US009204283B2

(12) **United States Patent**
Mullen

(10) **Patent No.: US 9,204,283 B2**
(45) **Date of Patent: Dec. 1, 2015**

(54) **SYSTEMS AND METHODS FOR LOCATING CELLULAR PHONES AND SECURITY MEASURES FOR THE SAME**

(76) Inventor: **Jeffrey D Mullen**, New York, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 847 days.

(21) Appl. No.: **11/462,201**

(22) Filed: **Aug. 3, 2006**

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US 2007/0049290 A1 Mar. 1, 2007

Related U.S. Application Data

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(60) Provisional application No. 60/367,967, filed on Mar. 25, 2002.

(51) **Int. Cl.**

H04W 24/00	(2009.01)
H04W 8/14	(2009.01)
H04W 64/00	(2009.01)
H04W 8/16	(2009.01)

(52) **U.S. Cl.**

CPC ***H04W 8/14*** (2013.01); ***H04W 64/00*** (2013.01); *H04W 8/16* (2013.01)

(58) **Field of Classification Search**

CPC H04W 64/00; H04W 8/16; H04W 12/08; H04W 4/02; H04W 12/06; H04W 8/10; H04W 8/14; H04W 8/005; H04W 4/04; G01S 5/06; G01S 19/17; H04L 67/18; H04L 2209/80; G06F 21/31; G06F 17/30241; G01C 21/00

USPC 455/456.1–457, 567

See application file for complete search history.

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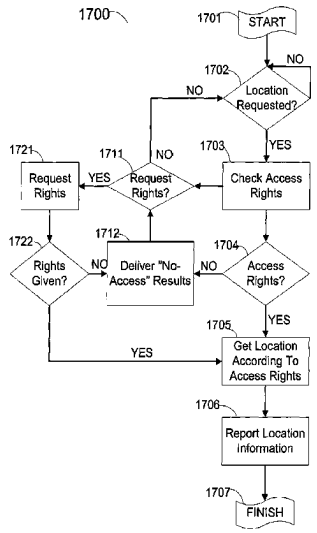
(Continued)

Primary Examiner — Allahyar Kasraian

(57) **ABSTRACT**

Systems and methods for locating a cellular phone are provided. More particularly, systems and methods for providing the location of a requested user's cellular phone from a requesting user's device (e.g., a second cellular phone) based on access rights defined by the requested user. Location descriptions may be provided at a multitude of levels. For example, if a cellular phone, or an identity associated to (e.g., logged into) a cellular phone, has been given access rights to a cell phone's exact location for an indefinite amount of time, that cell phone can receive, on command, the exact location of the approved cell phone. Other levels of location information that can be granted include, for example, proximities, states, and countries.

20 Claims, 17 Drawing Sheets



Google Exhibit 1001
Google v. Mullen

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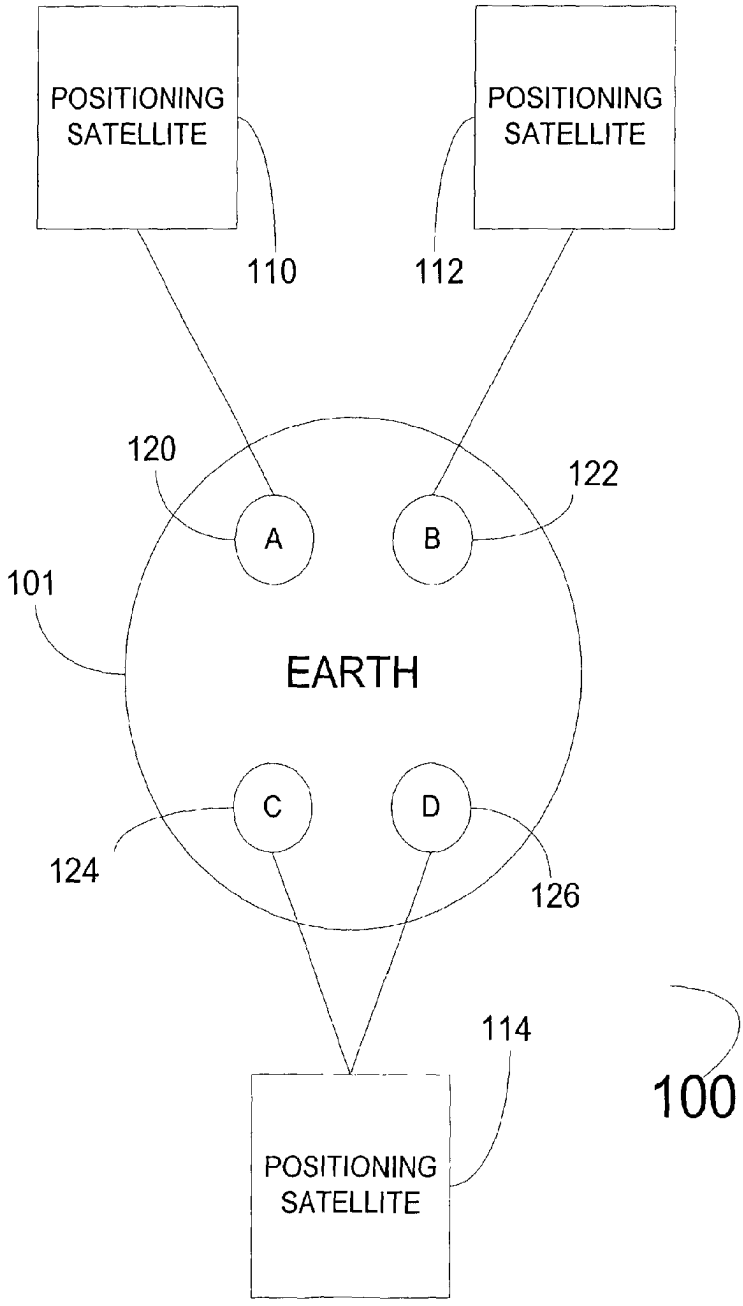

POSITIONING SATELLITE
POSITIONING SATELLITE
110
112
120
122
A
B
101
EARTH
C
D
124
126
114
100
POSITIONING SATELLITE

FIG. 1

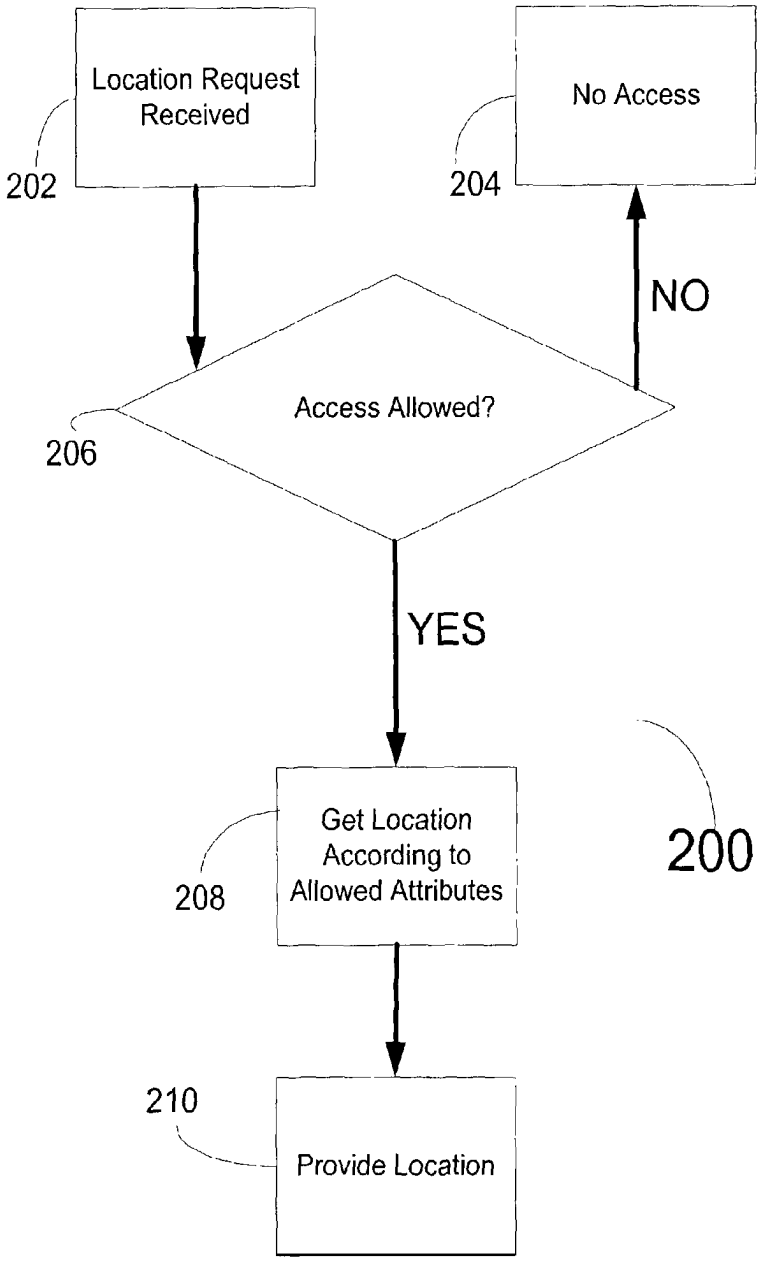

Location Request Received
202
No Access
204
NO
Access Allowed?
206
YES
Get Location According to Allowed Attributes
208
200
210
Provide Location

FIG. 2

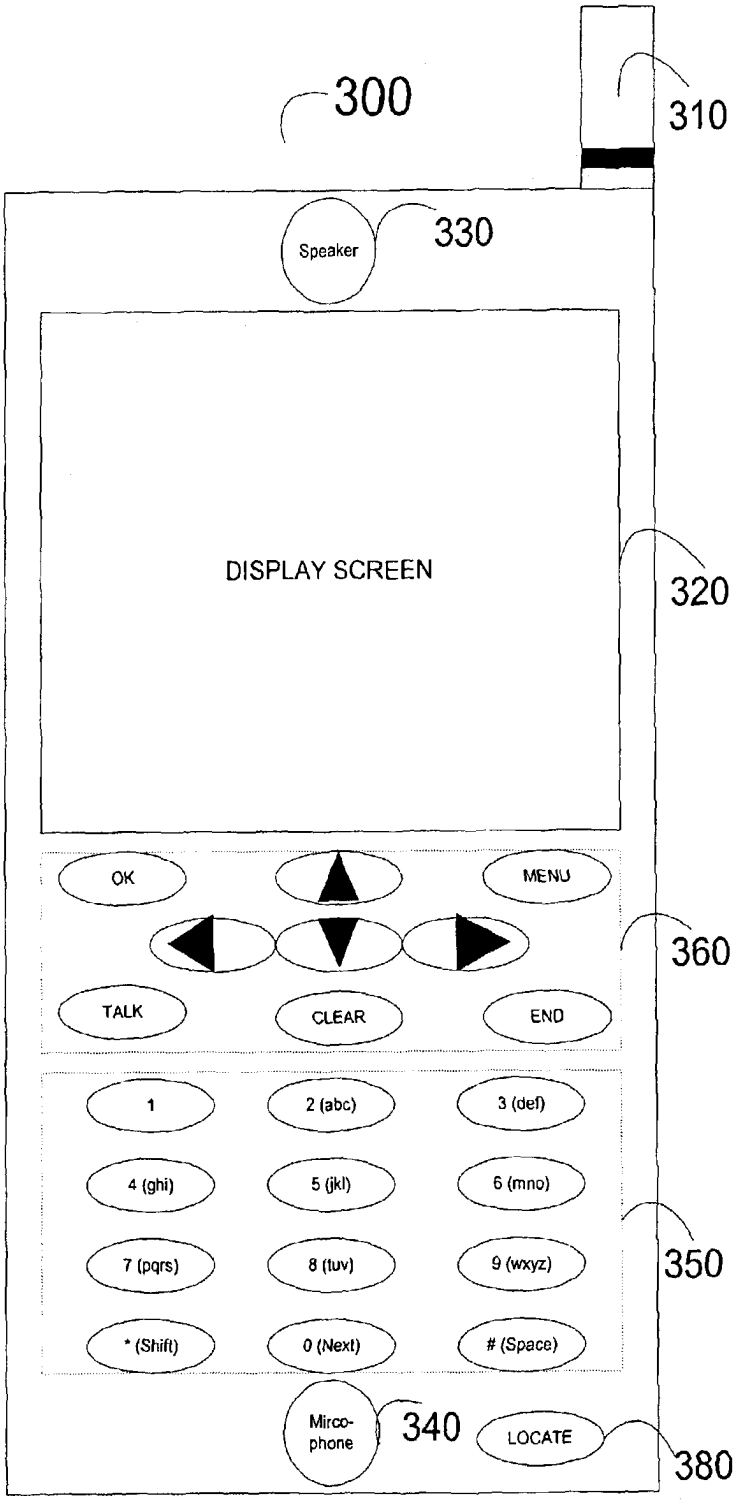

300
310
Speaker
330
DISPLAY SCREEN
320
OK
MENU
360
TALK
CLEAR
END
1
2 (abc)
3 (def)
4 (ghi)
5 (jkl)
6 (mno)
7 (pqrs)
8 (tuv)
9 (wxyz)
350
* (Shift)
0 (Next)
(Space)
Mirco-phone
340
LOCATE
380

FIG. 3

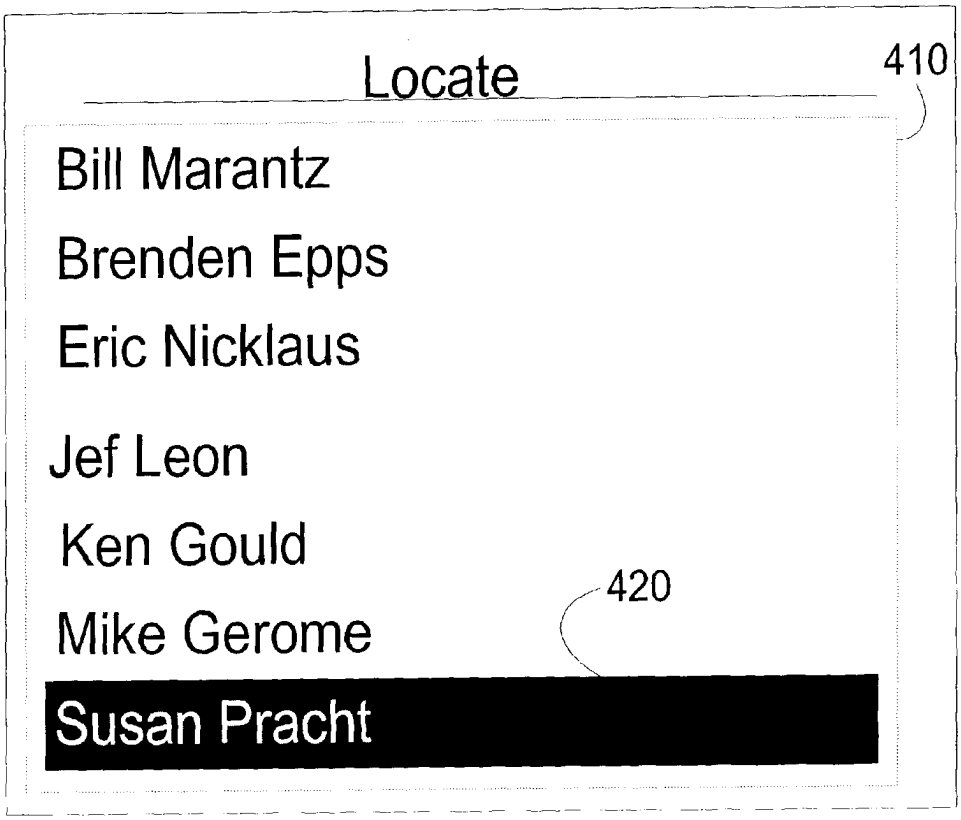

Locate
410
Bill Marantz
Brenden Epps
Eric Nicklaus
Jef Leon
Ken Gould
Mike Gerome
420
Susan Pracht

FIG. 4

400

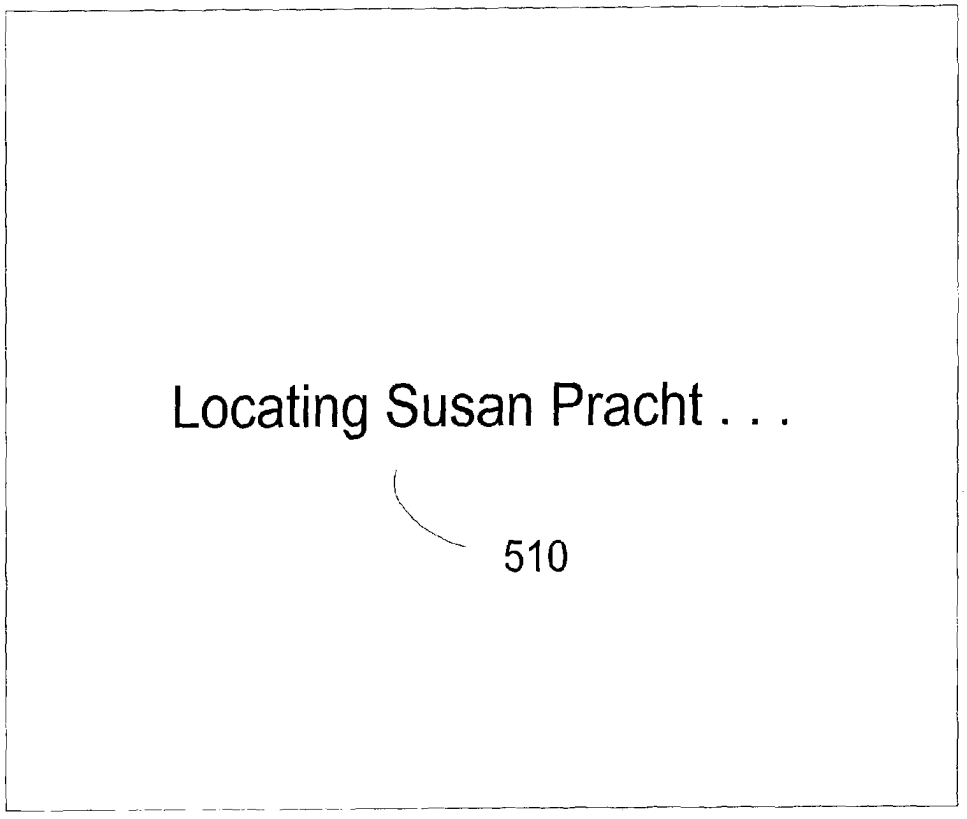


FIG. 5

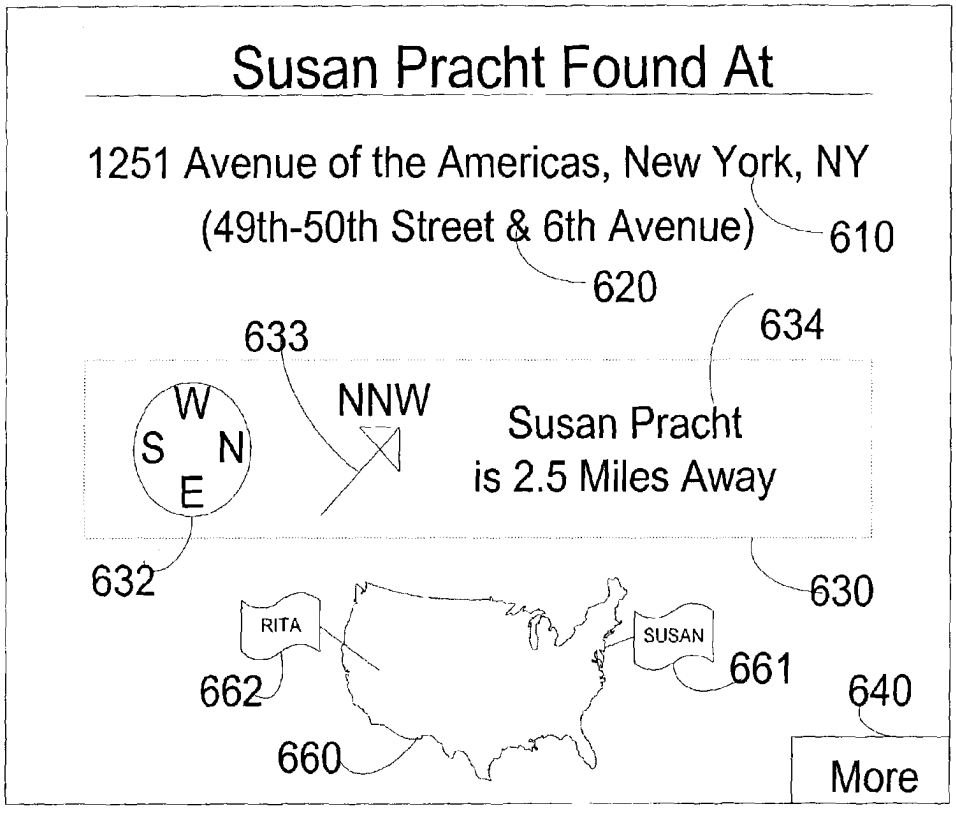

Susan Pracht Found At
1251 Avenue of the Americas, New York, NY
(49th-50th Street & 6th Avenue)
610
620
633
634
W
S
N
E
NNW
Susan Pracht
is 2.5 Miles Away
632
630
RITA
SUSAN
662
661
640
660
More
600

FIG. 6

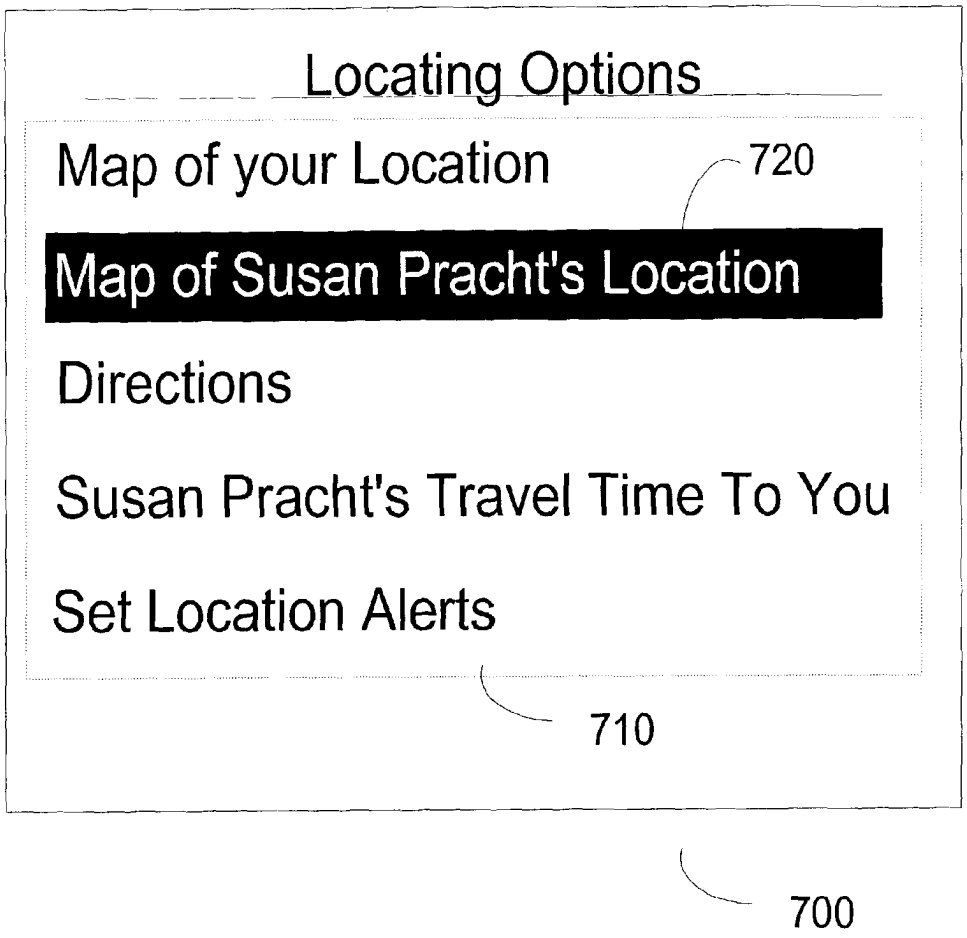

Locating Options
Map of your Location
720
Map of Susan Pracht's Location
Directions
Susan Pracht's Travel Time To You
Set Location Alerts
710
700

FIG. 7

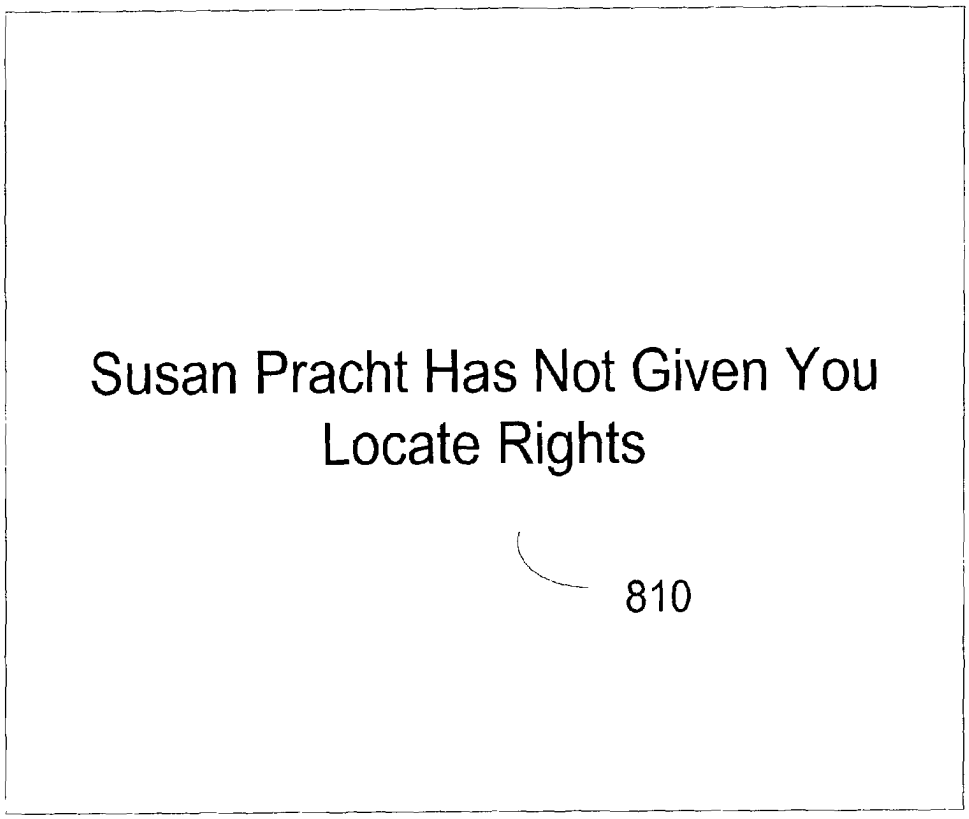


FIG. 8

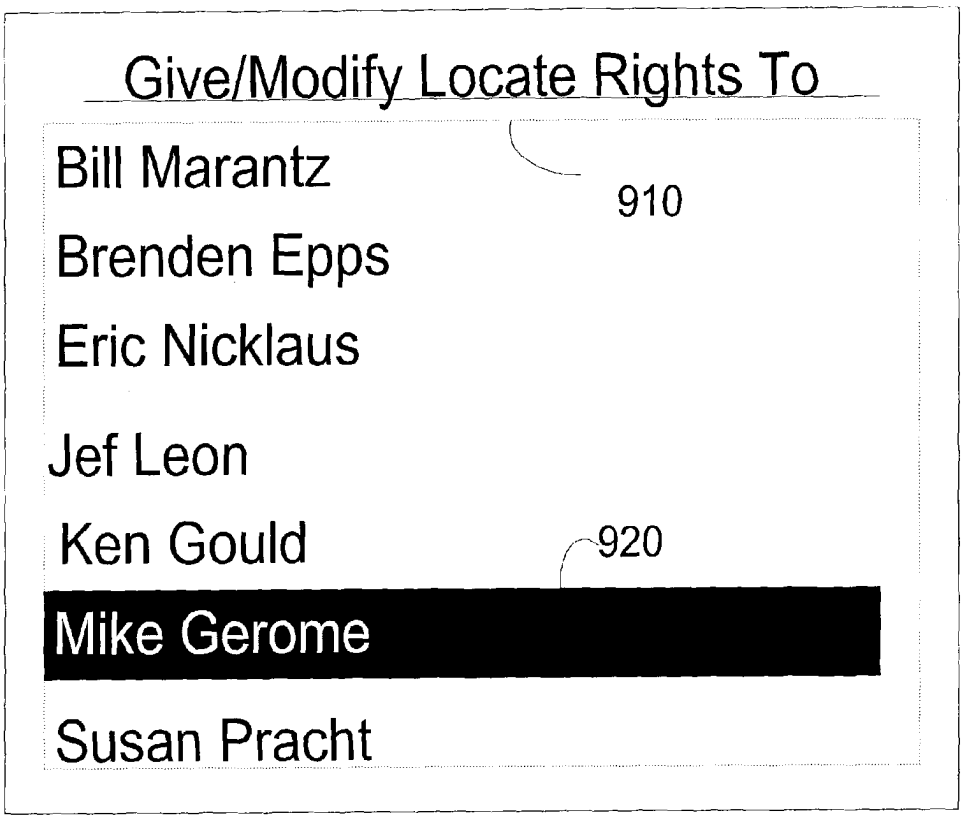

Give/Modify Locate Rights To
Bill Marantz
910
Brenden Epps
Eric Nicklaus
Jef Leon
Ken Gould
920
Mike Gerome
Susan Pracht
900

FIG. 9

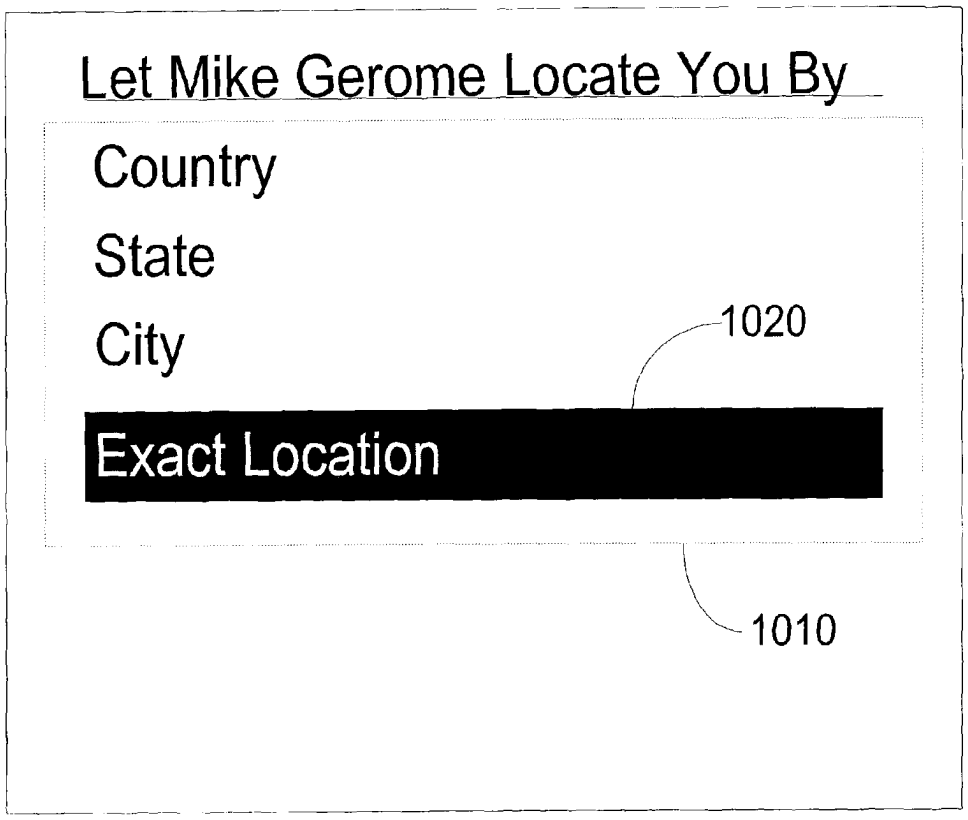

Let Mike Gerome Locate You By
Country
State
City
Exact Location
1020
1010
1000

FIG. 10

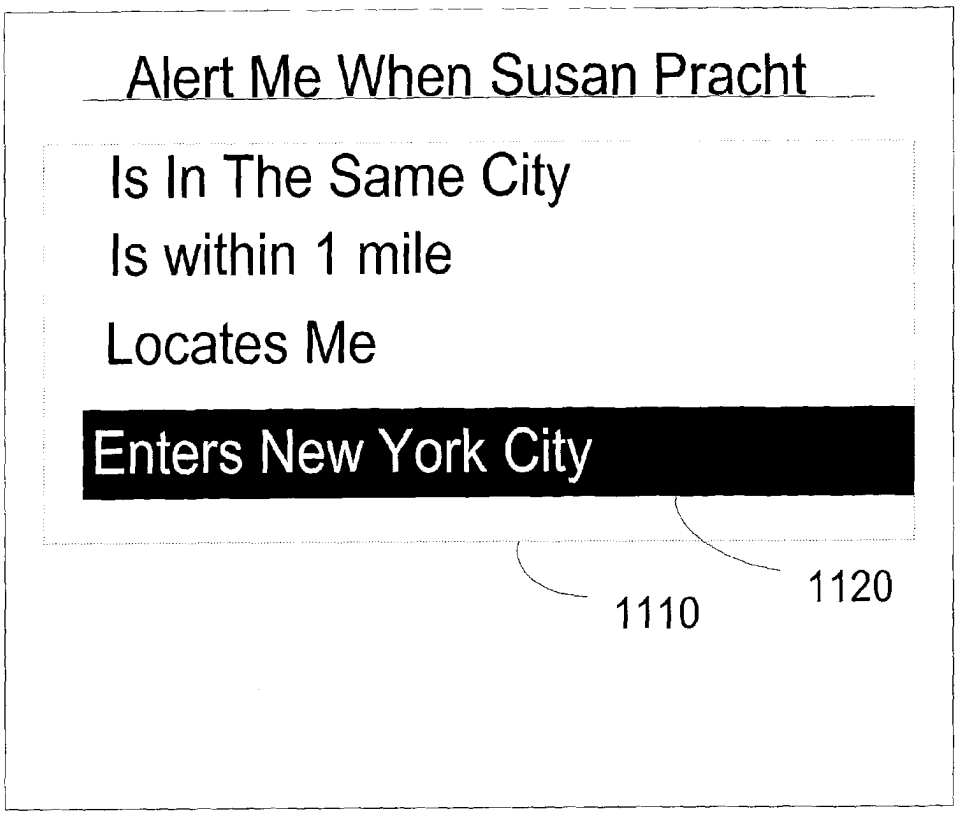

Alert Me When Susan Pracht
Is In The Same City
Is within 1 mile
Locates Me
Enters New York City
1110
1120
1100

FIG. 11

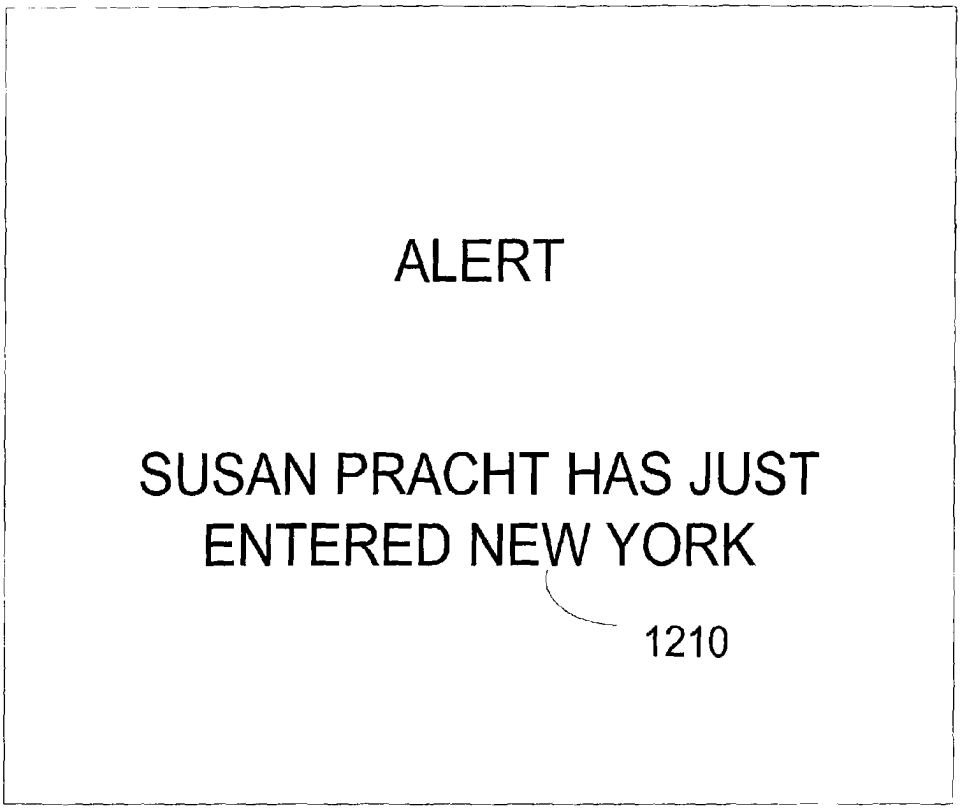


FIG. 12

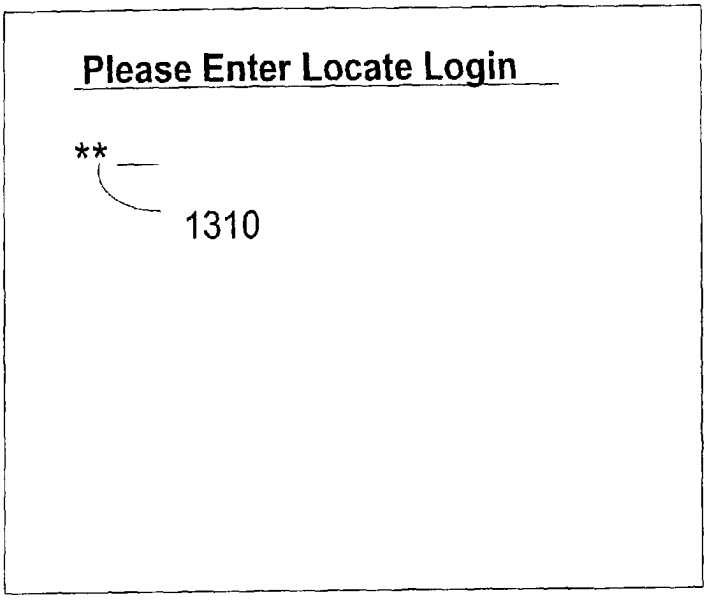

Please Enter Locate Login
**
1310
1300

FIG. 13

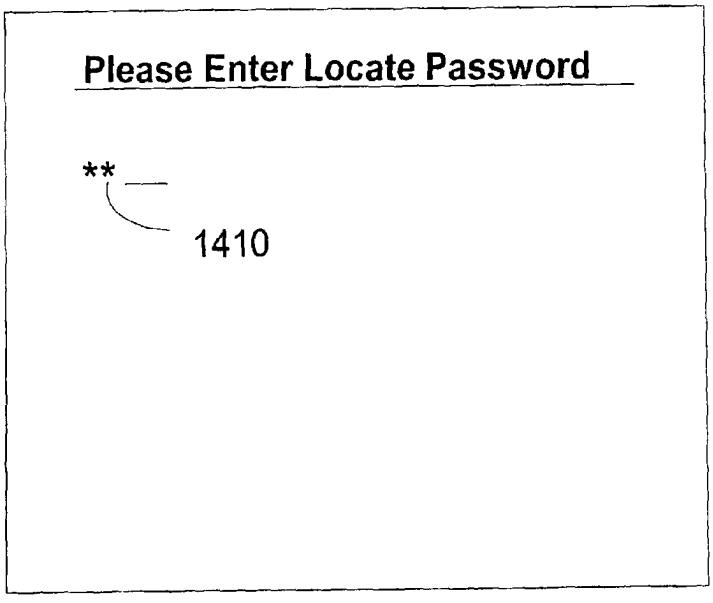

Please Enter Locate Password
**
1410
1400

FIG. 14

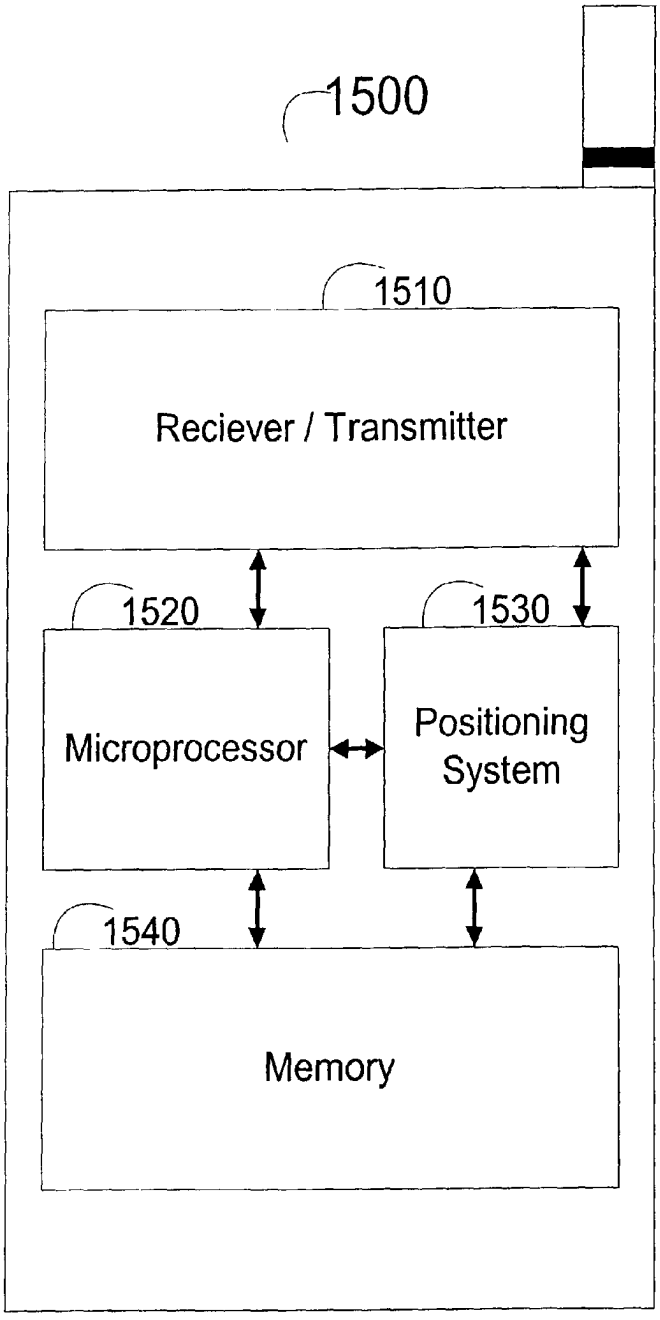

1500
1510
Reciever / Transmitter
1520
1530
Microprocessor
Positioning System
1540
Memory

FIG. 15

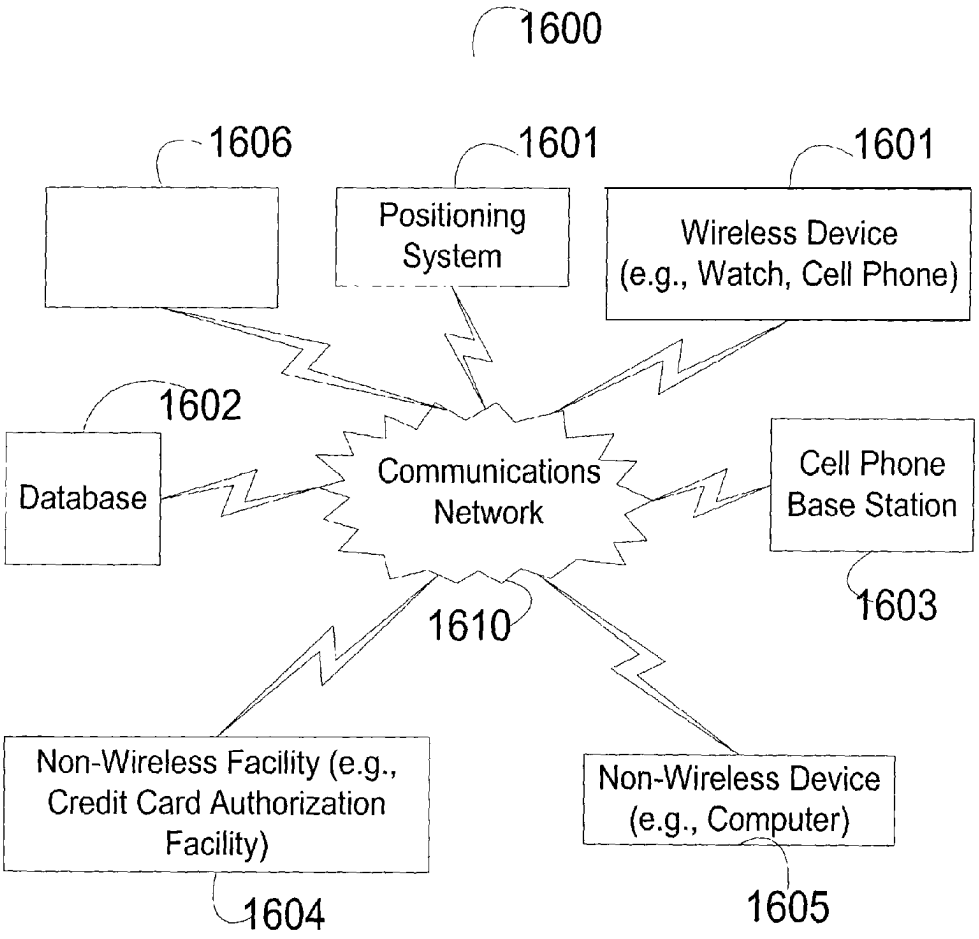

1600
1606
1601
1601
Positioning System
Wireless Device (e.g., Watch, Cell Phone)
1602
Database
Communications Network
Cell Phone Base Station
1603
1610
Non-Wireless Facility (e.g., Credit Card Authorization Facility)
Non-Wireless Device (e.g., Computer)
1604
1605

FIG. 16

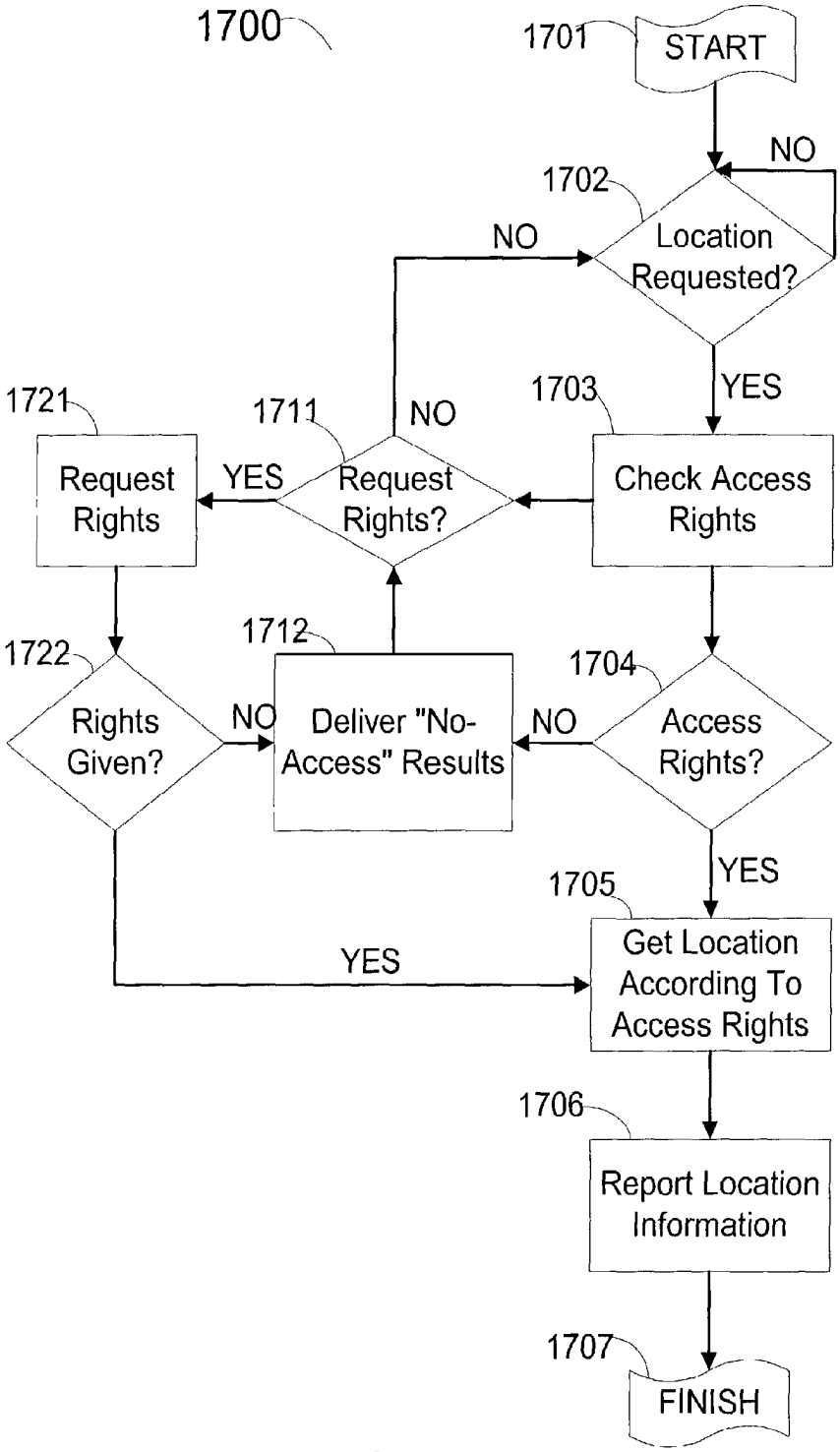

1700
1701
START
NO
1702
Location Requested?
NO
YES
1703
1721
1711
NO
Request Rights
YES
Request Rights?
Check Access Rights
1712
1722
1704
Rights Given?
NO
Deliver "No-Access" Results
NO
Access Rights?
YES
1705
YES
Get Location According To Access Rights
1706
Report Location Information
1707
FINISH

FIG. 17

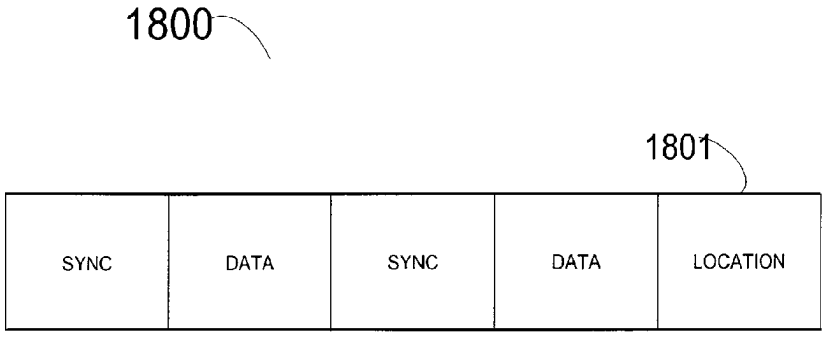


FIG. 18

SYSTEMS AND METHODS FOR LOCATING CELLULAR PHONES AND SECURITY MEASURES FOR THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 10/400,296, filed on Mar. 25, 2003, which claims the benefit of U.S. Provisional Application No. 60/367,967, filed on Mar. 25, 2002, both of which are incorporated by reference herein in their entirety.

BACKGROUND OF THE INVENTION

This invention relates to systems and methods for determining a device's location. More particularly, this invention relates to systems and methods for remotely determining a device's location.

The Global Positioning System (GPS) has been developed in which a ground-based system can receive GPS signals from satellites and determine its location based on the time that it takes the GPS signals to reach the ground-based system. Generally, three satellite signals are needed to determine where in the world a receiver is located (i.e., position triangulation).

GPS systems have been integrated into cellular phones. However, these systems are deficient because the location of a device that is determined by these GPS signals are only minimally utilized. It is therefore desirable to provide systems and methods which better utilize the information about a device's location.

SUMMARY OF THE INVENTION

In accordance with the present invention, systems and methods are provided for locating cellular phones. More particularly, the present invention provides systems and methods for allowing a user of a cellular phone (e.g., a requesting user or a requester) to locate the position of a different user's cellular phone (e.g., a requested user) based upon requestor-assigned access rights.

One object of the present invention is to provide a security feature which allows a user to limit and/or deny location access to a particular user. In preferred embodiments, only the users that have been granted access to the location of a user's cellular phone can actually locate that user's cellular phone. Furthermore, different types of access levels may be provided that allow a user to filter location information to a different user. In this manner, a cell phone user may give access, through his or her cell phone, to a friend so that the friend can locate him or her dependent on the level of access that is granted to that friend.

For example, suppose that Phil tells Bill that he will be shopping in Manhattan and that Bill should locate him when Bill gets to Manhattan through their cell phones. In such an example, Phil may grant Bill access the exact location of his cell phone for a specific period of time (e.g., the next two hours). As a result, when Bill tries to access Phil's location, Bill will be told exactly where in Manhattan Phil's cell phone is located. Thus, Bill does not have to contact Phil directly to see where he is and, therefore, Phil does not have to spend any time giving Bill verbal directions; Bill can simply see what store Phil is currently in and go to it.

As mentioned previously, levels in the scope of access may be controlled by a user such that, for example, only a user's exact location, approximate location, city, state, or country can be accessed by a particular user.

Location alerts and monitoring features are also provided. For example, Phil may give Jen, a resident of Pittsburgh, city access so that when Phil travels into Pittsburgh, Jen will be alerted of Phil's presence. Such an alert may take the form of, for example, a display on Jen's cell phone that communicates to Jen "Phil is in Pittsburgh."

Locating a cellular phone may be accomplished in several ways. For example, satellite positioning systems such as the Global Positional System and the soon to be deployed Galileo system may be used to locate a user's cell phone.

User positions and security settings may be regularly or manually transmitted to a remote system, such a remote database so that requesting users can locate a requested user's position even if the requested user turns his/her cell phone OFF. Placing the security measures on a remote system (e.g., remote database, computer, or server) provides an information brokering scheme such that the system is still operable even when cell phones are added, removed, or modified from the system.

Additionally, the present invention may be configured to provide additional information about the location of a user. Such additional information may be, for example, a map, a location marker on a map, a map that changes as the user moves, a compass, coordinates of the located cell phone, directions to the located cell phone, where a user is in relation to another user, and information about the location the located user is currently positioned in or nearby locations such as landmarks. Such information may be provided by a remote information provider (e.g., a remote map information provider) and accessed by an information broker through a communications network.

Many other features are also employed that realizes advantageous locating functionality. As per an example, suppose that a wife wants to see if her husband has left work yet. She can locate her husband, without having to talk to him, and realize that he is driving home on a highway. Thus, a travel time option may be provided to the user. This option would compute the distance between the wife's location and husband's location by taking multiple location readings of the husband's location to see how fast the husband is traveling. Alternatively, because the husband's position will map to a highway, the system may assume that the user is driving and may provide the wife with an estimate on the husband's arrival time based on an assumed route. In this manner, the present invention may determine how much time it will take the husband to reach the wife and display this information to the wife.

As per other examples, a "see my friends" option may also be provided that brings up a map of a desired area. Dots or symbols may be present on the map to signify the location of all user's from which the requesting user has location information for. Similarly, a "find closest friend" option may be employed which finds the closest user with which the requesting user has location access to.

A cell phone location may by accessed by a variety of other devices. Alternatively, a cell phone may be used to access the location of a variety of other devices. For example, if the wife was at home, that wife may connect to the internet and access a remote database to either provide the most recent location information about the husband's cell phone to her or request a location update from the husband's cell phone. The wife's location may be already stored in such a database by associating the location to the IP address of the computer or by a manual input of the wife's location. The wife's identity may be determined by, for example, a login and password on a

website. Thus, the above-identified security measures are not limited to device to-device locating rather user to user locating; the wife may only access the husband's location if the husband has granted access for the wife to do so. If, by accident, the wife's cell phone breaks, she may login on a friend's cell phone and determine the husband's location according to the device that the husband is logged into.

Security is preferably taken into account in the present invention and, therefore, location rights for a specific user may be given to a different user only by that specific user. However, a user may request location access rights from a different user. For example, a user may be provided with a request location screen on his cell phone and that user (e.g., user "X") may enter in the cell phone number of the cell phone whose location is desired. The user associated to the entered cell phone number may then receive an alert that says "user X has requested access to your location." Location access may then be given or denied on multiple levels and the requesting user notified of the decision.

The location feature of the present invention may be turned ON or OFF at any time. Users may be added, individually or in groups, to a list of users with location access rights to a specific user by that specific user. A specific user may, at any time, modify, delete, or add users allowed to access his or her location. Login and password information may be included to increase security or to create a user profile, allowing a specific user to log into any cell phone and be recognize by the present invention (and thereby be located with that cell phone or locatable device).

BRIEF DESCRIPTION OF THE DRAWINGS

The principles and advantages of the present invention can be more clearly understood from the following detailed description considered in conjunction with the following drawings, in which the same reference numerals denote the same structural elements throughout, and in which:

FIG. **1** is a network topology of a cell phone locating network in accordance with the principles of the present invention;

FIG. **2** is a flow chart of the locating feature in accordance with the principles of the present invention;

FIG. **3** is an illustration of a cell phone in accordance with the principles of the present invention;

FIG. **4** is a display screen for a locate feature in accordance with the principles of the present invention;

FIG. **5** is a display screen for a retrieving location status feature in accordance with the principles of the present invention;

FIG. **6** is a display screen for a displaying location feature in accordance with the principles of the present invention;

FIG. **7** is a display screen listing options for a locate feature in accordance with the principles of the present invention;

FIG. **8** is a display screen of a failed locate feature due to insufficient rights in accordance with the principles of the present invention;

FIG. **9** is a display screen of adding and modifying locate rights and options to a user in accordance with the principles of the present invention;

FIG. **10** is a display screen of assigning location rights to a user in accordance with the principles of the present invention;

FIG. **11** is a display screen of alert options in accordance with the principles of the present invention;

FIG. **12** is a display screen of an alert feature in accordance with the principles of the present invention;

FIG. **13** is a display screen of a login feature in accordance with the principles of the present invention;

FIG. **14** is a display screen of a login feature in accordance with the principles of the present invention;

FIG. **15** is a wireless device in accordance with the principles of the present invention;

FIG. **16** is an embodiment of a network topology in accordance with the principles of the present invention;

FIG. **17** is an embodiment of a locating feature in accordance with the principles of the present invention; and

FIG. **18** is an embodiment of a communications signal in accordance with the principles of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** depicts a network topology of device location network **100** incorporating principles of the present invention. Network **100** includes one or more positioning satellites **110**, **112**, and **114** that can locate the position of one or more cell phones **120**, **122**, **126**, and **124** (and other locatable devices) on Earth **101**. Positioning satellites **110**, **112**, and **114** may be, for example, the Global Positioning System (GPS) or the upcoming Galileo satellite network.

Preferably, any cell phone in network **100** may locate a different cell phone, as long as access to location information is allowed, through the utilization of positioning satellites **110**, **112**, and **114**. Persons skilled in the art will appreciate that other positioning systems and methods may be used in locating the position of a user on a cell phone of network **100**.

To route information to and from a cell phone of network **100** additional facilities and communication paths may be included. For example, a main facility (not shown in FIG. **1**) containing user location access rights may be included in network **100**. Such a main facility may retrieve location information directly from a positioning system or a cellular phone and then route this information to a cellular phone or positioning system.

Persons skilled in the art will appreciate that if the Global Positioning System (GPS) is used as the positioning system then GPS receivers will be incorporated into cellular phones of the present invention. Persons skilled in the art will also appreciate that devices other than cellular phones may include positioning features. For example, watches, clothing, laptop computers, personal digital assistants (PDAs), may all contain location systems (e.g., GPS) and utilize the security principles of the present invention to allow different user's to access these locations.

FIG. **2** shows flow chart **200** of a simplified locating feature constructed in accordance with the principles of the present invention. Step **202** initiates when a user requests the location of another user's cell phone. Step **206** evaluates if the user initiating the location request has the rights to access the location of the desired user. If no access rights for the requesting user have been granted then step **204** will preferably inform the requesting user that he/she has not been given access to the requested location. In this manner, every user may assign rights (e.g. govern the security) to whom may or may not locate him/her. In preferred embodiments, these rights will be stored in, or functionality executed from, a remote facility and accessed and utilized by a user's cell phone or other requesting device (e.g., a watch or PDA).

If access has been given by a particular user that allows for the requesting user to locate that particular user, step **208** is initiated and the allowed location information is provided to the user in step **210**. Step **208** may optionally filter the location information such that only a portion information is passed to the requesting user. The requested user may have,

for example, defined that the requesting user only can obtain the city, state, or country of his/her location. Persons skilled in the art will appreciate that only the location of the desired user needs to have a cell phone or a positioning system. The requesting user may user other means (e.g., the internet) to request the location of the desired user.

Persons skilled in the art will appreciate that the location of a user's cell phone may be retrieved, in step **208**, from a remote database, facility, distribution center, or any other system. More particularly, a remote database may periodically request the location of a cell phone user with a positioning system and store this information. This database may also keep a record of those people allowed to access that user's location, the extent to which access is allowed, and the extent to which a user has requested a user's location. A user may update, add, manipulate, or remove access at any time by doing so at this database. Thus, a requesting user only has to contact the remote database, have his/her identity recognized, have his/her access rights for the requested user location determined, and, if the requesting user has the correct access rights, be provided with the requested user's location.

Instead of a remote database periodically obtaining location information for a user, the database can obtain a user's locations when a request is made for that user's location, providing the requesting user has access to the requested user's location. However, persons skilled in the art will recognize that a remote database is utilized in the above examples that contains the locations, in most circumstances, of a multitude of users. Thus, to increase security even more, a requesting user's cell phone may directly request a user's location from the requested user's cell phone without the need for a database. In such an example a user adds, manipulates, or removes access rights locally on his/her cell phone and does not have to worry about security issues that surround placing his location on a remote database. Furthermore, in such an embodiment a user's location does not have to be saved anywhere, a positioning system can just be "read" by a requesting user with the appropriate access rights.

However, by recording a user's location on a device, e.g., a cell phone's memory or in a remote database, novel applications may be utilized. For example, whenever a user makes a credit card purchase, a credit card authorization system can record the location of a cell phone associated to the purchasing user. In this manner, a new system and method of fraud protection is introduced. The credit card authorization system may, for example, reject a purchase if the purchaser's cell phone (or watch, clothing, PDA, or other positioning enabled device) is not in the vicinity of the purchase. Alternatively, the credit card authorization system may request a second form of identification if the purchaser's cell phone location does not correlate to the location of the purchase. Additionally, the credit card authorization system may call the purchaser's cell phone and request authorization for the credit card purchase. However, such features would preferably first involve the user/purchaser giving the credit card authorization system access to the location of his/her cell phone.

As per another application, a unique dating/matching service could be embodied. For example, a user may store a number of preferences in a matching profile. These preferences may describe what type of person he is interested in meeting. Additionally, a user may store, preferably locally (for the dating/matching feature) but alternatively at a remote location, his/her own profile that has data describing similar attributes for what he/she is looking for. For example, an entry in a user's profile may be "male" and an entry in "looking for" profile may be "female." When a user comes within a certain distance of a user (determined by comparing locations of a user) that fits his/her "looking for" profile, the user may be alerted of the proximity of a matching user. Preferably, the particular user is only alerted if the "looking for" user has entered in attributes similar to the particular user's attributes and is also alerted of the particular user. The next stages of such an application could include, for example, requesting access to a form of communication. Such a form of communication could be for example, talking on the phone, instant messaging, or delivering an email address. Persons skilled in the art will therefore appreciate that many useful applications may be constructed using the principles of the present invention.

FIG. **3** depicts cell phone **300** constructed in accordance with the principles of the present invention. Cell Phone **300** preferably includes speaker **330**, antenna **310**, display screen **320**, control keys **360**, alpha-numeric keys **350**, and microphone **340**. Cell phone **300** also preferably may include, for example, a communications transmitter (not shown), communications receiver (not shown), memory (not shown), positioning device (not shown) and a microprocessor (not shown).

Cell phone **300** may also include locate button **380**. Cell phone **300** may be configured such that if locate button **380** is pressed, a locate feature is initiated (e.g., display screen **400** of FIG. **4** is initiated). Alternatively, cell phone **300** may be configured such that if locate button **380** is pressed, a location signal is sent to a remote storage area (e.g., a remote database), thus manually updating the user's location. This latter functionality may be useful when a user does not want his/her location accessed. As in another alternative embodiment, cell phone **380** may be configured such that if locate button **380** is pressed, the locating features of cell phone **300** are toggled between ON and OFF. Person skilled in the art will appreciate that locate button **380** may be configured to produce a variety of useful functionalities.

FIG. **4** depicts display screen **400** that is displaying a locate feature constructed in accordance with the principles of the present invention. The locate feature of display screen **400** may be included, for example, in cell phone **300** of FIG. **3** and displayed to the user of cell phone **300** of FIG. **3** when that user requests the location of a different user of the present invention. The programming for the feature may, for example, be stored in the memory of the cell phone and executed by the processor at a user's request. Locate Feature **400** includes identifier list **410** of alpha-numeric identifiers for users stored in the memory on cell phone **300** (FIG. **3**) or at a remote location. More particularly the user of display **410** may locate a user contained in identifier list **410** by selecting an appropriate user identifier **420**.

The user identifiers (e.g., "Susan Pracht") in identifier list **410** are selectable and may be selected by control keys **360** of FIG. **3**. Highlight window **410** may be used to prompt the user what identifier from list **410** is currently selected any may be controlled, for example, by the input keys of the cell phone (e.g., keys **350** and **360** of FIG. **3**). Identifiers may be associated to, for example, cellular telephone number, user profiles, or any other identifier that may be associated to a locatable device or user interacting with a locatable device.

Persons skilled in the art will appreciate that display screen **400** may be provided to a user of devices other than wireless devices. For example, display screen **410** may be provided to a user of a personal computer with no positioning system. Preferably, however, the security measures in accordance with the principles of the present invention are still abided to (e.g., access has been granted to the identifier associated to the requesting user). In this manner, a user can control who can access his/her wireless device (e.g., cell phone).

Persons skilled in the art will appreciate that identifier list **410** may be configured, for example, to contain only those users in which the user of cell phone **300** (FIG. **3**) has locate access rights to or any user stored in cell phone **300**. Persons skilled in the art will also appreciate that devices other than cell phone **300** may be used to incorporate the features of the present invention. Such devices could include, for example, personal digital assistants (PDAs), laptop, GPS pagers, GPS watches, car positioning devices, or any other devices that can be located. One advantage of the present invention is that it allows a mobile device with a positioning system to locate a different mobile device with a positioning system while still retaining a high level of location security and privacy.

FIG. **5** is display screen **500** for retrieving location status feature in accordance with the principles of the present invention. The selected identifier may be incorporated into display screen **500** through location status display **510** to inform the user of the status of the location retrieval. For example, display screen **500** may display "locating user" while a request is being processed by a remote facility or database.

FIG. **6** shoes display screen **600** for a display location feature constructed in accordance with the principles of the present invention. When a location is retrieved for the requested user, the location may be displayed on Display Screen **600** through primary location information **610**. Depending on what scope the requesting user has access to primary location information **610** may include, for example, the country, state, city, exact location, or any combination thereof of location information to the user. For example, if the user requesting the location of a desired user has been given unlimited location access by the desired user, primary information **610** may include the exact location of the user.

Secondary location information **620** may be included to supplement the requested users exact location so that the requesting user may have more of an idea of where the requested user is located. For example, if the desired user is located in a mall, primary location information **610** may be the address of the mall. In such an example, secondary location information **620** may be included and display, to the requesting user, the name of the mall.

Directional information **630** may also be included on display **600** or any other display of the present invention. Directional information **630** may include a digital compass **632** so that the user of cell phone **300** (FIG. **3**) knows what direction he or she is facing in. Digital compass **632** may be connected to a direction sensitive device (e.g, mechanical compass) in order to gather directional information. Directional arrow **633** may also be included in Display **600** to indicate where the requested user's location is relative to the location and direction of cell phone **300** (FIG. **3**) (e.g, the requesting user). Persons skilled in the art will appreciate that for some directional information **630** the location of the requesting user must be obtained. This information may be obtained either from cell phone **300**, a remote facility, or by any other suitable means. If the information is gathered from a location gathering device other than the requesting user's device (e.g, cell phone **300** (FIG. **3**)), then the user's device may communicate from this other location gathering device. Once both the locations of the requesting and requested/desired users are known, this information may be utilized in a number of features incorporating the principles of the present invention.

Distance information **634** is one such feature that displays the distance between the locations of the requested and requesting users (e.g., distance between the locations of the requested and requesting devices). Directional information **630** may contain many other elements to enhance the utility of the present invention. For example, a map (not shown in FIG. **6**) may be included in display **600**. This map may be of the area surrounding either the requested, the requesting user's location or both. Information may be included on the map to show the shortest path between the location as well as information about the surrounding area (e.g, area names, store names, etc.). Other information may include, for example, time to reach the destination according to specific types of travel (e.g, subway, walking, running, driving) and the direction the requested user is traveling in.

Many uses for this information may be utilized by a user. For example, if Jane calls Bill and Bill says "I am roaming midtown manhattan shopping why don't you join me", no other call to Bill is needed. Bill simply has to give Jane access to his location and Bill can continue shopping without having to worry about meeting up with Jane at a specific location.

In some instances, it may be beneficial to find the speed and direction of a requested user. For example, if a wife wants to see how long before her husband arrives home, the wife can use this feature of the present invention. This feature may find the husbands location multiple times in a determined amount of time. Through this information the feature may determine the speed and direction that the user is traveling. Using this speed, for example, this feature may display to the wife that the husband "is 10 minutes away" in directional information **630**. In doing so, the need for a call to the husband to determine his location is eliminated.

Persons skilled in the art that the location of multiple users may be displayed on display screen **600**. For example, suppose Jeff, Susan, and Chrissy are at a concert. If all three of these users have unlimited access to the other users, principles of the present invention would allow for a map to be displayed on each of the three locating devices with locator designations for each of the users. Using such map, the group may be able to find themselves in relative location to one another and decide, if need be, on the easiest location for them to meet. Thus map **660** may be included on display screen **600** and display the locations of multiple users (e.g., user's **621** and **622**).

More region **640** designates that more options or information may be retrieved or performed using principles of the present invention. A user may use control keys **340** (FIG. **3**) on cell phone **300** (FIG. **3**) to perform the functionality associated with more region **640**.

FIG. **7** shows display screen **700** for locate listing options in accordance with the principles of the present invention. Display screen **700** includes selectable options list **710** and highlight window **720** and may be displayed to the user, for example, through the activation of functionality associated by more region **640** (FIG. **6**). Options list **710** may include any of the features of the present invention. For example, options list **710** may include options activating a display screen of a map of the requesting user's location, a map of the requested user's location, directions to the requested user's location from the requesting user's location, travel time for the requesting user, travel time for the requested user, and options to set location alerts.

FIG. **8** shows display screen **800** of a failed locate feature due to insufficient rights in accordance with the principles of the present invention. Display screen **800** may be displayed if a requesting user attempts to located a requested user but has not been given access rights by the request user to his or her location. In such an instance insufficient rights message **801** may be prompted on display screen **800**.

FIG. **9** shows display screen **900** of adding and modifying locate rights and options to a user in accordance with the principles of the present invention. A user may give or modify access rights through display **900** to a user identifier in select-

able user identifier listing **910**. Highlight window **920** may be included to enhance the selecting process.

FIG. **10** shows display screen **1000** of assigning location rights to a user in accordance with the principles of the present invention. Display screen **1000** may be displayed, for example, after a user has been selected to be given location rights. Display screen **1000** contains selectable location rights listing **1010**, in which the selecting process may be enhanced by highlight window **1020**. Possible location access rights may be, for example, by country, state, city, exact location, or any other scope of location. Other rights may be assigned such as particular times in the day or time periods at which locations may be accessed.

FIG. **11** shows display screen **1100** of alert options in accordance with the principles of the present invention. Display screen **1100** allows for a user to set up alerts depending on the location of specific users. Selectable alert listings **1110** are included and may be selectable with highlight window **1120**. Examples of alerts that may be included in display screen **1100** may occur, for example, if the requested user is in a specific city or the same city as the user of display **1100**, is within a certain distance, or if a user located the user of display **1100**.

The alerts of the present invention may realize useful functionality. For example, suppose Susan Pracht lives in Pittsburgh and rarely comes to the city of the user of display screen **1100** on cell phone **300** (FIG. **3**) which is New York City. The user of cell phone **300** (FIG. **3**) may then use display screen **1100** and set an alert such that if Susan Pracht ever enters New York City, he or she would be alerted of Susan Pracht's presence.

FIG. **12** shows display screen **1200** of an alert feature in accordance with the principles of the present invention. Display screen **1200** includes an alert message and is displayed to a user when an event occurs that is designated by the user in display screen **1100** (FIG. **11**). Continuing the example from FIG. **11**, if Susan Pracht enters New York City, alert message **1210** would prompt the user that this event has occurred.

FIG. **13** shows display screen **1300** of a login feature in accordance with the principles of the present invention. In order for users to be identified by other user's cell phones or locating devices a user profile may need to be stored remotely from such devices. In such instances user profiles would be used as the locating identifier and the devices into which these profiles are logged into (recognized by) would allow for the user to be located. Display screen **1300** allows for a user to log into a locating device of the present invention. Logging into a device also adds a level of security to the present invention, especially when combined with a password. A user may use the controls of the device of the present invention to enter login **1310** of display **1300**.

In this manner a user may use another user's location device (e.g., cell phone) to locate a user or may use, for example, the internet to locate a user. Additionally, in this manner, a user may change the device being located. For example, a user may use his or her car GPS system or other systems in accordance with the principles of the present invention to be located instead of his or her cell phone. To further this example, a user may log into a web site on the internet and designate his or her current location as home, or any other location, thus eliminating the need for locatable device entirely.

FIG. **14** shows display screen **1400** of a login feature in accordance with the principles of the present invention. Display screen **1400** may be used by a user to enter a password associated to his profile, identity, or cell phone functionality access. A user may enter password **1410** using the controls of the device of display screen **1400** (e.g., cell phone **300** of FIG. **3**). By including a login/password scheme a user can be identified by a remote facility (e.g., a remote database) so that the user's location can be recorded/updated by multiple devices. Additionally, a login/password adds an extra level of security.

FIG. **15** shows cell phone **1500** that may be utilized to carry out the functionality in accordance with the principles of the present invention. Cell phone **1500** includes receiver/transmitter **1510**, microprocessor **1520**, positioning system **1530**, and memory **1540**.

Persons skilled in the art will appreciate that receiver/transmitter **1510** may directly communicate with memory **1540** if receiver/transmitter **1510** does not have its own memory (e.g., if receiver/transmitter **1510** are configured to utilize a buffer for capturing incoming communications bursts before demodulation and decryptions).

Positioning system **1530** may be, for example, a GPS system or a similar positioning system. Positioning system **1530** may include its own receiver for receiving particular signals utilized in positioning cell phone **1500**.

FIG. **16** shows network topology **1600**, in which all components of, or a part of the components of, may be utilized to carry out the features in accordance with the principles of the present invention. In this manner, persons skilled in the art will appreciate that multiple system configurations may be utilized. Topology **1600** introduces the diversity of systems that can be utilized to realize such configurations.

Generally, topology **1600** includes multiple mobile devices (e.g., multiple instances of mobile device **1601**), access control devices and location broker devices (e.g., database **1602** and cell phone base station **1603**), and non-mobile devices (e.g., grounded non-wireless device **1605**). Persons skilled in the art will appreciate that other devices or facilities may be included in topology **1600**. For example, one or more positioning systems **1601** may be included in topology **1600** in order to locate particular devices. For example, a positioning receiver (e.g., GPS receiver) may be included in wireless device **1601** with positing system **1601** being a positioning transmitter (e.g., GPS satellite network).

One or more wireless devices **1601** may be included in topology **1600** and may be, for example, watches, PDAs, cellular phones, radios, cars, or any other mobile device whose location can be determined.

As previously mentioned, access control and location broker devices may be included in topology **1600**. Such devices may be utilized, for example, to store user access rights for a particular user and may contain functionality to request and route a device's location. These devices may be considered information broker's such that devices may be added, removed, or modified without creating the necessity of having to modify the other devices of topology **1600**.

Database **1602** is one such information broker. Database **1602** may, for example, be located in cell phone base station **1603** if database **1602** is utilized to assist in cell phone locating. Database **1602** may be utilized, for example, to store a history a of a device's locations, a user's list of assigned access rights to other users, a log of a user's call activity, a log of a location initiations, a user profile, login/password information, or any other sort of information. Many features may be provided that utilize such information, For example, n approximate location may be determined for a device that is turned OFF (e.g., by utilizing the device's location history). As per another example, if a cell phone is lost and a new one replaced, information such as, for example, phone books, activity logs, and assigned user access rights may be downloaded/flashed into the cell phone.

Database **1602** may be accessed either directly (e.g., manually by an user of the device) or indirectly (e.g., periodically) by a cell phone or other device. Alternatively, a device or cell phone may access database **1602** directly (e.g., manually by an administrator of the database) or indirectly (e.g., periodically) by database **1602**.

A credit card authorization system is an example of additional system **1606** that may be added to topology **1600** to realize new features. Such a credit card authorization system, as described above, could utilize a devices location in order to decrease credit card fraud. System **1600** may also be, for example, systems needed to realize the described dating functionalities or another information provider (e.g., a map information provider).

Non-wireless devices **1605** (e.g., a personal computer) may be included in topology **1600**. Such devices may have locations associated to them or contain a positioning system. These locations may then be associated to a user that is recognized as using the device. For example, if a particular user logs into a non-mobile personal computer, that user's location will be recognized as being the location associated to the personal computer.

The devices of topology **1600** communicate with each other through communications network **1610**. Communications network **1610** may include, for example, any type of communications, routing, amplification, encryption, decryption, parsing, modulation, or demodulation technologies. For example, positioning system **1601** may communicate with wireless device **1601** by sending multiple wireless positioning signals. At the same time, database **1602** may be providing non-wireless device **1605** with a device's location over conventional telephone wires.

FIG. **17** shows locating feature **1700** in accordance with the principles of the present invention. Locating feature **1701** starts at step **1701** and waits at step **1702** until a location is requested. As stated, a location can be requested in a number of instances and by a variety of different means.

For example, a location may be requested by a user of a cell phone that desires to locate a friend by locating that friend's cell phone. Alternatively, a device may be triggered to request a location of a mobile device when an event occurs. For example, a credit card authorization system may request the location of a user's cell phone and the location of a store that just used a credit card associated to the requested user.

If a location is requested, access rights to the requested location for the requesting device and/or user are obtained at step **1703**. Step **1703** may be employed for example, as a call to a database storing a list of assigned access rights for the requested device/user and finding if any access rights were assigned to the requestor's identity. As per another example, step **1703** may be employed as a direct call to the requested device/user.

Step **1704** determines if the requestor has been assigned access rights to obtain the requested device/user's location. Persons skilled in the art will appreciate that some devices may always have access to a user's location regardless if a user has assigned access rights to the requesting device. In this manner, a device may be set up to always let a user access a location. For example, a mother may purchase a cell phone for a minor and may configure the cell phone to always allow her location information.

If access rights do exist for the requesting device/user at step **1704** then step **1705** may be initiated and location information may be provided to the requester. Such location information may be filtered according to the assigned access rights. For example, if a user has only been assigned access rights to obtain the requested user's city location, only the city that the requested user/device is currently located in (or the last city location available) may be obtained. The process then finishes at step **1707** after the assigned location information has been delivered to the requester at step **1705**. Persons skilled in the art will appreciate that steps may be added to, removed, or modified from locating feature **1700**. For example, instead of finish step **1707**, step **1702** may be initiated after step **1706** has completed.

If a requester has not been assigned rights to access the requested user/device's location as determined by step **1704**, then step **1712** may be initiated. Step **1712** informs the requester that the requester does not have access rights to obtain the location of a user/device. Step **1711** may follow and provide an opportunity for the requester to obtain the access rights. More particularly, step **1711** asks the requester if the requestor would like to request access rights. If the requester does not want to request access rights, locating feature **1700** may, for example, return to step **1702**. Else, access rights may be requested at step **1721**. Step **1722** follows and if access rights were given then step **1705** may be initiated. Else, step **1712** may, for example, be re-initiated.

FIG. **18** shows one embodiment of a cell phone burst that has been configured to embed a device or user's location **1801** between control signals (e.g., synchronization signals) and data signals. Persons skilled in the art will appreciate that some cell phone burst standards (e.g., TDMA and CDMA) have signal portions that are reserved for future technologies. In one embodiment, this reserved portion is utilized to house location information **1801**. A cell phone tower or base information may then strip received signals **1800** of location information **1801**, store location information **1801** into a database or other storage device, and deliver the received signals to its desired location. In this manner, a user may refresh his/her location information every time that a cell phone base station receives or routes information for the user. By stripping location information **1801** from signal **1800**, the intended receiver does not have access to the location of the device transmitting signal **1800**. A signal similar to signal **1800** may be sent to a cell phone that has requested, and has the appropriate location access rights, to location **1801**. Location **1701** may also be stored in other portions of signal **1700** that are not reserved portions. For example, a received signal **1800** may store location information in the data portions of signal **1800**. In embodiments where additional information is sent about location **1801** (e.g., a map associated with location **1801**) utilizing a main data portion of signal **1800** is preferred. Persons skilled in the art will appreciate that signal burst **1800** may actually be any type of communication signal such as, for example, information returned from a database inquiry.

Persons skilled in the art will also appreciate that the systems and methods of the present invention may be implemented using other locating features and configurations. For example, a user may be manually requested to allow location access rights every time his/her location is requested. As per another example, a user may organize his/her user list into groups and assign access rights to that group (e.g., family member user group, close friend user group). All such modifications are within the scope of the present invention, which is limited only by the claims that follow.

What is claimed is:

1. A method comprising:

displaying on a first wireless telephonic device a plurality of users, wherein each one of said plurality of users is associated to a different one of a plurality of wireless telephonic devices;

receiving on said first wireless telephonic device a first manual input in a form of a selection of one of said plurality of users;

receiving on said first wireless telephonic device an input in a form of a login and a second manual input in a form of a password;

determining whether to allow access of location information for said one of said plurality of wireless telephonic devices associated to said selected one of said plurality of users, wherein said determination includes identifying said user of said first wireless telephonic device from said plurality of users using said login and determining said password is associated with said login and determining whether said selected one of said plurality of users has provided access rights for said location information to said user of said first wireless telephonic device, and said first wireless telephonic device is operable to assign location access rights to said one of said plurality of wireless telephonic devices associated with said selected one of said plurality of users for obtaining a location of said first wireless telephonic device;

transmitting said location information from a server to said first wireless telephonic device; and

displaying said location information on said first wireless device.

2. The method of claim **1**, wherein a positioning system is utilized to provide said location information.

3. The method of claim **1**, wherein said selection occurs on a first display screen and a second display screen is provided on said first wireless telephonic device during said determination.

4. The method of claim **1**, wherein said selection occurs on a first display screen, a second display screen is provided on said first wireless telephonic device during said determination, and a third display screen is provided on said first wireless device after said location information is transmitted to said first wireless telephonic device.

5. The method of claim **1**, wherein said selection occurs on a first display screen, a second display screen is provided on said first wireless telephonic device during said determination, a third display screen is provided on said first wireless device after said location information is transmitted to said first wireless telephonic device, and a fourth display screen is provided that includes an option to obtain directions from said first wireless telephonic device to said one of said plurality of wireless telephonic devices associated to said selected one of said plurality of users.

6. The method of claim **1**, further comprising receiving a third manual input, wherein said first wireless telephonic device assigned location access rights to said one of said plurality of wireless telephonic devices associated with said selected one of said plurality of users for obtaining a location of said first wireless telephonic device and said third manual input modifies said location access rights.

7. The method of claim **1**, wherein a triangulation process is utilized to provide said location information.

8. A method comprising:

displaying on a wireless device a first name associated to a first wireless telephonic device and a second name associated to a second wireless telephonic device;

accepting a selection of said first name on said wireless device;

receiving manual input entered into said wireless device that includes a login and a password;

determining whether to transmit location information associated to said first wireless telephonic device from a server to said wireless device, wherein said determining includes performing an identification process based, at least in part, on said manual input to identify the user of said wireless device and determining whether said first wireless telephonic device has provided access rights for said location information for said identified user and said server is located remotely from said wireless device, said first wireless telephonic device, and said second wireless telephonic device, and said wireless device is operable to assign location access rights to said first wireless telephonic device for obtaining a location of said wireless device;

transmitting said location information to said wireless device based on said determination; and

displaying said location information on said wireless device.

9. The method of claim **8**, wherein a positioning system is utilized to provide said location information.

10. The method of claim **8**, wherein said selection occurs on a first display screen and a second display screen is provided on said wireless device during said determination.

11. The method of claim **8**, wherein said selection occurs on a first display screen, a second display screen is provided on said wireless device during said determination, and a third display screen is provided on said wireless device after said location information is transmitted to said wireless device.

12. The method of claim **8**, wherein said selection occurs on a first display screen, a second display screen is provided on said wireless device during said determination, a third display screen is provided on said wireless device after said location information is transmitted to said wireless device, and a fourth display screen is provided that includes an option to obtain directions from said wireless telephonic device to said first wireless telephonic device.

13. The method of claim **8**, further comprising receiving a third manual input, wherein said wireless device assigned location access rights to said first wireless telephonic device for obtaining a location of said wireless device and said third manual input modifies said location access rights.

14. The method of claim **3**, further comprising receiving a third manual input, wherein said wireless device assigned location access rights to said first wireless telephonic device for obtaining a location of said wireless device, said third manual input modifies said location access rights, and determining a travel time between said wireless device and said first wireless telephonic device.

15. A method comprising:

accepting on a first wireless device a manual selection representative of a second wireless device from a list representative of a plurality of wireless devices;

locating said second wireless device;

determining on a server whether said second wireless device has provided permission for said first wireless device to locate said second wireless device based, at least in part, on an identification of a login, that identifies the user of said first wireless device from a plurality of users, and password received by said first wireless device that is associated with said login and determining whether said user is associated with said permission, and said first wireless device is operable to assign a second permission to said second wireless device for obtaining second location information of said first wireless device;

providing location information to said first wireless device based on said determination; and

displaying a map on said first wireless device with a marker representative of the location of said second wireless device.

16. The method of claim 15, wherein a positioning system is utilized to provide said location information.

17. The method of claim 15, wherein said password is received on a first display screen.

18. The method of claim 15, wherein said password is received on a first display screen and said login is received on a second display screen.

19. The method of claim 15, wherein said manual selection occurs on a first display screen and a second display screen is provided on said first wireless device during said determination.

20. The method of claim 15, wherein said manual selection occurs on a first display screen, a second display screen is provided on said first wireless device during said determination, and a third display screen is provided on said first wireless device after said location information is transmitted to said first wireless device.

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