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Martin

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(54) **AUTO RESPONDER**

(75) Inventor: **Brian Martin**, Moraga, CA (US)

(73) Assignee: **WaveMarket, Inc.**, Emeryville, CA (US)

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See application file for complete search history.

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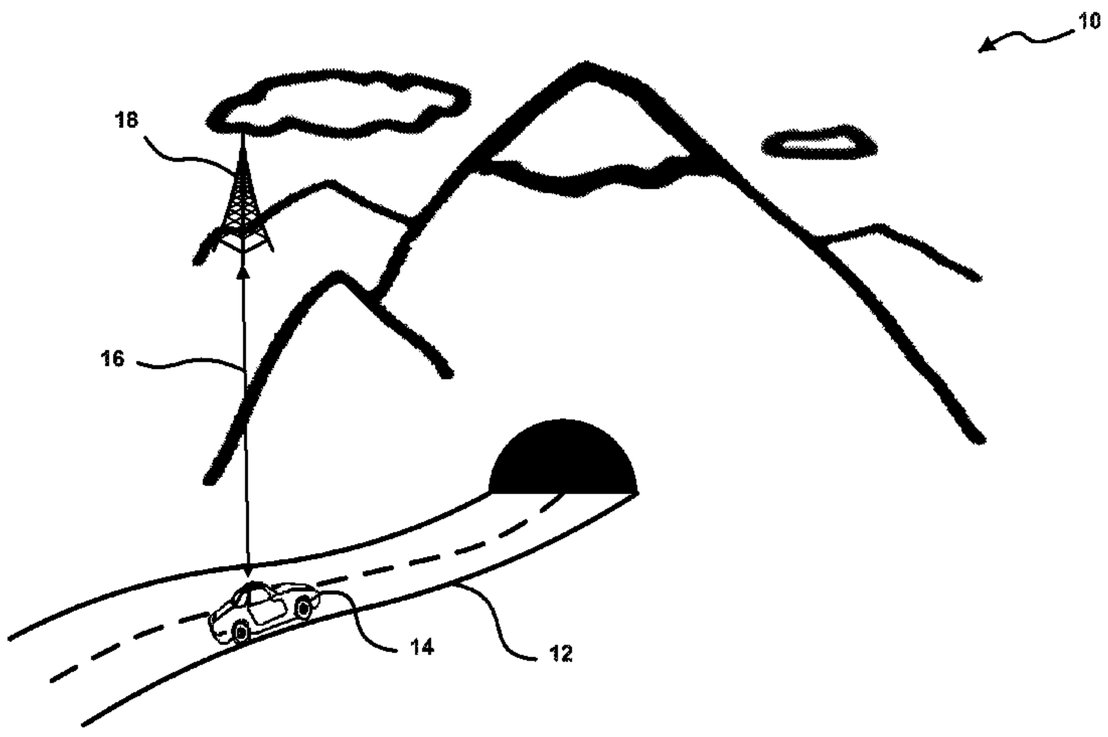
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Primary Examiner — Sharad Rampuria
(74) *Attorney, Agent, or Firm* — Dovas Law, P.C.

(57) **ABSTRACT**

Mobile device auto responders that dynamically send customized automated messages that depend on the identity of an incoming call, on the location of the mobile device, on the speed of the mobile device, on the acceleration of the mobile device, and/or on the time of day. The automated message can be customized to include the location, speed, heading and/or acceleration of the mobile device as well as an estimated time of arrival over a predetermined stored route to a predetermined location. The automated message may be audio, video, email, iMessage™, instant message, or SMS message.

35 Claims, 6 Drawing Sheets



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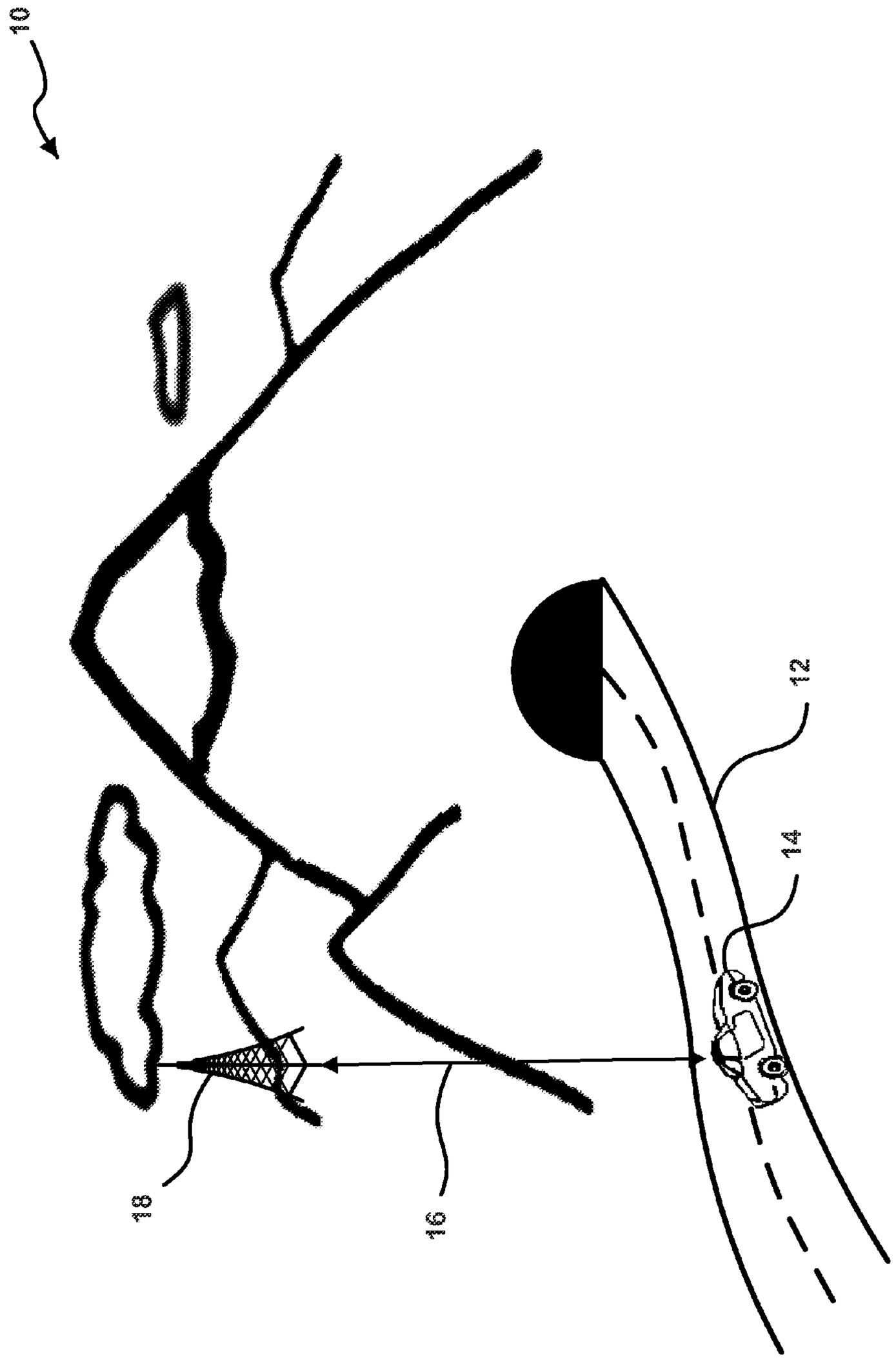


FIG. 1

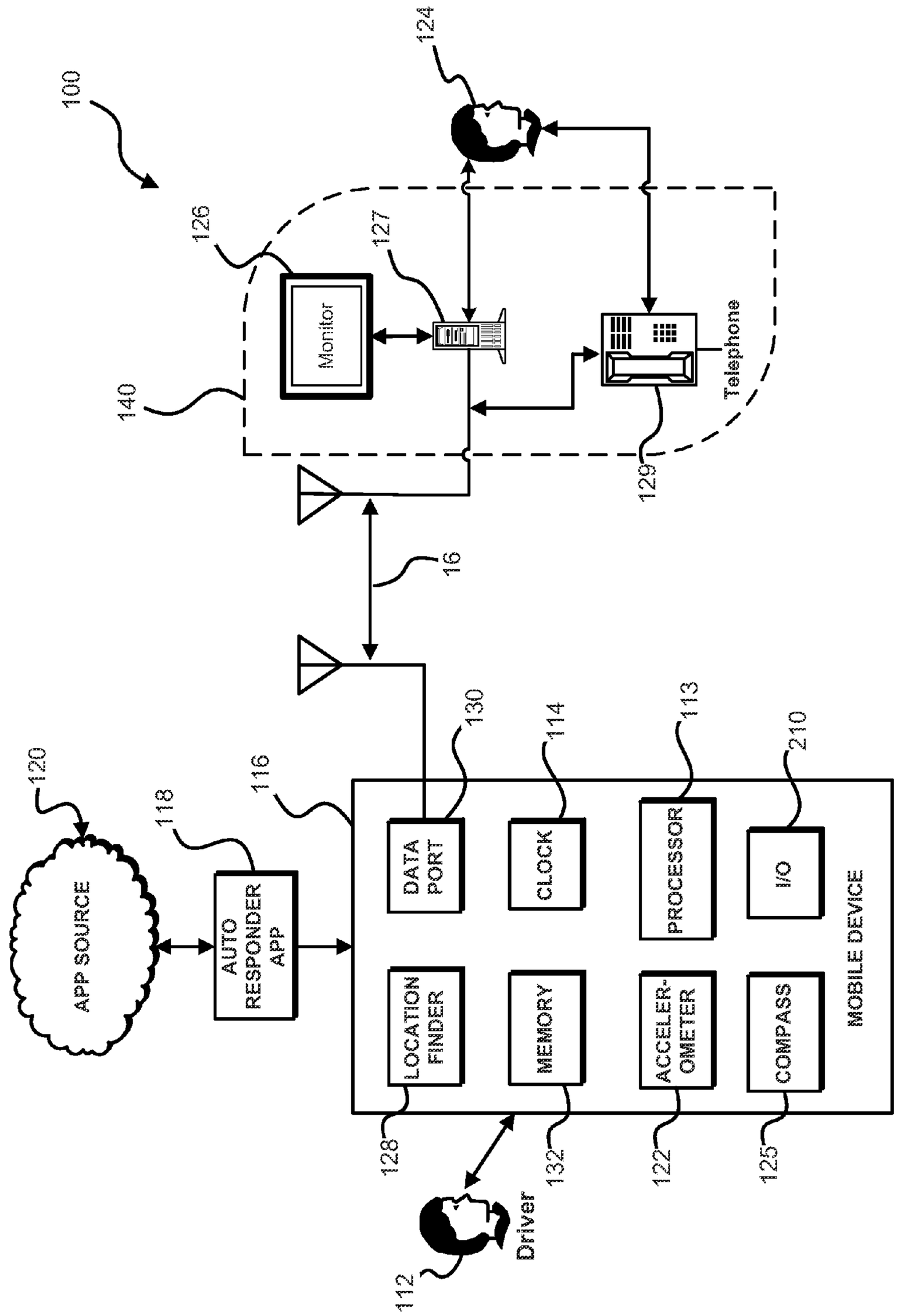

100
124
126
127
Monitor
140
Telephone
129
16
120
118
116
130
114
113
210
APP SOURCE
AUTO RESPONDER APP
DATA PORT
CLOCK
PROCESSOR
I/O
LOCATION FINDER
MEMORY
ACCELER-OMETER
COMPASS
MOBILE DEVICE
128
132
122
125
Driver
112

FIG. 2

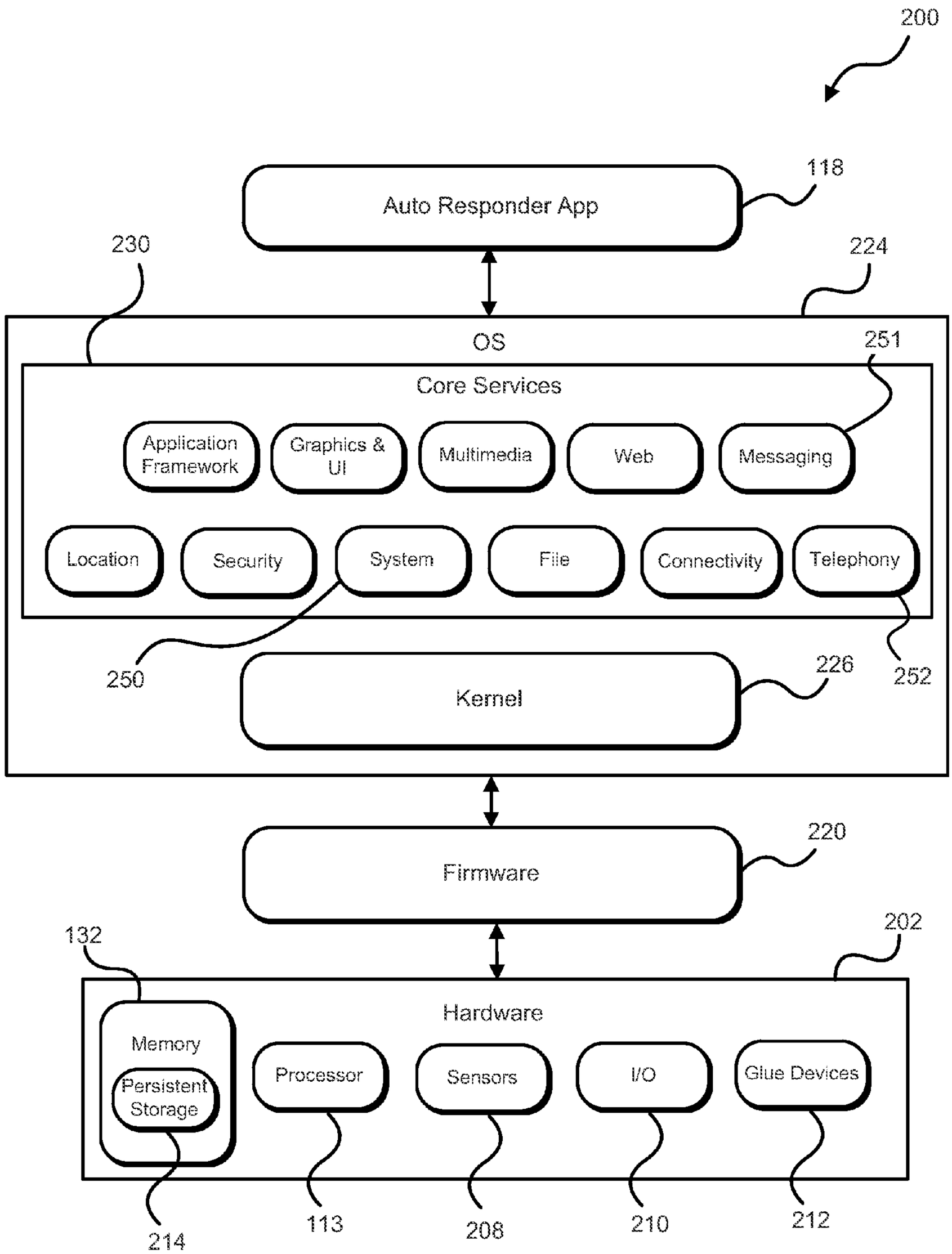

200
Auto Responder App
118
230
224
OS
251
Core Services
Application Framework
Graphics & UI
Multimedia
Web
Messaging
Location
Security
System
File
Connectivity
Telephony
250
252
Kernel
226
Firmware
220
132
202
Hardware
Memory
Persistent Storage
Processor
Sensors
I/O
Glue Devices
214
113
208
210
212

FIG. 3

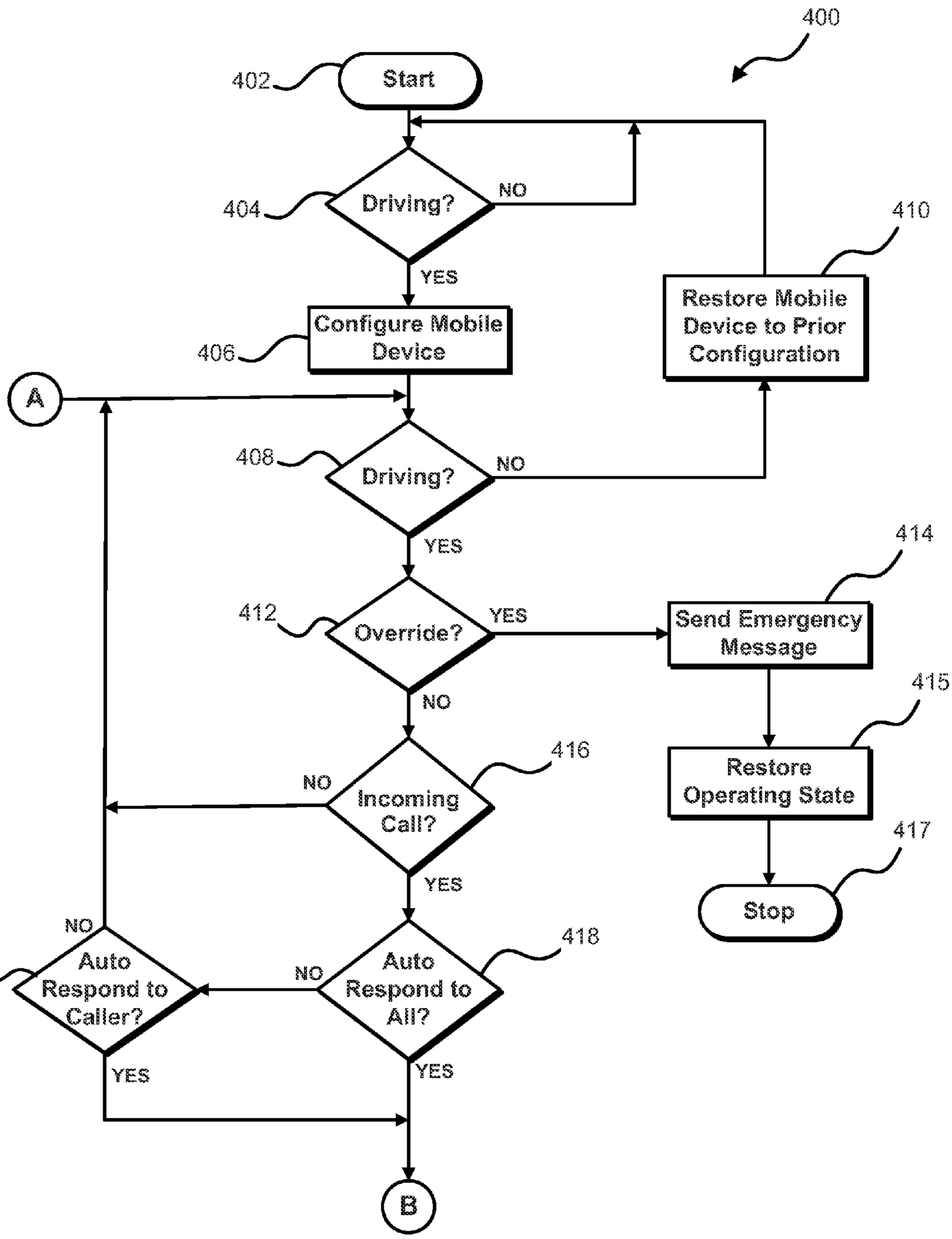

400
402
Start
404
Driving?
NO
YES
406
Configure Mobile Device
A
408
Driving?
NO
YES
410
Restore Mobile Device to Prior Configuration
412
Override?
YES
414
Send Emergency Message
NO
415
Restore Operating State
416
Incoming Call?
NO
YES
417
Stop
420
Auto Respond to Caller?
NO
418
Auto Respond to All?
NO
YES
YES
B

FIG. 4A

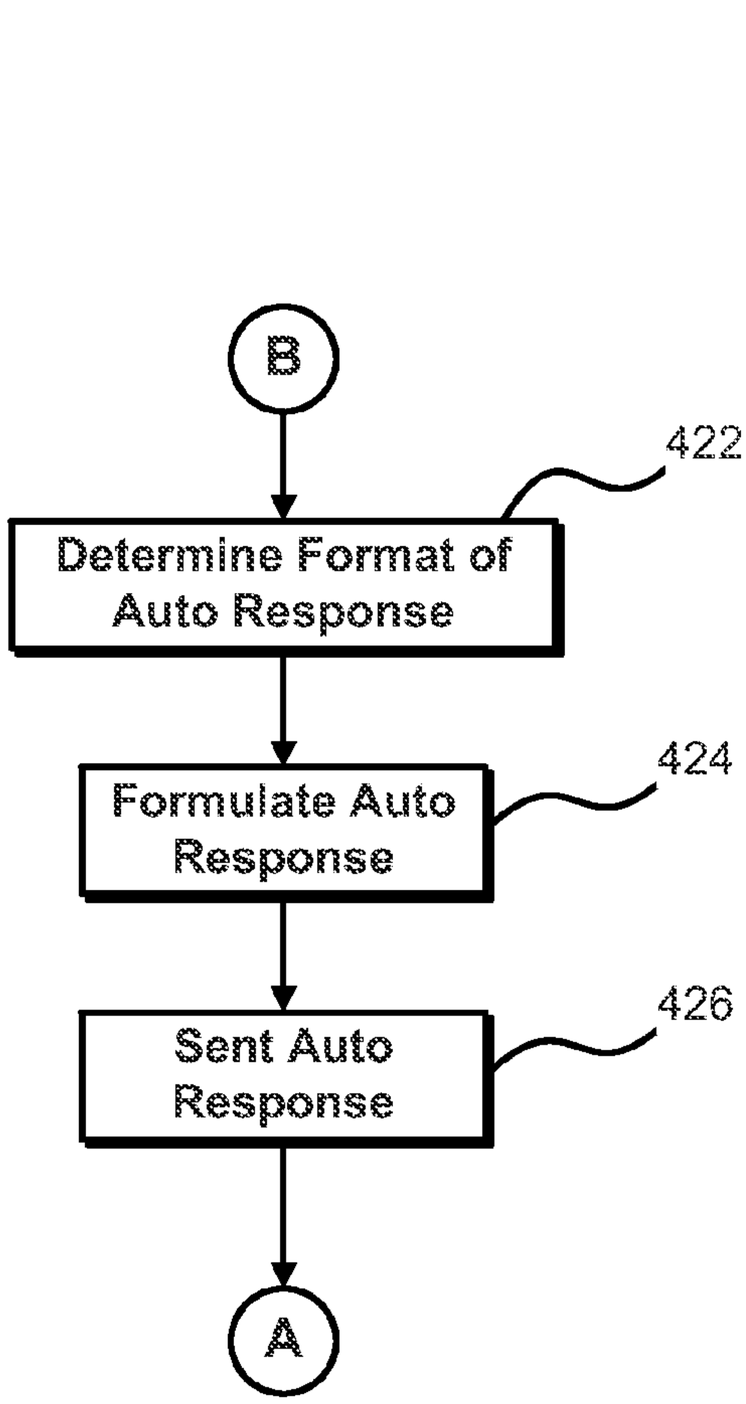

400
B
422
Determine Format of Auto Response
424
Formulate Auto Response
426
Sent Auto Response
A

FIG. 4B

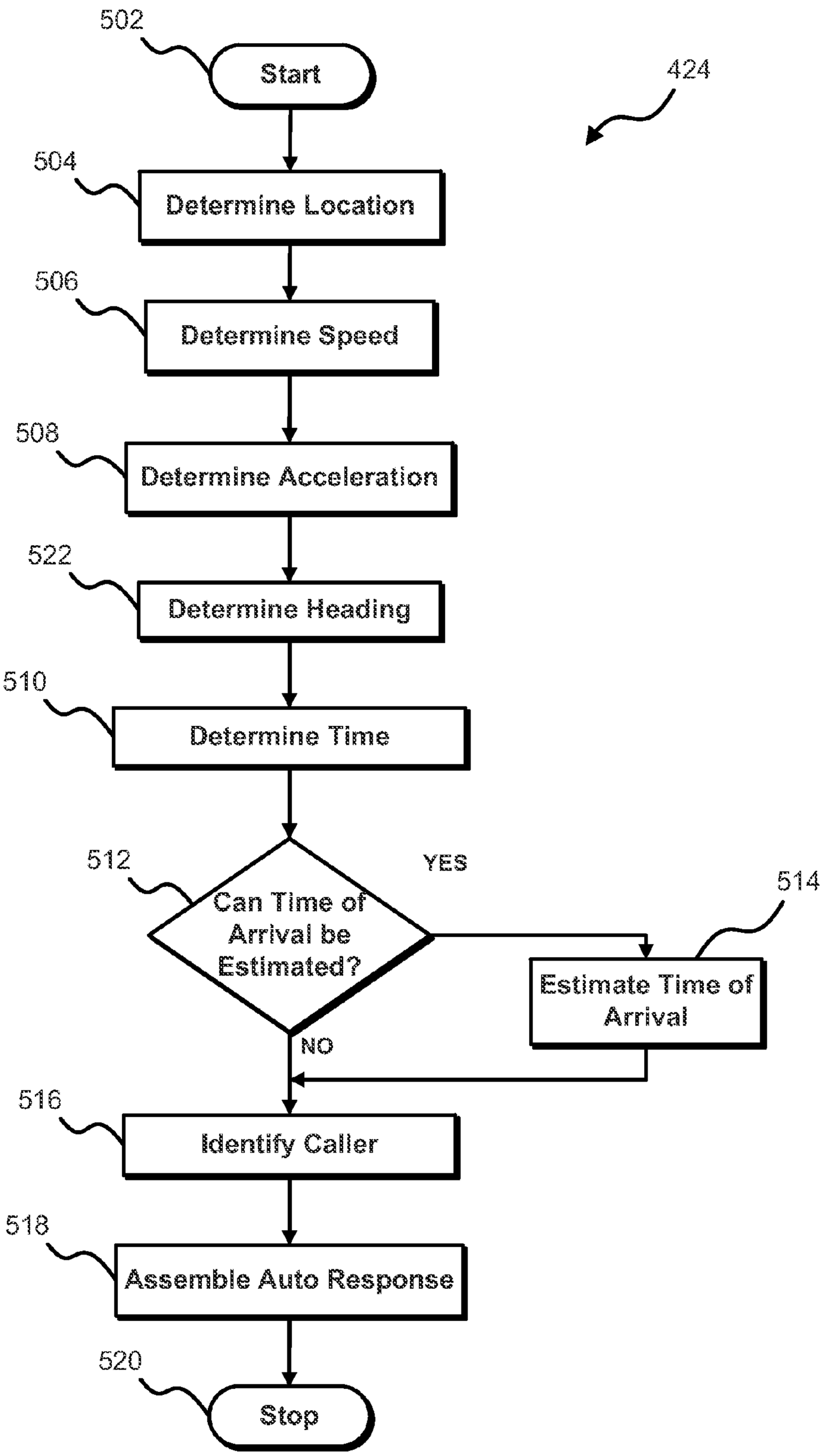

502
Start
424
504
Determine Location
506
Determine Speed
508
Determine Acceleration
522
Determine Heading
510
Determine Time
512
Can Time of Arrival be Estimated?
YES
514
Estimate Time of Arrival
NO
516
Identify Caller
518
Assemble Auto Response
520
Stop

FIG. 5

AUTO RESPONDER

FIELD OF INVENTION

This invention relates to mobile communication devices. More particularly, this invention relates to mobile communication devices having configurable and customizable auto responders.

BACKGROUND

Mobile devices such as cellular telephones, smart phones, GPS systems, and cellular-enabled personal computers have become very common and very powerful. This combination of ubiquity and capability has created an ongoing demand for even more capable devices and even more complex and enhanced applications.

Part of the power and capabilities of mobile devices are based on the existence of various infrastructures such as communication networks provided by mobile telephone operators. Such networks enable not only cellular communication links, but they also support "basic" services such as time keeping and access to the public telephone network. Other infrastructures include the United States Government operated global positioning system (GPS), which enables easily accessible position sensing, and ultra-accurate time signals that can be used by communication networks and mobile devices to synchronize signals and operations.

The power and capabilities of mobile devices are also based on using fast, powerful semiconductor devices such as very large scale integrated (VLSI) chips, their supporting components such as resistors, inductors, capacitors, and antennas, and software development and support tools. Such enable the development and use of powerful application software ("Apps") that can run on mobile devices to implement various features.

State-of-the-art mobile devices, sometimes referred to as smartphones, use the available infrastructures, devices, and software to implement a wide range of built-in features and capabilities. For example, communication ports, touch screen displays, keyboards, on/off sensors, compass orientation sensors, accelerometers, magnometers, light sensors, proximity sensors, cameras, timers, microphones, audio outputs, memory card readers, internal memory, specialized software, GPS, and capabilities such as programmability, identifying cell towers, ascertaining cell tower signal strengths, identifying WiFi networks, and determining battery levels (strength).

Much of the capabilities of mobile devices are implemented using specialized software applications, referred to hereinafter as "apps" that extend the basic features of mobile devices. Apps are available to enhance telephone communications, electronic texting, data communications, social networking, calendars, alarms, memo and note recording, GPS navigation, location tracking, music (MP3) and video (MP4) playback, video calling, conference calling, movie playback, picture taking and sending, games, emails, audio and video downloading, internet access and browsing, specialized advertising, short range communications such as Bluetooth™, mobile banking, instant messaging and the ever-popular specialized ringtones.

The immense power, speed, and capabilities of mobile devices can at times become breathtaking. But, mobile devices have so much capability and power, they at times become so burdensome and intrusive that their use is legally restricted. For example, many states have implemented laws that restrict the use of mobile devices when driving. At other times a user may decide that the use of a mobile device is not

warranted. For example, some drivers would rather not use a mobile device when driving, even if such is legal. At other times some users may not wish to be interrupted. However, most users would like to know who called even if they do not wish to actually answer a call.

To assist users in avoiding illegal driving activity related to mobile devices, and to assist other users from being distracted, a company, Location Labs, has developed a "Safe Driving" product for smart phones that automatically detects when a user is driving, and that automatically sets the mobile device into a "Driving Mode" which disables most texting and calling features, sends all incoming calls directly to voicemail, and hides text messages while driving. In emergencies, the "Driving Mode" can be overridden but, if overridden, a text message or an e-mail can be sent to a selected party (such as a parent). This "Safe Driving" product has proven itself to be a useful feature that enhances safety.

Some users may want to automatically "answer" an incoming call and send a message even if they cannot or will not personally handle the incoming call. The solution to the conflict of answering without answering is the auto responder.

An auto responder is a computerized system that automatically responds to incoming signals. Auto responders have proven themselves over the years to be very useful in automatically addressing problems with e-mails. For example, the rather basic automatically generated response from a service provider that an email could not be sent is one type of auto responder.

However, auto responders have proven themselves useful in other contexts such as automatically answering phones and responding with messages such as "X is not available and will return on Monday, please leave a message." Auto responders have also been used by marketers to leave automated messages while collecting phone numbers and the times of incoming calls. Later, pre-planned messages can be sent to the collected phone numbers.

While auto responders are known and have been used successfully, in the context of mobile devices the use of auto responders has been more limited. Mobile device auto responders that send "canned" messages in response to an incoming signal are known. For example, the foregoing Location Labs "Safe Driving" product when in "Driving Mode" can send an auto-response to alert an incoming caller that the call recipient is unavailable. However, enhanced mobile device auto responders that make use of the power of modern mobile devices would be useful.

SUMMARY

The invention relates to mobile device auto responders that dynamically send customized automated messages that depend on the identity of an incoming call, on the location of the mobile device, on the speed of the mobile device, on the acceleration of the mobile device, on the direction the mobile device is moving, on the type of call that is incoming (email, text, audio, instant messaging) and/or on the time of day. The automated message can be customized to include the location, speed, heading, and/or acceleration of the mobile device as well as an estimated time of arrival over a predetermined stored route to a predetermined location. Such a stored route may be learned. The automated message may be audio, email, iMessage™, another type of instant message, or an SMS message.

According to one aspect, the invention is a processor-implemented method for handling incoming communications to a mobile device. The method includes receiving an incoming communication from a caller to the mobile device

and determining if use of the mobile device is restricted. The caller is identified to determine a caller identity, and a response message is automatically transmitted responsive to determining use of the mobile device is restricted and determining the caller identity.

According to one aspect, the invention is a processor-implemented method for handling incoming communications to a mobile device. The method includes receiving an incoming communication from a caller to the mobile device and determining if use of the mobile device is restricted. At least one of location, speed, acceleration and heading (compass orientation) of the mobile device is determined, and a response message is automatically transmitted to the caller responsive to determining use of the mobile device is restricted. The response message includes an indication of at least one of the location, heading, speed and the acceleration of the mobile device.

According to another aspect, the invention is a communication network having a mobile device with a processor, memory for storing information, a data port for receiving incoming calls and for sending messages, a GPS finder for determining the current location of the mobile device, a heading sensor for determining the direction the mobile device is moving, at least one I/O element for producing a human detectable output, and a clock for determining time. The memory, data port, GPS finder, I/O element, and clock are all operatively connected to the processor. Application software controls the processor to determine if the mobile device is moving. If moving, the application software causes the processor to automatically stop the I/O element from producing the human detectable output and is so programmed automatically prevents the driver from making any non-emergency calls. Then, upon the data port receiving an incoming call from a caller the application software controls the processor to identify the caller and then to automatically formulate a response message that depends on the identity of the caller. That automatically formulated response message is then automatically sent to the caller via the data port.

According to another aspect, the invention is a communication network having a mobile device with a processor, persistent memory for storing information, a data port for receiving incoming calls and for sending messages, a GPS finder for determining the current location of the mobile device, a method of determining the direction the mobile device is heading, at least one I/O element for producing a human detectable output, and a clock for determining time. The persistent memory, data port, GPS finder, I/O element, and clock are all operatively connected to the processor. Application software controls the processor to determine if the mobile device is moving. If moving, the application software causes the processor to automatically stop the I/O element from producing the human detectable output and if so programmed automatically prevents the driver from making any non-emergency calls. Then, upon the data port receiving an incoming call the application software controls the processor to determine the current location of the mobile device, and then to automatically formulate a response message that depends on the current location. That automatically formulated response message is then automatically sent to the caller via the data port.

In yet another aspect, the invention is a communication network having a mobile device with a processor, persistent memory for storing route and destination information, a data port for receiving incoming calls and for sending messages, a GPS finder for determining the current location of the mobile device, at least one I/O element for producing a human detectable output, and a clock for determining time. The persistent memory, data port, GPS finder, I/O element, and clock are all operatively connected to the processor. Application software causes the processor to determine the current location and current speed of the mobile device when the data port receives an incoming call. The application software than causes the processor to use the current location to determine route information to a destination. The application software further causes the processor to produce and estimated time of arrival at the destination. The application software then controls the processor to automatically formulate a response message that includes the estimated time of arrival and to automatically cause the data port to send the response message. The route information in the persistent memory can be learned over time or stored by the user.

BRIEF DESCRIPTION OF THE DRAWING(S)

The foregoing Summary as well as the following detailed description will be readily understood in conjunction with the appended drawings which illustrate embodiments of the invention. In the drawings:

FIG. **1** is a depiction of a prototypical context in which the invention is practiced;

FIG. **2** illustrates a prototypical communication link for the context shown in FIG. **1**;

FIG. **3** illustrates the functional hierarchy of a mobile device practicing the invention;

FIG. **4**A is a flow diagram of part of the operation of an auto responder that is in accord with the invention;

FIG. **4**B is a flow diagram of another part of the operation shown in FIG. **4**A; and

FIG. **5** is a flow diagram of the step of formulating an auto response in the operation shown in FIG. **4**.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENT(S)

The disclosed subject matter will now be described more fully hereinafter with reference to the accompanying drawings. It should be understood that this invention may take many different forms and thus the invention should not be construed as being limited to the specific embodiment set forth herein.

In the figures like numbers refer to like elements. Furthermore, the terms "a" and "an" as used herein do not denote a limitation of quantity, but rather denote the presence of at least one of the referenced items. All documents and references referred to herein are hereby incorporated by reference for all purposes.

FIG. **1** illustrates a prototypical context **10** in which the invention is practiced. As shown the context **10** has a road that is part of a route **12** that is being traversed by a moving vehicle **14**. That vehicle **14** is currently positioned at a specific location and is traveling at a certain speed along the route **12**. As the vehicle **14** travels, its position, heading, and speed vary. A mobile device **116** (not shown, but see FIG. **2**) is in the vehicle **14** and has established a communication path **16** using a cell tower **18** (which represents a communication server). The invention provides configurable auto responses to incoming calls received over the communication path **16**.

FIG. **2** illustrates a prototypical communication link **100** that makes use of the invention. The communication link **100** includes a driver **112** driving the vehicle **14** (see FIG. **1**) along the route **12** (again, see FIG. **1**). The driver **112** carries the processor **113**-based mobile device **116**. The driver **112**, or another party having access to the mobile device **116** such as a parent, has caused an auto responder app **118** to be down-

loaded from an app source **120**. An example of the foregoing is a younger driver (the driver **112**) who has been given a cell phone (the mobile device **116**) by a parent who downloaded and installed the auto responder app **118** from a phone store (the app source **120**) with the intent of improving driver safety by preventing incoming messages from disturbing the driver **112** and preventing the driver **112** from making any non-emergency outgoing calls while enabling automated and customized responses to incoming calls such that automated responses can send information such as location, speed, and estimated time of arrival.

Still referring to FIG. **2**, the mobile device **116** includes a number of "built in" sensors and data sources that are accessible by the processor **113** in accord with the auto responder app **118**. Typically these will include an accelerometer **122**, a location finder **128** (e.g. a global positioning system ("GPS") finder), a clock **114**, a data port **130**, a compass **125** for producing direction information, and memory **132**. The data port **130** supports communications between the mobile device **116** and a communication server (represented by the cell tower **18** of FIG. **1**) over the communication path **16**. Preferably the communication server enables the mobile device **116** to establish the communication path **16**. Despite the seeming complexity of the mobile device **116**, such devices are available at reasonable cost almost anywhere in the US and are sold by the tens of millions worldwide.

The communication link **100** also includes a caller **124** having a representative computerized communication system **140** that communicates over the communication path **16** with the driver **112**. The communication system **140** is comprised of a telephone **129** for providing voice and SMS (short message service) communications, a computer **127** for supporting email and iMessage™ communications, and a monitor **126** that supports visual communications. Both the communication system **140** and the auto responder app **118** support voice, email, and SMS capabilities.

The mobile device **116** is capable of running a multitude of software applications and can be configured to enable a variety of features using a variety of settings and resources. The driver **112** can set up the mobile device **116** by adjusting sound levels, visual intensity levels, dates, times, timers, calendars, contact lists, contact groupings, speed dials, tools, and clock settings. In addition, the auto responder app **118** can automatically adjust features and settings and use any of the foregoing mentioned sensors as required to perform its programmed task(s). In particular, the auto responder app **118** can automatically prevent incoming call notifications, such as ring tones, vibrations, and display changes.

Still referring to FIG. **2**, as noted the mobile device **116** includes sensors that provide information to the auto responder app **118**. In particular, the auto responder app **118** can obtain and use GPS or other location information available from the location finder **128**, accelerometer information from the accelerometer **122**, compass heading information from the compass **125**, and time information from the clock **114**. It should be noted that location information can be used to determine not only location but also speed, heading, acceleration, and direction if the processor **113** is properly programmed.

FIG. **3** illustrates the functional hierarchy of the mobile device **116** when practicing the invention. At the lowest level are basic electronic hardware **202** devices. Such electronic hardware **202** includes the memory **132**, the processor **113**, numerous sensors **208**, which includes the location finder **128**, the accelerometer **122**, and a time base which supports the clock **114**, input/output ("I/O") devices **210** such as display screens and drivers, audio drivers and outputs, and RF transceivers that implement the data port **130**, and various "glue" devices **212** required to change voltage levels or signal levels and to perform other interfacing as required for proper electronic hardware **202** functionally. The memory **132** includes persistent storage **214** whose purpose is described subsequently. The persistent storage **214** retains its stored information even when power is turned off.

Still referring to FIG. **3**, the next level of hierarchical progression is firmware **220**, if required. Firmware **220** is useful for assisting interfacing upper level systems with the electronic hardware **202**, upgrading the mobile device **116**, establishing a certain set of basic "start-up" and other functions, limiting or restricting the mobile device's capabilities, and storing non-volatile information, for example model number and revision number of the mobile device **116**.

Moving up the hierarchical progression from the firmware **220** is an operating system (OS) **224**. The operating system **224** provides a set of software programs that manage the electronic hardware **202** and firmware **220** and implement common services for a wide range of application software. The operating system **224** includes a low-level "kernel" routine **226** that handles software integration to the firmware **220** and electronic hardware **202** to implement underlying functionality. In practice the kernel **226** is seldom modified when used to form a family of mobile devices. However, different releases of operating systems may have different kernels **226**. Over the kernel **226** is a set of core services **230** that, while basic, may change from time to time or from family device to family device. The core services **230** are software-based functions that support the on-board services of the mobile device **116**. In the mobile device **116** those core services include system **250** software routines that support and enable obtaining GPS or other location information, accelerometer information, heading information, time information, and use of memory, as well as messaging routines **251** and telephony routines **252**. The messaging routines **251** support voicemail, email, SMS service, iMessage™ and other instant messaging services, visual, and audio messaging while the telephony routines **252** support the data port **130**.

Overlaying the operating system **224** is the auto responder app **118** whose operation is described in more detail subsequently.

The persistent storage **214** stores a wide range of permanent data in databases, specifically including position information. Such position information can be input by the driver **112**, downloaded from a remote source, or learned over time. In particular, the position information includes destination information, such as the locations of the driver's home, office, and other locations that the driver **112** often goes to. The persistent storage **214** also stores route information, which includes routes the driver **112** commonly uses to go to the various destinations. For example, the route **12** shown in FIG. **1**. Route information can be input by the driver **112**, downloaded from a remote source such as MapQuest™ or Google Maps™, or learned over time. For example, if the route **12** is the path the driver **112** takes by leaving home, traveling South on Oak Street, turning onto I-5 traveling north, traveling 35 miles, exiting on Fern Street, traveling east 1 mile, and then turning into his office parking lot, route **12** can be learned by recording that travel.

In addition, the persistent storage **214** contains time information regarding the routes. For example, the persistent storage **214** records an average of 2 minutes to travel from the driver's home to the on-ramp of I-5, the average time it takes the driver **112** to travel each half-mile on I-5, and the average time it takes the driver **112** to travel from the off-ramp of I-5 to his office. The persistent storage **214** can therefore be used

to estimate travel times between the driver's **112** home and his office, and along each half-mile of I-5.

The persistent storage **214** further includes time-of-day information. As is well-known to drivers in many urban areas, the time required to travel from point A to point B can be heavily dependent on the time-of-day. Driving 30 miles on I-5 starting at 3:00 AM might take 30 minutes while that same distance over the same route starting at 5:00 PM might take well over 2 hours. Thus the persistent storage **214** includes information to provide travel time estimates based on the time of day. For example, the times required to travel the same route at different times during a day can be stored or, equivalently, time-dependent correction factors can be stored.

FIGS. **4**A and **4**B present flow diagrams of the operation **400** of the auto responder app **118** when controlling the mobile device **116**. As an overview, when the driver **112** is driving, the auto responder app **118** automatically detects that driving and prevents the mobile device **116** from informing the driver **112** of incoming calls while driving and prevents the driver from sending any non-emergency outgoing communication. The auto responder app **118** also determines whether to automatically respond to the particular caller **124**, and, if so, prepares and sends an auto response to that caller **124**. The auto response message can depend on the particular caller, on the time of day, on the user's location, on the user's speed, or on the user's acceleration, or on the user's compass heading. Furthermore, the auto respond message can be customized to include the user's location, speed, heading, and an estimated time of arrival. In addition, the auto respond message can be sent via voice, picture, SMS, email, Apple's iMessage™, another instant message service and/or any equivalent type of message.

The operation **400** starts **402** and proceeds with an automatic determination as to whether the driver **112** is driving, step **404**. If the driver **112** is not driving the auto responder app **118** idles in a loop waiting for the driver **112** to start driving. During idling, the auto responder app **118** is transparent and does not interfere with other operations of the mobile device **116**. However, the auto responder app **118** can be programmed during idling. For example, the auto responder app **118** can be configured to respond to all callers or to just select callers in the persistent storage **214**. Additionally, response formats for auto response messages can be assigned (voice, visual, SMS, email, iMessage™, instant message), specific responses can be formatted for each select caller in the persistent storage **214**, driving routes, such as the route **12** in FIG. **1**, can be added to the persistent storage **214**. The auto responder app **118** can be programmed to respond with different messages at different times, and auto responses can be configured to include the driver's location, speed, acceleration, heading, and estimated time of arrival.

When driving is detected in step **404** the operation **400** proceeds to automatically configure the mobile device **116** for auto responding, step **406**. Auto configuration includes shutting off the ability of the driver **112** to make any outgoing calls (except emergency calls to selected numbers such as 911), texting, and data entry. Furthermore, all incoming message notifications to the driver **112** such as ring tones, vibrations, and display screen messages and actions (such as lighting up) are prevented. In addition, the operating state of the mobile device **116** before driving is saved and stored in the persistent storage **214**.

After the mobile device is configured a determination is made as to whether the driver **112** is still driving, step **408**. If not, the operation **400** proceeds to step **410** where the operating state of the mobile device **116** before driving started is recalled from the persistent storage **214** and restored. Then operation **400** proceeds back to step **404** where the auto responder app **118** waits for the driver **112** to start driving again.

However, if in step **408** the operation **400** detects that the driver **112** is still driving, a determination is made as to whether an override of the auto responder app **118** should be taken, step **412**. In one case a driver **112** may seek to manually override the auto responder app **118**. In another case the auto responder app **118** may detect an abnormal state, such as a probability of a collision, resulting from a sharp, high output from the accelerometer **122** or the mobile device **116** being out of an allowed area based on the location finder **128**. If yes, a special emergency message is sent to a select party (such as a parent, co-worker, police department) or parties step **414**, the saved operating state of the mobile device **116** is restored, step **415**, and the operation **400** stops, step **417**. The format, emergency message content, and select party are all preprogrammed (or defaults) and are stored in the persistent storage **214**. After step **417** the driver **112** is free to make and send calls and messages in a normal fashion.

If there is no override, the operation **400** proceeds from step **412** to a determination as to whether there is an incoming call, step **416**. If there is no incoming call the operation **400** returns to step **408** and a multi-step loop begins until the driver **112** stops driving, the driver **112** overrides the auto response app **118**, or an incoming call is received.

If in step **416** an incoming call is received, the incoming caller's phone number is available via caller ID. A determination is then made as to whether the auto responder app **118** will respond to all callers, step **418**. If the auto responder app **118** is set up to respond to only select callers the outcome of step **418** is NO, and the operation **400** proceeds by determining whether to respond to the caller, step **420**. That determination involves attempting to find the caller in the persistent storage **214** using the incoming phone number. If the caller's phone number is not in the persistent storage **214** the determination in step **420** is NO and the operation **400** returns to step **408**. But, if the caller's phone number is in the persistent storage **214** the determination is YES and an auto response is to be sent.

If an auto response is to be sent per step **418** or per step **420**, the operation **400** proceeds to step **422** where a determination is made as to the format of the auto response. Formats include audio, video, SMS messages, iMessage™, instant messages, and/or email. The determination of which format to use can be preprogrammed and stored in the persistent storage **214**, it can depend on who the incoming caller is (using caller ID), it can depend on the format of the incoming call, or an auto response in each format can be sent.

After the determination of the format of the auto response per step **422** the operation **400** proceeds to formulate one or more auto responses, step **424**. It should be understood that the auto response app **118** is highly configurable and that different callers may be sent different auto responses, the auto responses may depend on the time of day, or on the driver's **112** location, speed, heading, or acceleration. Additionally, an auto response can be configured to include current information such as the driver's location, speed, heading, and estimated time of arrival. Details about step **422** are shown in more detail in the flow diagram of FIG. **5**.

After the format of the auto response is determined per step **422**, and after the auto response itself is formulated, the auto response is sent, step **426**. Then the operation **400** returns to step **408** for continuing operations.

FIG. **5** provides operational details of step **424**. It should be understood that how step **424** is performed depends on how the auto responder app **118** is setup. As noted, the auto

responder app **118** is highly configurable and can be set up to provide the same response to all callers, different responses to different callers, auto responses that depend on the time of day, caller location, speed, heading, and acceleration, and can include an estimated time of arrival of the driver **112** at his destination. Also as previously noted, the estimated time of arrival depends on the route the driver **112**, on historical travel times, as well as on the time of day. Because of the very large number of different permutations on formulating auto response messages, FIG. **5** should be understood as only illustrating features of the invention and not as limiting the scope of the invention.

Step **424** starts, step **502**, and proceeds with determining the location of the driver **112**, step **504**. This involves having the auto responder app **118** interrogate the location finder **128** to find the location of the mobile device **116**. Next, the auto responder app **118** determines the speed of the mobile device **116**, step **506**. Typically this will be performed by interrogating the location finder **128**. After step **506** the auto responder app **118** determines the acceleration of the mobile device **116**, step **508**. This is performed by interrogating the accelerometer **122**. Next, the auto responder app **118** determines the heading of the mobile device **116** using the compass **125**, step **522**. Then, at step **510** the time is determined by interrogating the clock **114**.

The foregoing methods of determining location, speed, heading, and acceleration are example only. Such information may also be gleaned from cell tower signals or Wi-Fi signals. Additionally, acceleration and speed may also be estimated from GPS location fixes.

After step **510**, a determination is then made as to whether an estimated time of arrival can be determined, step **512**. To estimate the time of arrival, the destination and the route must be known. Those parameters must have been programmed or contained in the persistent storage **214**. In addition, the location of the driver **112** determined in step **504** must correspond to a route in the persistent storage **214**. Alternatively, the location of the driver **112** can be used to select a route from a list of routes and a destination. The distance between the driver **112** and the destination can be determined, either from the persistent storage **214**, or by interrogating an external reference such as Google Maps™, MapQuest™ or other network accessible mapping data source.

If an estimated time of arrival can be determined, it is determined, step **514**. That estimated time of arrival can be found from the current time (available from the clock **114**), the distance to travel from step **512**, and the speed, from step **506**. However, a better estimate can be obtained using historical time travel information in the persistent storage **214**. For example, the prior travel times to travel from the current location along the current route can be stored. An even better estimate is available if prior travel times to travel from the current location along the current route at the current time of day are stored. Compilation of historical information and its use are disclosed in U.S. patent application Ser. No. 13/350,497 entitled "System and Method for Implementing Histogram Controlled Mobile Devices," filed on Jan. 13, 2012. However, other ways to compile and use historical information will be apparent to those skilled in the art.

In step **516**, the auto responder app **118** identifies the caller. If the auto responder app **118** is configured to send the same auto response to all callers, step **516** need not be performed. However, since the invention is configurable to send different auto response messages to different callers, step **516** should be understood as enabling sufficient caller identification to enable assembly of a tailored message for the particular caller.

After step **516**, the auto response message is assembled, step **518**. As previously noted auto response messages may depend on the caller, which is available per step **516**. Auto response messages may also depend on time, which is available per step **510**. Auto response messages may also depend on the current location of the mobile device **116**, which is available per step **504**. Auto response messages may depend on the current acceleration, which is available per step **508**. Auto response messages may depend on the current heading, which is available per step **522**. Auto response messages may depend on the current speed, which is available per step **506**. Auto response messages may include an estimated arrival time, which is available per step **514**. Finally, the auto response message may depend on the type of incoming call. If an email is received one auto response can be sent, if an SMS message is received another auto response can be sent, if an iMessage™ is received another auto response can be sent, if an instant message is received another auto response can be sent, and if a voice call is received yet another auto response can be sent.

Assembly of the auto response message involves incorporating the components of the auto response message in accord with an arrangement stored in the persistent storage **214**. For example, if during step **516** the caller **124** is identified as the parent of the driver **112** the persistent storage **214** has a stored arrangement consisting of the current location of the driver **112**, the current speed of the driver **112**, and an estimated time of arrival. In response, step **518** would arrange a message informing the caller **125** of the current location, speed, and estimated time of arrival. For other callers "canned" responses such as "Jim is currently driving and is unavailable," or "Robin is currently unavailable and will return your call as soon as possible," can be incorporated into the auto response message.

After assembly of the auto response message the process ends, step **520** and step **424** is complete.

While various embodiments of the invention have been described in detail above, the invention is not limited to the described embodiments, which should be considered as merely exemplary. Many modifications and extensions of the invention may be developed, and all such modifications are deemed to be within the scope of the invention defined by the appended claims.

What is claimed is:

1. A processor-implemented method for handling incoming communications at a mobile device, the method comprising:

receiving an incoming communication from a caller at the mobile device;

detecting at least one of location, speed, heading, and acceleration of the mobile device;

automatically detecting if the mobile device is in a moving vehicle;

automatically restricting use of the mobile device by blocking incoming message notifications and outgoing non-emergency messages when the mobile device is detected in a moving vehicle;

determining if use of the mobile device is restricted;

identifying the caller to determine a caller identity;

determining a destination based on predetermined route information and the at least one of the location, speed, heading and acceleration of the mobile device;

determining an estimated time of arrival at the determined destination; and

automatically transmitting from the mobile device a response message with an indication of the estimated time of arrival at the determined destination responsive

to determining if use of the mobile device is restricted and responsive to the caller identity.

2. The processor-implemented method of claim **1**, further comprising:

restricting use of the mobile device based on the detected at least one of location, speed, heading and acceleration of the mobile device.

3. The processor-implemented method of claim **2**, wherein restricting use of the mobile device further comprises at least one of locking a user interface of the mobile device, preventing receipt of phone calls, preventing sending of non-emergency messages, and preventing receipt of electronic messages.

4. The processor-implemented method of claim **2**, further comprising detecting the at least one of location, speed, heading, and acceleration of the mobile device responsive to the incoming communication.

5. The processor-implemented method of claim **1**, further comprising:

transmitting the response message with an indication of the at least one of the location, the speed, the heading, and the acceleration of the mobile device.

6. The processor-implemented method of claim **1**, further comprising:

comparing the caller identity with a predetermined identity list; and

automatically transmitting the response message responsive to the caller identity corresponding to an identity in the identity list.

7. The processor-implemented method of claim **1**, wherein content of the response message is dependent on the caller identity.

8. A processor-implemented method for handling incoming communications at a mobile device, the method comprising:

receiving an incoming communication from a caller at the mobile device;

automatically detecting if the mobile device is in a moving vehicle;

automatically restricting use of the mobile device by blocking incoming message notifications and outgoing non-emergency messages when the mobile device is detected in a moving vehicle;

determining if use of the mobile device is restricted;

detecting at least one of location, speed, heading, and acceleration of the mobile device;

determining a destination based on predetermined route information and the at least one of the location, speed, heading, and acceleration of the mobile device;

determining an estimated time of arrival at the determined destination; and

automatically transmitting a response message to the caller responsive to determining use of the mobile device is restricted, wherein the response message comprises an indication of the estimated time of arrival at the determined destination.

9. A communication network, comprising:

a mobile device having a processor, persistent memory for storing information, a data port for receiving incoming calls and for sending messages, a location finder for determining the current location of the mobile device, at least one input/output ("I/O") element for producing a human detectable output, and a clock for determining time, wherein the memory, data port, location finder, I/O element, and clock are operatively connected to the processor; and

application software controlling the processor;

wherein the application software controls the processor to detect at least one of location, speed, heading, and acceleration of the mobile device to, and to determine if the mobile device is moving, and to determine a destination based on predetermined route information and the at least one of the location, speed, heading, and acceleration of the mobile device, and to determine an estimated time of arrival at the determined destination;

wherein if the processor determines that the mobile device is moving the application software controls the processor to automatically stop the I/O element from producing human detectable output and to prevent outgoing non-emergency communications;

wherein if the mobile device is moving and the data port receives an incoming call from a caller the application software controls the processor to identify the caller;

wherein the application software controls the processor to automatically formulate a response message that depends on the identity of the caller, the response message comprising an indication of the estimated time of arrival at the determined destination; and

wherein the application software controls the processor to automatically cause the data port to send the response message.

10. The communication network according to claim **9**, wherein if the processor cannot determine the identity of the caller a response message is not sent.

11. The communication network according to claim **9**, wherein the response message is at least one of an audio message, a short message service ("SMS") message, a visual message, an email message, an iMessage, and an instant message.

12. The communication network according to claim **9**, wherein the mobile device includes a compass sensor and the response message includes a compass heading.

13. The communication network according to claim **9**, wherein the mobile device is prevented from sending out a user initiated signal when the mobile device is moving.

14. The communication network according to claim **9**, wherein the response message comprises the location of the mobile device.

15. The communication network according to claim **9**, wherein the response message comprises the speed of the mobile device.

16. The communication network according to claim **9**, wherein the response message comprises the acceleration of the mobile device.

17. The communication network according to claim **9**, wherein the response message depends on the time of day.

18. The communication network according to claim **9**, wherein the estimated time of arrival depends on a route stored in the persistent memory.

19. The communication network according to claim **18**, wherein the estimated time of arrival depends on the current location of the mobile device.

20. The communication network according to claim **9**, wherein the identity of the caller is determined from information stored in the persistent memory.

21. A communication network, comprising:

a mobile device having a processor, memory for storing information, a data port for receiving incoming calls and for sending messages, a location finder for determining the location of the mobile device, at least one I/O element for producing a human detectable output, and a clock for determining time, where the memory, data port, location finder, I/O element, and clock are operatively connected to the processor; and

application software controlling the processor;

wherein the application software controls the processor to detect at least one of location, speed, heading, and acceleration of the mobile device, and to determine if the mobile device is moving, and to determine a destination and an estimated time of arrival at the destination based on predetermined route information and the at least one of the location, speed, heading, and acceleration of the mobile device;

wherein if the processor determines that the mobile device is moving the application software controls the processor to automatically stop the I/O element from producing the human detectable output and to prevent outgoing non-emergency communications;

wherein if the mobile device is moving when the data port receives an incoming call from a caller the application software controls the processor to determine the current location of the mobile device;

wherein the application software controls the processor to automatically formulate an automatic response message that depends on the current location of the mobile device, the response message comprising an indication of the estimated time of arrival at the determined destination; and

wherein the application software controls the processor to cause the data port to automatically send the response message.

22. The communication network according to claim **21**, wherein the response message is at least one of an audio message, a visual message, a short message service ("SMS") message, an iMessage, an instant message, and an email message.

23. The communication network according to claim **21**, wherein the application software controls the processor to determine when an abnormal condition occurs, and wherein when an abnormal condition occurs the response message is an emergency message.

24. The communication network according to claim **21**, wherein the abnormal condition is a collision.

25. The communication network according to claim **21**, wherein the response message comprises at least one of the location, the speed and the acceleration of the mobile device.

26. The communication network according to claim **21**, wherein the response message depends on the time of day.

27. The communication network according to claim **21**, wherein the estimated time of arrival depends on a route stored in the memory.

28. A communication network, comprising:

a mobile device having a processor, memory storing data related to a route to a destination, a data port for receiving incoming calls and for sending messages, a location finder for determining the location of the mobile device, at least one I/O element for producing a human detectable output, and a clock for determining time, wherein the memory, data port, location finder, I/O element, and clock are operatively connected to the processor; and

application software controlling the processor;

wherein the application software controls the processor to detect at least one of location, speed, heading, and acceleration of the mobile device and to determine if the mobile device is moving;

wherein the application software automatically prevents the user from sending a message when the mobile device is moving;

wherein if the mobile device is moving when the data port receives an incoming call the application software controls the processor to determine the current location of the mobile device and to determine the destination based on the data related to the route and the at least one of the location, speed, heading, and acceleration of the mobile device;

wherein if the current location of the mobile device is on the route the application software controls the processor to recall route information;

wherein the application software controls the processor to determine the speed of the mobile device;

wherein the application software controls the processor to produce an estimated time of arrival of the mobile device at the destination over the route from the current location;

wherein the application software controls the processor to automatically formulate a response message that includes the estimated time of arrival; and

wherein the application software controls the processor to automatically cause the data port to send the response message.

29. The communication network according to claim **28**, wherein if the mobile device is moving the application software controls the processor to automatically stop the I/O element from producing the human detectable output.

30. The communication network according to claim **28**, wherein the response message is at least one of an audio message, a text message, and an email message.

31. The communication network according to claim **28**, wherein the response comprises the location of the mobile device.

32. The communication network according to claim **28**, wherein the response message comprises at least one of the speed, heading, and acceleration of the mobile device.

33. The communication network according to claim **28**, wherein the response message depends on the time of day.

34. A non-transitory computer readable storage media containing coded instructions to:

implement a positioning system to produce location information;

implement a motion system to detect at least one of location, speed, heading, and acceleration to detect motion of a mobile device;

implement an I/O element to produce human detectable output;

implement a data port to receive incoming calls and send messages;

implement a memory to store location information;

automatically prevent the I/O element from producing human detectable output based on the detected motion;

automatically prevent outgoing non-emergency communications;

determine the current location of the mobile device;

determine a destination and an estimated time of arrival at the destination based on predetermined route information and the at least one of the location, speed, heading, and acceleration of the mobile device;

formulate an automatic response message comprising an indication of the estimated time of arrival at the determined destination based on the current location; and

automatically send the automatic response message from the data port.

35. A non-transitory computer readable storage media containing coded instructions to:

implement a positioning system to produce location information;

implement a motion system to detect at least one of location, speed, heading, and acceleration to detect motion of a mobile device;

implement an I/O element to produce human detectable output;

implement a data port to receive incoming calls and send messages;

implement a memory to store caller identification information;

automatically prevent the I/O element from producing human detectable output based on the detected motion;

automatically prevent outgoing non-emergency communications based on the detected motion;

determine a destination and an estimated time of arrival at the destination based on predetermined route information and the at least one of the location, speed, heading, and acceleration of the mobile device;

identify the caller when the data port receives an incoming call;

formulate an automatic response message comprising an indication of the estimated time of arrival at the determined destination based on the identity of the caller; and

automatically send the automatic response message from the data port.

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