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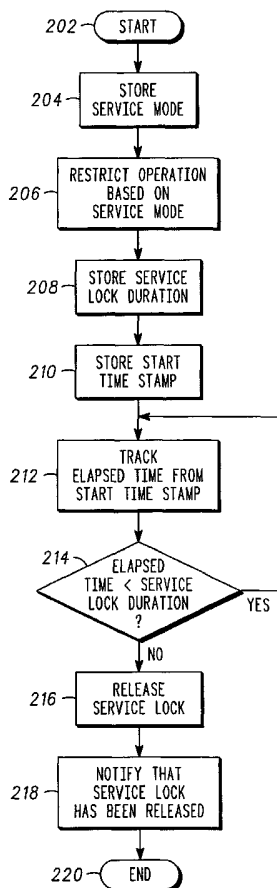
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[Continued on next page]

(54) Title: SERVICE LOCK RELEASE FOR A WIRELESS COMMUNICATION DEVICE



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(57) Abstract: Apparatus and method for controlling access to configuration of a wireless communication device (100) are provided. Once the access control is enabled, the wireless communication device keeps track the elapsed time (212, 310) using an internal timing circuitry (116), and compares it against a predetermined duration (214, 312). When the elapsed time exceeds the predetermined duration, the access to configuration is changed (216, 314).

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**SERVICE LOCK RELEASE  
FOR A WIRELESS COMMUNICATION DEVICE**

5    **Technical Field**

          The present invention relates generally to communication devices, more particularly to wireless communication devices having the capability of releasing a service lock.

10

**Background Art**

          In a wireless communication system such as a cellular telephone network, a subscriber generally has a subscription contract with a service provider for a certain subscription period to use his or her wireless communication device within the system. The subscription contract typically imposes a penalty to the subscriber if he or she terminates the contract before the subscription period expires. After the expiration of the subscription period, the subscriber is no longer bound to the service provider by the subscription contract, and may seek a different subscription contract with a different service provider. On the other hand, the subscriber may continue using his or her wireless communication device with the current service provider's system under the terms described in the original subscription contract or a new subscriber contract.

25           Many wireless communication devices have a service lock that secures its configuration information. If the subscriber is aware of the expiration of the subscription period and desires to have a different subscription contract with another service provider using the same wireless communication device, then the wireless communication device must be "unlocked" or released from a current configuration set by the current service provider in order to accept a new configuration to be set by a new service provider. The current configuration may be "unlocked" or released by obtaining an access code from the current service provider and entering it into the

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wireless communication device. The wireless communication device is ready to accept a new configuration if entry of the access code is successful.

Unfortunately, the subscriber may not be notified of the expiration of the subscription period, and may not even be aware that the subscription period has expired. Accordingly, there is a need for a device having an improved and convenient method for releasing its service lock.

#### Brief Description of Drawings

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FIG. 1 is an exemplary block diagram of a preferred embodiment of the present invention.

FIG. 2 is an exemplary flowchart of one of the aspects of the present invention.

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FIG. 3 is an exemplary flowchart of another aspect of the present invention.

#### Disclosure of the Invention

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When a subscriber receives a wireless communication device such as a cellular telephone, the wireless communication device is configured specifically to match the configuration defined by a service provider with whom the subscriber has a service contract, but is also configured to work in any compatible communication networks. The present invention provides an apparatus and method for providing the wireless communication device to be able accept a configuration specified by a different service provider upon the expiration of the current service contract allowing the subscriber to switch the service provider. The present invention may also be employed to provide temporary use of a wireless communication device to a third party. For example, the subscriber may allow temporary use of his or her wireless communication device to a friend for a specific number of days.

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Referring to FIG. 1, there is shown an exemplary wireless communication device 100 having service lock functionality in accordance with the present

invention. The device may be, but is not limited to, a radiotelephone (such as a cellular phone or two-way radio), a paging device, a personal digital assistant ("PDA"), a handheld computer, an audio/video device (such as a television or an MP3 player), a network browsing device, a tablet for pen, a touchpad for finger and pen, a touch keypad for finger, a virtual pen, and any type of computing device.

FIG. 1 is a representation of internal components of the exemplary wireless communication device 100. The preferred embodiment includes an antenna 102; a transceiver 104; a processor 106; a display 108; a user interface 110; an audio input & output 112; a memory circuit 114; and a timing circuit 116. Upon reception of wireless signals, the internal components 100 detect the signals through the antenna 102 to producing detected voice and/or data signals. The transceiver 104, coupled to the antenna 102, converts the detected signals into electrical baseband signals and demodulates the electrical baseband signals to recover incoming information, such as voice and/or data, transmitted by the wireless signals. After receiving the incoming information from the transceiver 104, the processor 106 formats the incoming information for output to the display 108 and/or audio input & output 112. Likewise, for transmission of wireless signals, the processor 106 formats outgoing information and conveys it to the transceiver 104 for modulation of a carrier and conversion into modulated signals. The transceiver 104 conveys the modulated signals to the antenna 102 for transmission to a remote transceiver (not shown).

The input and output devices may include a variety of visual, audio and/or motion devices. The output devices may include, but are not limited to, the display 108 (such as liquid crystal displays and light emitting diode indicators) and the audio outputs (such as speakers, alarms and buzzers) of the audio input & output 112. The input devices may include, but are not limited to, the user input 110 (such as keyboards, keypads, selection buttons, touch pads, touch screens, capacitive sensors, motions sensors, and switches) and audio inputs (such as microphones) of the audio input & output 112.

The internal components of the wireless communication device 100 further include the memory circuit 114 for storing and retrieving data and the timing circuit 116. The processor 106 may perform various operations to store, manipulate and retrieve information in the memory circuit 114. The configuration information

specified by the service provider is stored in the memory along with duration information specifying how long the configuration is to be in effect. The timing circuit 116 may include clock circuitry that provides the current time and/or a timer that provides elapsed time from a particular starting time such as the beginning of the duration of the configuration. It is to be understood that, for the invention described herein, the word "time" is used broadly to include calendar dates as well as times of day. Unless the processor determines that the elapsed time has exceeded the duration, the processor prevents modification to the configuration information to be made. However, the processor may allow modification before the end of the duration of the configuration upon receiving a proper password.

The internal components of the wireless communication device 100 may further include a component interface 118 and a power supply 120. Accessories and additional components may be coupled to the component interface 118 to provide additional functionality and capabilities to the device 100. The power supply 120, such as a battery, is controlled by the processor 106 and provides power to the internal components so that they may function correctly.

FIG. 2 is an exemplary flowchart of one of the aspects of the present invention. Before a subscriber receives and is able to use a wireless communication device 100, preferably a cellular portable telephone, the wireless communication device needs to be programmed with a service mode, which configures the wireless communication device to match a specific configuration provided by a service provider with whom the subscriber has a subscription contract for a certain period of time, for example, for two years. In block 204, the wireless communication device stores in its memory 114 the service mode. Once the service mode is stored, the wireless communication device is prevented from accepting another service mode or modifying the current service mode by a service lock. By storing the service mode, the wireless communication device becomes identified with the service provider, and its operation becomes restricted to the configuration provided by the service mode in block 206. In block 208, a service lock duration, which is the duration of the subscription contract, is also stored. The wireless communication device then stores a start time stamp to mark the start of the subscription contract, i.e., the service lock duration, in block 210. The marking of the start time stamp may be accomplished by

recording the time provided by an internal clock 116 of the wireless communication device when the wireless communication device is powered on for the first time in the service mode. The internal clock of the wireless communication device may be synchronized, upon powering on and/or off, to the time kept by a wireless  
5 communication network where the wireless communication device is being used.

In block 212, the wireless communication device begins to track the elapsed time from the time marked by the start time stamp. The tracking of the elapsed time may be accomplished by tracking the time kept by the internal clock of the wireless communication device. In block 214, the wireless communication device compares  
10 the elapsed time from the time marked by the start time stamp to the service lock duration. If the elapsed time is less than the service lock duration, the wireless communication device keeps tracking the elapsed time and, the process repeats from block 212. If the elapsed time is greater than or equal to the service lock duration, then the wireless communication device releases the service lock in block 216.

Although by releasing the service lock, the wireless communication device is  
15 now able to accept a new service mode or a modification to the current service mode, a new service mode or a modification to the existing service mode need not be entered for the wireless communication device to continue functioning as before. When the wireless communication device releases the service lock, it may notify the subscriber,  
20 for example, by displaying a message indicating that the service lock has been removed in block 216, and the process terminates in block 218.

FIG. 3 is an exemplary flowchart of another aspect of the present invention. In block 304, the wireless communication device stores in its memory a temporary service mode, which allows normal operation of the wireless communication device  
25 for a predetermined period of time, i.e., temporary service duration. The temporary service mode may be activated by a predetermined method such as, but not limited to, entering an activation password or selecting a menu item. Once the temporary service mode is activated, it may be deactivated anytime by entering a deactivation password. In block 306, the wireless communication device also stores the temporary service  
30 duration in the memory. The wireless communication device then stores a start time stamp to mark the start of the temporary service duration, in block 308. The marking of the start time stamp may be accomplished by recording the time provided by an

internal clock of the wireless communication device when the wireless communication device is powered on for the first time in the temporary service mode. The internal clock of the wireless communication device may be synchronized, upon powering on and/or off, to the time kept by a wireless communication network where  
5 the wireless communication device is being used.

In block 308, the wireless communication device then begins to track the elapsed time from the time marked by the start time stamp. The tracking of the elapsed time may be accomplished by tracking the time kept by the internal clock of the wireless communication device. In block 312, the wireless communication device  
10 compares the elapsed time from the time marked by the start time stamp to the temporary service duration. If the elapsed time is less than the temporary service duration, the wireless communication device keeps tracking the elapsed time and, the process repeats from block 310. If the elapsed time is greater than or equal to the temporary service duration, then the wireless communication device activates a  
15 service lockout mode in block 314. The service lockout mode disables the normal operation of the wireless communication device and restricts the operation of the wireless communication device to only initiating a call to an emergency number in block 316. When the wireless communication device activate the service lockout mode, it notifies the subscriber, for example, by displaying a message indicating that  
20 the service lockout mode has been activated in block 318, and the process terminates in block 320. To avoid a sudden termination of a call, a notice of the service lockout mode activation may be given prior to the activation, for example, one day or one hour before the activation. Once the service lockout mode is activated, it may be deactivated by entering another password, which may be the same as the deactivation  
25 password for deactivating the temporary service mode.

While the preferred embodiments of the invention have been illustrated and described, it is to be understood that the invention is not so limited. Numerous modifications, changes, variations, substitutions and equivalents will occur to those skilled in the art without departing from the spirit and scope of the present invention  
30 as defined by the appended claims.

**CLAIMS**

1.           A method in a communication device for releasing a service lock, the  
method comprising:  
5           storing configuration information of the communication device;  
              preventing modification of the configuration information for a defined  
time period;  
              operating the device based on the configuration information; and  
              permitting modification of the configuration information after the  
10          defined time period.
  
2.           The method of claim 1, further comprising:  
              receiving external input to define the defined time period,  
              wherein the external input is at least one of a start time, an end time,  
15          and a time duration.
  
3.           The method of claim 1, wherein preventing modification of the  
configuration for a defined time period includes allowing modification of the  
configuration during the defined time period if a defined code is received.  
20
  
4.           The method of claim 1, further comprising:  
              identifying that the defined time period has passed.

5. A communication device comprising:  
a memory circuit configured to store configuration information; and  
a processor configured to prevent modification of the configuration  
information for a defined time period and permitting modification of the  
5 configuration information after the defined time period.
6. The communication device of claim 5, wherein the processor permits  
access to the configuration information during and after the defined time  
period.
- 10 7. The communication device of claim 6, further comprising:  
a password circuit configured to allow modification of the  
configuration information during the defined time period.
- 15 8. The communication device of claim 5, further comprising:  
a timing circuit configured to provide timing information to the  
processor,  
wherein the processor determines whether the defined time period as  
past based on the information received from the timing circuit.
- 20 9. The communication device of claim 5, further comprising:  
a user interface configured to receive external input to define the  
defined time period,  
wherein the external input is at least one of a start time, an end time,  
25 and a time duration.

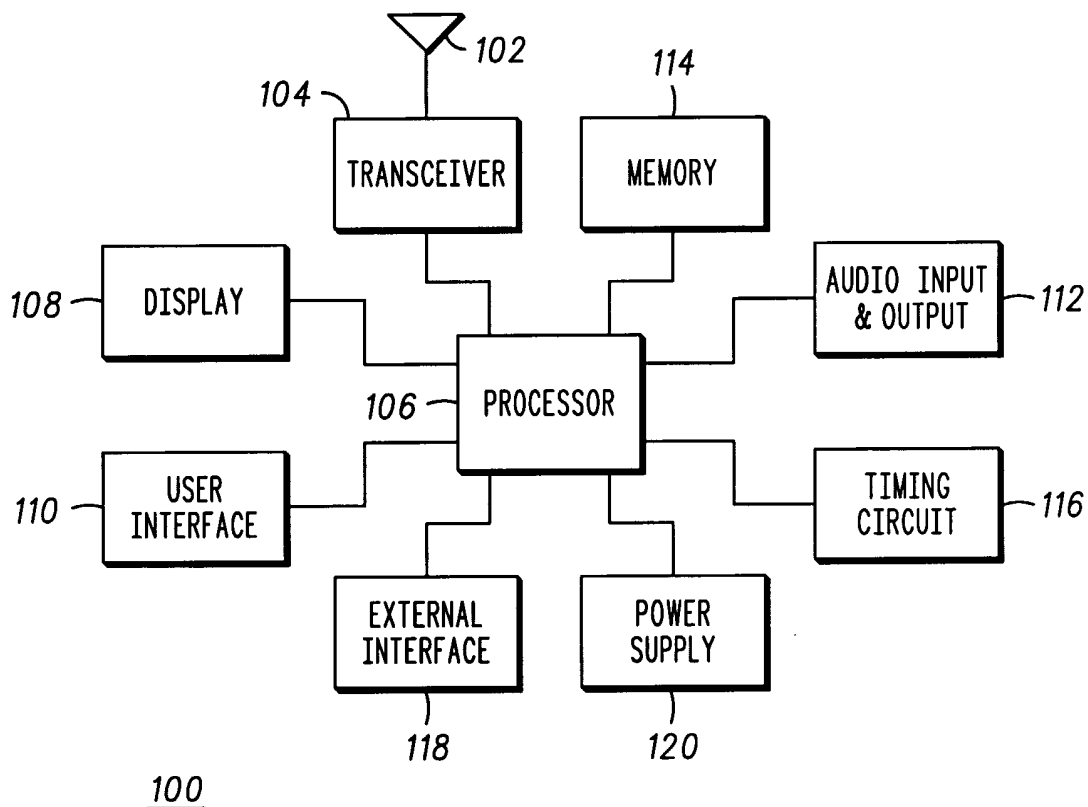
10.           A program for managing a service lock of a communication device comprising:
- computer readable program code that stores configuration information of the device;
- 5                computer readable program code that prevents modification of the configuration information for a defined time period;
- computer readable program code that operates the device based on the configuration information; and
- computer readable program code that permits modification of the configuration information after the defined time period.
- 10
11.           The program of claim 10, further comprising:
- computer readable program code that receives external input to define the defined time period, wherein the external input is at least one of a start
- 15                time, an end time, and a time duration.
12.           The program of claim 10, wherein the computer readable program code that prevents modification of the configuration for a defined time period includes computer readable program code that allows modification of the configuration during the defined time period if a defined code is received.
- 20
13.           The program of claim 10, further comprising:
- computer readable program code that identifies that the defined time period has passed.

14. A method in a wireless portable communication device having a service lock that prevents modifications to a service mode, the method comprising:
- storing the service mode in memory of the wireless portable communication device;
  - restricting operation of the wireless portable communication device based upon the service mode;
  - storing service lock duration of the service mode in the memory;
  - storing a start time stamp indicating a start of the service lock duration in the memory;
  - tracking an elapsed time period from the start time stamp;
  - determining whether the elapse time period has exceeded the service lock duration; and
  - releasing the service lock upon determining the elapsed time period has exceeded the service lock duration.
15. The method of claim 14, further comprising:
- allowing modifications to the service mode after releasing the service lock.
16. The method of claim 15, wherein storing a start time stamp indicating a start of the service lock duration by storing the start time stamp upon powering of the wireless portable communication device on for the first time in the service mode recording the time provided by an internal clock of the wireless portable communication device.
17. The method of claim 16, wherein tracking an elapsed time period from the start time stamp by tracking the time kept by the internal clock of the wireless portable communication device.

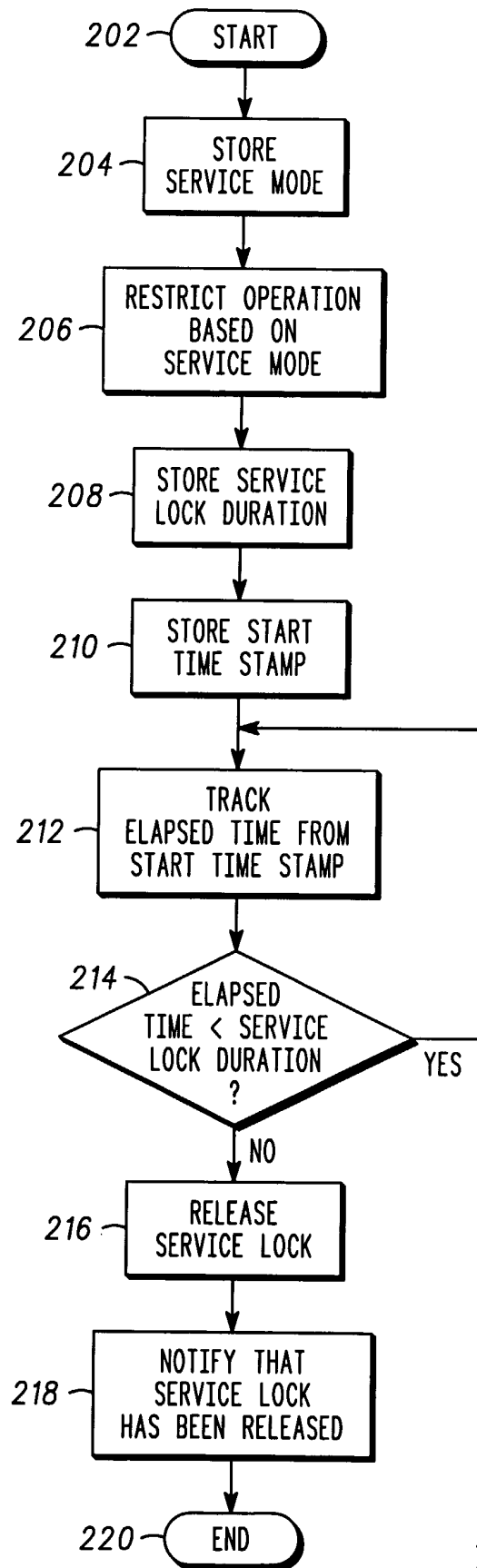
18. The method of claim 17, further comprising:  
notifying the service lock release upon determining the elapsed time  
period has exceeded the service lock duration.
- 5 19. The method of claim 15, wherein storing a start time stamp indicating  
a start of the service lock duration by storing the start time stamp upon  
powering of the wireless portable communication device on for the first time  
in the service mode recording the time provided by a wireless communication  
network upon synchronizing to the wireless communication network.
- 10 20. The method of claim 19, wherein tracking an elapsed time period from  
the start time stamp by tracking the time kept by an internal clock of the  
wireless portable communication device.
- 15 21. The method of claim 20, further comprising:  
synchronizing the internal clock to the wireless communication  
network upon powering the wireless portable communication device on.
22. The method of claim 21, further comprising:  
20 notifying the service lock release upon determining the elapsed time  
period has exceeded the service lock duration.
23. The method of claim 20, further comprising:  
synchronizing the internal clock to the wireless communication  
25 network upon powering the wireless portable communication device off.
24. The method of claim 23, further comprising:  
notifying the service lock release upon determining the elapsed time  
period has exceeded the service lock period.

25. A method in a wireless portable communication device having a temporary service mode that allows normal operation of the wireless portable communication device during temporary service duration, the method comprising:
- 5 storing the temporary service duration in memory of the wireless portable communication device;
- storing a start time stamp indicating a start of the temporary service duration in the memory;
- tracking an elapsed time period from the start time stamp;
- 10 determining whether the elapse time period has exceeded the temporary service duration;
- activating a service lockout mode upon determining the elapsed time period has exceeded the temporary service duration; and
- restricting the operation of the wireless portable communication device to initiating a call to an emergency number.
- 15
26. The method of claim 25, wherein:
- the temporary service mode is deactivatable by entering a first access code; and
- 20 the service lockout mode is deactivatable by entering a second access code.
27. The method of claim 25, wherein storing a start time stamp indicating a start of the temporary service duration by storing the start time stamp upon powering of the wireless portable communication device on for the first time
- 25 in the temporary service mode recording the time provided by an internal clock of the wireless portable communication device.
28. The method of claim 27, wherein tracking an elapsed time period from the start time stamp by tracking the time kept by the internal clock of the wireless portable communication device.
- 30

29.           The method of claim 25, wherein storing a start time stamp indicating a start of the temporary service duration by storing the start time stamp upon powering of the wireless portable communication device on for the first time in the temporary service mode recording the time provided by a wireless  
5           communication network upon synchronizing to the wireless communication network.
30.           The method of claim 29, wherein tracking an elapsed time period from the start time stamp by tracking the time kept by an internal clock of the  
10           wireless portable communication device, the internal clock synchronized to the wireless communication network upon powering the wireless portable communication device on.
31.           The method of claim 30, further comprising:  
15           notifying the service lock mode activation upon determining the elapsed time period has exceeded the temporary service duration.
32.           The method of claim 29, wherein tracking an elapsed time period from the start time stamp by tracking the time kept by the internal clock of the  
20           wireless portable communication device, an internal clock synchronized to the wireless communication network upon powering the wireless portable communication device off.
33.           The method of claim 32, wherein notifying the service lock mode  
25           activation upon determining the elapsed time period has exceeded the temporary service duration.

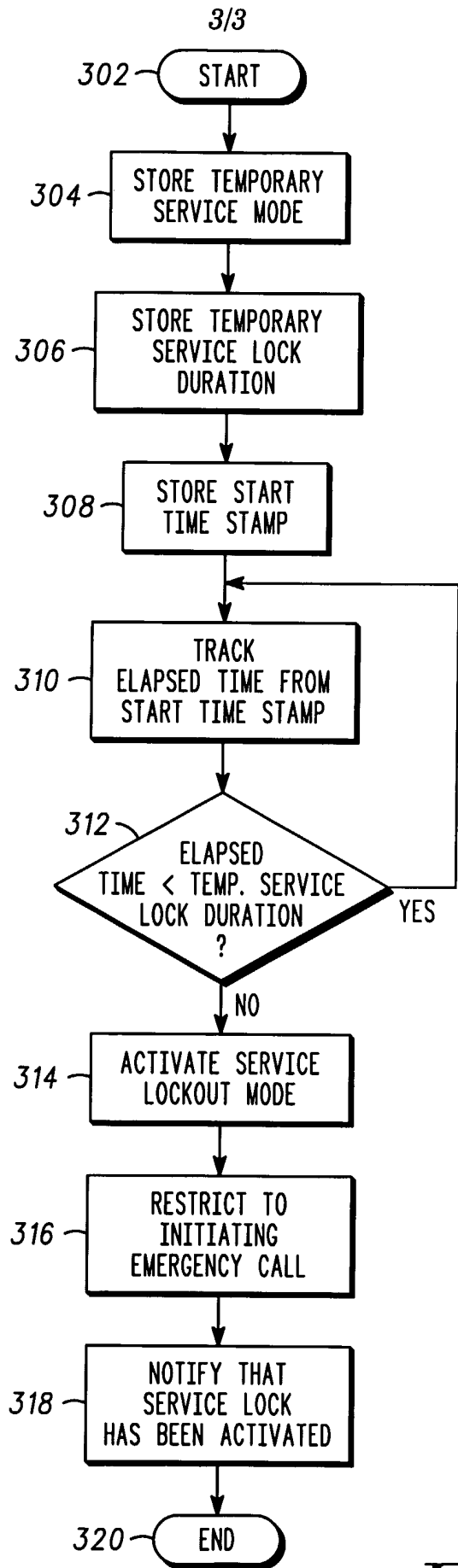


**FIG. 1**



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**FIG. 2**



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**FIG. 3**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/35490

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
IPC(7)	: H04M 1/66	
US CL	: 455/565, 410	
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) U.S. : 455/565, 410, 411, 567, 418, 419, 412.1, 424		
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) USPAT		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,243,574 B1 (MCGREGOR et al) 05 June 2001, fig. 1-2; 18 of fig.1 or 36 of fig.2; 30 of fig. 2; col. 3, lines 54-65; col. 4, lines 34-61.	1-33
Y	US 5,684,861 A (LEWIS et al) 04 November 1997, col. 3, line 13 - col. 4, line 66; col. 5, line 46 - col. 6, line 56; col. 7, lines 3-27; col. 8, lines 3-57.	1-33
A,P	US 6,636,489 B1 (FINGERHUT) 21 October 2003, see entire document.	1-33
A	US 5,918,160 A (LYSEJKO et al) 29 June 1999, see entire document.	1-33
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
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