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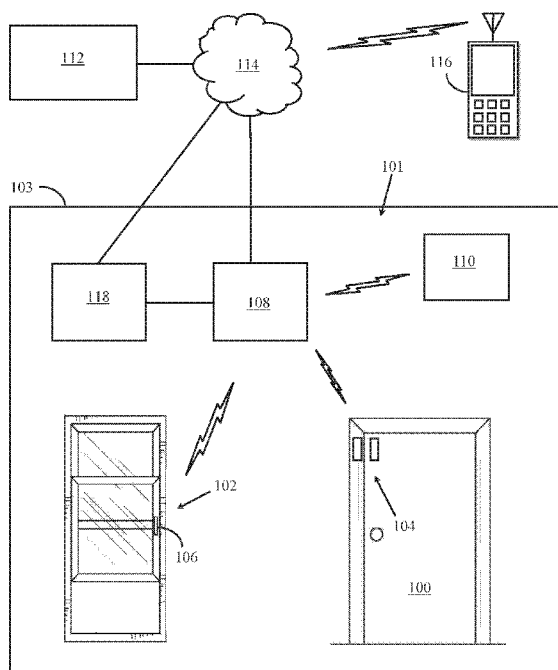


FIG. 1

(57) Abstract: Embodiments of a central security monitoring device for reducing incidences of false alarms in a security system is disclosed. In one embodiment, a method is described, comprising receiving an alarm signal from an occupancy sensor via a receiver, receiving a second alarm signal from a barrier alarm device after receiving the alarm signal, determining an elapsed time from when the alarm signal from the occupancy sensor was received to when the second alarm signal from the barrier alarm device was received, performing one or more actions when the elapsed time is greater than the predetermined time, and refraining from performing the one or more actions when the elapsed time is less than the predetermined time.

REDUCED FALSE ALARM SECURITY SYSTEM

BACKGROUND

I. Field of Use

[001] The present application relates to the field of home security. More specifically, the present application relates to reducing the occurrence of false alarms that frequently occur in current home security systems.

II. Description of the Related Art

[002] Security systems for homes and businesses have been around for many years. Often, these systems make use of barrier alarm devices, such as door and window sensors, motion detectors, sound detectors, etc. Door and window sensors typically comprise two distinct parts: a magnet and a reed switch/transmitter assembly. The reed switch/transmitter assembly is typically installed onto a stationary surface, such as a door or window frame, while the magnet is mounted to a movable portion of a door or window. When the door or window is closed, the magnet and reed switch are in close proximity to one another, maintaining the reed switch in a first state indicative of a “no alarm” condition. If the door or window is opened, proximity is lost between the magnet and the reed switch, resulting in the reed switch changing state, e.g., from closed to open or from open to closed. The change of state is indicative of an unauthorized entry, and a signal may be generated by circuitry located within the reed switch assembly and sent, via wires or over-the-air, to a central security panel or gateway in the home, which may forward the signal to a remote monitoring station. In addition, a loud audible alert may be generated, either at the central security panel in the home or directly by the circuitry within the reed switch assembly, indicating that a door or window has been opened.

[003] One problem with these prior-art security systems is the relatively frequent occurrence of false alarms. Most security systems offer a “home” arming feature which arms all door and window sensors, but disables any interior motion sensors. In this way, occupants are able to move about within the home without causing motion sensors to alarm while being protected against unauthorized entry. Often times though, occupants forget that the security system is armed, and when they open a door or a window, a false alarm is triggered. These false alarms sometimes cause a response by police or fire

personnel, wasting valuable public resources. Additionally, homeowners may be fined if too many false alarms occur within a certain time period.

[004] It would be desirable to provide a security system that allows occupants to open doors or windows while the security system is in an armed, “home” mode of operation, without triggering an alarm.

SUMMARY

[005] The embodiments described herein relate to various embodiments of a central security monitoring device for reducing incidences of false alarms in a security system. In one embodiment, a method is described, performed by a central security monitoring device, comprising receiving an alarm signal from an occupancy sensor via a receiver, receiving a second alarm signal from a barrier alarm device after receiving the alarm signal, determining an elapsed time from when the alarm signal from the occupancy sensor was received to when the second alarm signal from the barrier alarm device was received, performing one or more actions when the elapsed time is greater than the predetermined time, and refraining from performing the one or more actions when the elapsed time is less than the predetermined time.

[006] In another embodiment, a central security monitoring device is described for reducing incidences of false alarms of a security system. In this embodiment, the central security monitoring device comprises a receiver for receiving a first alarm signal from an occupancy sensor and a second alarm signal from a barrier alarm device, a memory for storing processor-executable instructions and a predetermined time, a processor, coupled to the memory and the receiver, for executing the processor-executable instructions that cause the central security monitoring device to receive the first alarm signal from the occupancy sensor via the receiver, receive the second alarm signal from the barrier alarm device after receiving the first alarm signal, determine an elapsed time from when the first alarm signal from the occupancy sensor was received to when the second alarm signal from the barrier alarm device was received, perform one or more actions when the elapsed time is greater than the predetermined time, and refrain from performing the one or more actions when the elapsed time is less than the predetermined time.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] The features, advantages, and objects of the present invention will become more apparent from the detailed description as set forth below, when taken in conjunction with the drawings in which like referenced characters identify correspondingly throughout, and wherein:

[008] FIG. 1 is a block diagram illustration of a security system inside a building in accordance with one embodiment of the principles discussed herein;

[009] FIG. 2 is a functional block diagram of a central security monitoring device shown in FIG. 1; and

[0010] FIGs. 3a and 3b are flow diagrams illustrating one embodiment of a method performed by the central security monitoring device shown in FIGs. 1 and 2 for reducing or preventing the occurrence of false alarms.

DETAILED DESCRIPTION

[0011] The present application relates to a security system for reducing the occurrence of false alarms. In one embodiment, such a system uses standard door and window sensors and an occupancy sensor (such as a standard motion detector), each in communication with a central security monitoring device. The central security monitoring device receives signals from the door and window sensors and from the occupancy sensor when doors and windows are opened and when a person is detected inside a building, by the door and window sensors and the occupancy sensor, respectively. The central security monitoring device uses the signals from these sensors to determine whether a false alarm has occurred when a door or window is opened. For the purpose of the discussions herein, the term entry barrier means a door, a window, a gate, a garage door, or some other object that prevents entry to a building, such as a home or business.

[0012] FIG. 1 is an illustration of a security system **101** inside a building **103** in accordance with one embodiment of the principles discussed herein. In this embodiment, a door **100** and a window **102** of building **103** are monitored by “barrier alarm devices”, such as door and window sensors **104** and **106**, respectively. In one embodiment, door sensor **104** comprises a magnet and a reed switch assembly, as shown, with the magnet mounted to door **100** and reed switch assembly mounted to a door sill. Window sensor **106** comprises a magnet-less type sensor mounted to a movable portion of the window. The door and/or window sensors could alternatively comprise other types of sensors, such

as mechanical switches, beam-interruption devices, glass-break detectors, or any other device that can sense when a door or window is opened.

[0013] Occupancy sensor **110** is a device that detects the presence of persons inside building **103**. For example, occupancy sensor **110** could comprise a motion detector such as a PIR or PID, a thermal detector, a floor pressure sensor, or some other means for determining the presence of a person inside building **103**.

[0014] It should be understood that although FIG. **1** illustrates only a single door sensor, a single window sensor, and a single occupancy sensor, in most cases such security systems **101** comprise a greater number and/or type of sensors, and that the number and type of sensors shown in FIG. **1** is for illustrative purposes only.

[0015] Central security monitoring device **108** comprises circuitry that performs a variety of tasks, such as receive signals from sensors located throughout building **103**, and take predetermined actions in response. Additional functionality may include the capability of transmitting signals to the sensors and/or to other devices, such as home automation devices, such as light control devices, thermostats, door locks, etc. Further functionality may include the capability of receiving signals from remote locations, such as remote monitoring station **112** or personal communication device **116**, and taking certain actions in response. In one embodiment, central security monitoring device **108** comprises a security control panel, such as those commonly sold by Honeywell, 2Gig, Interlogix, and others, in one embodiment programmed to perform the functionalities of various embodiments of the invention described herein. In another embodiment, central security monitoring device **108** comprises a specialized “hub” capable of one or two-way communication with the sensors and/or other devices, sometimes coupled to a router or gateway to enable IP-based communications with remote devices. In another embodiment, central security monitoring device **108** comprises internal circuitry that allows it to communicate with remote devices directly via wide-area network **114**.

[0016] Each of the sensors in system **101** communicates with central security monitoring device **108**, typically using wireless RF signals generated by the sensors. For example, if door **100** is opened, the reed switch assembly detects a reduction or elimination of a magnetic field produced by its corresponding magnet as the magnet moves away from the reed switch assembly as door **100** is opened. In response, the reed switch assembly transmits a message to central security monitoring device **108** indicative of a local alarm condition, e.g., door **100** has been opened. Central security monitoring device **108** receives these signals and may take one or more predefined actions in response thereto,

such as contacting remote monitoring station **112** via wide-area network **114**, causing a siren (not shown) located within and/or outside building **103** to sound, and/or illuminating one or more lights located in or around building **103**.

[0017] Central security monitoring device **108** may additionally contact an owner or resident of building **103** via text message, email or voice call, to alert the owner or resident that a door or window had been opened, that motion had been detected at building **103**, or some other anomaly. In response, a user who receives such a notification from central security monitoring device **108** may take one or more actions, such as sending a command to central security monitoring device **108** to reset security system **101**, to stop sounding a siren, to stop illuminating any lights that may have been activated by central security monitoring device **108**, and/or to call authorities such as the police to investigate building **103**.

[0018] Remote monitoring station **112** provides professional security monitoring services for homes and businesses equipped with security systems such as the one shown in FIG. 1. In response to receiving a signal from central monitoring station **108**, personnel at remote monitoring station **112** may call or otherwise contact a homeowner or other building occupant associated with building **103** to verify whether a break-in has occurred or whether the signal generated by central monitoring station **108** was a false alarm, i.e., a building occupant opened a monitored door or window while security system **101** was armed. If no response to the call or other communication is received, authorities may be summoned to building **103** by the remote monitoring station **112** personnel.

[0019] Wide-area network **114** allows central security monitoring device **108** to communicate with remote monitoring station **112**, in one embodiment, via gateway **118**. Gateway **118** comprises a device that allows digital communications between various devices in building **103** and other, remote digital devices via wide-area network **114**. In one embodiment, gateway **118** comprises an IP-based router, commonly found in homes that allow computers to communicate with remote web sites via IP-based protocols over the Internet. In another embodiment, central security monitoring device **108** and gateway **118** may comprise a single unit with capabilities of both devices, e.g., receiving/sending information from/to sensors and taking certain predetermined actions, described above, and potentially receiving commands or instructions from remote devices to take certain actions in response. Wide-area network **114** comprises one or more communication networks, such as the Internet, PSTN networks, fiber optic networks, cellular networks, satellite networks and/or other communication networks to provide communications

between central security monitoring device **108**, remote monitoring station **112** and personal communication device **116**. Personal communication device **116** comprises a cellular telephone, smart phone, desktop or portable computer, tablet computer, wearable, or some other device that can receive communications from central security monitoring device **108** and provide notifications to a user of personal communication device **116**. In this embodiment, gateway **118** provides signals from the central security monitoring device **108** to remote monitoring station **112** and to personal communication device **116** via wide-area network **114**.

[0020] Central security monitoring device **108** monitors sensors **104** and **106**, and other security devices (for example, tilt sensors, shock sensors, glass breakage detectors, etc.) that may be part of security system **101** for signals from the sensors indicative of an unauthorized entry into building **103**. Central monitoring device **108** may provide status information to users via a display, e.g., by providing a visual indication of the status (“open”, “closed”, “on”, “off”, “normal”, “alarm”, etc.) of each barrier alarm device, other security devices in the system, or the system as a whole.

[0021] FIG. 2 illustrates a functional block diagram of central security monitoring device **108**. Specifically, FIG. 2 shows processor **200**, memory **202**, network interface **204**, receiver (or transceiver) **206**, optional status indicator **208**, and optional user input **210**. It should be understood that not all of the functional blocks shown in FIG. 2 are required for operation of central controller **116** (for example, status indicator **208** and/or user input **210**), that the functional blocks may be connected to one another in a variety of ways other than what is shown in FIG. 2, and that not all functional blocks necessary for operation of central controller **116** are shown (such as a power supply), for purposes of clarity.

[0022] Processor **200** is configured to provide general operation of central security monitoring device **108** by executing processor-executable instructions stored in memory **202**, for example, executable computer code. Processor **200** typically comprises a general purpose microprocessor or microcontroller, manufactured by well-known companies such as Intel Corporation of Santa Clara, California, Atmel of San Jose, California, and STMicroelectronics based in Geneva, Switzerland.

[0023] Memory **202** comprises one or more information storage devices, such as RAM, ROM, EEPROM, UVPROM, flash memory, SD memory, XD memory, or other type of electronic, optical, or mechanical information storage device. Memory **202** is used to store the processor-executable instructions for operation of central security monitoring

device **108** as well as any information used by processor **200**, such as information pertaining to the number, type, location, serial number, etc. of sensors in security system **101**, identification information of central security monitoring device **108**, such as a serial number, contact information pertaining to remote monitoring station **112**, users, owners, and/or occupants of building **103**, various door and window status information (e.g., “open”, “closed”, times when a door or window was opened or closed), and/or other information.

[0024] Network interface **204** comprises circuitry necessary for central security monitoring device **108** to communicate with remote devices/entities, such as gateway **118** and/or directly with remote monitoring station **112** and/or personal communication device **116**. Such circuitry comprises one or more of a T1/T3 interface circuitry, Ethernet circuitry, and/or wireless communication circuitry, all of which is well-known in the art.

[0025] Receiver **206** comprises circuitry necessary to wirelessly receive electronic signals from the sensors, either wirelessly and/or by wired means. Such circuitry is well known in the art and may comprise BlueTooth, Wi-Fi, RF, optical, and ultrasonic circuitry, telephone wiring, twisted pair, two-conductor pair, CAT wiring, AC power wires, or other type of wiring. In one embodiment, receiver **206** is replaced by a transceiver, for allowing two-way communication between central security monitoring device **108** and the sensors and/or other devices, such as home automation and control devices.

[0026] Optional status indicator **208** is used to convey the status of one or more sensors, a particular “zone” of building **103**, and/or security system **101** in general. Status indicator **208** may comprise one or more LEDs, LCDs, seven segment displays, electronic displays, or any other device for providing a visual status, and/or it may comprise a device capable of emitting audible tones, messages, alerts, etc., that also indicates one or more statuses.

[0027] Optional user interface **210** comprises hardware and/or circuitry for allowing a user to interact with central security monitoring device **108**. For example, a user may arm or disarm security system **101**, typically by pushing one or more keys of a keypad that comprises user input **210**. Security systems typically operate in at least three modes, an “armed-away” mode, an “armed-home”, and an unarmed mode. The armed-away mode typically causes central security monitoring device **108** to perform one or more actions when an alarm signal is received from any one sensor, including door/window sensors or motion sensors. The armed-home mode typically causes central security monitoring device **108** to perform one or more actions only when an alarm signal from a barrier alarm device is received. In other words, alarm signals generated by motion sensors and

other occupancy sensors (such as thermal detectors or floor pressure sensors) are ignored by central security monitoring device **108**. The unarmed mode generally causes central security monitoring device **108** to ignore any alarm signal received from any sensor.

[0028] FIG. 3 is a flow diagram illustrating one embodiment of a method performed by central security monitoring device **108** for reducing or preventing the occurrence of false alarms. It should be understood that in some embodiments, not all of the steps shown in FIG. 3 are performed. It should also be understood that the order in which the steps are carried out may be different in other embodiments.

[0029] At block **300**, security system **101** is placed into the armed-home mode via user interface **210** or by some other means, such as by using a smartphone having communication capability with central security monitoring device **108** either directly or indirectly via wide-area network **114**, local network provided by gateway **118**.

[0030] At block **302**, a person inside building **103** moves across a room monitored by occupancy sensor **110**. In response, occupancy sensor **110** transmits an alarm signal to central security monitoring device **108**, indicating that the room is being occupied.

[0031] At block **304**, central security monitoring device **108** receives the alarm signal sent by occupancy sensor **110** via receiver **206**.

[0032] At block **306**, processor **200** starts a timer in response to central security monitoring device **108** receiving the alarm signal. Alternatively, processor **200** determines a time that the alarm signal was received and stores the time in memory **202**.

[0033] At block **308**, the person who moved across the room opens a door or window that is monitored by a barrier alarm device. In this example, door **100** is opened.

[0034] At block **310**, door sensor **104** transmits an alarm signal to central security monitoring device **108**, indicating that door **100** has been opened.

[0035] At block **312**, central security monitoring device **108** receives the alarm signal sent by door sensor **104** via receiver **206**.

[0036] At block **314**, processor **200** determines an elapsed time by the timer that was started at block **306**. Alternatively, processor **200** determines a time that the alarm signal from door sensor **104** was received and calculates an elapsed time by subtracting the time that the alarm signal from door sensor **104** was received from the time that the alarm signal from occupancy sensor **110** was received.

[0037] At block **316**, processor **200** compares the elapsed time to a predetermined time stored in memory **202**. The predetermined time relates to an estimated time between when occupancy sensor **110** detects the presence of a person and when that person opens

a door or window. For example, if a monitored door or window is opened by someone inside building **103**, motion of the person will be detected by occupancy sensor **110** as the person approaches the door or window. When motion is detected just before a door or window is opened, this typically indicates that the door or window has been opened by someone inside building **103**, and it would be desirable if such an occurrence would not cause central security monitoring device **108** to take any action based on receiving the alarm signal from the door or window sensor. Thus, the predetermined time should be chosen to account for detection of a person moving through a room as he or she approaches a door or window, but not too long, as an unauthorized person could enter through the door or window without triggering action by central security monitoring device **108**. In one embodiment, the predetermined time value is 10 seconds.

[0038] When a person moves across a room, triggering occupancy sensor **110**, and does not open a door or window within the predetermined time period, processor **200** resets the elapsed time to zero, or otherwise erases or ignores the time stored in memory **202** that the alarm signal was received from the occupancy sensor **110**.

[0039] At block **318**, when the elapsed time is greater than the predetermined time, this indicates that the door or window was opened by someone outside building **103**, because motion inside building **103** was not detected within the predetermined time before the door or window was opened.

[0040] At block **320**, in response to determining that the elapsed time is greater than the predetermined time, processor **200** causes central security monitoring device **108** to take one or more actions, as directed by the processor-executable instructions stored in memory **202**. For example, processor **200** may cause central security monitoring device **108** to contact remote monitoring station **112**, sound one or more local sirens, illuminate one or more local lights, and/or notify personal communication device **116** that an alarm condition has occurred, indicating that an unauthorized entry had been detected by one of the sensors.

[0041] At block **322**, when the elapsed time is less than the predetermined time, this is a strong indication that the door or window was opened by someone inside building **103**, because motion inside building **103** was detected within the predetermined time prior to the door or window being opened. In this case, it is undesirable for central security monitoring device **108** to take any action, because this scenario exemplifies a false alarm, where security system **101** was set to armed-home, but a monitored door or window was opened by an authorized person inside building **103**, such as a home owner, or friends and

family of the homeowner. In this case, at block **324**, central security monitoring device **108** does not perform any of the actions normally performed upon receipt of an alarm signal from door alarm **104** or window alarm **106**.

[0042] At block **326**, the person who opened the door or window may return the door or window to the closed position. When this occurs, a closed status signal is transmitted from door sensor **104** or window sensor **106** indicating that the door or window has been closed. In response to receiving the closed status signal, processor **200** may reset the elapsed time, or otherwise erase or ignore the time stored in memory **202** associated with receipt of the alarm signal from occupancy sensor **110**.

[0043] At block **328**, processor **200** may cause a message to be transmitted to one or more personal communication devices **116**, informing the user(s) of such devices that a false alarm had just occurred. In response, a specialized software application running on one or more communication devices **116** may record the day and time of the false alarm, so that patterns of false alarms may be realized and mitigated. For example, if false alarms occur generally before 7am, it may indicate that a particular family member who rises prior to 7am may need to be reminded about security system **101** and that it is generally armed until 8am, where it is automatically placed into the unarmed mode.

[0044] In some instances, an unauthorized entry may occur into building **103** within the predetermined time period described above. For example, a burglar could break through a door or window of building **103** just after a homeowner inside building **103** was sensed by occupancy sensor **110**. Under the teachings of block **322**, the signals received by central security monitoring device **108** would indicate a non-alarm event. In order to prevent this kind of result, in one embodiment, alternative to block **322**, at block **330**, in response to determining that the elapsed time is less than the predetermined time, processor **200** may start a second timer or otherwise note the current time, to allow a person inside building **103** a cancellation time period to notify central security monitoring device **108** that no emergency condition exists. In this embodiment, receipt of an entry barrier alarm signal within the predetermined time period is referred to herein as a “potential alarm condition”.

[0045] At block **332**, processor **200** may provide a local or remote notification to the homeowner, building occupants, or one or more persons remotely located from building **103** that a potential false alarm condition has been detected, e.g., that a barrier entry device has detected an anomaly within the predetermined time from when motion was detected inside building **103**. Such notification may comprise illuminating one or more

lights, sounding one or more sirens, providing a text, email or phone call to one or more personal communication devices per notification information stored in memory **202**, and/or by some other means known in the art. In one embodiment, the notification alerts one or more authorized persons that a potential alarm condition has been determined, and that additional actions will be taken by central security monitoring device **108** if an authorized person does not act to cancel such additional actions within the cancellation time period.

[0046] At block **334**, processor **200** may receive a cancellation command from an authorized person, such as the homeowner or other building occupant, or person remotely located from building **103** to cancel such additional actions, via user interface **210** or via network interface **204** if the homeowner or other authorized person provided the cancellation command via, for example, a personal computer, cell phone, tablet computer, or wearable device. In response, processor **200** does not take the additional actions and may reset the first timer and the second timer to return to normal monitoring of the sensors within building **103**. The cancellation command may comprise an indication of an identity of the authorized person who submitted the command, such as a disarm code uniquely assigned to each authorized person, an email address, a phone number, a username, or some other information that can identify an authorized person.

[0047] At block **336**, processor **200** may provide a notification via text, email, phone call, or other well-known means of communication, to one or more authorized persons that a potential alarm condition was detected, but that no further action was taken by central security monitoring device **108** due to receipt of a cancellation command. The notification may provide an indication of an identity of the person who provided the command and a time that the potential alarm condition occurred, the time that the cancellation command was received, or both.

[0048] At block **338**, when a cancellation command is not received within the cancellation time period, as determined by processor **200**, processor **200** takes additional actions as directed by the processor-executable instructions stored in memory **202**. For example, processor **200** may cause central security monitoring device **108** to contact remote monitoring station **112**, sound one or more local sirens, illuminate one or more local lights, and/or contact one or more personal communication devices **116**, indicating that an alarm condition, e.g., an unauthorized entry, had been detected by one of the sensors.

[0049] The methods or algorithms described in connection with the embodiments disclosed herein may be embodied directly in hardware or embodied in processor-readable instructions executed by a processor. The processor-readable instructions may reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of storage medium known in the art. An exemplary storage medium is coupled to the processor such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in a user terminal. In the alternative, the processor and the storage medium may reside as discrete components.

[0050] Accordingly, an embodiment of the invention may comprise a computer-readable media embodying code or processor-readable instructions to implement the teachings, methods, processes, algorithms, steps and/or functions disclosed herein.

[0051] While the foregoing disclosure shows illustrative embodiments of the invention, it should be noted that various changes and modifications could be made herein without departing from the scope of the invention as defined by the appended claims. The functions, steps and/or actions of the method claims in accordance with the embodiments of the invention described herein need not be performed in any particular order. Furthermore, although elements of the invention may be described or claimed in the singular, the plural is contemplated unless limitation to the singular is explicitly stated.

CLAIMS

We claim:

1. A method performed by a central security monitoring device for reducing incidences of false alarms in a security system, comprising:
 - receiving an alarm signal from an occupancy sensor via a receiver;
 - receiving a second alarm signal from a barrier alarm device after receiving the alarm signal;
 - determining, by a processor, an elapsed time from when the alarm signal from the occupancy sensor was received to when the second alarm signal from the barrier alarm device was received;
 - causing, by the processor, one or more actions to occur when the elapsed time is greater than the predetermined time; and
 - refraining, by the processor, from taking the one or more actions when the elapsed time is less than the predetermined time.
2. The method of claim 1, wherein the barrier alarm device comprises a door or a window sensor.
3. The method of claim 1, wherein the occupancy sensor comprises a motion detector.
4. The method of claim 1, wherein the one or more actions are selected from the group consisting of causing illumination of one or more lights, causing one or more sirens to sound, contacting a remote monitoring station, and notifying one or more personal communication devices that an alarm condition has occurred.
5. The method of claim 1, further comprising:
 - providing a notification to a personal communication device when the elapsed time is less than the predetermined time, indicating that a false alarm has occurred.

6. The method of claim 1, wherein the method of claim 1 is performed when the central security monitoring device is placed into an armed-home mode of operation.
7. The method of claim 6, wherein:
 - in an armed-away mode of operation, the central security monitoring device performs the one or more actions in response to either the alarm signal or the second alarm signal.
8. The method of claim 1, further comprising:
 - failing to receive a cancellation command within a cancellation time period after the second alarm signal from the barrier alarm device is received; and
 - causing, by the processor, the one or more actions to occur when the cancellation command is not received within the cancellation time period.
9. The method of claim 8, further comprising:
 - providing a notification of a potential alarm condition in response to determining that the elapsed time is less than the predetermined time.
10. The method of claim 9, wherein the notification is selected from the group consisting of causing illumination of one or more lights, causing one or more sirens to sound, contacting a remote monitoring station, and notifying one or more personal communication devices that an alarm condition has occurred.
11. A central security monitoring device for reducing incidences of false alarms of a security system, comprising:
 - a receiver for receiving a first alarm signal from an occupancy sensor and a second alarm signal from a barrier alarm device;
 - a memory for storing processor-executable instructions and a predetermined time;
 - a processor, coupled to the memory and the receiver, for executing the processor-executable instructions that cause the central security monitoring device to:
 - receive the first alarm signal from the occupancy sensor via the receiver;
 - receive the second alarm signal from the barrier alarm device after receiving the first alarm signal;

determine an elapsed time from when the first alarm signal from the occupancy sensor was received to when the second alarm signal from the barrier alarm device was received;

perform one or more actions when the elapsed time is greater than the predetermined time; and

refrain from performing the one or more actions when the elapsed time is less than the predetermined time.

12. The central security monitoring device of claim 11, wherein the barrier alarm device comprises a door or a window sensor.

13. The central security monitoring device of claim 11, wherein the occupancy sensor comprises a motion detector.

14. The central security monitoring device of claim 11, wherein the one or more actions are selected from the group consisting of causing illumination of one or more lights, causing one or more sirens to sound, contacting a remote monitoring station, and notifying one or more personal communication devices that an alarm condition has occurred.

15. The central security monitoring device of claim 11, wherein the processor-executable instructions further comprise instructions that cause the central security monitoring device to:

provide a notification to a personal communication device when the elapsed time is less than the predetermined time, indicating that a false alarm has occurred.

16. The central security monitoring device of claim 11, wherein the processor-executable instructions are performed when the central security monitoring device has entered into an armed-home mode of operation.

17. The central security monitoring device of claim 16, wherein the processor-executable instructions further comprise instructions that cause the central security monitoring device to:

perform the one or more actions in response to receipt of either the first alarm signal or the second alarm signal when the central security monitoring device is placed into an armed-away mode of operation.

18. The central security monitoring device of claim 11, wherein the memory further stores a cancellation time and the processor-executable instructions further comprise instructions that cause the central security monitoring device to:

provide a notification of a potential alarm condition in response to determining that the elapsed time is less than the predetermined time; and

perform the one or more actions to occur when a cancellation command is not received within the cancellation time.

19. The central security monitoring device of claim 18, wherein the notification is selected from the group consisting of causing illumination of one or more lights, causing one or more sirens to sound, contacting a remote monitoring station, and notifying one or more personal communication devices that an alarm condition has occurred.

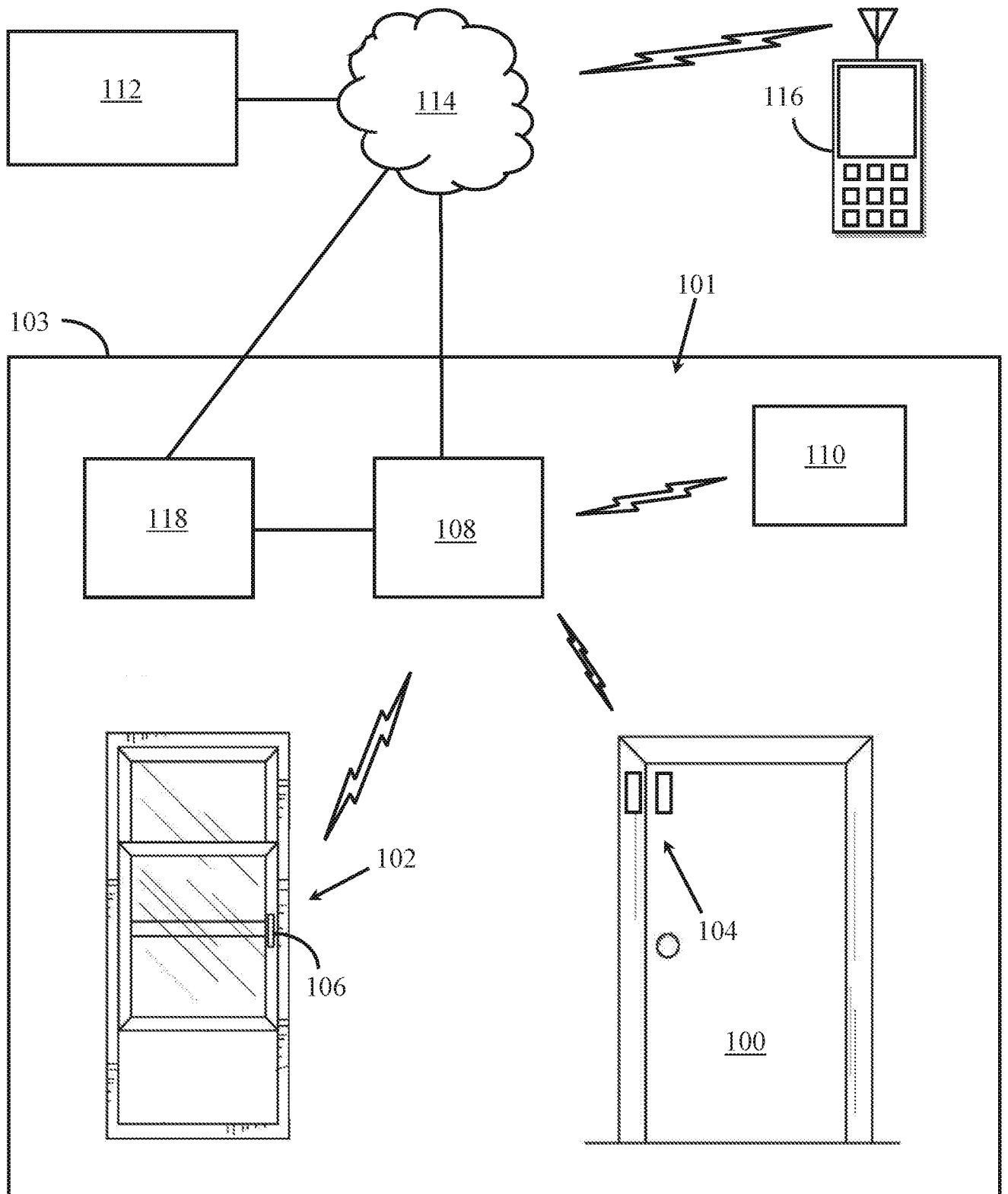


FIG. 1

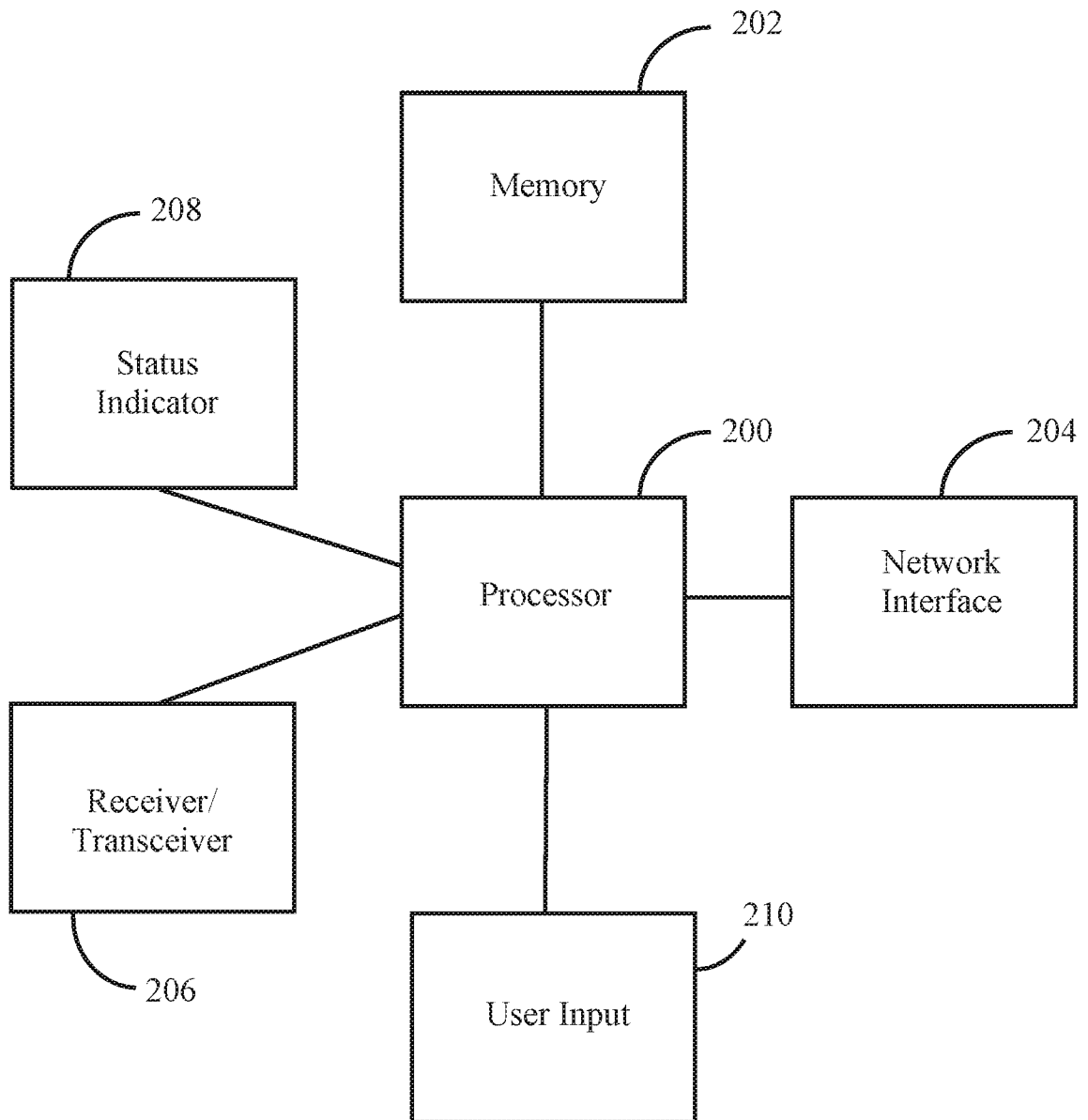


FIG. 2

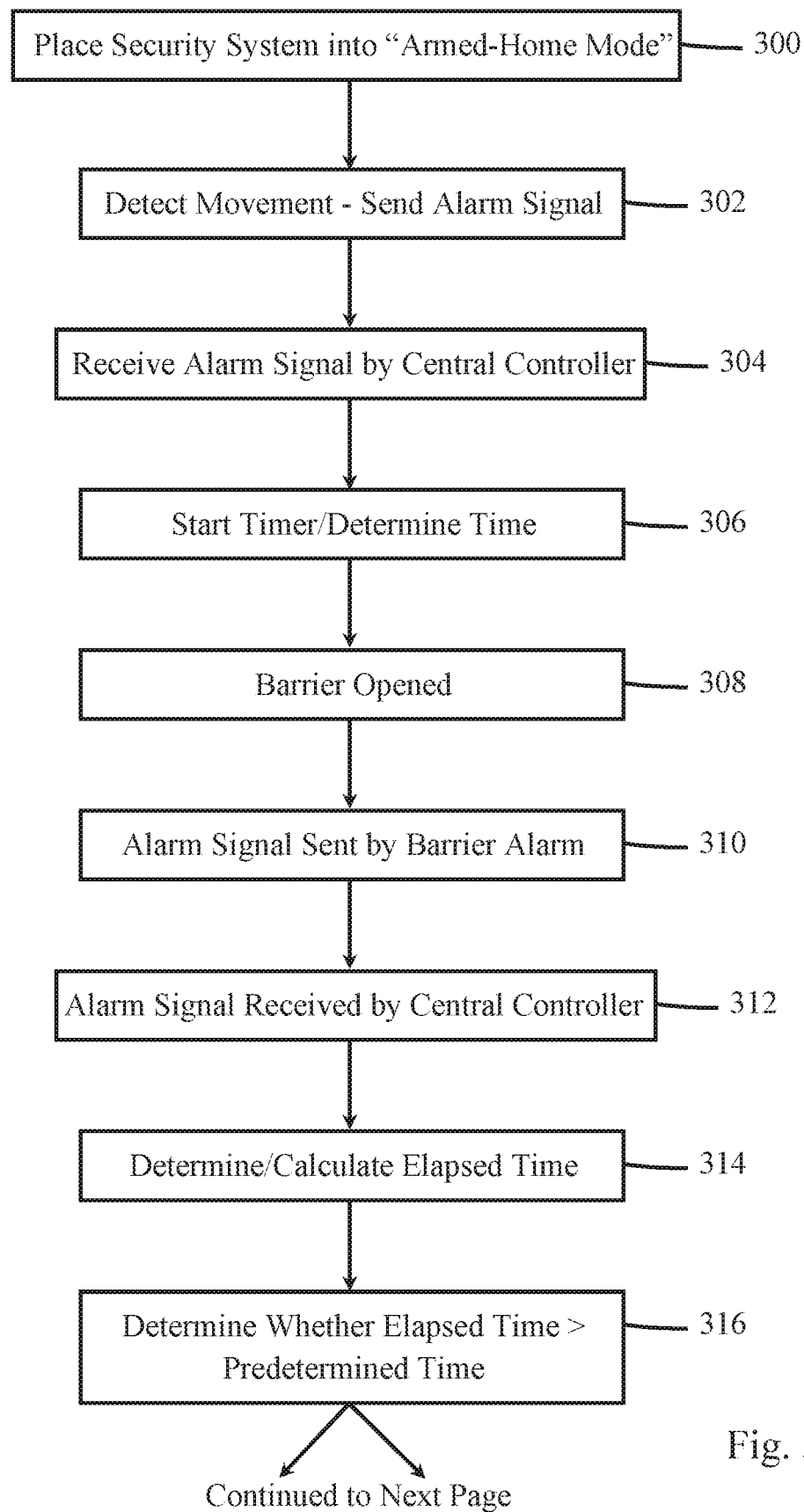


Fig. 3a

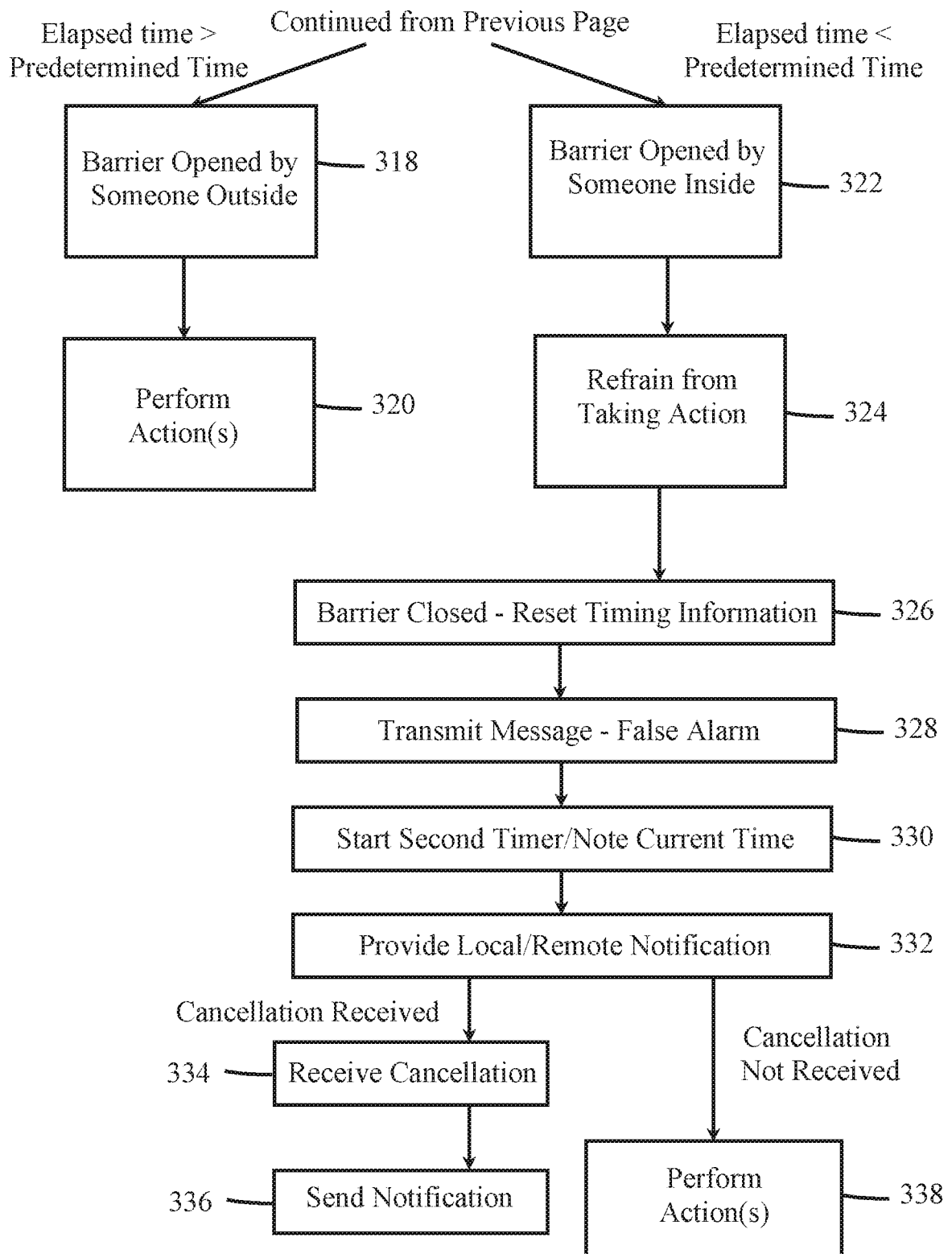


Fig. 3b

INTERNATIONAL SEARCH REPORT		International application No. PCT/US17/14368		
A. CLASSIFICATION OF SUBJECT MATTER IPC: G08B 29/00 (2006.01) CPC: 340/506 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) CPC : 340/506				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 7,916,018 B2 (Eskildsen et al.) 29 March 2011, see entire document.	1-19		
A	US 2008/0157964 A1 (Eskildsen et al.) 03 July 2008, see entire document.	1-19		
A	WO 2016/109335 A1(AU LAWRENCE), see entire document.	1-19		
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
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Date of the actual completion of the international search 15 February 2017 (15.02.2017)		Date of mailing of the international search report 24 FEB 2017		
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