receiving a transmitted signal to provide a received signal:
   signal processing means (3, 4) for processing the received signal to provide a received message, the signal processing means (3, 4) being cooperative with the clock means (5) to define a reception time of the received message and a time difference between the reception time and the current time;
   memory means (44) for storing the received message and the reception time;
   display means (13, 14) for displaying the current time in a first fashion (14a), the display means (13, 14) being cooperative with the signal processing means (3, 4) for displaying the received message, as it is read from the memory means (44);
   decision means (45) responsive to a larger value of the time difference than a predetermined value for concluding that the received message is an unread message; and
   control means (40, 46) responsive to a presence of the unread message for controlling the display means (13, 14) to display the reception time, as it is read from the memory means (44), in a second fashion (14b) different from the first fashion (14a).

2. A radio paging selective receiver according to claim 1, wherein the displayed reception time flickers in the second fashion (14b).

3. A radio paging selective receiver according to claim 1, wherein the display means (13, 14) in the second fashion (14b) has an inverted brightness with respect to the first fashion (14a).

4. A radio paging selective receiver according to claim 1, further comprising beep means (9, 10) for beeping out a reception of the received message for a time interval equivalent to said predetermined value.

5. A radio paging selective receiver according to claim 1, further comprising:

   detection means (2, 42) responsive to the received signal for detecting a communicatable zone of the radio paging selective receiver to provide a detection signal; and
   the control means (40) being responsible for the detection signal to respond to the presence of the unread message for controlling the display means (13, 14) to display the reception time.

FIG. 1

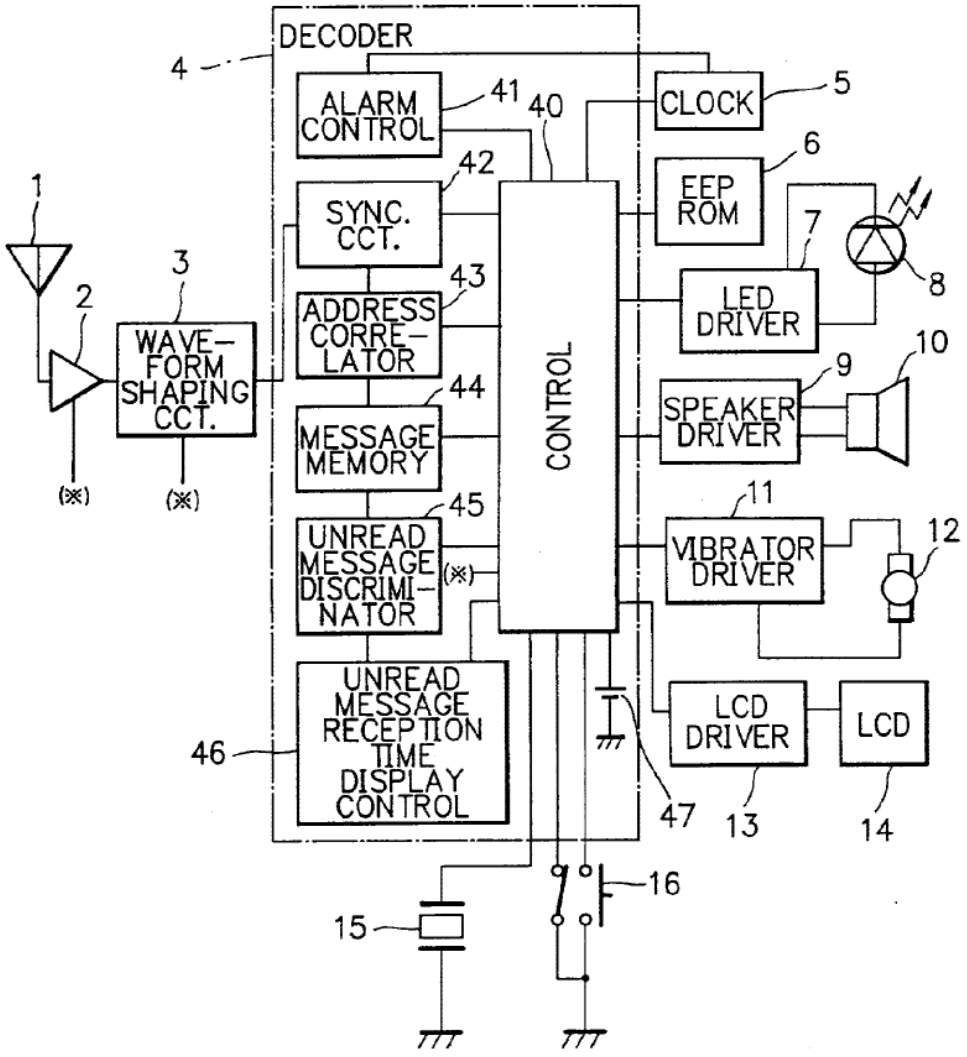

DECODER
4
ALARM CONTROL
41
40
CLOCK
5
6
EEP ROM
42
SYNC. CCT.
1
2
3
WAVE-FORM SHAPING CCT.
43
ADDRESS CORRE-LATOR
7
LED DRIVER
8
9
10
SPEAKER DRIVER
44
MESSAGE MEMORY
CONTROL
45
UNREAD MESSAGE DISCRIMI-NATOR
(※)
11
VIBRATOR DRIVER
12
UNREAD MESSAGE RECEPTION TIME DISPLAY CONTROL
46
LCD DRIVER
LCD
47
13
14
15
16
(※)
(※)

FIG. 2

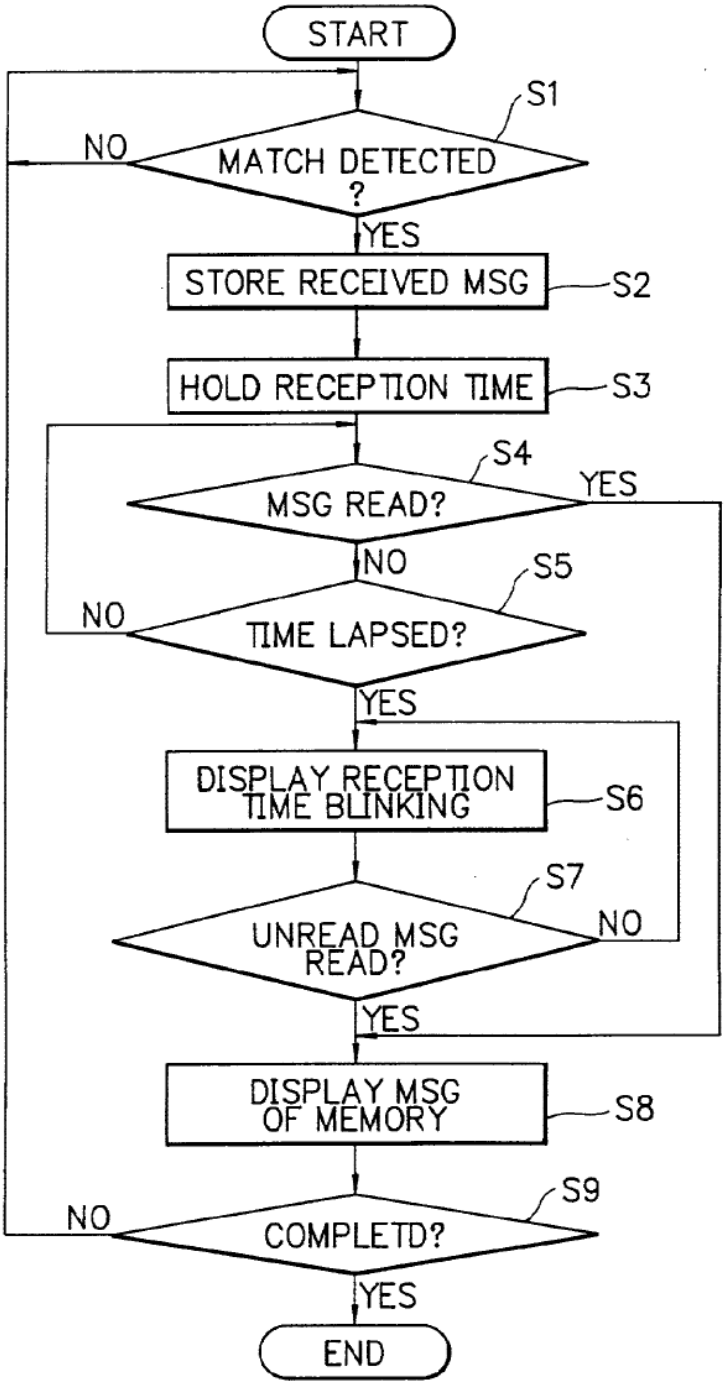
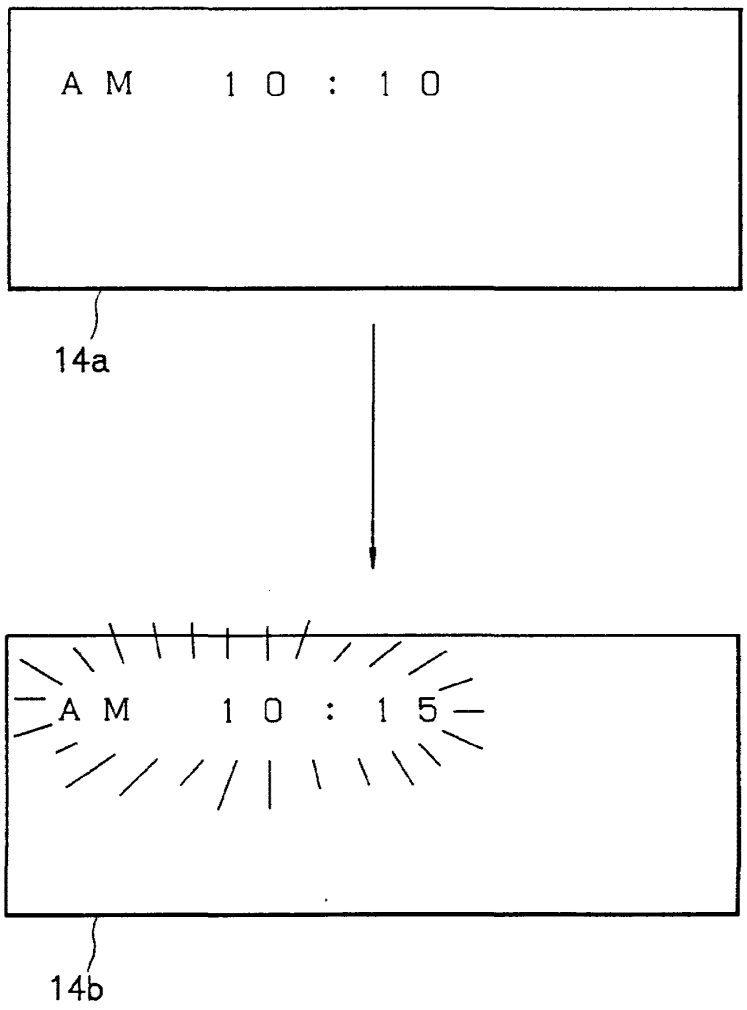

START
S1
MATCH DETECTED ?
NO
YES
STORE RECEIVED MSG
S2
HOLD RECEPTION TIME
S3
S4
MSG READ?
YES
NO
S5
TIME LAPSED?
NO
YES
DISPLAY RECEPTION TIME BLINKING
S6
S7
UNREAD MSG READ?
NO
YES
DISPLAY MSG OF MEMORY
S8
S9
COMPLETD?
NO
YES
END

FIG. 3



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(71) Applicant: MATSUSHITA ELECTRIC WORKS LTD
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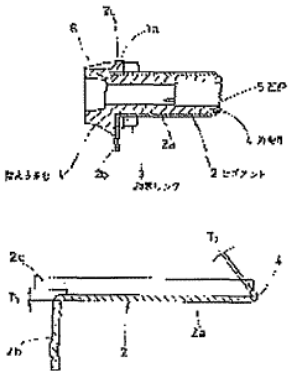
(54) COMMUTATOR FOR MOTOR

(57) Abstract:

PURPOSE: To improve mechanical strength and to facilitate banding of a bent pawl by providing the bent pawls to be engaged with a recess formed on a commutator base at segments, and forming the thickness of the pawl to be thinner than that of the body of the segment.

CONSTITUTION: A restricting ring 3 is externally engaged with the outer periphery of a segment 2 adjacent to the step 1a of a commutator base 1, and the base end of each segment 2 is held at the base 1. Each segment 2 has a bent pawl 4 bent from the end too the inside at the body 2a. The pawl 4 is engaged with a recess 5 formed partly at the end face of the base 1 circumferentially. Here, the thickness T_1 of the pawl 4 is thinner than that T_1 of the body 2a. Thus, since the end of the segment is engaged with the recess of the base via the pawl, the segment is held by the ring and the pawl, thereby improving mechanical properties. Since the thickness T_2 of the pawl is thinner than that of the body, its bending is facilitated, and an assembling operation with no strength deterioration is performed.



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㊹発明の名称　モータ整流子

㉑特　願　平1−133813

㉒出　願　平1(1989)5月26日

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明　細　書

1．発明の名称

モータ整流子

2．特許請求の範囲

円筒状の整流子基台の円筒端面に凹部を設け、円筒外周面に導電性のセグメントを周方向に複数個配置し、これらセグメントの外面から前記整流子基台に外嵌して前記各セグメントの基端を保持する拘束リングを設け、前記整流子基台の凹部に係合する折曲爪を前記各セグメントの先端に設け、前記折曲爪の板厚を前記セグメントの本体部分の板厚よりも薄くしたモータ整流子。

3．発明の詳細な説明

〔産業上の利用分野〕

この発明は、組立構造のモータ整流子に関するものである。

〔従来の技術〕

従来、整流子基台の外周面に複数のセグメントを配置し、整流子基台に外嵌した拘束リングにより各セグメントの基端を固定した組立構造のモータ整流子がある。

このような組立構造のモータ整流子において、セグメントの軸方向長さを長くすると、基端の拘束リングによる固定だけでは固定強度が不足する。そのため、整流子の長さを直径程度にとどめ、セグメントの剛性はセグメント自身の持つ機械的強度で補う構造を採用している。

モータ性能上や外形上で、整流子を短く形成することができない場合は、セグメントの先端側にも拘束リングを外嵌させ、強度を補っている。

しかし、拘束リングがセグメントの基端と先端との両方に必要なため、部品点数が増えるという問題点がある。そのため、整流子形状を短くすることのできないモータにおいて、部品点数が少なくセグメントの固定の確実なモータ整流子の開発が急がれている。

この問題点を解消するため、第12図に示すモータ整流子を考えた。すなわち、整流子基台51の外面に配置した各セグメント52の先端に折曲爪52aを設け、折曲爪52aを整流子基台51の

凹部５３に係合したものである。これよると、折曲爪５２ａの係合のため、機械的強度が向上し、セグメント５２の先端側に拘束リングを設けることが不要で部品点数が削減される。

〔発明が解決しようとする課題〕

しかし、第１３図に示すように、折曲爪５２ａの厚さT₂がセグメント52の本体部分の厚さT₁と同じであって厚いため、折曲爪５２ａの曲げ加工が行い難く、組立性が悪いうえ、曲げ精度も不安定となる。また、曲げによる強度劣化も生じ易いという問題点がある。

この発明の目的は、部品点数が少なく、機械的強度や機械的精度に優れ、かつ折曲爪の曲げ加工も容易で強度劣化のない組立構造のモータ整流子を提供することである。

〔課題を解決するための手段〕

この発明は、円筒状整流子基台の円筒外周面に導電性のセグメントを周方向に複数個配置し、これらセグメントの外面から前記整流子基台に外嵌して前記各セグメントの基端を拘束する拘束リングを設けたモータ整流子において、整流子基台の円筒端面に形成した凹部に係合する折曲爪を各セグメントの先端に設ける。折曲爪の板厚は、セグメントの本体部分の板厚よりも薄くする。

〔作　用〕

この発明の構成によると、各セグメントは基端においては拘束リングにより、先端においては折曲爪の係合により整流子基台に保持される。折曲爪はセグメントの本体部分よりも薄くしてあるため、折り曲げが行い易い。

〔実施例〕

この発明の一実施例を第１図ないし第８図に基づいて説明する。整流子基台１は基端が大径となった段付厚肉円筒状の樹脂成形品からなり、外周面に複数個の導電性のセグメント２が周方向に並べて配置してある。整流子基台１の段面１ａに隣接してセグメント２の外周に拘束リング３を外嵌し、各セグメント２の基端を整流子基台１に保持している。

第２図に示すように、各セグメント２は、円弧状断面形状の本体部分２ａと、その基端から径方向外側へ突出した端子片２ｂと、基端の周方向両縁に設けた一対の延出片２ｃと、本体部分２ａの先端から内側へ折り曲げた折曲爪４とを有する。折曲爪４は、整流子基台１の先端面の周方向の一部に設けた各凹部５に係合する。

折曲爪４の厚さT₂は、本体部分２ａの厚さT₁よりも薄くしてある。例えば本体部分２ａの厚さT₁が0.３㎜である場合、折曲爪４の厚さT₂は0.１５㎜とする。折曲爪４の曲げ角度θ（第６図）は、例えば４８°とする。折曲爪４の各部ａ～ｃの曲率半径は、各々例えば0.９㎜，0.１５㎜，0.１㎜としてある。

セグメント２の各端子片２ｂは、整流子基台１に設けた端子挿通溝９（第３図，第４図）から外部に突出する。セグメント２の基端の延出片２ｃは、整流子基台１の段面１ａに設けた環状溝６（第４図）に挿入する。環状溝６内には軸方向に延びる突条７が設けてあり、各延出片２ｃは各突条７に圧接する。

第８図は、セグメント２の製造方法の一例を示す。フープ状の素材１０（第８図（Ａ））に一対の縦形の穴１１をプレスにより打ち抜き（第８図（Ｂ））、穴１１間の部分を厚さT₂の薄肉に圧印する（第８図（Ｃ））。この後、仕上げ加工としてトリミングを施し、折曲爪４になる部分を形成する（第８図（Ｄ））。この素材１０から各セグメント２の打ち抜きを行う。この後、第７図に示すように折曲爪４を所定の角度θに折り曲げる。

この構成によると、セグメント２の先端部を折曲爪４で整流子基台１の凹部５に係合させたため、拘束リング３と折曲爪４とによりセグメント２の両端が保持され、機械的強度の向上が図れる。そのため、モータ整流子を軸方向長さに比べて半径の短い細型としても、充分なセグメント２の保持が行え、コンパクトな設計が行える。

また、折曲爪２は、その厚さT₂をセグメント２の本体部分２ａよりも薄くしてあるため、曲げ加工が行い易くて組立作業性が良く、また精度良く曲げ加工ができて組立精度が向上する。しかも、

折曲爪4を薄くしたため、無理な曲げによる強度劣化がなく、かつ厚さの薄い分だけ省スペースが図れる。

第13図のように折曲爪52aの厚さT_2'を本体部分52の厚さT_1と同じにした場合と比較する。曲げ角度θは同じである。第13図のように同じ厚さにした場合は、曲げ部外面の延び部分の長さℓ_2が非常に長くなるのに対して、厚さT_2を薄くした場合は、第7図のように曲げ部外面の延び部分の長さℓ_1が短くなる。このように、材料の伸び量の差を生じ、伸び量ℓ_2が長い場合は材料強度劣化を起こすが、厚さT_2を薄くして伸び量ℓ_1が短くなるようにすると、材料劣化が防止できる。

また、セグメント2には基端に延出部2cを設け、これを整流子基台1の環状溝6に挿入し、かつ環状溝6内の突条7で延出部7を圧接させるようにしてあるため、組立作業時において、セグメント2を挿入した時に適度な保持力が得られ、組立作業性が良い。しかも、突条7によりセグメント2の位置決めが行えるため、より一層組立性が向上する。このように組立作業性がよいため、組立誤差が生じ難く、高精度なモータ整流子を製造することができる。

セグメント2の折曲爪4の外面は円弧状に湾曲しているが、そのため拘束リング3を圧入するときにガイド作用が得られ、このことからも組立性が向上する。

第9図ないし第11図は、各々セグメント2の製造方法の他の例を示す。

第9図の例は、第8図の例の圧印工程（第8図（C））までとし、トリミング工程（第8図（D））を省略する方法である。

第10図の例は、素材10′を圧延フープ材の状態で薄肉部10a′を有する異形状とし、これに穴11′を打ち抜く方法である。この穴11′間で折曲爪4となる薄肉部分が得られる。

第11図の方法は、素材10に切削加工により薄肉部10aを形成し（第10図（B））、この部分10aに穴11′を形成して折曲爪4になる部分を形成する方法である。

〔発明の効果〕

この発明のモータ整流子は、セグメントの先端部を折曲爪で整流子基台に係合させたため、拘束リングと折曲爪とによりセグメントの両端が保持され、機械的強度の向上が図れる。折曲爪は、その厚さをセグメントの本体部分よりも薄くしてあるため、曲げ加工が行い易くて組立作業性が良く、また精度良く曲げ加工ができて組立精度が向上する。しかも、折曲爪を薄くしたため、無理な曲げによる強度劣化がなく、かつ厚さの薄い分だけ省スペースが図れるという効果がある。

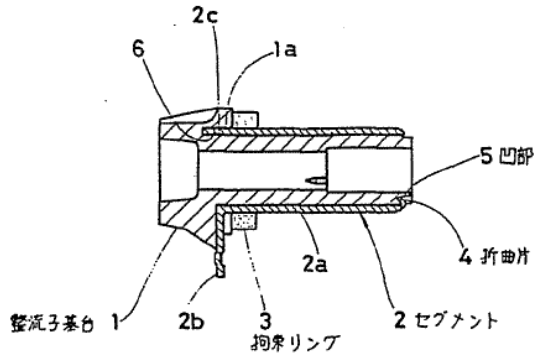
4．図面の簡単な説明

第1図はこの発明の一実施例の断面図、第2図はそのセグメントの拡大断面図、第3図は同じくそのモータ整流子の斜視図、第4図は同じくその分解斜視図、第5図は同じくその部分断面図、第6図は同じくそのセグメントの折曲爪部分の断面図、第7図は同じくそのセグメントの折曲爪折り曲げ前の状態を示す説明図、第8図は同じくそのセグメントの製造工程の説明図、第9図ないし第11図は各々セグメントの他の製造工程の説明図、第12図はモータ整流子の提案例の断面図、第13図はその作用説明図である。

1…整流子基台、2…セグメント、3…拘束リング、4…折曲爪、5…凹部

特許出願人　松下電工株式会社
代理人　弁理士　宮井暎夫

第 1 図



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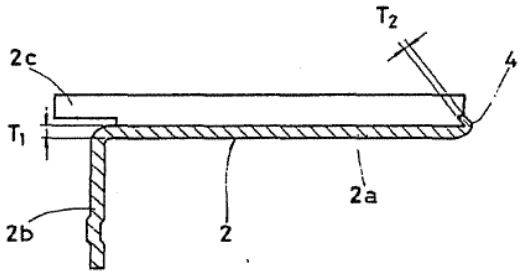

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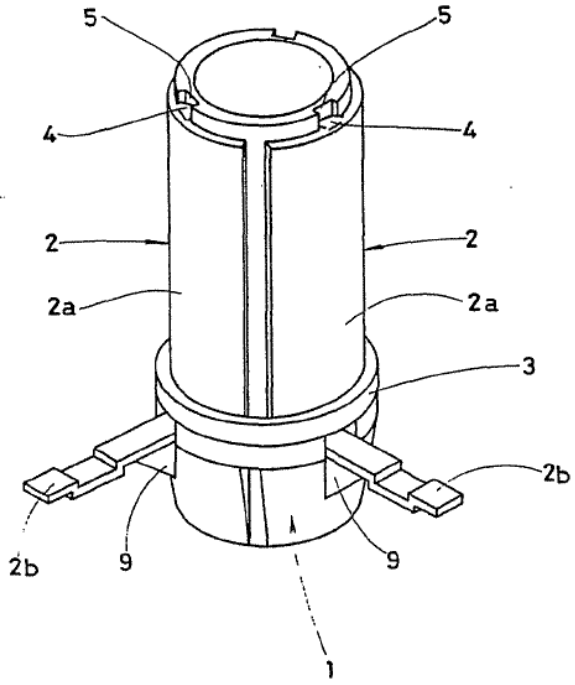

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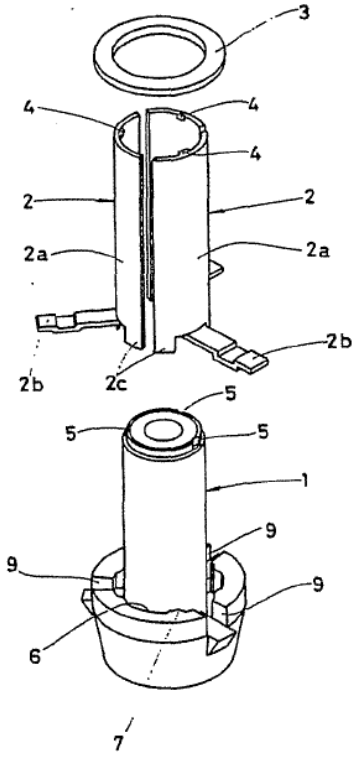

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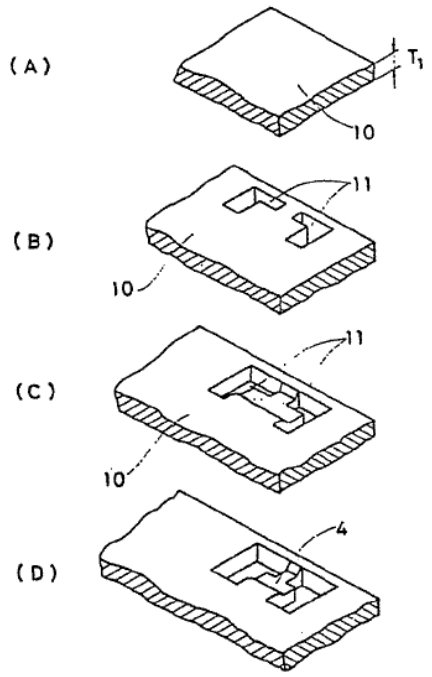

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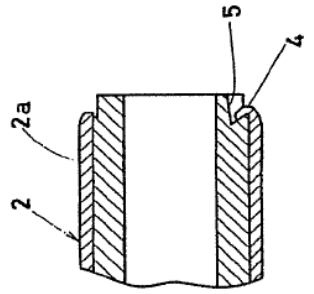
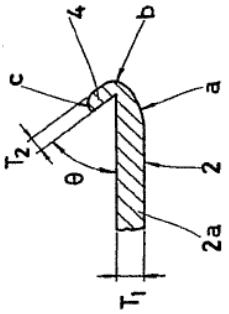
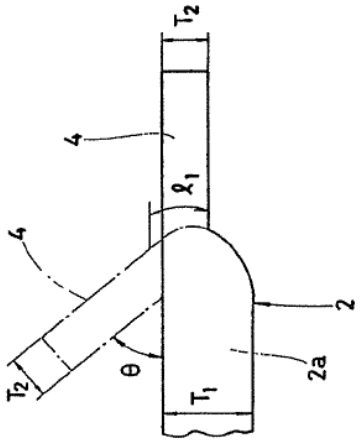


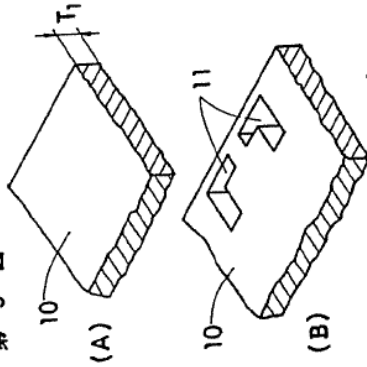
第6図



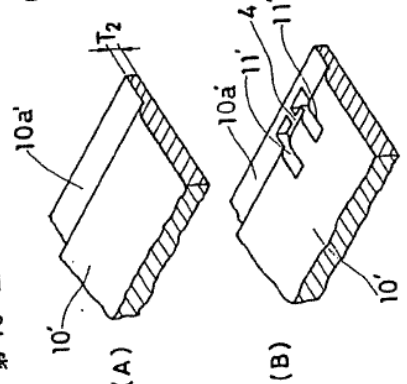
第7図



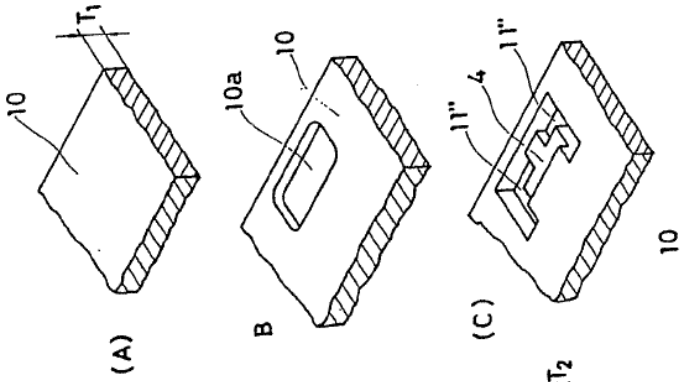
第9図



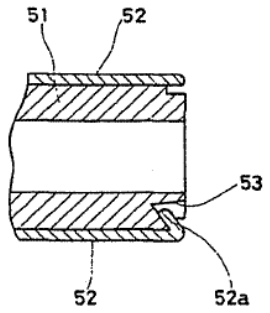
第10図



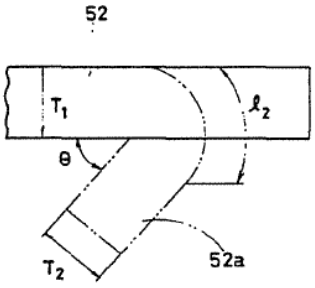
第11図



第 12 図



第 13 図



INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001712

A. CLASSIFICATION OF SUBJECT MATTER
IPC[7]: H04L 12/24, H04L 12/54
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC[7]: H04L 12* (all subclasses, keywords)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)
Delphion, Canadian Patent Database, USPTO (handheld electronic device, time, timestamp,personal digital assistant, pda, display

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6590529 B2 (SCHWOEGLER et al.), 8 July 2003 (8.07.3002), column 2, lines 44-50, column 2, line 65-column 3, line 3, column 5, lines 10-12, lines 24-27, lines 42-46, column 6, lines 12-15, lines 21-23, lines 47-50, column 10, lines 13-16, lines 22-26, column 12, lines 38-40, lines 61-63, column 16, claim 18	1-20
Y	GB 2384150 A (YAMAMOTO et al.), 16 July 2003 (16.07.2003), abstract, page 1, lines 7-10, page 2, lines 4-6, page 3, lines 7-23, page 6, lines 13-24; Figure 2, Figure 6, Figure 7, Figure 8	1-20
A, P	US 2004/0137967 A1 (BODLEY et al.), 15 July 2004 (15.07.2004), abstract, page 1, paragraph [0004], page 2, paragraph [0019]-[0020], paragraph [0022]-[0024], paragraph [0026]-[0028], page 3, claim 1, claim 7, claim 10, claim 11, page 4, claim 18, claim 19, claim 21, claim 27	1-20
A, P	WO 2004/064362 A1 (BODLEY et al.), 29 July 2004 (29.07.2004), abstract, page 1, lines 21-25, page 5, lines 10-13, page 6, lines 3-10, line 17-20, page 7, lines 10-23, page 7, line 26-page 8, line 1, page 8, lines 9-12, page 9, lines 12-15, page 10, claim 1, page 11, claim 11, page 12, claim 18, claim 21	1-20

X Further documents are listed in the continuation of Box C.

X Patent family members are listed in annex.

* Special categories of cited documents :
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international-type search	Date of mailing of the international-type search report
1 December 2004 (01-12-2004)	14 February 2005 (14-02-2005)
Name and mailing address of the ISA/CA *Commissioner of Patents* *Canadian Patent Office - PCT* *Ottawa/Gatineau K1A 0C9* Facsimile No. 1-819-953-9358	Authorized officer Suchita Varma Tel: (819) 934-4549

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001712

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 6727930 B2 (CURRANS et al.), 27 April 2004 (27.04.2004), abstract, column 1, lines 11-37, column 1, line 66-column 2, line 9, column 2, lines 15-20, lines 62-66, column 4, lines 22-31, lines 42-55, column 5, lines 47-59, column 6, lines 56-65, column 7, lines 61-65, column 8, lines 7-14, claim 1, column 9, claim4, claim 5	1-20
A, P	US 6721651 B1 (MINELLI et al.), 13 April 2004 (13.04.2004), abstract, column 2, lines 2-7, lines 51-54, column 4, lines 38-41, column 5, line 57-column 6, line 11, column 9, lines 37-39, column 12, lines 33-40, column 13, lines 42-45, column 14, lines 32-35, column 15, lines 15-21	1-20
A, P	WO 2004/038603 A1(MACKAY et al.), 6 May 2004 (6.05.2004), abstract	1-20

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/CA2004/001712

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2004137967	15-07-2004	US2004137967 A1	15-07-2004
		WO2004064362 A1	29-07-2004
WO2004064362	29-07-2004	US2004137967 A1	15-07-2004
		WO2004064362 A1	29-07-2004
GB2384150		CN1423502 A	11-06-2003
		GB0228076D D0	08-01-2003
		JP2003167569 A	13-06-2003
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US6590529	08-07-2003	CA2472187 A1	11-07-2002
		EP1405108 A2	07-04-2004
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		US2004010372 A1	15-01-2004
		WO02054113 A2	11-07-2002
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		JP2003058511 A	28-02-2003
		SE0200318 A	19-11-2002
		US6727930 B2	27-04-2004
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WO2004038603	06-05-2004	FR2846439 A1	30-04-2004
		WO2004038603 A1	06-05-2004

Form PCT/ISA/210 (patent family annex) (January 2004)

Electronic Acknowledgement Receipt	
EFS ID:	10577001
Application Number:	13111734
International Application Number:	
Confirmation Number:	6081
Title of Invention:	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment
First Named Inventor/Applicant Name:	Gerhard D. Klassen
Customer Number:	91704
Filer:	Brett Joseph Slaney/Judith Martin
Filer Authorized By:	Brett Joseph Slaney
Attorney Docket Number:	70314/00568
Receipt Date:	22-JUL-2011
Filing Date:	19-MAY-2011
Time Stamp:	12:52:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		11144-US-CNT3_IDS.pdf	657796 44f89a784ee4e0fdfa377d2a19b8d9b3ef4690c3	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description	**Start**	**End**		
	Transmittal Letter	1	2		
	Information Disclosure Statement (IDS) Form (SB08)	3	5		
Warnings:					
Information:					
2	Foreign Reference	11144-US-CNT3_Foreign_Ref1.pdf	826115 558183b0c8e2ef358cdb265bc6dd9ad2c65c74f8	no	21
Warnings:					
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3	Foreign Reference	11144-US-CNT3_Foreign_Ref2.pdf	2689016 4d204d1f0bb22f1283bad20628305bccddfa4f61	no	53
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4	Foreign Reference	11144-US-CNT3_Foreign_Ref3.pdf	994758 82b0bd4deb965e6d013dc632df742429a8b15c2a	no	22
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5	Foreign Reference	11144-US-CNT3_Foreign_Ref4.pdf	1650772 d2a741da018f56efb3e72622d97b1c3681d8c268	no	20
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6	Foreign Reference	11144-US-CNT3_Foreign_Ref5.pdf	3059095 2601c4e20611126d118a0796fb89aa8f024fd191	no	39
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7	Foreign Reference	11144-US-CNT3_Foreign_Ref6.pdf	1504323 5dacf6751178f3660ace773c2c59e400c9088cb3	no	25
Warnings:					
Information:					
8	Foreign Reference	11144-US-CNT3_Foreign_Ref7.pdf	399521 e78958ff7b912efe537d12ded228b66a3ea28a12	no	8
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9	Foreign Reference	11144-US-CNT3_Foreign_Ref8.pdf	511145 42fbbd32fb46d7a1027f5afef52ed847f50e3630	no	7
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10	Non Patent Literature	11144-US-CNT3_NPL1.pdf	167446 73e493718b5515791f06a12f3c1cb4969bfcc7b9	no	2
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11	Non Patent Literature	11144-US-CNT3_NPL2.pdf	322955 e38540bc7de20f74ba2d643cbda37bad412c3686	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	12782942		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Appl. No.: **13/111,734**

Applicant: **KLASSEN, Gerhard D. et al.**

Filed: **May 19, 2011**

Title: **Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment**

Art Unit: **2629**

Examiner: **Not yet assigned**

Docket No.: **70314/00568**

Mail Stop Amendment
U.S. Patent & Trademark Office
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to the duty to disclose under 37 CFR §1.56, Applicant submits herewith a Form PTO/SB/08 listing references of which the Applicant is aware and which are brought to the attention of the Examiner. In accordance with 37 CFR §1.98(a)(2), a copy of each foreign patent document and non-patent reference document listed in the enclosed Form PTO/SB/08 is submitted herewith.

An English-language translation of JP 200311145, listed on the enclosed Form, is not within the possession, custody, or control of, nor is readily available to, the Applicant. Applicant encloses together with the copy of the Japanese reference an English-language translation of the abstract, and that abstract constitutes a concise statement of the relevance of JP 200311145 as presently understood by the Applicant.

Pursuant to 35 USC §120, this application relies on the earlier filing date(s) of the following prior application(s):

Serial Number	Filing Date
10/944,925	September 20, 2004

The filing of this IDS shall not be construed as a representation that a search has been made, an admission that the information cited is, or is considered to be, material for patentability, or

that no other material information exists. This filing shall not be construed as an admission against interest in any matter.

This IDS is submitted pursuant to 37 CFR §1.97(b) and, accordingly, no fee is believed to be due for consideration of the documents submitted herewith.

Applicant respectfully requests consideration of the items listed and requests the Examiner to return a copy of the attached Form PTO/SB/08 after being marked as being considered by the Examiner.

Respectfully submitted,

Date: July 22/11

Brett J. Slaney
Registration No. ~~38,772~~
Agent for Applicant

BLAKE, CASSELS & GRAYDON LLP
199 Bay Street
Suite 2800, Commerce Court West
Toronto, Ontario, M5L 1A9
Canada

Tel 416-863-2518
Fax 416-863-2653

BSL/jm

(✓) encl.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/111,734	05/19/2011	2629	1298	70314/00568	24	3

CONFIRMATION NO. 6081

91704
Blake, Cassels & Graydon LLP
199 BAY STREET , SUITE 4000
COMMERCE COURT WEST
TORONTO, ON M5L 1A9
CANADA

FILING RECEIPT

Date Mailed: 06/03/2011

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Gerhard D. Klassen, Waterloo, CANADA;
Christopher R. Wormald, Kitchener, CANADA;
Lawrence E. Kuhl, Waterloo, CANADA;

Assignment For Published Patent Application

Research In Motion Limited, Waterloo, CANADA

Power of Attorney: The patent practitioners associated with Customer Number 91704

Domestic Priority data as claimed by applicant

This application is a CON of 10/944,925 09/20/2004
which claims benefit of 60/504,379 09/19/2003

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

If Required, Foreign Filing License Granted: 06/01/2011

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/111,734**

Projected Publication Date: 09/08/2011

Non-Publication Request: No

Early Publication Request: No

Title

Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment

Preliminary Class

345

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/111,734

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	24 minus 20 =	* 4			OR	x 52 =	208
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 220 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1298

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/111,734	05/19/2011	Gerhard D. Klassen	70314/00568

CONFIRMATION NO. 6081

91704
Blake, Cassels & Graydon LLP
199 BAY STREET , SUITE 4000
COMMERCE COURT WEST
TORONTO, ON M5L 1A9
CANADA

POA ACCEPTANCE LETTER

OC000000047988149

Date Mailed: 06/03/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/19/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/jchery/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 91704

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 91704

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Research In Motion Limited
295 Phillip Street
Waterloo, Ontario N2L 3W8 CANADA

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Bill Feng	Date	(519)888-7465
Name	Bill Feng	Telephone	Oct 27/09
Title	Vice President, Shared Services		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Legal OK MMA

FRM OK

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: KLASSEN, Gerhard, Dietrich et al.

Application No./Patent No.: _____ Filed/Issue Date: _____

Titled:

Research In Motion Limited , a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

_____ May 19/11

Signature Date

Brett J. Slaney Agent for Assignee

Printed or Typed Name Title

WORLDWIDE ASSIGNMENT

WHEREAS, WE, (hereinafter referred to as the "ASSIGNORS"):

GERHARD D. KLASSEN, 510 Heatherhill Place, Waterloo, Ontario, Canada, N2T 1H7
CHRISTOPHER R. WORMALD, 215 Hawkswood Drive, Kitchener, Ontario, Canada N2K 4J2
and
LAWRENCE E. KUHL, 686 Jacob Lane, Waterloo, Ontario, Canada N2V 2G9

have invented certain new and useful improvements in an invention entitled **HANDHELD ELECTRONIC DEVICE AND ASSOCIATED METHOD PROVIDING TIME DATA IN A MESSAGING ENVIRONEMENT** for which an application for United States Letters Patent was filed on September 20, 2004, Application Serial No. 10/944,925, and as further identified by Docket No. 291010-00084 and RIM Reference No. 11144-US-PAT; and

WHEREAS, **RESEARCH IN MOTION LIMITED** (hereinafter referred to as the "ASSIGNEE"), a corporation organized under the laws of the Province of Ontario, CANADA, having a place of business at 295 Phillip Street, Waterloo, Ontario, CANADA, N2L 3W8, is desirous of acquiring the full and exclusive right, title and interest in and to said application inclusive of any and all priority rights derived therefrom and the inventions therein disclosed, and in and to all Letters Patent, both United States and foreign, to be granted for said inventions.

NOW, THEREFORE, for a valuable consideration, the receipt whereof is hereby acknowledged, WE ASSIGNORS, intending to be legally bound, do hereby confirm sale, assignment, transfer, and set over, and hereby sell, assign, transfer, and set over unto the ASSIGNEE, its successors and assigns, the full and exclusive right, title and interest in and to the aforesaid application for United States Letters Patent inclusive of any and all priority rights derived therefrom, and the inventions therein disclosed, and in and to all Letters Patent and issues thereof which may be granted upon said application and in and to all Letters Patent which may be issued upon any substitutes, divisions, or continuations of said application, and in and to any and all Letters Patent which may be granted for said inventions in any other country or countries; the same to be held and enjoyed by the ASSIGNEE for its own use and behoof, and for the use and behoof of its successors and assigns, to the full end of the term or terms for which said Letters Patent and reissues thereof may be granted as fully and entirely as the same would have been held and enjoyed by us had this assignment and sale not been made;

AND WE, ASSIGNORS hereby agree to execute, upon request, any and all further papers which may be necessary or desirable to enable the ASSIGNEE, its successors and assigns, to file and prosecute said application, and any and all substitutes, divisions, or continuations thereof, and any and all reissues of the Letters Patent granted upon said application, or upon any substitutes, divisions, or continuations thereof, and any and all applications for foreign Letters Patent on said inventions; and ASSIGNORS further agree to execute any and all further papers which may be necessary or desirable to vest or perfect the title of ASSIGNEE, its successors and assigns, in and to said application and the inventions therein disclosed, and in and to any and all Letters Patent and reissues thereof, both United States and foreign, which may be granted upon said application, and any substitutes, divisions, or continuations thereof, and upon any foreign applications;

AND WE, ASSIGNORS hereby authorize and request The Commissioner of Patents to issue each and every Letters Patent to be granted upon the aforesaid application for United States Letters Patent, and upon any and all substitutes, divisions, and continuations of said application, and each and every reissue of said Letters Patent, to the ASSIGNEE, its successors and assigns, as the assignee of the entire right, title and interest therein, in accordance with this assignment.

IN WITNESS WHEREOF, this assignment has been executed below by the undersigned:

Date: August 31, 2006

GERHARD D. KLASSEN

Waterloo,
Ontario, Canada N2T 1H7

STATEMENT BY WITNESS

I, Shanel Wiebenert, whose full Post Office address is

B232 Inverhuron Cres., Waterloo, ON, N2V 2H8
(Address of Witness)

hereby declare that I was personally present and did see the above named person, personally known to me to be the person named in the Worldwide Assignment, duly sign and execute the same.

Date: August 31, 2006

(Signature of Witness)

Date: Sep 5, 2006

CHRISTOPHER R. WORMALD

Kitchener,
Ontario, Canada N2K 4J2

STATEMENT BY WITNESS

I, Raymond Rebbs, whose full Post Office address is

801-547 Belmont ave. W.
(Address of Witness)

hereby declare that I was personally present and did see the above named person, personally known to me to be the person named in the Worldwide Assignment, duly sign and execute the same.

Date: Sep 5, 2006

(Signature of Witness)

Date: Aug 11/06

LAWRENCE E. KUHL

Waterloo,
Ontario, Canada N2V 2G9

STATEMENT BY WITNESS

I, KEIZO MARUI, whose full Post Office address is

301 - 400 PARKSIDE DR. WATERLOO, ON N2L 6E5
(Address of Witness)

hereby declare that I was personally present and did see the above named person, personally known to me to be the person named in the Worldwide Assignment, duly sign and execute the same.

Date: 11 Aug 2006

(Signature of Witness)

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment
First Named Inventor/Applicant Name:	Gerhard D. Klassen
Filer:	Brett Joseph Slaney/Judith Martin
Attorney Docket Number:	70314/00568

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	4	52	208
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1298**

Electronic Acknowledgement Receipt	
EFS ID:	10131066
Application Number:	13111734
International Application Number:	
Confirmation Number:	6081
Title of Invention:	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment
First Named Inventor/Applicant Name:	Gerhard D. Klassen
Customer Number:	91704
Filer:	Brett Joseph Slaney/Judith Martin
Filer Authorized By:	Brett Joseph Slaney
Attorney Docket Number:	70314/00568
Receipt Date:	19-MAY-2011
Filing Date:	
Time Stamp:	18:02:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1298
RAM confirmation Number	4494
Deposit Account	022553
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	11144-US-CNT3_ADS.pdf	589341 bc81e8bdab275001522407181 3fd8cf5a9f4df34	no	4
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
2		11144-US-CNT3_Appln.pdf	2040387 e440678c73c333747d914ebcbc054330fe691360	yes	19
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	13	
	Claims		14	18	
	Abstract		19	19	
Warnings:					
Information:					
3	Drawings-only black and white line drawings	11144-US-CNT3_Drawings.pdf	410307 8c73597c776fd801aedda9eeb6ce9f1b5349ba80	no	7
Warnings:					
Information:					
4	Oath or Declaration filed	11144-US-CNT3_Declaration.pdf	471557 b6c30aa2b9925f3583b58f97c2079dfc1fb4a478	no	4
Warnings:					
Information:					
5		11144-US-CNT3_POA_Assignee_Statement.pdf	563560 cf33e96c2c814eba538b7e8c0fa7b4e12c78c237	yes	5
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Power of Attorney		1	1	
	Assignee showing of ownership per 37 CFR 3.73(b).		2	5	
Warnings:					
Information:					

6	Fee Worksheet (PTO-875)	fee-info.pdf	36554 b4c3172d7d003f67ab1266b121856f22cda27428	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	4111706

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70314/00568
	Application Number	
Title of Invention	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Gerhard	D.	KLASSEN	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Waterloo	Country Of Residence	CA
Citizenship under 37 CFR 1.41(b)	CA		

Mailing Address of Applicant:

Address 1	295 Phillip Street, Ext. 72999		
Address 2			
City	Waterloo	State/Province	ON
Postal Code	N2L 3W8	Country	CA

Applicant 2

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Christopher	R.	WORMALD	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Kitchener	Country Of Residence	CA
Citizenship under 37 CFR 1.41(b)	CA		

Mailing Address of Applicant:

Address 1	295 Phillip Street, Ext. 72876		
Address 2			
City	Waterloo	State/Province	ON
Postal Code	N2L 3W8	Country	CA

Applicant 3

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Lawrence	E.	KUHL	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Waterloo	Country Of Residence	CA

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70314/00568
	Application Number	
Title of Invention	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment	

Citizenship under 37 CFR 1.41(b)	CA		
Mailing Address of Applicant:			
Address 1	295 Phillip Street, Ext. 72572		
Address 2			
City	Waterloo	**State/Province**	ON
Postal Code	N2L 3W8	**Country**	CA

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	91704		
Email Address	rimpatent@blakes.com	Add Email	Remove Email

Application Information:

Title of the Invention	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment		
Attorney Docket Number	70314/00568	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	7	**Suggested Figure for Publication (if any)**	2

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70314/00568
	Application Number	
Title of Invention	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment	

Customer Number	91704

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	10944925	2004-09-20
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
10944925	non provisional of	60504379	2003-09-19

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Application Number	Country[i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
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Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	Research In Motion Limited		
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Email Address			

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	70314/00568
		Application Number	
Title of Invention	Handheld Electronic Device and Associated Method Providing Time Data in a Messaging Environment		

Signature:

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Signature				Date (YYYY-MM-DD)	2011-05-19
First Name	Brett	Last Name	Slaney	Registration Number	58772

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HANDHELD ELECTRONIC DEVICE AND ASSOCIATED METHOD PROVIDING TIME DATA IN A MESSAGING ENVIRONMENT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 10/944,925 filed on September 20, 2004 which claims the benefit of U.S. Provisional Application No. 60/504,379 entitled filed on Sep. 19, 2003 both of which are hereby incorporated into the present application by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention relates generally to handheld electronic devices and, more particularly, to a handheld electronic device and a method for providing information representative of the times of certain communications in a messaging environment.

2. Background of the Invention

[0003] Numerous types of handheld electronic devices are known. Examples of such handheld electronic devices include, for instance, personal data assistants (PDAs), handheld computers, two-way pagers, cellular telephones, and the like. Such handheld electronic devices are generally intended to be portable, and thus are relatively small. Many handheld electronic devices also feature wireless communication capability, although many such handheld electronic devices are stand-alone devices that are functional without communication with other devices. With advances in technology, handheld electronic devices are being configured to include greater numbers of features while having relatively smaller form factors.

[0004] Electronic devices, including handheld electronic devices, are capable of numerous types of communication. One type of communication is "messaging", and one type of messaging is "instant messaging" which enables a first device to send a message on a more or less instantaneous basis to a second device. With most all instant messaging, a given electronic device is provided with an interface that outputs the various communications that have occurred between the electronic device and another electronic device during a messaging "conversation". A sample output on an electronic device that is representative of the various communications that have occurred during a conversation may be as follows:

[0005] Hi Honey, how was your day?

[0006] <Brutal! Larry embarrassed me in front of everybody.

[0007] What a Jerk!

[0008] <Yeah, but I got him back later with a karate chop! ☺

[0009] good for you.

[0010] In this example, incoming messages are indicated by a greater than ">"mathematical symbol, and outgoing messages are indicated by a less than "<" mathematical symbol. If the conversation continues quickly, i.e., substantially without interruption, the messages do not need a time stamp on them. In the environment of a handheld electronic device, it would be desirable to avoid unnecessary time stamps and other unnecessary output since it occupies too much valuable space on the limited display of the handheld electronic device.

[0011] In some messaging circumstances, however, it may be desirable for information regarding certain timing aspects of conversation to be available to a user. Nevertheless, the limited space available on a display of a handheld electronic device has made a solution difficult. It thus would be desirable to provide an improved handheld electronic device and an associated method that provide time data in a messaging environment.

SUMMARY OF THE INVENTION

[0012] An improved handheld electronic device and an associated method are provided in which time data regarding certain aspects of a messaging conversation on a handheld electronic device are made available to a user. Such time data is provided, for instance, in situations where an interruption has occurred during a messaging conversation. Time data can also be provided to a user on demand in certain circumstances.

[0013] Accordingly, an aspect of the invention is to provide an improved handheld electronic device and a method in which data regarding the times at which certain communications have occurred in a messaging environment are made available to a user.

[0014] Another aspect of the invention is to provide an improved handheld electronic device and a method that enables a user to be made aware of certain timing aspects of a conversation in a messaging environment.

[0015] Another aspect of the invention is to provide an improved handheld electronic device and a method in which data regarding the times at which certain communications have occurred are made available to a user while limiting the amount of display area that is occupied by such data.

[0016] Another aspect of the invention is to provide an improved handheld electronic device and a method in which data can be provided regarding the elapsed time since a communication.

[0017] Accordingly, an aspect of the invention is to provide an improved method of providing an output on at least one of a first electronic device and a second electronic device, with the first electronic device being adapted to be in electronic communication with a second electronic device. The general nature of the method can be stated as including determining that a first messaging communication has occurred at a first time between the first device and the second device, outputting a first indication that is representative of at least a portion of the first communication, determining that a predetermined period of time has elapsed since the first time substantially without further communication between the first device and the second device and, responsive to determining that a predetermined period of time has elapsed, outputting a first time stamp representative of the first time.

[0018] Another aspect of the invention is to provide an improved method of providing an output on at least one of a first electronic device and a second electronic device, with the first electronic device being adapted to be in electronic communication with a second electronic device. The general nature of the method can be stated as including determining that a first messaging communication has occurred at a first time between the first device and the second device, outputting a first indication that is representative of at least a portion of the first communication, detecting a predetermined input and, responsive to detecting a predetermined input, outputting a first time stamp representative of the first time.

[0019] Another aspect of the invention is to provide an improved method of providing an output on at least one of a first electronic device and a second electronic device, with the first electronic device being adapted to be in electronic communication with a second electronic device. The general nature of the method can be stated as including determining that a first messaging communication has occurred at a first time between the first device and the second device, outputting a first indication that is representative of at least a portion of the first communication, determining that a first period of time has elapsed since the first time substantially without further communication between the first device and the second device and, responsive to determining that a first period of time has elapsed, outputting a first time stamp representative of the first period of time.

[0020] Another aspect of the invention is to provide an improved handheld electronic device of a type that is adapted to be in electronic communication with another electronic device. The general nature of the handheld electronic device can be stated as including a processor apparatus, an input apparatus, and an output apparatus. The processor apparatus includes a processor and a memory and is adapted to receive input from the input apparatus and to provide output to the output apparatus. The processor apparatus also is adapted to determine that a first messaging communication has occurred at a first time between the handheld electronic device and the other electronic device. The output apparatus is adapted to output a first indication that is representative of at least a portion of the first communication. The processor apparatus is adapted to determine that a predetermined period of time has elapsed since the first time substantially without further communication between the handheld electronic device and the other electronic device. Responsive to a determination that a predetermined period of time has elapsed, the output apparatus is adapted to output a first time stamp representative of the first time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] A full understanding of the invention can be gained from the following Description of the Preferred Embodiments when read in conjunction with the accompanying drawings in which:

[0022] FIG. 1 is an exemplary top plan view of a handheld electronic device in accordance with the invention which can be used in conjunction with an improved method in accordance with

the invention;

[0023] FIG. 2 is a schematic view of the handheld electronic device of FIG. 1;

[0024] FIG. 3 is a schematic view of the handheld electronic device of FIG. 1 and another device in a messaging environment;

[0025] FIG. 4 is an exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0026] FIG. 5 is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0027] FIG. 6a is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0028] FIG. 6b is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0029] FIG. 7 is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0030] FIG. 8a is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0031] FIG. 8b is another exemplary view of an output provided in accordance with an aspect of the method of the invention;

[0032] FIG. 9 is another exemplary view of an output provided in accordance with an aspect of the method of the invention; and

[0033] FIG. 10 is another exemplary view of an output provided in accordance with an aspect of the method of the invention.

[0034] Similar numerals refer to similar parts to the specification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0035] An improved handheld electronic device 4 in accordance with the invention is indicated generally in FIG. 1 and is depicted schematically in FIG. 2. The exemplary handheld electronic device 4 includes a housing 8 upon which are disposed an input apparatus 12, an output apparatus 16 and a processor apparatus 20. The input apparatus 12 includes a keypad 24 that can be said to include a plurality of keys 28.

[0036] The output apparatus 16 includes a display 50. The output apparatus 16 can additionally include, for instance, additional indicators such as lights, and the like, and can additionally include an audible output such as a speaker as well as other output devices.

[0037] The processor apparatus 20 includes a processor 52 that can be, for instance, and without limitation, a microprocessor (μP), and it is responsive to inputs from the input apparatus 12 and provides output signals to the output apparatus 16. The processor apparatus 20 further includes a memory 56 that includes a routine 60 stored therein. The exemplary routine 60 is a messaging routine that can provide a messaging capability on the device 4. It is understood that the memory 56 likely includes a number of other routines that are not expressly mentioned herein. As employed herein, the expression "a number of" and variations thereof shall refer broadly to any nonzero quantity including a quantity of one. The processor 52 interfaces with the memory 56, and the routine 60 is executable on the processor 52.

[0038] The device 4 further includes a wireless communication system. As can be seen in FIG. 3, the device 4 with the routine 60 can interface with a messaging service 62 to wirelessly provide the messaging capability on the device 4. In the depicted exemplary embodiment, the messaging service 62 provides an instant messaging capability on the device 4 and on the other electronic devices having routines that are subscribers to the messaging service 62. The messaging service 62 is schematically depicted as including a server, although the teachings herein are not limited to messaging services that employ a server. For instance, the

messaging service could, for example, provide a point-to-point communication capability such as is provided with the Bluetooth protocol, or may provide some other type of communication capability, whether or not wireless.

[0039] FIG. 3 further depicts another device 104 as being a device having a routine that is another subscriber to the messaging service 62. Specifically, the device 104 is an electronic device having a routine 160 thereon which can communicate with the messaging service 62 to provide a messaging capability on the device 104. While the exemplary devices 4 and 104 are depicted as having a wireless connection with the messaging service 62, it is understood that either or both of the devices 4 and 104 may employ a non-wireless communication capability and still not depart from the concept of the invention. It is further understood that while only the two devices 4 and 104 are depicted in FIG. 3 as being subscribers to the messaging service 62, many more subscribers to the messaging service 62 may exist but are not expressly depicted in FIG. 3.

[0040] During the course of an electronic conversation, such as depicted in FIG. 4 between, for instance, the devices 4 and 104, a number of messages 68 are communicated between the devices 4 and 104. An incoming message 72 received on, for instance, the device 4, provides a visual indication of a communication that has been transmitted from, for instance, the device 104 to the device 4. As can be seen in FIG. 4, an incoming message 72 includes an incoming symbol 66 and an incoming text portion 70. In the exemplary output depicted herein, the incoming symbol 66 is a mathematical greater than ">" symbol. The text portion 70 is an exemplary linguistic output that could be of numerous types of forms, such as in different languages, and also can include, for instance, symbols and the like that need not necessarily be a part of any particular language.

[0041] An outgoing message 76 is depicted as including an outgoing symbol 74, and an outgoing text portion 78. In the exemplary output depicted herein, the outgoing symbol 74 is a mathematical less than "<" symbol. The text portion 78 is an exemplary linguistic output that could be of numerous types of forms.

[0042] As can be further seen from FIG. 4, the exemplary conversation depicted therein includes a plurality of incoming messages 72 and a plurality of outgoing messages 76 that are

transmitted between the devices 4 and 104 at a conversational speed, i.e., at a speed in which back-to-back communications between the devices 4 and 104 occur without a meaningful delay therebetween. Due to the conversational speed of the back-to-back communications, the messages 68 do not include an indication of the times at which such messages 68 were transmitted, it being assumed as a general matter that in such circumstances the specific time at which a given message within such a conversation occurred may not be of significance to a user.

[0043] At a certain point in the exemplary conversation, though, an exemplary message 68 which, for example, may be an outgoing message 76, may also become a non-responded-to message 80, meaning that subsequent to its transmission substantially no additional communication occurs between the device 4 and 104 within a predetermined duration of time. More specifically, as the conversation transpires, the back-to-back incoming messages 72 and outgoing messages 76 are displayed adjacent one another. However, after the expiration of a predetermined duration of time after the transmission of a message 68, for instance ten minutes, in which substantially no additional communication occurs between the device 4 and 104, the message 68 is determined in accordance with the invention to be a non-responded-to message 80, and responsive to such determination a first time stamp 84 is output adjacent the non-responded-to message 80. For instance, if the non-responded-to message 80 was transmitted at 2:44 PM, and if substantially no additional communication between the device 4 and 104 occurs between 2:44 PM and 2:54 PM, at 2:54 PM the first time stamp 84 "2:44 pm" is output to provide to the users of the devices 4 and 104 an indication that the conversation was interrupted at 2:44 PM. Such selective outputting of the first time stamp 84 generally only in response to a message 68 of some significance, such as the terminal message of a conversation, saves space on the display 50. It is noted that the display of the first time stamp 84 typically will occur on both the device 4 and the device 104.

[0044] It is understood, however, that the time duration of ten minutes is completely exemplary and that the time duration could be set at any duration. It is also understood that the first time stamp 84 can be output in response to the occurrence of additional and/or other predetermined events. Moreover, it is noted that the predetermined time duration may be variable depending upon the characteristics of the conversation. For instance, if messages are being exchanged on a more infrequent basis, such as every nine minutes, the predetermined

duration of time after which the first time stamp 84 is output may be adjusted to be twenty minutes, for example.

[0045] By way of further example, and as is depicted generally in FIG. 5, another message 68 may subsequently be communicated between the devices 4 and 104. Since the message 68 corresponds with a resumption of communication between the devices 4 and 104 after a period of interruption, the message 68 is determined to be a resumption message 88, and a second time stamp 92 is output adjacent the resumption message 88. A user thus can determine from the output on the display 50 the period of time during which the conversation was suspended, i.e., the time between transmission of the non-responded-to message 80 and transmission of the resumption message 88. Selective outputting of the second time stamp 92 saves space on the display 50. In this depicted example, the first time stamp 84 is disposed, for example, adjacent the non-responded-to message 80, and the second time stamp 92 is disposed, for example, adjacent the resumption message 88. It is also noted that the second time stamp 92 is disposed, for example, between the non-responded-to message 80 and the resumption message 88.

[0046] As the conversation continues after transmission of the resumption message 88, one of the users of the devices 4 and 104 may determine that a time stamp would desirably be displayed in association with a message 68, such as if the user wished to emphasize to himself or herself, or to the other user, the time at which the message 68 was transmitted. If such a time stamp is desired, the user may activate a user interface 96, such as the exemplary user interface 96 of FIG. 6a, which can manually cause the output of an inserted time stamp 98 adjacent the message 68, as in FIG. 6b. As mentioned above, the inserted time stamp 98 can be made to appear on both the device 4 and the device 104, and it is also noted that, if desired, the inserted time stamp 98 could be made to appear on only one or the other of the devices 4 and 104.

[0047] As can be seen in FIG. 7, the output could provide a non-responded-to message 180 and a resumption message 188, with a first time stamp 184 being disposed adjacent the non-responded-to message 180, and with a second time stamp 192 being disposed adjacent the resumption message 188. However, in the exemplary output of FIG. 7 the first time stamp 184 and the second time stamp 192 are disposed adjacent one another and are both disposed

between the non-responded-to message 180 and the resumption message 188. Such an exemplary display of the first and second time stamps 184 and 192 illustrates the gap in the conversation that occurred between transmission of the non-responded-to message 180 and transmission of the resumption message 188. It is noted that the first time stamp 184 and the second time stamp 192 may have been generated in a fashion similar to the generation of the first time stamp 84 and the second time stamp 92.

[0048] As can be seen in FIGS. 8a and 8b, the time stamps can be output in other places. For instance, a text portion of a non-responded-to message 280 may have a beginning 282 and an ending 286. Similarly, a text portion of a resumption message 288 may have a beginning 290 and an ending 294. In accordance with another aspect of the invention, a first time stamp 284 can be output at either the beginning 282 or the ending 286 of the text portion of the non-responded-to message 280, and in the example of FIG. 8a the exemplary first time stamp 284 is output at the beginning 282. Also, a second time stamp 292 can be output at either the beginning 290 or the ending 294 of the text portion of the resumption message 288, and in the example of FIG. 8a the exemplary second time stamp 292 is output at the beginning 290. Other positioning of the first time stamp 284 and the second time stamp 292 are possible within the concept of the invention.

[0049] For instance, and as another example, FIG. 8b depicts the exemplary first time stamp 284 as being output at the ending 286 while the exemplary second time stamp 292 is output at the beginning 290. FIGS. 8a and 8b depict different exemplary ways in which the first and second time stamps 284 and 292 can be output to provide time data to a user. In FIG. 8a the first and second time stamps 284 and 292 are disposed at a consistent location, i.e., at the beginnings 282 and 290 of the text portions of the non-responded-to message 280 and the resumption message 288. FIG. 8b disposes the first and second time stamps 284 and 292 generally between the ending 286 of the non-responded-to message 280 and the beginning 290 of the resumption message 288, which focuses the attention of the user on the interval during which the conversation was interrupted. Other ways of outputting the first and second time stamps 284 and 292 will be apparent.

[0050] Another way of providing time stamps in a fashion that saves space on the display 50 is depicted in FIG. 9. Specifically, the messages 368 are output without displayed time stamps,

but upon moving a cursor 374 or other pointing device or other device in proximity to a given message 368 a corresponding requested time stamp is output adjacent the message 368. In this way, the messages 368 can be provided without also displaying time stamps, but if a time stamp is desired as to any of the messages 368 a requested time stamp 378 can be readily output. In this regard, the requested time stamp 378 may be output for only a predetermined duration of time, for instance a few seconds, and/or the requested time stamp 378 may be deleted from the display 50 upon a detection of another input, such as from the input apparatus 12 or otherwise. In this regard, all of the messages 368 can have time stamps associated therewith that are not displayed until requested.

[0051] It is also noted that the requested time stamp 378 need not be requested by the cursor 374, and rather could be requested with virtually any other type of input desired, such as with a stylus and a touch sensitive screen, by an actuation of a key, or by the use of alternate pointing or other devices. Other ways of managing the output of the requested time stamp 378 as to any of the messages 368 will be apparent.

[0052] It is noted that the appearances of the various time stamps herein is completely exemplary, and that the time stamps could be provided in any format without departing from the concept of the invention. In this regard, and in accordance with another aspect of the invention, a given time stamp may be a smart time stamp and provide additional information depending upon the prevailing circumstances. For instance, if the first time stamp 84 of FIG. 4 was output as indicated above, and if the conversation was not resumed until the following day, the first time stamp 84 potentially could be configured to automatically change from being displayed as "2:44 pm" on the day of communication of the non-responded-to message 80 to being displayed as, for instance, "2:44 pm Thursday" or, for instance, "2:44 PM September 17, 2004" or, for instance, "2:44 pm yesterday" on the following day, although other configurations will be apparent and will be within the concept of the invention.

[0053] Further in this regard, the time stamps can be configured to depict relative times, i.e., elapsed times, rather than absolute times. For instance, and as is depicted generally in FIG. 10, a time stamp 478 associated with a message 468 can be output to say, for example, "less than one minute ago", meaning that the message 468 that has been activated by the cursor 474 has been transmitted less than one minute prior to the current time.

[0054] Such a time stamp 478 could be configured to be an active time stamp, meaning that it would change as time progressed. For instance, the time stamp 478 could progressively change from saying "less than one minute ago" to saying "one minute ago", "two minutes ago", "forty-five minutes ago", and the like as time progressed. Such a time stamp also could be configured, for instance, to revert back to displaying an absolute time after the expiration of a given time duration. For example, once the message 468 is one hour old, for instance, the time stamp 478 might be configured to no longer output a relative time such as "fifty-nine minutes ago", and rather to output an absolute time such as "2:54 pm". Other variations can be provided without departing from the concept of the invention.

[0055] If it is desired to provide such time stamps that output relative times, it might also be desirable to output such time stamps in any of the fashions set forth above, and such time stamps potentially could be configured to be output without first detecting a delay or a break in the "conversation". For instance, the time stamp "less than a minute ago" could be displayed immediately upon receiving a message on the handheld electronic device 4, if such a configuration is desired. In such a configuration, and in order to save space on the display 50, the handheld electronic device 4 may be configured to provide such a relative time stamp only for the most recently transmitted message. That is, responsive to detecting the transmission of a message, the handheld electronic device may be configured to substantially immediately output a time stamp such as "less than a minute ago". After one minute the time stamp may be altered to say "one minute ago", and the like. However, upon the transmission of an additional message, the time stamp for the prior message can be deleted and a new time stamp such as "less than a minute ago" can be provided with respect to the new message.

[0056] Such relative time stamps provide to the user an expedited understanding of the timing aspects of the message. That is, the user can understand an aspect of the time of transmission without having to refer to the current time. This advantageously saves effort by the user because it eliminates the mental step of determining the current time and subtracting therefrom an absolute time displayed by a time stamp to determine the elapsed time since transmission of the message.

[0057] The different fashions of selectively providing intelligent time data in the form of

selectively output time stamps advantageously saves valuable space on the display 50. Moreover, such selective outputting of time stamps advantageously avoids unnecessary visual clutter on the display 50.

[0058] While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of the invention which is to be given the full breadth of the claims appended and any and all equivalents thereof.

CLAIMS:

1. A method of displaying an instant message conversation on an electronic device, the instant message conversation comprising a plurality of instant messages exchanged between the electronic device and a second electronic device, the method comprising:

receiving a plurality of incoming instant messages from the second electronic device, each incoming instant message having an incoming textual portion;

transmitting a plurality of outgoing instant messages to the second electronic device, each outgoing instant message having an outgoing textual portion;

associating each instant message with a corresponding time stamp;

displaying the incoming textual portion of at least one of the incoming instant messages along with a respective time stamp, the incoming textual portion of each displayed incoming instant message being horizontally aligned at a same first horizontal position; and

displaying the outgoing textual portion of at least one of the outgoing instant messages along with a respective time stamp, the outgoing textual portion of each displayed outgoing instant message being horizontally aligned at a same second horizontal position, the second horizontal position being different from the first horizontal position.

2. The method of claim 1 further comprising displaying an incoming symbol with each displayed incoming instant message.

3. The method of claim 1 further comprising displaying an outgoing symbol with each displayed outgoing instant message.

4. The method of claim 1, wherein at least one first time stamp is displayed adjacent to its corresponding incoming instant message.

5. The method of claim 1, wherein at least one second time stamp is displayed adjacent to its corresponding outgoing instant message.

6. The method of claim 1, further comprising:

detecting an interruption in the instant message conversation; and

refraining from displaying a time stamp associated with a next one of an incoming instant message and an outgoing instant message if the interruption is less than a predetermined duration of time.

7. The method of claim 1, further comprising refraining from displaying at least one of the corresponding time stamps.

8. The method of claim 7, wherein the refraining is performed if an amount of time that has lapsed between the at least one corresponding time stamp and a previous corresponding time stamp is less than a predetermined duration of time.

9. An electronic device for displaying an instant message conversation, the instant message conversation comprising a plurality of instant messages exchanged between the electronic device and a second electronic device, the electronic device comprising:

a display;

a memory; and

a processor electronically coupled with the display and the memory, the processor configured to:

receive a plurality of incoming instant messages from the second electronic device, each incoming instant message having an incoming textual portion;

transmit a plurality of outgoing instant messages to the second electronic device, each outgoing instant message having an outgoing textual portion;

associate each instant message with a corresponding time stamp;

displaying the incoming textual portion of at least one of the incoming instant messages along with a respective time stamp, the incoming textual portion of each displayed incoming instant message being horizontally aligned at a same first horizontal position; and

display the outgoing textual portion of at least one of the outgoing instant messages along with a respective time stamp, the outgoing textual portion of each displayed outgoing instant message being horizontally aligned at a same second horizontal position, the second horizontal position being different from the first horizontal position.

10. The electronic device of claim 9, wherein the processor is further configured to display an incoming symbol with each displayed incoming instant message.

11. The electronic device of claim 9, wherein the processor is further configured to display an outgoing symbol with each displayed outgoing instant message.

12. The electronic device of claim 9, wherein at least one first time stamp is displayed adjacent to its corresponding incoming instant message.

13. The electronic device of claim 9, wherein at least one second time stamp is displayed adjacent to its corresponding outgoing instant message.

14. The electronic device of claim 9, wherein the processor is further configured to:

detect an interruption in the instant message conversation; and

refrain from displaying a time stamp associated with a next one of an incoming instant message and an outgoing instant message if the interruption is less than a predetermined duration of time.

15. The electronic device of claim 9, wherein the processor is further configured to refrain from displaying at least one of the corresponding time stamps.

16. The electronic device of claim 15, wherein the processor refrains from displaying the at least one of the corresponding time stamps if an amount of time that has lapsed between the at least one corresponding time stamp and a previous corresponding time stamp is less than a predetermined duration of time.

17. A computer readable medium comprising computer executable instructions embedded thereon for execution by a processor of an electronic device for displaying an instant message conversation upon a display of the electronic device, the instant message conversation comprising a plurality of instant messages exchanged between the electronic device and a second electronic device, such that when executed, the processor:

receives a plurality of incoming instant messages from the second electronic device, each incoming instant message having an incoming textual portion;

transmits a plurality of outgoing instant messages to the second electronic device, each outgoing instant message having an outgoing textual portion;

associates each instant message with a corresponding time stamp;

displays the incoming textual portion of at least one of the incoming instant messages along with a respective time stamp, the incoming textual portion of each displayed incoming instant message being horizontally aligned at a same first horizontal position; and

displays the outgoing textual portion of at least one of the outgoing instant messages along with a respective time stamp, the outgoing textual portion of each displayed outgoing instant message being horizontally aligned at a same second horizontal position, the second horizontal position being different from the first horizontal position.

18. The computer readable medium of claim 17, further comprising computer instructions such that when executed cause the processor to display an incoming symbol with each displayed incoming instant message.

19. The computer readable medium of claim 17, further comprising computer instructions such that when executed cause the processor to display an outgoing symbol with each displayed outgoing instant message.

20. The computer readable medium of claim 17, wherein at least one first time stamp is displayed adjacent to its corresponding incoming instant message.

21. The computer readable medium of claim 17, wherein at least one second time stamp is displayed adjacent to its corresponding outgoing instant message.

22. The computer readable medium of claim 17, further comprising computer instructions such that when executed cause the processor to:

detect an interruption in the instant message conversation; and

refrain from displaying a time stamp associated with a next one of an incoming instant message and an outgoing instant message if the interruption is less than a predetermined duration of time.

23. The computer readable medium of claim 17, further comprising computer instructions such that when executed cause the processor to refrain from displaying at least one of the corresponding time stamps.

24. The computer readable medium of claim 23, wherein the computer instructions that when executed cause the processor to refrain from displaying at least one of the corresponding time stamps are executed if an amount of time that has lapsed between the at least one corresponding time stamp and a previous corresponding time stamp is less than a predetermined duration of time.

ABSTRACT

An improved handheld electronic device and an associated method are provided in which time data regarding certain aspects of a messaging conversation on a handheld electronic device are made available to a user. Such time data is provided, for instance, in situations where an interruption has occurred during a messaging conversation. Time data can also be provided to a user on demand in certain circumstances.

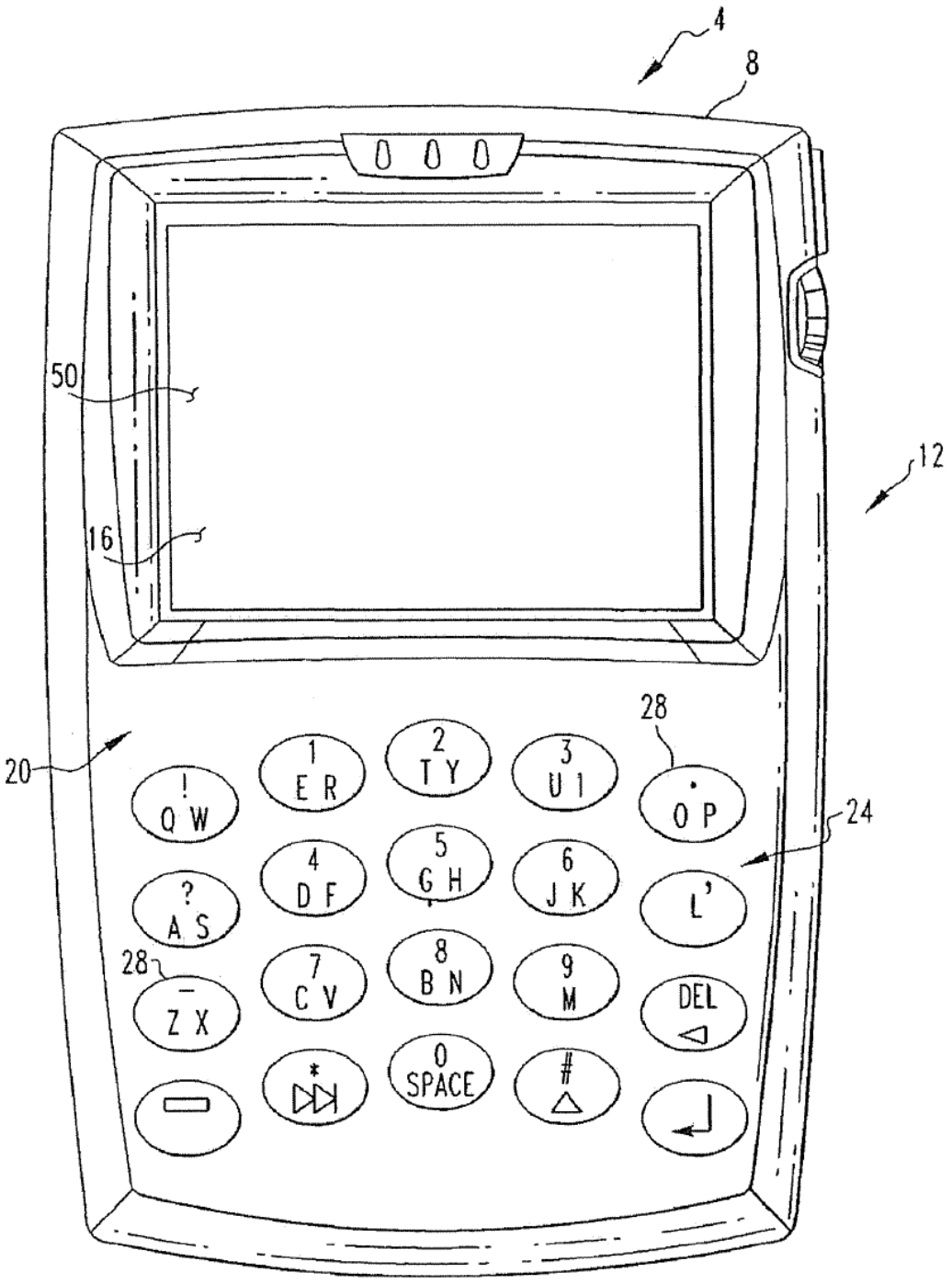
4
8
0 0 0
50
16
12
20
28
24
28
1 E R
2 T Y
3 U I
! Q W
O P
4 D F
5 G H
6 J K
? A S
L'
7 C V
8 B N
9 M
Z X
DEL
0 SPACE
#

FIG.1

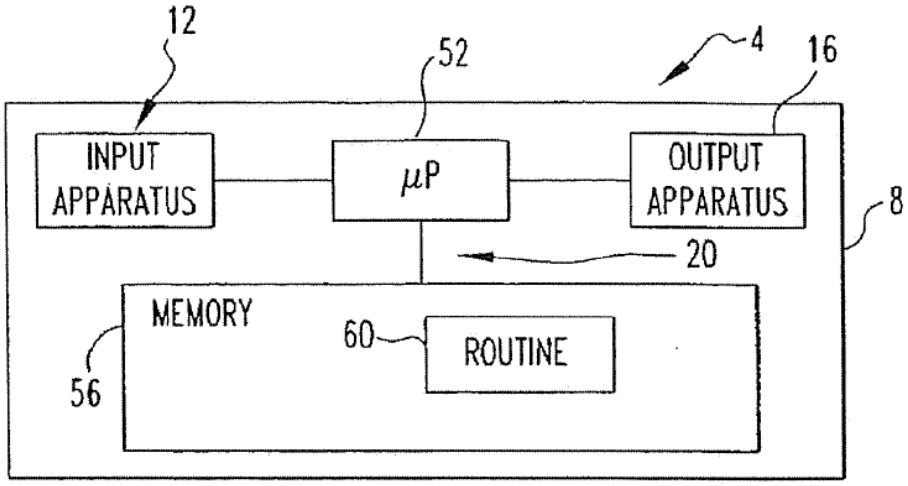
12
52
4
16
INPUT APPARATUS
μP
OUTPUT APPARATUS
8
20
MEMORY
60
ROUTINE
56

FIG.2

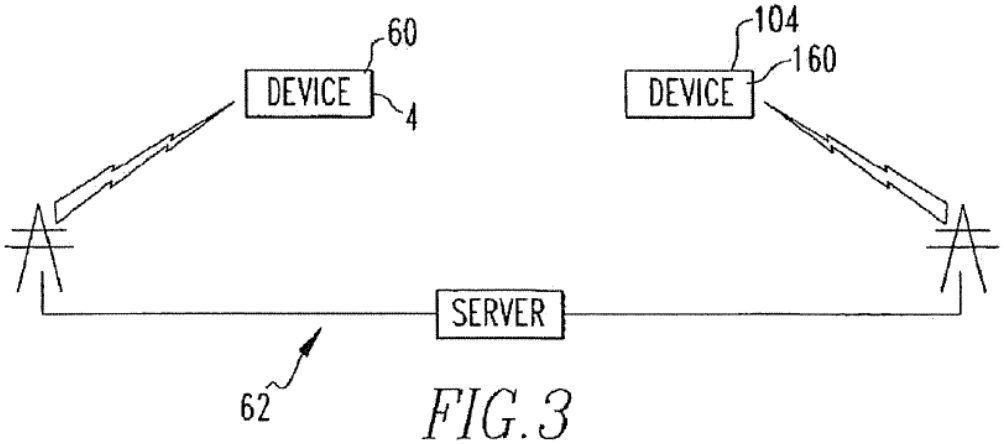
60
104
160
DEVICE
4
DEVICE
SERVER
62

FIG.3

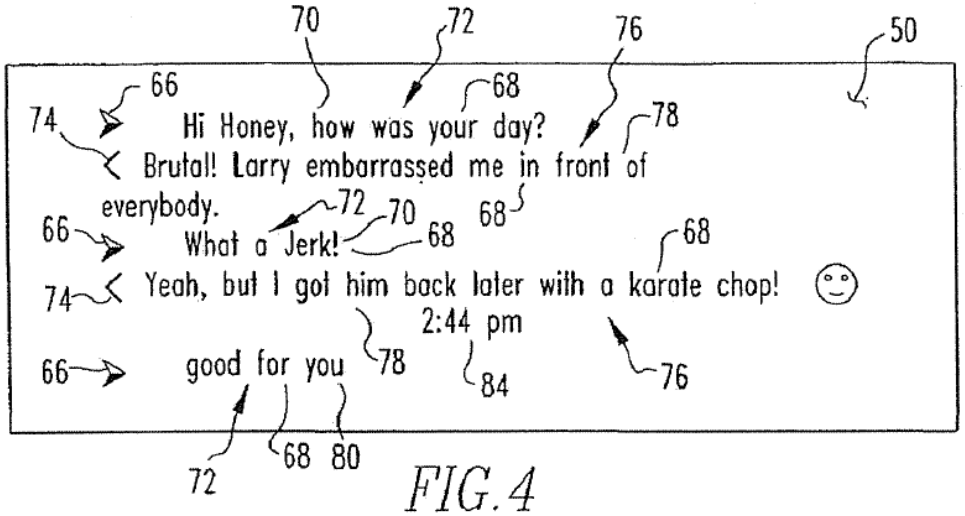
70
72
76
50
66
68
74
Hi Honey, how was your day?
78
Brutal! Larry embarrassed me in front of everybody.
72
70
68
66
What a Jerk!
68
74
Yeah, but I got him back later with a karate chop!
2:44 pm
66
good for you
78
84
76
72
68
80

FIG. 4

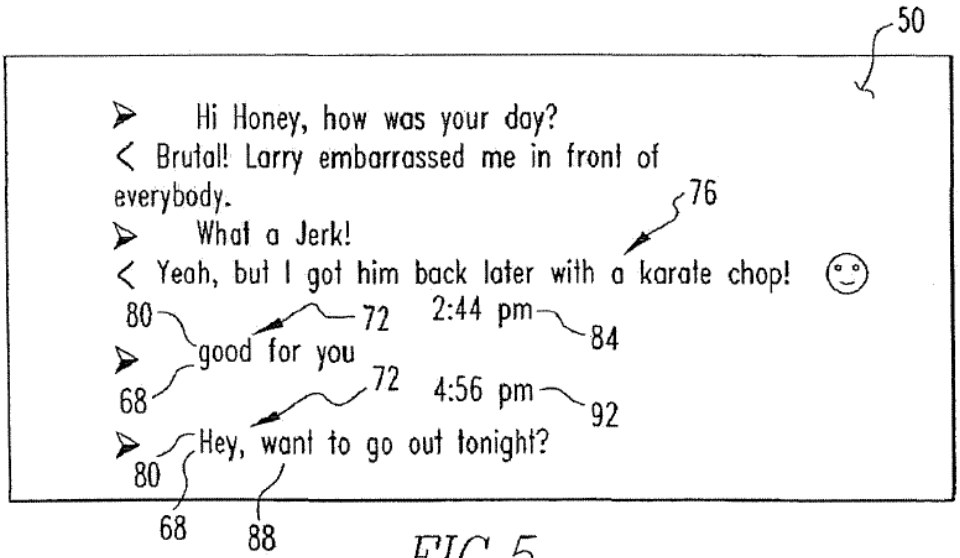
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
76
What a Jerk!
Yeah, but I got him back later with a karate chop!
80
72
2:44 pm
84
good for you
68
72
4:56 pm
92
Hey, want to go out tonight?
80
68
88

FIG. 5

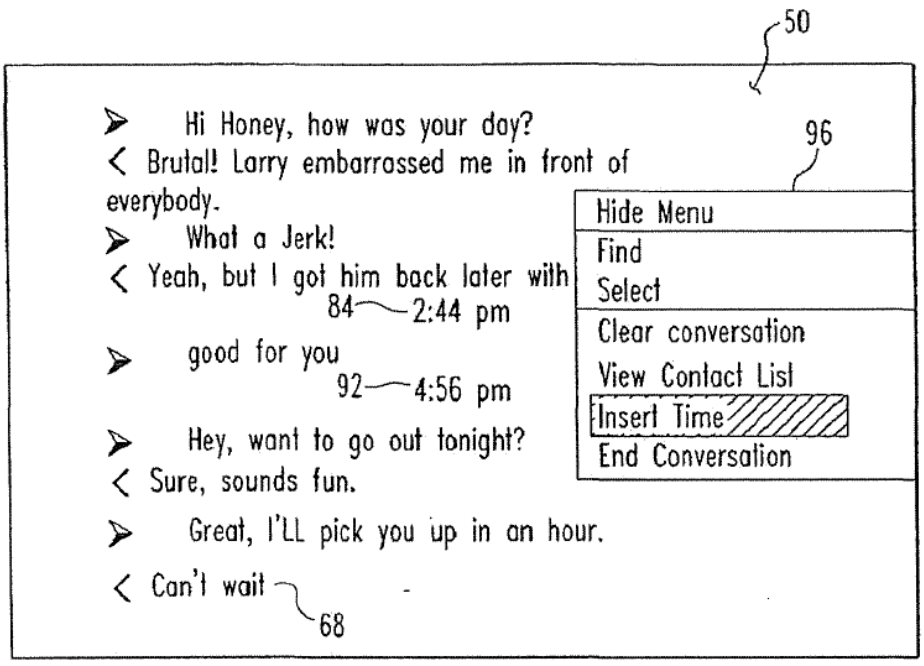
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
Yeah, but I got him back later with
84
2:44 pm
good for you
92
4:56 pm
Hey, want to go out tonight?
Sure, sounds fun.
Great, I'LL pick you up in an hour.
Can't wait
68
96
Hide Menu
Find
Select
Clear conversation
View Contact List
Insert Time
End Conversation

FIG.6a

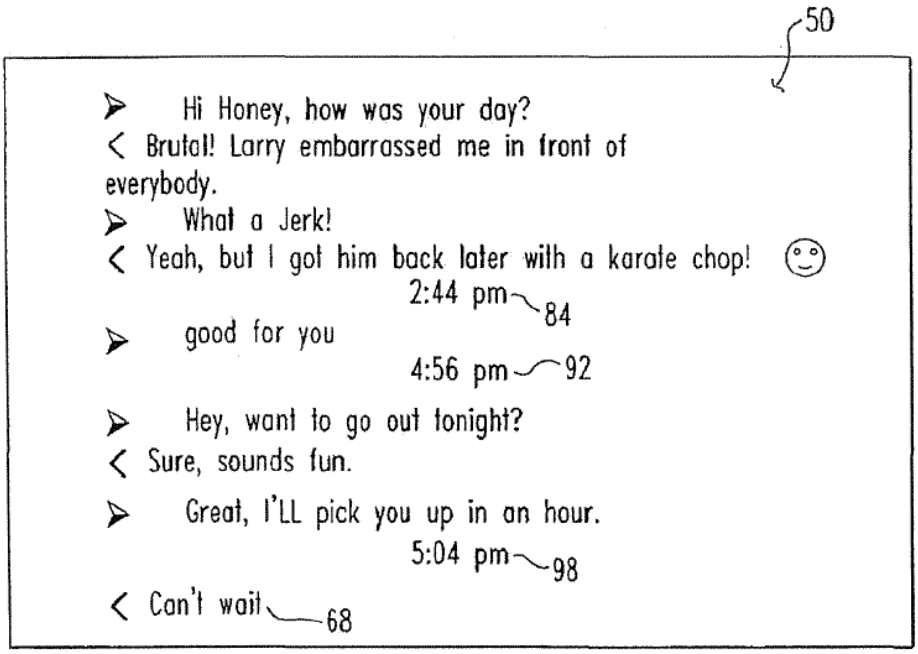
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
Yeah, but I got him back later with a karate chop!
2:44 pm
84
good for you
4:56 pm
92
Hey, want to go out tonight?
Sure, sounds fun.
Great, I'LL pick you up in an hour.
5:04 pm
98
Can't wait
68

FIG.6b

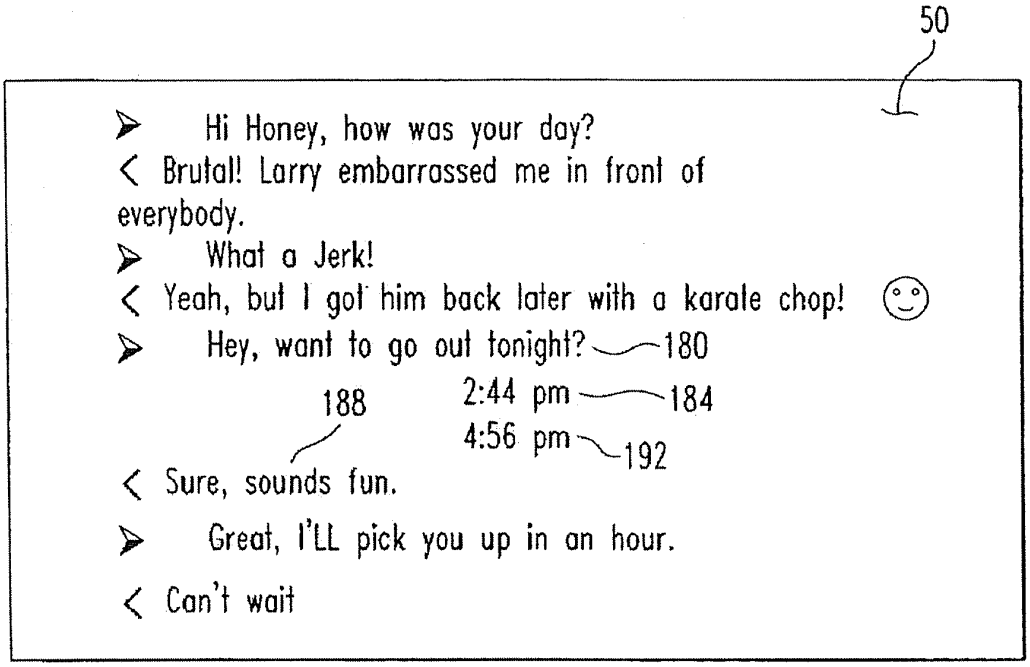
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
Yeah, but I got him back later with a karate chop!
Hey, want to go out tonight?
180
2:44 pm
184
188
4:56 pm
192
Sure, sounds fun.
Great, I'LL pick you up in an hour.
Can't wait

FIG. 7

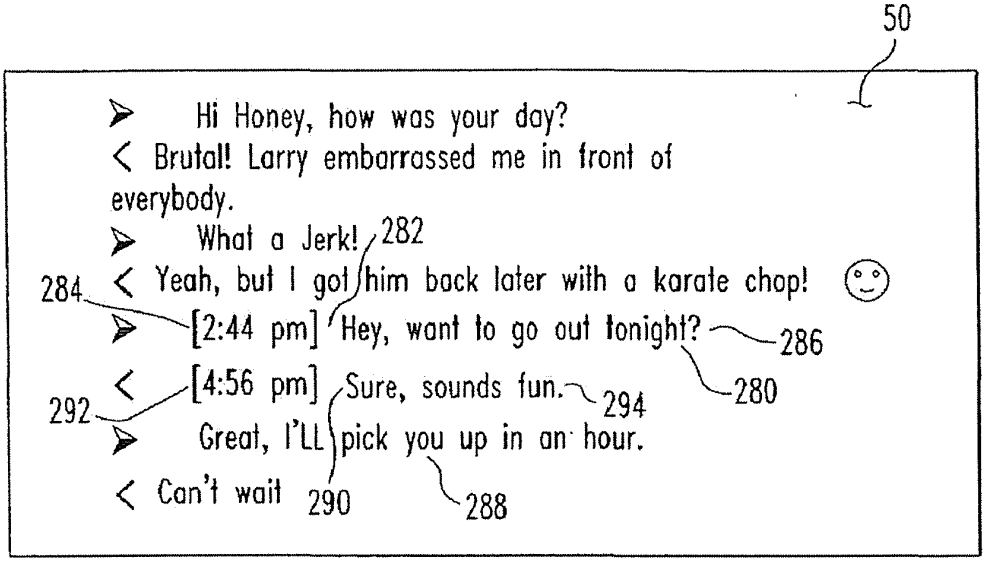
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
282
Yeah, but I got him back later with a karate chop!
284
[2:44 pm] Hey, want to go out tonight?
286
280
[4:56 pm] Sure, sounds fun.
294
292
Great, I'LL pick you up in an hour.
Can't wait
290
288

FIG.8a

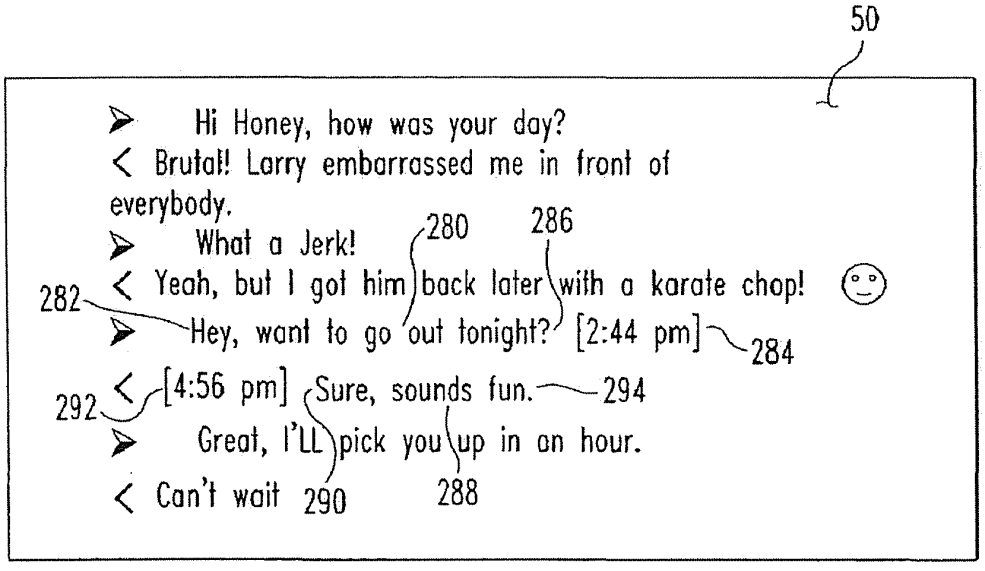
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
280
286
Yeah, but I got him back later with a karate chop!
282
Hey, want to go out tonight? [2:44 pm]
284
[4:56 pm] Sure, sounds fun.
294
292
Great, I'LL pick you up in an hour.
Can't wait
290
288

FIG.8b

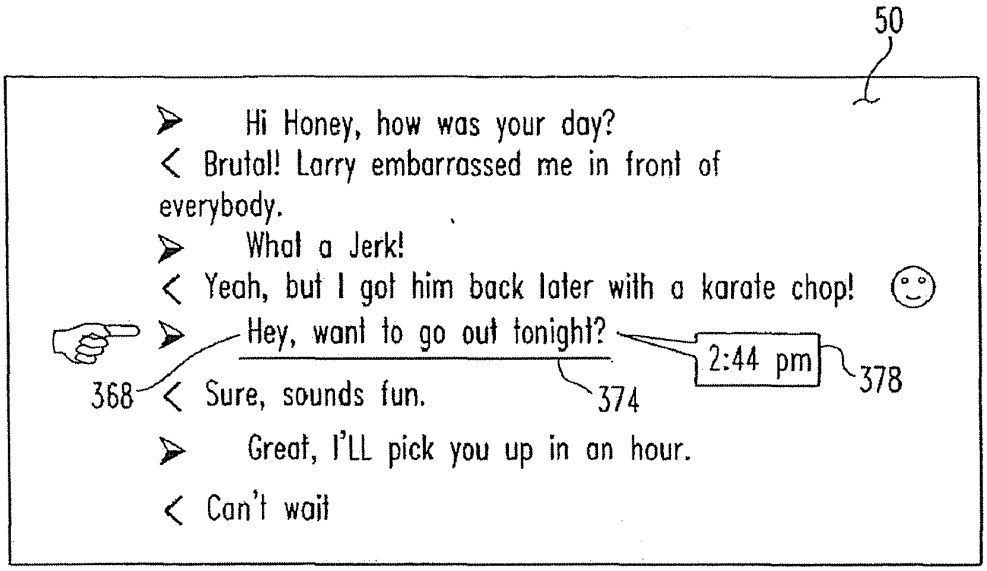
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
Yeah, but I got him back later with a karate chop!
Hey, want to go out tonight?
2:44 pm
378
368
Sure, sounds fun.
374
Great, I'LL pick you up in an hour.
Can't wait

FIG.9

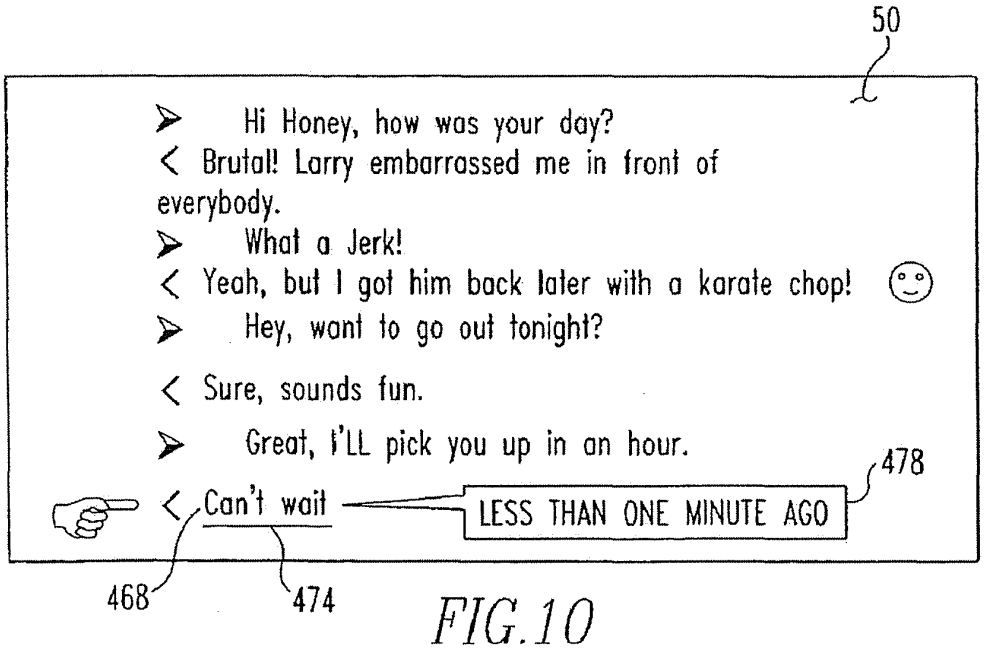
50
Hi Honey, how was your day?
Brutal! Larry embarrassed me in front of everybody.
What a Jerk!
Yeah, but I got him back later with a karate chop!
Hey, want to go out tonight?
Sure, sounds fun.
Great, I'LL pick you up in an hour.
478
Can't wait
LESS THAN ONE MINUTE AGO
468
474

FIG.10

COPY FROM PARENT APPLICATION 10/964,925

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☑ Declaration Submitted with Initial Filing OR ☐ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	291010-00084
First Named Inventor	Gerhard D. Klassen
COMPLETE IF KNOWN	
Application Number	/
Filing Date	
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

HANDHELD ELECTRONIC DEVICE AND ASSOCIATED METHOD PROVIDING TIME DATA IN A MESSAGING ENVIRONMENT

(Title of the Invention)

the specification of which

☑ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) ☐ as United States Application Number or PCT International Application Number ☐ and was amended on (MM/DD/YYYY) ☐ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

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DECLARATION — Utility or Design Patent Application

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Name

Address

City | State | ZIP

Country | Telephone | Fax

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR : ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): Gerhard D. | Family Name or Surname: Klassen

Inventor's Signature: Gerhard D. Klassen | Date: September 20, 2004

Residence: City: Waterloo | State: Ontario | Country: Canada | Citizenship: Canada

Mailing Address: 510 Heatherhill Place

City: Waterloo | State: Ontario | ZIP: N2T 1H7 | Country: Canada

NAME OF SECOND INVENTOR: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]): Christopher R. | Family Name or Surname: Wormald

Inventor's Signature: Chr Worm | Date: Sep 20, 2004

Residence: City: Kitchener | State: Ontario | Country: Canada | Citizenship: Canada

Mailing Address: 215 Hawkswood Drive

City: Kitchener | State: Ontario | ZIP: N2K 4J2 | Country: Canada

☑ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

Please type a plus sign (+) inside this box → +

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 1 of 1

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])		Family Name or Surname					
Lawrence E.		Kuhl					
Inventor's Signature	[signature]					Date	Sept 20/04
Residence: City	Waterloo	State	Ontario	Country	Canada	Citizenship	Canada
Post Office Address	686 Jacob Lane						
Post Office Address							
City	Waterloo	State	Ontario	ZIP	N2V 2G9	Country	Canada

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])		Family Name or Surname					
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor						
Given Name (first and middle [if any])		Family Name or Surname					
Inventor's Signature						Date	
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	

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Please type a plus sign (+) inside this box → [+]

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DECLARATION — Supplemental Priority Data Sheet

Additional foreign applications:

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

Additional provisional applications:

Application Number	Filing Date (MM/DD/YYYY)
60/504,379	09/19/2003

Additional U.S. applications:

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(if applicable)*

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