(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 June 2017 (01.06.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/091826 A1

(51) **International Patent Classification**:
H04M 11/00 (2006.01) *G05B 11/01* (2006.01)
H04Q 5/22 (2006.01)

(21) **International Application Number**:
PCT/US2016/063833

(22) **International Filing Date**:
28 November 2016 (28.11.2016)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:

62/260,508	28 November 2015 (28.11.2015)	US
15/008,366	27 January 2016 (27.01.2016)	US
15/008,304	27 January 2016 (27.01.2016)	US
15/167,831	27 May 2016 (27.05.2016)	US

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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

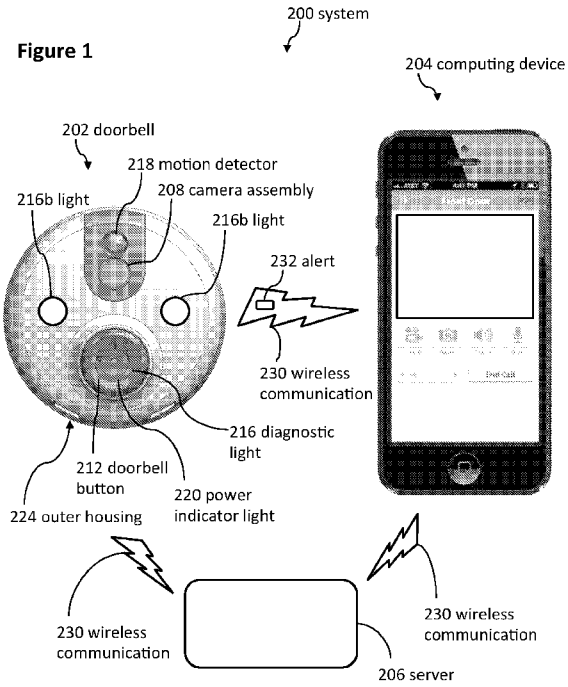
(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,

[Continued on next page]

(54) **Title**: DOORBELL COMMUNICATION SYSTEMS AND METHODS

(57) **Abstract**: Delivery parcel detection systems can include a remote computing device and a doorbell configured to detect a delivery parcel. The doorbell can have a wireless communication system and a radio frequency identification reader. The remote computing device can be communicatively coupled with the doorbell via the wireless communication system. The delivery parcel can have a radio-frequency identification tag. The doorbell can be configured to detect the delivery parcel by detecting the radio-frequency identification tag.

Figure 1



WO 2017/091826 A1

TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

DOORBELL COMMUNICATION SYSTEMS AND METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit and priority of U.S. Provisional Patent Application No. 62/260,508; filed November 28, 2015; and entitled DOORBELL CHIME SYSTEMS AND METHODS; U.S. Nonprovisional Patent Application No. 15/008,366; filed January 27, 2016; and entitled DOORBELL CHIME SYSTEMS AND METHODS; U.S. Nonprovisional Patent Application No. 15/008,304; filed January 27, 2016; and entitled DOORBELL PACKAGE DETECTION SYSTEMS AND METHODS; U.S. Nonprovisional Patent Application No. 15/167,831; filed May 27, 2016; and entitled DOORBELL PACKAGE DETECTION SYSTEMS AND METHODS; the entire contents of which are incorporated herein by reference.

BACKGROUND

Field

Various embodiments disclosed herein relate to doorbells. Certain embodiments relate to doorbell systems that detect packages.

Description of Related Art

Doorbells can enable a person located outside of an entry point, such as a door, to alert a person inside of an entry point that someone outside would like to talk to someone inside. Doorbells sometimes include a button located near a door, such as a front door, side door, or back door of a home, office, dwelling, warehouse, building, or structure. Doorbells are sometimes used near a gate or some other entrance to a partially enclosed area. Pushing the doorbell sometimes causes a chime or other alerting sound to be emitted.

A doorbell chime can be communicatively coupled with a doorbell while the chime is located remotely relative to the doorbell. For example, the doorbell can be coupled to an exterior surface of a building (e.g., near an entryway) and the chime can be coupled to an interior surface of a building.

Delivery parcels (e.g., packages, envelopes) are often left in a publicly accessible entryway of a building. These delivery parcels are sometimes stolen before the rightful owner can pick up the delivery parcels. Thus, there is a need for systems that reduce the likelihood of delivery parcel theft.

SUMMARY

In several embodiments, doorbells can include communication systems that enable the doorbells to communicate with other devices such as floor coverings and remote computing devices. Floor coverings can include sensors to detect whether a delivery parcel is located on the floor covering. When a delivery parcel is placed on the floor covering, the floor covering can send a first communication to the doorbell. The doorbell can then send a second communication to a remote computing device (e.g., a smartphone) regarding the arrival of the delivery parcel.

In some embodiments, the floor covering can also sense when the delivery parcel is removed from the floor covering, which can cause the floor covering to send a third communication to the doorbell. The doorbell can then send a removal alert to the remote computing device regarding the removal of the delivery parcel from the floor covering.

In several embodiments, the doorbell can send a picture of the delivery parcel arriving and can send a picture of the delivery parcel being removed. The doorbell and/or the floor covering can also emit lights and/or sounds in response to the arrival of the delivery parcel and/or the removal of the delivery parcel. The picture can be a still picture and/or a video.

In some embodiments, a delivery parcel detection system can comprise a doorbell having a first wireless communication system and a floor covering. The floor covering can be configured for placement on an entryway floor. The floor covering can comprise a sensor that can be configured to detect a first indication of a delivery parcel on the floor covering. The floor covering can be communicatively coupled to the doorbell.

In several embodiments, the delivery parcel detection system can further comprise a first communication sent from the floor covering to the doorbell. The first communication can be sent in response to the floor covering detecting the first indication of the delivery parcel. The system can further comprise a second communication that can be sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

In some embodiments, the floor covering of the system can be a mat.

In several embodiments, the second communication can comprise a first picture taken by the doorbell. The doorbell can be configured to send the first picture to the remote computing device in response to the floor covering detecting the first indication of the delivery parcel. In some embodiments, the first picture shows the delivery parcel.

In several embodiments, the first indication can be associated with an arrival of the delivery parcel to the floor covering.

In some embodiments, the system can further comprise a first alert regarding the delivery parcel. The first alert can be displayed on the remote computing device in response to the remote computing device receiving the second communication from the doorbell.

In several embodiments, the system can further comprise a graphical user interface displayed on the remote computing device. The graphical user interface can be configured to display information regarding the delivery parcel and/or the weather.

In some embodiments, the system can further comprise a graphical user interface displayed on the remote computing device. The doorbell can comprise at least one light. The graphical user interface can be configured to enable changing at least one setting of the light of the doorbell. In several embodiments, the setting can control a color of the light. In some embodiments, the setting can control a brightness of the light. In several embodiments, the system can automatically change the setting in response to the floor covering detecting the first indication of the delivery parcel.

In some embodiments of the system, the first communication can be a first wireless communication. The second communication can be a second wireless communication.

In several embodiments, the doorbell can comprise an electrical power consumption rate. The electrical power consumption rate can increase in response to the floor covering detecting the first indication of the delivery parcel.

In some embodiments, the doorbell can comprise a camera that can be configured to take at least one picture. At least one picture can be taken in response to the floor covering detecting the first indication of the delivery parcel.

In several embodiments of the system, the sensor can comprise a pressure sensor. The pressure sensor can be configured such that placing the delivery parcel on the floor covering enables the pressure sensor to detect the first indication.

In some embodiments, the system can further comprise a camera electrically coupled to at least one of the doorbell and the floor covering. The system can further comprise a video taken by the camera in response to the system detecting a removal of the delivery parcel.

In several embodiments, the system can further comprise a first communication that can be sent from the floor covering to the doorbell. A first communication can be sent in response to the floor covering detecting the first indication of the delivery parcel. The system can further comprise a second communication. The second communication can be sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

In some embodiments, the system can further comprise a camera. The camera can be electrically coupled to at least one of the doorbell and the floor covering. The system can further comprise a video. The video can be taken by the camera in response to the camera detecting an object that has moved into a field of view of the camera during a period when the system may have determined the delivery parcel may be located on the floor covering.

In several embodiments, the system can further comprise a motion detector and a camera. The motion detector and the camera can be electrically coupled to at least one of the doorbell and the floor covering. The system can further comprise a video taken by the camera in response to the motion detector detecting a motion indication during a period when the system has determined the delivery parcel is located on the floor covering.

In some embodiments, the system can further comprise a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel. In several embodiments, the system can further comprise a second communication sent from the doorbell to a remote computing device. The second communication can be in response to the doorbell receiving the first communication.

In some embodiments, the system can further comprise a second communication sent from the doorbell to a remote computing device. The second communication can be in response to the motion detector detecting the motion indication. The second communication can comprise the video.

In several embodiments, the first indication can be associated with a removal of the delivery parcel from the floor covering. The system can further comprise a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first

indication. The system can further comprise a second communication sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

In some embodiments, the system can further comprise a camera. The camera can be electrically coupled to at least one of the doorbell and the floor covering. The second communication can comprise a picture that can be taken by the camera within five seconds of the sensor detecting the first indication.

In several embodiments, the system can comprise a camera that is electrically coupled to the doorbell. A first communication can be sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel. A picture can be taken by the camera of the doorbell in response to the floor covering detecting a removal of the delivery parcel from the floor covering.

In some embodiments, the system can further comprise a second communication that can be sent from the doorbell to the remote computing device. The second communication can be in response to the floor covering detecting the removal of the delivery parcel from the floor covering. The second communication can comprise the picture.

In several embodiments, the system can further comprise a warning sound. The warning sound can be emitted from the doorbell in response to the system detecting a removal of the delivery parcel from the floor covering.

In some embodiments, the system can further comprise at least one of a warning light and a warning sound that can be emitted from at least one of the doorbell and the floor covering. At least one of a warning light and a warning sound can be emitted in response to the system detecting at least one of motion and an object that has moved into a field of view of a camera of the doorbell. At least one of a warning light and warning sound can be in response to the system determining the delivery parcel is located on the floor covering.

In several embodiments, the system can further comprise at least one of a warning light and a warning sound emitted from at least one of the doorbell and the floor covering. At least one of a warning light and warning sound can be in response to the system detecting a removal of the delivery parcel from the floor covering. The warning may be emitted in response to a removal of the delivery parcel from the floor covering during a period when the system has determined that the remote computing device is not located within a predetermined distance of the doorbell, is not located within a detection range of the doorbell, or both.

In several embodiments, a delivery parcel detection system may comprise a doorbell, a remote computing device, and a delivery parcel. The doorbell may have a first wireless communication system and a radio-frequency identification reader. The remote computing device may be communicatively coupled with the doorbell via the first wireless communication system. The delivery parcel may have a radio-frequency identification tag. The doorbell may be configured to detect the delivery parcel by the radio-frequency identification reader reading the radio-frequency identification tag of the delivery parcel. A first communication may be sent from the doorbell to a remote computer system in response to the doorbell detecting the delivery parcel. The remote computer system may comprise a database. The database may have information regarding the delivery parcel. A second communication may be sent from the remote computer system to the doorbell in response to the remote computer system receiving the first communication. The second communication may comprise the information regarding the delivery parcel.

In some embodiments, the system may further comprise a third communication sent from the doorbell to the remote computing device in response to the doorbell receiving the second communication, wherein the third communication comprises the information. The third communication may comprise a time indicative of when the doorbell first detected the delivery parcel. The system may further comprise a fourth communication sent from the doorbell to the remote computing device in response to the doorbell receiving the second communication. The fourth communication may comprise a first picture taken by a camera of the doorbell. The first picture may show the delivery parcel. The system may further comprise a fourth communication sent from the doorbell to the remote computing device in response to the doorbell detecting the delivery parcel. The fourth communication may comprise a first picture taken by a camera of the doorbell. The first picture may show the delivery parcel.

In several embodiments the system may further comprise a first notification sent from the doorbell to the remote computing device in response to the doorbell detecting the radio-frequency identification tag of the delivery parcel. The first notification may comprise a first picture taken by a camera of the doorbell in response to the doorbell detecting the radio-frequency identification tag of the delivery parcel. The remote computing device may comprise a display screen. The system may further comprise at least a portion of the first picture displayed on the display screen. The system may be configured to enable a user of the remote computing

device to see the delivery parcel on the display screen in response to the first notification. The system may further comprise a second notification sent from the doorbell to the remote computing device in response to the doorbell determining that the radio-frequency identification tag of the delivery parcel is no longer detected by the doorbell. The system may be configured to detect a removal of the delivery parcel from a detection range of the radio-frequency identification reader of the doorbell. The second notification may comprise a second picture taken by a camera of the doorbell in response to the doorbell determining that the radio-frequency identification tag of the delivery parcel is no longer detected by the doorbell. The system may further comprise a second notification sent from the doorbell to the remote computing device in response to the doorbell detecting a removal of the delivery parcel. The system may further comprising a first signal of the radio-frequency identification tag detected by the doorbell at a first time, a second signal of the radio-frequency identification tag detected by the doorbell at a second time, and a second notification sent from the doorbell to the remote computing device in response to the doorbell detecting a removal of the delivery parcel by determining that the second signal is weaker than the first signal. The second notification comprises a second picture taken by a camera of the doorbell in response to the doorbell detecting the removal. The radio frequency identification tag may be a passive tag. The radio frequency identification tag may be an active tag. The doorbell may be configured to detect the delivery parcel by the radio-frequency identification reader reading the passive radio-frequency identification tag of the delivery parcel. The doorbell may be configured to detect the delivery parcel by the radio-frequency identification reader reading the active radio-frequency identification tag of the delivery parcel.

In several embodiments the delivery parcel detection system may comprise a doorbell, a remote computing device, and a delivery parcel. The doorbell may have a first wireless communication system and a radio-frequency identification reader. The delivery parcel may have a radio-frequency identification tag. Some embodiments may include a method of using the delivery parcel detection system. The method may include detecting, by the doorbell, a delivery parcel; and sending, by the doorbell, a notification to a user. Detecting, by the doorbell, a delivery parcel may comprise reading, by the radio-frequency identification reader, a radio-frequency identification tag on the delivery parcel. The method may further comprise sending, by the doorbell, a notification to a sender. The method may further comprise receiving, by the

doorbell system, information associated with the delivery parcel from the sender. The notification to the user may contain the information associated with the delivery parcel. The information associated with the delivery parcel may include at least a description of the contents. Detecting, by the doorbell, a delivery parcel may further comprise the delivery parcel entering an RFID reading distance of the doorbell. The method may further comprise detecting, by the doorbell, that the delivery parcel has been removed. The method may further comprise sending, by the doorbell, a notification to the user in response to the doorbell detecting that the delivery parcel has been removed. The method may further comprise taking, by the doorbell, a picture in response to the doorbell detecting that the delivery parcel has been removed.

In several embodiments, methods may include using a doorbell chime system. Doorbell chime systems may include an electronic monitor and a transceiver. The methods may comprise detecting, by an electronic monitor, that a person is asleep and receiving a first signal, by a transceiver, in response to the electronic monitor detecting that the person is asleep. Methods may include modifying a notification sound emitted by a doorbell chime in response to detecting, by the electronic monitor, that the person is asleep.

Some embodiments may include detecting, by the electronic monitor, that the person is awake and receiving a second signal, by the transceiver, in response to the electronic monitor detecting that the person is awake. Methods may include modifying the notification sound emitted by the doorbell chime in response to detecting, by the electronic monitor, that the person is awake. Modifying the notification sound emitted by the doorbell chime may include increasing the volume of the notification sound. Modifying the notification sound emitted by the doorbell chime may comprise enabling the notification sound. Modifying the notification sound emitted by the doorbell chime may comprise decreasing the volume of the notification sound. Modifying the notification sound emitted by the doorbell chime may comprise blocking the notification sound.

Some embodiments may include one or more of the following features. The transceiver may be the doorbell chime, the doorbell, or a communication hub. Modifying the notification sound emitted by the doorbell chime may comprise: sending, by the doorbell, a modifying signal to the doorbell chime in response to the doorbell receiving the first signal, and blocking, by the doorbell chime, the notification sound in response to receiving the modifying signal. Modifying the notification sound emitted by the doorbell chime may comprise: sending, by the

communication hub, a modifying signal to the doorbell chime in response to the communication hub receiving the first signal and blocking, by the doorbell chime, the notification sound in response to receiving the modifying signal. The electronic monitor may be a camera, an activity tracker, a motion detector, or an under-mattress monitor.

In several embodiments a doorbell system may include a doorbell chime configured to emit a notification sound in response to receiving a visitor indication from a doorbell and a sleep detection system having a sensor configured to determine whether a person is asleep. The doorbell, the doorbell chime, and the sleep detection system may be communicatively coupled such that the doorbell system, in response to the sleep detection system determining that the person is asleep, may be configured to modify the notification sound emitted by the doorbell chime.

Some embodiments may include one or more of the following features. The doorbell chime system may include a communication hub. The doorbell, doorbell chime, and the sleep detection system may be communicatively coupled to the communication hub. The doorbell system may, in response to the sleep detection system determining that the person is awake, be configured to modify the notification sound emitted by the doorbell chime.

Several embodiments may include a doorbell chime that is configured to emit a notification sound in response to receiving a visitor indication from a doorbell, and a sleep detection system. The sleep detection system may have a sensor configured to determine whether a person is asleep. The doorbell chime and the sleep detection system may be communicatively coupled to a transceiver such that the doorbell system, in response to the sleep detection system determining that the person is asleep, is configured to modify the notification sound emitted by the doorbell chime.

Some embodiments may include one or more of the following features. The doorbell system may be configured to, in response to the sleep detection system determining that the person is awake, modify the notification sound emitted by the doorbell chime. Modifying the notification sound emitted by the doorbell chime may include enabling the notification sound or increasing the volume of the notification sound. The transceiver may be, among other things, a communication hub, a doorbell, or a doorbell chime. Modifying the notification sound emitted by the doorbell chime may include blocking the notification sound or decreasing the volume of the notification sound.

Methods for using a doorbell chime system can include detecting, by an electronic monitor, that a person is asleep; receiving a first signal, by the doorbell chime, in response to the electronic monitor detecting that the person is asleep; and blocking the doorbell chime from emitting a first notification sound in response to detecting, by the electronic monitor, that the person is asleep.

Some embodiments include reducing a volume of the chime in response to detecting, by a sleep detection system, an indication that the person is asleep. Several embodiments include reducing a volume of the chime in response to detecting, by a sleep detection system, an indication that the person is located in a sleeping area such as a bed or a crib.

In some embodiments, the sleep detection system communicates directly with the chime via wireless communication. In several embodiments, the chime receives a signal from another device (e.g., a hub, a doorbell) in response to the other device receiving a signal from the sleep detection system. The sleep detection system can send the signal to the other device in response to detecting an indication that the person is asleep.

The chime can receive a second signal to permit the chime to emit notification sounds and/or increase the volume of notification sounds in response to the sleep detection system detecting that the person is no longer asleep (e.g., the person is no longer located in a sleeping area and/or is no longer exhibiting indications of sleep).

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects, and advantages are described below with reference to the drawings, which are intended to illustrate, but not to limit, the invention. In the drawings, like reference characters denote corresponding features consistently throughout similar embodiments.

Figure 1 illustrates a front view of a communication system, according to some embodiments.

Figure 2 illustrates a computing device running software, according to some embodiments.

Figure 3 illustrates a diagrammatic view of multiple computing devices and doorbells, according to some embodiments.

Figure 4 illustrates a back view of a doorbell without a back cover to show various components of the doorbell's electrical system, according to some embodiments.

Figures 5 and 6 illustrate diagrammatic views of a doorbell system that can use a floor covering to detect parcels, according to some embodiments.

Figure 7 illustrates a diagrammatic view of a doorbell system that can use a radio frequency identification reader to detect parcels, according to some embodiments.

Figures 8 and 9 illustrate a diagrammatic view of a doorbell system that can use a radio frequency identification reader to detect parcels, according to some embodiments.

Figures 10, 11, and 12 illustrate a diagrammatic view of a doorbell system that can use a radio frequency identification reader to detect parcels within a detection range, according to some embodiments.

Figures 13 and 14 illustrate a diagrammatic view of a doorbell system that can use a radio frequency identification reader to detect parcels within a detection range, according to some embodiments.

Figure 15 illustrates a front view of a doorbell chime, according to some embodiments.

Figure 16 illustrates a back view of a chime without a back cover to show various components of the chime's electrical system, according to some embodiments.

Figure 17 illustrates a side perspective view of a doorbell chime, according to some embodiments.

Figure 18 illustrates a front view of a doorbell chime coupled to a power outlet, according to some embodiments.

Figures 19, 20, and 21 illustrate diagrammatic views view of doorbell systems, according to some embodiments.

Figure 22 illustrates a diagrammatic view of a doorbell chime system according to some embodiments.

Figure 23 illustrates a diagrammatic view of a doorbell chime system according to some embodiments.

DETAILED DESCRIPTION

Although certain embodiments and examples are disclosed below, inventive subject matter extends beyond the specifically disclosed embodiments to other alternative embodiments and/or uses, and to modifications and equivalents thereof. Thus, the scope of the claims appended hereto is not limited by any of the particular embodiments described below. For

example, in any method or process disclosed herein, the acts or operations of the method or process may be performed in any suitable sequence and are not necessarily limited to any particular disclosed sequence. Various operations may be described as multiple discrete operations in turn, in a manner that may be helpful in understanding certain embodiments; however, the order of description should not be construed to imply that these operations are order dependent. Additionally, the structures, systems, and/or devices described herein may be embodied as integrated components or as separate components.

For purposes of comparing various embodiments, certain aspects and advantages of these embodiments are described. Not necessarily all such aspects or advantages are achieved by any particular embodiment. Thus, for example, various embodiments may be carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other aspects or advantages as may also be taught or suggested herein.

SYSTEM EMBODIMENTS

Communication systems can provide a secure and convenient way for a remotely located individual to communicate with a person who is approaching a sensor, such as a proximity sensor or motion sensor, or with a person who rings a doorbell, which can be located in a doorway, near an entrance, or within 15 feet of a door. Some communication systems allow an individual to hear, see, and talk with visitors who approach at least a portion of the communication system and/or press a button, such as a doorbell's button. For example, communication systems can use a computing device to enable a remotely located person to see, hear, and/or talk with visitors. Computing devices can include computers, laptops, tablets, mobile devices, smartphones, cellular phones, and wireless devices (e.g., cars with wireless communication). Example computing devices include the iPhone, iPad, iMac, MacBook Air, and MacBook Pro made by Apple Inc. Communication between a remotely located person and a visitor can occur via the Internet, cellular networks, telecommunication networks, and wireless networks.

Referring now to Figure 1, the doorbell 202 can record video and audio, which can then be sent to a remote computing device 204. The remote computing device 204 displays the video and emits the audio from the doorbell 202 to enable a user of the remote computing device 204 to see and hear a visitor. For example, when the doorbell 202 detects a visitor (e.g., a motion

sensor 218 detects a visitor or the visitor presses the button 212), the doorbell 202 can send a push notification to the remote computing device 204. A user of the remote computing device 204 can then see and hear the visitor.

The user of the remote computing device 204 can select a button on application software running on the remote computing device 204 to initiate two-way audio and/or video communication with the visitor. In some embodiments, the user can see and hear the visitor, and the visitor can hear (but not see the user). In several embodiments, the user can hear (but not see) the visitor. In some embodiments, the user and visitor can both see and hear each other (e.g., the doorbell 202 can include a display screen to show live video captured by a camera of the remote computing device 204).

Doorbell systems can be a portion of a smart home hub. In some embodiments, the doorbell system 200 forms the core of the smart home hub. For example, the various systems described herein enable complete home automation. In some embodiments, the doorbell 202 controls various electrical items in a home (e.g., lights, air conditioners, heaters, motion sensors, garage door openers, locks, televisions, computers, entertainment systems, pool monitors, elderly monitors). In some embodiments, the computing device 204 controls the doorbell 202 and other electrical items in a home (e.g., lights, air conditioners, heaters, motion sensors, garage door openers, locks, televisions, computers, entertainment systems, pool monitors, elderly monitors).

Figure 1 illustrates a front view of a communication system embodiment. The doorbell system 200 can include a doorbell 202 (e.g., a security system) and a computing device 204. Although the illustrated doorbell 202 includes many components in one housing, several doorbell embodiments include components in separate housings. The doorbell 202 can include a camera assembly 208 and a doorbell button 212. The camera assembly 208 can include a video camera, which in some embodiments is a webcam. The doorbell 202 can include a diagnostic light 216 and a power indicator light 220. In some embodiments, the diagnostic light 216 is a first color (e.g., blue) if the doorbell 202 and/or the doorbell system 200 is connected to a wireless Internet network and is a second color (e.g., red) if the doorbell 202 and/or the doorbell system 200 is not connected to a wireless Internet network. In some embodiments, the power indicator 220 is a first color if the doorbell 202 is connected to a power source. The power source can be supplied by the building to which the doorbell 202 is attached. In some embodiments, the

power indicator 220 is a second color or does not emit light if the doorbell 202 is not connected to the power source.

The doorbell 202 can include an outer housing 224, which can be water resistant and/or waterproof. The outer housing can be made from metal or plastic, such as molded plastic with a hardness of 60 Shore D. In some embodiments, the outer housing 224 is made from brushed nickel or aluminum.

Rubber seals can be used to make the outer housing 224 water resistant or waterproof. The doorbell 202 can be electrically coupled to a power source, such as wires electrically connected to a building's electrical power system. In some embodiments, the doorbell 202 includes a battery for backup and/or primary power.

Wireless communication 230 can enable the doorbell 202 to communicate with the computing device 204. Some embodiments enable communication via cellular networks and/or wireless local area networks ("WiFi"). Some embodiments enable communication via the Internet. Several embodiments enable wired communication between the doorbell 202 and the computing device 204. The wireless communication 230 can comprise the following communication means: radio, WiFi, cellular, Internet, Bluetooth, Bluetooth Low Energy, telecommunication, electromagnetic, infrared, light, sonic, and microwave. Other communication means are used by some embodiments. In some embodiments, such as embodiments that include telecommunication or cellular communication means, the doorbell 202 can initiate voice calls or send text messages to a computing device 204 (e.g., a smartphone, a desktop computer, a tablet computer, a laptop computer).

Several embodiments use near field communication ("NFC") to communicate between the computing device 204 and the doorbell 202. The doorbell 202 and/or the computing device 204 can include a NFC tag. Some NFC technologies include Bluetooth, radio-frequency identification, and quick response codes ("QR codes").

Some embodiments include computer software (e.g., application software), which can be a mobile application designed to run on smartphones, tablet computers, and other mobile devices. Software of this nature is sometimes referred to as "app" software. Some embodiments include software designed to run on desktop computers and laptop computers.

The computing device 204 can run software with a graphical user interface. The user interface can include icons or buttons. In some embodiments, the software is configured for use with a touch-screen computing device such as a smartphone or tablet.

Figure 2 illustrates a computing device 204 running software. The software includes a user interface 240 displayed on a display screen 242. The user interface 240 can include a doorbell indicator 244, which can indicate the location of the doorbell that the user interface is displaying. For example, a person can use one computing device 204 to control and/or interact with multiple doorbells, such as one doorbell located at a front door and another doorbell located at a back door. Selecting the doorbell indicator 244 can allow the user to choose another doorbell (e.g., a doorbell located by a back door rather than a doorbell located by a front door).

The user interface 240 can include a connectivity indicator 248. In some embodiments, the connectivity indicator 248 can indicate whether the computing device is in communication with a doorbell, the Internet, and/or a cellular network. The connectivity indicator 248 can alert the user if the computing device 204 has lost its connection with the doorbell 202; the doorbell 202 has been damaged; the doorbell 202 has been stolen; the doorbell 202 has been removed from its mounting location; the doorbell 202 has lost electrical power; and/or if the computing device 204 cannot communicate with the doorbell 202. In some embodiments, the connectivity indicator 248 notifies the user of the computing device 204 by flashing, emitting a sound, displaying a message, and/or displaying a symbol.

Referring now to Figure 1, in some embodiments, if the doorbell 202 loses power, loses connectivity to the computing device 204, loses connectivity to the Internet, and/or loses connectivity to a remote server, a remote server 206 sends an alert 232 (e.g., phone call, text message, image on the user interface 240) regarding the power and/or connectivity issue. In several embodiments, the remote server 206 can manage communication between the doorbell 202 and the computing device 204. In some embodiments, information from the doorbell 202 is stored by the remote server 206. In several embodiments, information from the doorbell 202 is stored by the remote server 206 until the information can be sent to the computing device 204, uploaded to the computing device 204, and/or displayed to the remotely located person via the computing device 204. The remote server 206 can be a computing device that stores information from the doorbell 202 and/or from the computing device 204. In some embodiments, the remote server 206 is located in a data center.

In some embodiments, the computing device 204 and/or the remote server 206 attempts to communicate with the doorbell 202. If the computing device 204 and/or the remote server 206 is unable to communicate with the doorbell 202, the computing device 204 and/or the remote server 206 alerts the remotely located person via the software, phone, text, a displayed message, and/or a website. In some embodiments, the computing device 204 and/or the remote server 206 attempts to communicate with the doorbell 202 periodically; at least every five hours and/or less than every 10 minutes; at least every 24 hours and/or less than every 60 minutes; or at least every hour and/or less than every second.

In some embodiments, the server 206 can initiate communication with the computing device 204 and/or with the doorbell 202. In several embodiments, the server 206 can initiate, control, and/or block communication between the computing device 204 and the doorbell 202.

In several embodiments, a user can log in to an "app," website, and/or software on a computing device (e.g., mobile computing device, smartphone, tablet, desktop computer) to adjust the doorbell settings discussed herein.

In some embodiments, a computing device can enable a user to watch live video and/or hear live audio from a doorbell due to the user's request rather than due to actions of a visitor. Some embodiments include a computing device initiating a live video feed (or a video feed that is less than five minutes old).

Referring now to Figures 1 and 2, in some embodiments, the user interface 240 displays an image 252 such as a still image or a video of an area near and/or in front of the doorbell 202. The image 252 can be taken by the camera assembly 208 and stored by the doorbell 202, server 206, and/or computing device 204. The user interface 240 can include a recording button 256 to enable a user to record images, videos, and/or sound from the camera assembly 208, microphone of the doorbell 202, and/or microphone of the computing device 204.

In several embodiments, the user interface 240 includes a picture button 260 to allow the user to take still pictures and/or videos of the area near and/or in front of the doorbell 202. The user interface 240 can also include a sound adjustment button 264 and a mute button 268. The user interface 240 can include camera manipulation buttons such as zoom, pan, and light adjustment buttons. In some embodiments, the camera assembly 208 automatically adjusts between Day Mode and Night Mode. Some embodiments include an infrared camera and/or

infrared lights to illuminate an area near the doorbell 202 to enable the camera assembly 208 to provide sufficient visibility (even at night).

In some embodiments, buttons include diverse means of selecting various options, features, and functions. Buttons can be selected by mouse clicks, keyboard commands, and touching a touch screen. Many embodiments include buttons that can be selected without touch screens.

In some embodiments, the user interface 240 includes a quality selection button 272, which can allow a user to select the quality and/or amount of the data transmitted from the doorbell 202 to the computing device 204 and/or from the computing device 204 to the doorbell 202.

In some embodiments, video can be sent to and/or received from the computing device 204 using video chat protocols such as FaceTime (by Apple Inc.) or Skype (by Microsoft Corporation). In some embodiments, these videos are played by videoconferencing apps on the computing device 204 instead of being played by the user interface 240.

The user interface 240 can include a termination button 276 to end communication between the doorbell 202 and the computing device 204. In some embodiments, the termination button 276 ends the ability of the person located near the doorbell 202 (i.e., the visitor) to hear and/or see the user of the computing device 204, but does not end the ability of the user of the computing device 204 to hear and/or see the person located near the doorbell 202.

In some embodiments, a button 276 is both an answer button (to accept a communication request from a visitor) and a termination button (to end communication between the doorbell 202 and the computing device 204). The button 276 can include the word "Answer" when the system is attempting to establish two-way communication between the visitor and the user. Selecting the button 276 when the system is attempting to establish two-way communication between the visitor and the user can start two-way communication. The button 276 can include the words "End Call" during two-way communication between the visitor and the user. Selecting the button 276 during two-way communication between the visitor and the user can terminate two-way communication. In some embodiments, terminating two-way communication still enables the user to see and hear the visitor. In some embodiments, terminating two-way communication causes the computing device 204 to stop showing video from the doorbell and to stop emitting sounds recorded by the doorbell.

In some embodiments, the user interface 240 opens as soon as the doorbell detects a visitor (e.g., senses indications of a visitor). Once the user interface 240 opens, the user can see and/or hear the visitor even before "answering" or otherwise accepting two-way communication, in several embodiments.

Some method embodiments include detecting a visitor with a doorbell. The methods can include causing the user interface to display on a remote computing device 204 due to the detection of the visitor (e.g., with or without user interaction). The methods can include displaying video from the doorbell and/or audio from the doorbell before the user accepts two-way communication with the visitor. The methods can include displaying video from the doorbell and/or audio from the doorbell before the user accepts the visitor's communication request. The methods can include the computing device simultaneously asking the user if the user wants to accept (e.g., answer) the communication request and displaying audio and/or video of the visitor. For example, in some embodiments, the user can see and hear the visitor via the doorbell before opening a means of two-way communication with the visitor.

In some embodiments, the software includes means to start the video feed on demand. For example, a user of the computing device might wonder what is happening near the doorbell 202. The user can open the software application on the computing device 204 and instruct the application to show live video and/or audio from the security device 202 even if no event near the doorbell 202 has triggered the communication.

In several embodiments, the security device 202 can be configured to record when the security device 202 detects movement and/or the presence of a person. The user of the computing device 204 can later review all video and/or audio records from when the security device 202 detected movement and/or the presence of a person.

Referring now to Figure 1, in some embodiments, the server 206 controls communication between the computing device 204 and the doorbell 202, which can be a doorbell with a camera, a microphone, and a speaker. In several embodiments, the server 206 does not control communication between the computing device 204 and the doorbell 202.

In some embodiments, data captured by the doorbell and/or the computing device 204 (such as videos, pictures, and audio) is stored by another remote device such as the server 206. Cloud storage, enterprise storage, and/or networked enterprise storage can be used to store video, pictures, and/or audio from the doorbell system 200 or from any part of the doorbell system 200.

The user can download and/or stream stored data and/or storage video, pictures, and/or audio. For example, a user can record visitors for a year and then later can review conversations with visitors from the last year. In some embodiments, remote storage, the server 206, the computing device 204, and/or the doorbell 202 can store information and statistics regarding visitors and usage.

Figure 3 illustrates an embodiment in which a doorbell 202 is connected to a building 300, which can include an entryway 310 that has a door 254. A visitor 388 can approach the doorbell 202 and then can be detected by the doorbell 202. The visitor 388 can press the doorbell button 212. The user of the doorbell 202 can configure the doorbell 202 such that when the visitor 388 presses the doorbell button 212, the user receives a notification regarding the visitor 388.

Electrical wires 304 can electrically couple the doorbell 202 to the electrical system 312 of the building 300, such that the doorbell 202 can receive electrical power from the building 300. The building can include a door lock 250 to lock the door 254.

A wireless network 308 can allow devices to wirelessly access the Internet. The doorbell 202 can access the Internet via the wireless network 308. The wireless network 308 can transmit data from the doorbell 202 to the Internet, which can transmit the data to remotely located computing devices 204. The Internet and wireless networks can transmit data from remotely located computing devices 204 to the doorbell 202. In some embodiments, a doorbell 202 connects to a home's WiFi.

As illustrated in Figure 3, multiple computing devices 204 can communicate with one doorbell 202. In some embodiments, one computing device 204 (e.g., a laptop, a smartphone, a mobile computing device, a television) can communicate with multiple doorbells 202.

In some embodiments, the doorbell 202 can communicate (e.g., wirelessly 230) with a television 306, which can be a smart television. Users can view the television 306 to see a visitor and/or talk with the visitor.

Figure 4 illustrates an internal view of the doorbell 202. Doorbells 202 can include a chip 480 (e.g., integrated circuits, microprocessor, computer) and a memory 492. Doorbells 202 can also include a microphone 484 and a speaker 488. The speaker 488 can comprise a flat speaker and a sound chamber 460 configured to amplify an emitted sound. The flat speaker can be located in the sound chamber. Some doorbell embodiments include a proximity sensor 500. In

several embodiments, doorbells 202 include a wireless communication module 504, such as a WiFi module. The communication module 504 can have an integrated antenna. In some embodiments, an antenna is contained within the outer housing 224.

The doorbell 202 can include one or more heating elements 508 configured to regulate the temperature of the doorbell 202. For example, doorbells 202 can be used in very cold environments, such as in Alaska. The heating element 508 can be used in various methods to protect temperature sensitive portions of the doorbell 202 from cold weather.

While protecting the doorbell 202 from cold weather can be important in some embodiments, protecting visitors from excessive heat can also be important in some embodiments. Excessive heat could burn visitors as they "ring" the doorbell (e.g., press the doorbell button 212 shown in Figure 1). The doorbell 202 can include a thermometer 512 to enable the system to determine the temperature inside a portion of the doorbell 202 and/or outside the doorbell 202.

Several embodiments can be configured for 9 to 40 volts alternating current ("VAC") and/or 9 to 40 volts direct current ("VDC"). Some embodiments convert input electricity into direct current ("DC"), such as 12 VDC. Several embodiments include a converter 494 for power conversion (e.g., converting electrical energy from one form to another). The converter 494 can convert input power (e.g., from wiring in a building) to a suitable power form for the doorbell 202. The power conversion can convert between AC and DC, change the voltage, and/or change the frequency. The converter 494 can include a transformer and/or a voltage regulator. In several embodiments, the converter 494 can include a voltage stabilizer, a linear regulator, a surge protector, a rectifier, a power supply unit, a switch, an inverter, and/or a voltage converter. In some embodiments, the converter 494 converts 50 Hertz ("Hz") power into 60 Hz power.

The electrical components of the doorbell 202 (e.g., the camera assembly 208, the memory 492, the chip 480, the speaker 488, the converter 494, the microphone 484, the lights 458, a rectifier, the proximity sensor 500, the communication module 504, the heating element 508, the electrical connectors 510, the thermometer 512, the image analysis system 520, and the battery 462) can be electrically coupled to a printed circuit board ("PCB") 516 and can receive electrical power from the PCB 516.

The PCB 516 and the electrical components of the doorbell 202 can be the electrical system 456 of the doorbell 202. Additional details regarding the PCB 516 and the electrical

components of the doorbell 202 are described in U.S. Nonprovisional Patent Application No. 14/612,376; filed February 3, 2015; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS. The entire contents of Patent Application No. 14/612,376 are incorporated by reference herein.

The doorbell 202 can include a detection system 528. The doorbell 202 may be configured to alert the user to the presence of a visitor 388 by, for example, sounding a chime 302.

Although some embodiments are described in the context of devices and systems, the device embodiments and the system embodiments can also be formulated as methods. Devices and systems described herein can be applied to the methods incorporated by references herein.

Although some embodiments are described in the context of methods, the method embodiments can also be formulated as devices and systems. Methods described herein can be applied to the devices and systems incorporated by references herein.

DOORBELL PACKAGE DETECTION EMBODIMENTS

Millions of parcels are delivered each week. Often, these parcels are delivered during working hours when the homeowner is away at work. When the parcels are too large to fit in a mailbox, mail carriers and other delivery personnel often leave the parcels on a front porch of the home or even in a common area of an apartment building.

These parcels can sit unattended for long periods of time. Thieves see unattended parcels as soft targets and often drive around neighborhoods looking for unattended parcels. Thieves can jump out of a car, steal the parcel, and then drive away within seconds. With shopping being done increasingly online and the resulting increase in parcel deliveries, parcel theft is becoming more and more of a problem. Until now, little has been done to combat parcel theft.

Embodiments described herein include high-tech floor coverings (e.g., mats) that can communicate wirelessly with a smart doorbell. The floor coverings can include sensors, such as pressure sensors and optical sensors, to detect when a parcel (e.g., a package, an envelope) is placed on the floor covering.

The floor covering can “wake up” the smart doorbell by sending a wireless communication (e.g., via Bluetooth Low Energy) to the doorbell. The doorbell can then send an

alert to a remote computing device (e.g., a smartphone) to alert the user regarding the arrival or removal of the delivery parcel.

If the doorbell's motion sensor and/or camera detects a visitor when a delivery parcel is located on the floor covering, the doorbell can start recording a video. If the visitor takes the delivery parcel, then the video will document who took the delivery parcel. If the system senses that the visitor removed the delivery parcel from the floor covering, the system can send an alert (e.g., a push notification) to the remote computing device. This alert can include the video.

The system can recognize when a delivery parcel has arrived via image recognition. The system can create a security zone around the delivery parcel. If a visitor enters the security zone, the system can send an alert to the remote computing device and/or emit lights and sounds (e.g., from the doorbell, from the floor covering). This security zone can be a portion of the field of the view of the camera.

Figure 5 illustrates a diagrammatic view of a delivery parcel detection system 200. A doorbell 202 is mounted to an exterior of a building 300 (e.g., in an entryway 310 near a door 254). The doorbell 202 can include a camera assembly 208 and a motion detector 218. The camera assembly 208 and the motion detector 218 can detect when a visitor 388 approaches the doorbell 202. This configuration enables the doorbell 202 to monitor the delivery parcel 241, which can be located in the entryway 310.

The floor covering 235 can communicate with the doorbell 202 (e.g., can send information to the doorbell 202). In some embodiments, the floor covering 235 is communicatively coupled (e.g., wirelessly coupled) to a wireless network 308 (e.g., of the building 300). The doorbell 202 can be communicatively coupled to the same wireless network 308 as the floor covering 235.

In several embodiments, the floor covering 235 communicates directly (via wires or wirelessly) with the doorbell 202. For example, Bluetooth, Bluetooth Low Energy, radio waves, and/or any suitable short-range communication system or protocol can be used by the communication system 504b of the floor covering 235 to enable the floor covering 235 to communicate with the doorbell 202.

The doorbell 202 can communicate with a remote computing device 204, which can be located inside the building 300, outside the building 300, or even many miles away from the building 300. The doorbell 202 can be communicatively coupled with the remote computing

device 204 via the wireless network 308, the Internet, cellular networks, telecommunication networks, the server 206, and/or any other suitable system.

The delivery parcel 241 is located on top of a floor covering 235, which can be a mat. As used herein, the term "delivery parcel" is used broadly and can mean a box or envelope that is usually given, sent, or delivered to a person. For example, a mail carrier, a FedEx Corporation delivery worker, and any suitable delivery service can place a delivery parcel 241 near the building 300. In some cases, a friend or neighbor places a delivery parcel 241 near the building 300 (e.g., on the floor covering 235). Delivery parcels 241 can be large boxes, small boxes, odd-shaped packages, large envelopes, small envelopes, and/or any object that is placed on the floor covering 235.

As used herein, the term "floor covering" is used broadly. Floor coverings are configured for placing on the ground. Floor coverings can be mats. Mats can have a length and width that are more than ten times their thickness, which is measured vertically upward when the mat is placed on the ground. In some embodiments, mats can be used to wiping soiled shoe soles; however, not all mats are used for wiping shoe soles. For example, mats can be specially designed such that a delivery person can place parcels on the mats. Mats can be made of fabric or can be molded from plastic.

In Figure 5, the floor covering 235 is located directly in front of the door 254, but in several embodiments, the floor covering 235 is located on the ground to the side of the door 254 to discourage visitors 388 from stepping on the floor covering 235.

The floor covering 235 can include sensors 239 to detect whether a delivery parcel 241 is located on the floor covering 235. In some embodiments, these sensors 239 are pressure sensors.

The pressure sensors can be thin and flexible. Tekscan, Inc., having an office in South Boston, Massachusetts, makes high resolution pressure sensors that can be embedded in floor coverings 235. The nature of Tekscan's pressure sensors enables the system 200 to detect the footprint and the weight of the delivery parcel 241. This information can be compared to a database of parcels that are expected to be delivered to the address at which the floor covering 235 is located. This comparison enables the system 200 to determine which expected parcel has a footprint and/or weight indicative of being the parcel 239 located on the floor covering 235. The communication 230b to the remote computing device 204 can then include information regarding the contents of the parcel 241.

Digi-Key Corporation, having an office in Thief River Falls, Minnesota, sells many types of pressure sensors that can be embedded into the floor covering 235. Digi-Key sells pressure sensors from Freescale Semiconductor, Inc. that can be mounted to a PCB of the floor covering 235. Digi-Key also sells pressure sensors from STMicroelectronics N.V. that can be surface mounted on the floor covering 235.

In several embodiments, floor covering 235 comprises sensors 239 that are optical sensors. For example, the optical sensors can include light emitting diodes ("LEDs") that emit light upwards (away from the ground). The optical sensors can also include light sensors configured to detect the light from the LEDs. The optical sensors can face upwards. If no object is located on top of the floor covering 235, the light from the LEDs simply continues upward and is not sensed by the light sensors. If an object is located on top of the floor covering 235, the light from the LEDs can reflect off the object such that the light is redirected back towards the light sensors. As a result, the light sensors can detect the object (e.g., a delivery parcel).

A light sensor can be located in the same upward facing hole as an LED, such that the light sensor is configured to detect light emitted from the LED if a delivery parcel covers the hole to deflect the light emitted from the LED towards the light sensor. The light sensor can be configured to only detect a specific type of light emitted by the LED, such that the sensor system does not confuse the presence or lack of sunlight as the presence or removal of a delivery parcel.

As shown in Figure 5, a delivery parcel detection system 200 can include a doorbell 202 having a first wireless communication system 504 (shown in Figure 4); and a floor covering 235 configured for placement on the ground (e.g., an entryway floor). The floor covering 235 can comprise a sensor 239 configured to detect a first indication of a delivery parcel 124 on the floor covering 235. The floor covering 235 is communicatively coupled to the doorbell 202 (e.g., via wires or wirelessly). The doorbell 202 can be mounted to a wall of the building 300 while the floor covering is located on the ground. The floor covering 235 can be a mat that includes a battery to provide electrical power to electrical components of the floor covering 235.

The system 200 can include a first communication 230a (e.g., a Bluetooth wireless communication) sent from the floor covering 235 to the doorbell 202 in response to the floor covering 235 detecting the first indication of the delivery parcel 241. The system 200 can also include a second communication 230b (e.g., a wireless communication) sent from the doorbell

202 to a remote computing device 204 in response to the doorbell 202 receiving the first communication 230a.

The doorbell 202 can include a camera 208. The second communication 230b can comprise a first picture 243 taken by the doorbell 202, such that the doorbell 202 is configured to send the first picture 243 to the remote computing device 204 in response to the floor covering 235 detecting the first indication of the delivery parcel 241. As illustrated in Figure 5, the first picture 243 can show the delivery parcel 241 to enable the user of the remote computing device 204 to see the delivery parcel 241. The first picture 243 can be sent directly from the doorbell 202 to the computing device 204, but in many embodiments, the first picture 243 is sent from the doorbell 202 to the remote computing device 204 indirectly (e.g., via a server 206).

The first indication of the delivery parcel 241 can be a weight of the delivery parcel 241 sensed by the floor covering 235 (e.g., via a pressure sensor). The first indication of the delivery parcel 241 can also be a light sensed by a light sensor (e.g., as described above). The first indication can be due to the arrival of the delivery parcel (e.g., a pressure increase, a light increase) or can be due to a removal of the delivery parcel from the floor covering 235 (e.g., a pressure decrease, a light decrease).

The first indication can be associated with an arrival of the delivery parcel 241 to the floor covering 235. The first indication can be associated with a removal of the delivery parcel 241 from the floor covering 235. The communication 230b sent to the remote computing device 204 can indicate if the delivery parcel 241 arrived or was removed.

The system 200 can also comprise a first alert 232 regarding the delivery parcel 241. In some embodiments, the first alert is a push notification sent to the remote computing device 204 (e.g., sent wirelessly over various communication networks, sent via WiFi). The first alert 232 can be a text message on the remote computing device. The first alert 232 can be a graphic displayed on the screen of the remote computing device 204. The graphic can be configured to enable a user of the remote computing device 204 to see information regarding the delivery parcel (e.g., a picture of the parcel, a time of parcel arrival, a time of parcel removal, an identity of the person who delivered the parcel, an identity of the person who removed the parcel).

The first alert 232 can be displayed on the remote computing device 204 in response to the remote computing device 204 receiving the second communication 230b from the doorbell 202. The system 200 can include a graphical user interface 240 displayed on the remote

computing device 204. The graphical user interface 240 can be configured to display information regarding the delivery parcel 241.

This information regarding the delivery parcel 241 can be displayed simultaneously with weather information (e.g., as detected by the system 200) described in U.S. Nonprovisional Patent Application No. 14/813,479; filed July 30, 2015; and entitled DOORBELL COMMUNICATION SYSTEMS AND METHODS, which is incorporated by references herein. For example, the display can show information such as, "your package is outside in the rain" or "wind of 25 miles per hour is blowing your mail away."

As shown in Figure 5, the graphical user interface shows a picture 243 of the delivery parcel 241. The graphical user interface 240 can display the following information, and any other relevant information, regarding the delivery parcel 241: delivery time, to whom the delivery parcel is addressed, sender information, contents, and the status. The status can indicate whether the delivery parcel 241 is currently located on the floor covering 235. The status can also indicate if the delivery parcel 241 is still within a detection range (e.g., a field of view of the camera 208) of the doorbell 202.

The graphical user interface 240 is configured to enable changing at least one setting of the lights 216b of the doorbell 202. The user interface 240 can include buttons 237 (e.g., touch screen icons, which are not necessarily physical buttons). At least one of these buttons 237 can be a light adjustment button configured to enable changing settings of a light 216b (e.g., an LED) of the doorbell 202.

The setting that is changed by the button 237 can be a color of the light 216b. For example, the color can change from red to green to blue to white. Millions of color combinations are possible with LEDs. The color can correspond with holiday colors or special occasions.

The setting that is changed by the button 237 can be a brightness of the light 216b. For example, the button 237 can act as a light dimmer.

In some embodiments, the system 200 automatically changes the setting in response to the floor covering 235 detecting the first indication of the delivery parcel 241. For example, parcel 241 removal can cause a red light to flash from the doorbell 202 and/or from the floor covering 235. Parcel 241 arrival can cause a green light to flash.

In several embodiments, the system 200 (e.g., the doorbell) emits a sound or audible words in response to detecting the arrival or removal of the parcel 241. The sound and/or words can thank the deliver and/or warn the remover.

Many types of warning sounds can emitted from the doorbell 202 (e.g., from the speaker 488 shown in Figure 4) in response to the system 200 detecting a removal of the delivery parcel 241 from the floor covering 235. The floor covering 235 can also emit the warning sound from a speaker 488b. The warning sound can be a voice saying a predetermined message such as, "stop, package theft is against the law." Reduced pressure, as sensed by the floor covering 235, can enable the system 200 to detect the removal of the parcel 241.

In addition to having a speaker 488b, the floor covering 235 can also include many warning lights 216c, which can be LEDs. In several embodiments, a warning light and a warning sound are emitted from at least one of the doorbell 202 and the floor covering 235 in response to the system 200 detecting motion (e.g., via the motion detector 218).

In some embodiments, a warning light and a warning sound are emitted from at least one of the doorbell 202 and the floor covering 235 in response to the system 200 detecting that an object (e.g., a visitor 388) has moved into a field of view of a camera 208 of the doorbell 202. For example, if a visitor 388 approaches the doorbell 202 and/or the floor covering 235 while a parcel 241 is located on the floor covering 235 and/or detected by the doorbell 202, the doorbell 202 and/or the floor covering 235 can emit the warning light from the lights 216b, 216c and can emit the warning sounds from the speakers 488b, 488 (shown in Figure 4). Thus, the system 200 can emit the warnings in response to motion and/or object detection plus in response to the system 200 determining the delivery parcel 241 is located on the floor covering 235.

In some embodiments, the system 200 is configured to not emit a warning if a person carrying the remote computing device 204 is the one removing the parcel 241. In contrast, if a person is removing the parcel 241 when the remote computing device 204 is located far from the doorbell 202 (e.g., is away from home), then the person removing the parcel 241 might be a thief. Thus, some embodiments include a warning light and a warning sound emitted from at least one of the doorbell 202 and the floor covering 235 in response to the system 200 detecting a removal of the delivery parcel 241 from the floor covering 235 during a period when the system has determined that the remote computing device 204 is at least one of not located within a

predetermined distance of the doorbell 202 and not located within a detection range of the doorbell 202. The predetermined distance can be within 30 meters of the doorbell 202.

The system 200 can determine if the computing device 204 is within a predetermined distance based on Global Positioning System ("GPS") information from the doorbell 202 and the remote computing device 204. The system 200 can determine if the remote computing device 204 is within a detection range of the doorbell 202 via the doorbell 202 trying to communicate with the remote computing device 204 directly via a short-range communication protocol such as Bluetooth. If the remote computing device 204 does not respond to the Bluetooth signal from the doorbell 202, then the system 200 determines that the remote computing device 204 is outside of the detection range of the doorbell 202.

Doorbell 202 power consumption minimization can be important, especially in embodiments in which the doorbell 202 is powered exclusively via battery power (rather than via electrical wires 304 from a building 300 as shown in Figure 3). In some embodiments, the doorbell 202 is in a Sleep Mode that precludes the camera 208 from recording without exiting the Sleep Mode. The floor covering 235 detecting parcel 241 delivery, movement, or removal can cause the doorbell 202 to exit the sleep mode, take a picture, and/or start recording a video. The picture and video can be sent to the server 206 and/or to the remote computing device 204. In some embodiments, the doorbell 202 comprises an electrical power consumption rate that increases in response to the floor covering 235 detecting the first indication of the delivery parcel 241 (e.g., due to the activity of the camera 208).

In several embodiments, the doorbell 202 comprises a camera 208 configured to take at least one picture in response to the floor covering 235 detecting the first indication of the delivery parcel 241. The sensor 239 can comprise a pressure sensor configured such that placing the delivery parcel 241 on the floor covering 235 enables the pressure sensor to detect the first indication.

A camera 208 can be electrically coupled to the doorbell 202. The camera 208 can also be electrically coupled to the floor covering 235. The system 200 can comprise a video taken by the camera 208 in response to the system detecting a removal of the delivery parcel 241. A video can be taken by the camera 208 in response to the camera 208 detecting an object (e.g., a visitor 388) that has moved into a field of view of the camera 208 during a period when the system 200 has determined the delivery parcel 241 is located on the floor covering 235.

The doorbell 202 can include a motion detector 218. The floor covering can also include a motion detector 218, which can have all the same features and functions of the motion detector 218 of the doorbell 202. In some embodiments, a motion detector 218 and a camera 208 are electrically coupled to at least one of the doorbell 202 and the floor covering 235. The system 200 can comprise a video taken by the camera 208 in response to the motion detector 218 detecting a motion indication during a period when the system 200 has determined the delivery parcel 241 is located on the floor covering 235. A second communication 230b can be sent from the doorbell 202 to the remote computing device 204 in response to the motion detector 218 detecting the motion indication. The second communication 230b can comprise the video.

In several embodiments, the first indication is associated with a removal of the delivery parcel 241 from the floor covering 235. The system can further comprise a first communication 230a sent from the floor covering 235 to the doorbell 202 in response to the floor covering 235 detecting the first indication. The system can also comprise a second communication 230b sent from the doorbell 202 to a remote computing device 204 in response to the doorbell 202 receiving the first communication 230a. As described previously, a camera 208 can be electrically coupled to at least one of the doorbell 202 and the floor covering 235. The second communication 230b can comprise a picture taken by the camera 208 within five seconds of the sensor 239 detecting the first indication. Taking the picture within five seconds can help ensure the picture (which can be a video) shows the thief who removed the parcel 241 (via the system 200 taking the picture before the thief is able to run away).

The system 200 can take pictures 245 when the system 200 detects the arrival of the parcel 241, a visitor 388 moving (e.g., towards the doorbell 202), a movement of the parcel 241, and/or the removal of the parcel 241. The communication 230b between the doorbell 202 and the remote computing device 204 can include these pictures 245. Thus, the system 200 can send many pictures to the remote computing device 204 depending on the preferences of the user of the remote computing device 204. As used herein, sending a video includes sending a picture (because a picture is a portion of a video). Thus, a picture can be a still picture and can be an instant of a video (e.g., can be one frame of a video).

A doorbell communication 230d regarding the parcel 241 can be sent via a wireless network 308 (e.g., of the building 300), via Bluetooth, via cellular networks, via telecommunication networks, via the Internet, and/or via a server 206 to the remote computing

device 204. In some embodiments, another remote computing device 204n also receives the doorbell communication 230d regarding the parcel 241. The doorbell communication 230d can include a picture 243 of the parcel 241 and/or a picture 243 taken by a camera 208, 208b of the system 200 at a time within 5 seconds of the doorbell 202 and/or the floor covering 235 detecting of an indication of the parcel 241 (e.g., an arrival of the parcel 241, a movement of the parcel 241, and/or a removal of the parcel 241 from the floor covering 235 and/or from a field of view of the doorbell 202).

In some embodiments, the second remote computing device 204n is a neighbor's remote computing device. The doorbell communication 230d can include a request for the neighbor to pick up and move the parcel 241. In response to this request, the neighbor can bring the parcel 241 to the neighbor's home to prevent the parcel 241 from being stolen until the parcel's owner can get the parcel 241 from the neighbor.

Some embodiments of the system 200 use the floor covering 235 to detect parcels 241. Some embodiments of the system 200, however, do not use the floor covering 235 to detect parcels 241. For example, the doorbell 202 can use the camera 208 to detect parcels 241.

The doorbell 202 can use the camera 208 to take a picture 243 when the doorbell 202 detects movement (via the camera 208 and/or via the motion detector 218). The system 200 can then analyze the picture 243 to determine if the picture 243 shows a parcel 241. This picture analysis can use image recognition procedures to look for indications of a parcel 241 in the picture 243. For example, the image recognition procedure can include looking for colors that are typical of cardboard delivery boxes (e.g., brown). The image recognition procedure can include looking for flat surfaces connected at approximately ninety degree angles (which are indicative of a box shape). The image recognition procedure can include looking for flat surfaces located in different locations in images taken at different times (which is indicative of a box being carried towards the doorbell 202 such that the box is located in a first position in a first picture and is located in a second position in a second picture taken within 10 seconds of the first picture).

The parcel 241 detection procedure can also include using the microphone 484 (shown in Figure 4) of the doorbell 202 to listen for sounds indicative of delivery vehicles (e.g., the sounds of large engines and heavy trucks typical of delivery services such as FedEx Corporation and United Parcel Service, Inc.). The system 200 can also use the microphone 484 to listen for sounds indicative of a parcel 241 being dropped on a floor (e.g., of an entryway 310). The

system 200 can then analyze the sounds to identify that the parcel 241 has been delivered to the building 300 (e.g., the parcel 241 is located outside of the building 300 within a detection range of the doorbell 202).

The system 200 might hear a delivery vehicle stop within a detection range of the doorbell 202 (e.g., within a range that the microphone 484 can hear the delivery vehicle). However, the system 200 might not know if the delivery vehicle left a parcel 241 at the building 300 or at a neighbor's home. The system 200 can distinguish between deliveries to neighbors' homes and deliveries to the building 300 by identifying a parcel delivery in response to detecting movement (via the camera 208 and/or via the motion detector 218) within 30 seconds of detecting sounds indicative of a delivery vehicle.

In Figure 5 illustrates a perspective view of the floor covering 235. The view of Figure 5 shows a front view of the door 254. Figure 5 is a view that a visitor 388 typically sees as she walks towards a door 254 of a home.

Figure 6 illustrates a diagrammatic view of the floor covering 235. Figure 6 illustrates a top view of the floor covering 235 and a front view of the doorbell 202. Electrical wires 304 electrically couple the doorbell 202 to the floor covering 235 to enable the doorbell 202 to provide electrical power to the floor covering 235 (or vice versa). The doorbell 202 can receive electrical power from the building 300 (shown in Figure 5) and then can provide at least a portion of the electrical power to the floor covering 235 via the electrical wires 304 (e.g., while the doorbell 202 is mounted to a wall of the building 300 and while the floor covering 235 is located on the ground). The electrical wires 304 can also be used for one-way communication and/or two-way communication between the doorbell 202 and the floor covering 235.

Several embodiments do not include electrical wires 304 between the doorbell 202 and the floor covering. The doorbell 202 can send communications 230c to the floor covering 235 wirelessly. The floor covering 235 can send communications 230a to the doorbell 202 wirelessly.

The floor covering 235 can comprise a PCB, a speaker 488b, a light 216c, a battery 462b, a camera 208b, and a motion detector 218b. The floor covering 235 can also include a communication system 504b configured to enable communication between the floor covering 235 and the doorbell 202. The communication system 504b can include a transceiver. The communication system 504b can be a Bluetooth communication system, which can use Bluetooth Low Energy.

The sensor 239 can be configured to detect parcels on at least 60 percent of the top surface of the floor covering 235. This configuration can help minimize the occurrences of failing to detect a parcel that is located on the floor covering 235. The sensor 239 can be made of many individual pressure sensors, light sensors, package sensors, and/or any sensor configured to detect a parcel.

Although some embodiments are described in the context of devices and systems, the device embodiments and the system embodiments can also be formulated as methods. Some embodiments include methods of detecting parcels. Methods can include obtaining a delivery parcel detection system comprising a doorbell having a first wireless communication system; and a floor covering configured for placement on an entryway floor. The floor covering can comprise a sensor. Methods can include detecting, by the sensor of the floor covering, a first indication of a delivery parcel on the floor covering. Methods can include communicatively coupling the doorbell to the floor covering; mounting the doorbell to a building; and/or placing the floor covering in on an entryway floor.

Several embodiments include sending a first communication from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel. Some methods include sending a second communication from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

The second communication can comprise a first picture taken by the doorbell. Some methods comprise sending, by the doorbell, the first picture to the remote computing device in response to the floor covering detecting the first indication of the delivery parcel.

Referring now to Figures 7 and 8, in several embodiments, a delivery parcel detection system 700 includes a doorbell 702, a remote computing device 704, and a delivery parcel 706. The doorbell 702 may have a first wireless communication system708 and a radio-frequency identification reader 710. The doorbell 702 can be attached to the outside wall of a building 711, for example near a door 713. The remote computing device 704 may be communicatively coupled with the doorbell 702 via the first wireless communication system 708. The first wireless communication system 708 may be configured to interface with or include a wireless network 709. The delivery parcel 706 may have a radio-frequency identification tag 712. When a parcel 706 with a radio frequency identification tag 712 is left near the door 713 by, for example, a mail carrier, the doorbell 702 can detect the parcel 706. The doorbell 702 detects the parcel 706

by the radio-frequency identification reader 710 reading the radio-frequency identification tag 712 of the delivery parcel 706.

When the doorbell 702 detects the radio-frequency identification tag 712, a first communication 714 can be sent from the doorbell 702 to a remote computer system 716. The remote computer system 716 may comprise a database 718. The remote computer system 716 may be affiliated with the sender. The database 718 may have information 715 regarding the delivery parcel 706. A second communication 720 may be sent from the remote computer system 716 to the doorbell 702 in response to the remote computer system 716 receiving the first communication 714. The second communication 720 may comprise the information 715 regarding the delivery parcel 706.

In some embodiments, the system 700 may further comprise a third communication 722 sent from the doorbell 702 to the remote computing device 704 in response to the doorbell 702 receiving the second communication 720. The third communication 722 can contain the information 715 that was received by the doorbell 702 from the sender. The third communication 722 may also contain a time 724 indicative of when the doorbell 702 first detected the delivery parcel 706.

For example, the user may order a product from the sender online. The sender ships the product and when it arrives on the doorstep (the delivery parcel 706), the doorbell 702 detects the parcel 706 and sends a communication 714 to the sender that the parcel 706 has arrived at its destination. The sender may then send information 715 associated with the delivery parcel 706 back to the doorbell 702. Once the doorbell 702 has this information 715 it may send it on, in another communication, to the user, thus allowing the user to be notified that they have a parcel 706 and information 715 about it. The communication may also notify them of the time of delivery of the parcel 706. The information 715 associated with the delivery parcel 706 may be a description of the contents of the parcel 706, the name of the sender of the parcel 706, the value of the parcel 706, etc. The remote computer system 716 may be, for example, a server, a website, a computer, or a workstation.

Referring now to Figure 9, the doorbell 702 may also include a camera 730 to allow the user to see the parcel 706 that has been delivered. When the doorbell 702 detects a parcel 706, it may take a picture of the parcel 706 and send it to the remote computing device 704 in a fourth communication 726. A fourth communication 726 may also be sent from the doorbell 702 to the

remote computing device 704 in response to the doorbell 702 receiving the second communication 720. The fourth communication 726 may comprise a first picture 728 taken by a camera 730. The first picture 728 may show the delivery parcel 706.

Referring now to Figure 10, in several embodiments the system 800 may comprise a first notification 814 sent from the doorbell 802 to the remote computing device 804 in response to the doorbell 802 detecting the radio-frequency identification tag 812 of the delivery parcel 806. The first notification 814 may comprise a first picture 828 taken by a camera 830 of the doorbell 802 in response to the doorbell 802 detecting the radio-frequency identification tag 812 of the delivery parcel 806. The remote computing device 804 may have a display screen 832 to allow a user to, for example, view at least a portion of the first picture 828 displayed on the display screen 832. The system 800 may be configured to enable a user of the remote computing device 804 to see the delivery parcel 806 on the display screen 832 in response to the first notification 814.

Referring now to Figures 11 and 12, the doorbell 802 may be attached to a building 811, for example, near a door 813. The doorbell has a radio-frequency identification reader 810, which has a specific detection range 834. When a package is brought into this detection range 834, the radio-frequency identification reader 810 is able to read the radio-frequency identification tag 812 on the parcel 806. The system 800 may send a notification 814 to the remote computing device when a parcel 806 with a radio-frequency identification tag 812 enters the detection range 834. Likewise, if a parcel 806 with a radio-frequency identification tag 812 is removed from the detection range 834 (i.e. is no longer detected by the doorbell 802), the doorbell 802 may send a notification 820 to the remote computing device 804. The removal of a parcel 806 may trigger the camera 830 to take a picture 836. The picture 836 may allow a user to determine if the parcel 806 was stolen, or blown away, etc. The notification 820 that the parcel 806 has been removed could also alert a user when a parcel 806 is picked up by, for example, a mail carrier. The notification 820 that the parcel 806 has been removed may contain the picture 836 taken by the camera 830 of the doorbell 802 as well as other information (i.e. the time, date, etc.).

Referring now to Figures 13 and 14, the doorbell 802 may also detect when the parcel 806 is moving. It may detect the parcel moving by comparing strengths of two different signals 838, 842 from the radio-frequency identification tag 812 on the parcel 806. For example, the

system 800 may further comprise a first signal 838 of the radio-frequency identification tag 812 detected by the doorbell 802 at a first time, a second signal 842 of the radio-frequency identification tag 812 detected by the doorbell 802 at a second time 844, and a second notification 820 sent from the doorbell 802 to the remote computing device 804. The system may determine that the parcel is moving farther from the doorbell 802 or is being removed if the second signal 842 is weaker than the first signal 838. In response to the doorbell 802 detecting the parcel moving farther from the doorbell or a removal of the delivery parcel 806 the doorbell 802 may send a second notification 820 to the remote computing device 804. The doorbell 802 may also take a picture 836 with the camera 830 in response to the doorbell 802 detecting the parcel 806 is moving or is removed. The second notification 820 may comprise the second picture 836 taken by a camera 830 of the doorbell 802. The radio-frequency identification tag 812 may be an active tag. The doorbell 802 may be configured to detect the delivery parcel 806 by the radio-frequency identification reader 810 reading the passive radio-frequency identification tag 812 of the delivery parcel 806. The doorbell 802 may be configured to detect the delivery parcel 806 by the radio-frequency identification reader 810 reading the active radio-frequency identification tag 812 of the delivery parcel 806.

CHIME SILENCING EMBODIMENTS

The entire contents of the following application are incorporated by reference herein: U.S. Nonprovisional Patent Application No. 14/724,723; filed May 28, 2015; and entitled DOORBELL CHIME SYSTEMS AND METHODS. Figures 15-21 herein are described in U.S. Patent Application No. 14/724,723 as Figures 31-37, which include chime embodiments.

Doorbell chimes are often loud and may interfere with a person's sleep. This sleep interruption is often especially hard on babies and small children who may be napping during the day when visitors would most likely ring the doorbell. A doorbell system that allows the chime to be turned off or down while a person (baby, child, or adult) is asleep may help that person get a better quality of sleep.

Chimes 302 can include all of the features, assemblies, parts, systems, and components of any doorbell 202 described herein or incorporated by reference. Chimes 302 can include all the items shown in Figures 15 and 16.

Referring now to Figures 15-21, a user can use the remote computing device 204 to select a sound emitted by the chime 302 located inside the building or silence the chime 302 located inside the building. Several embodiments include many different sounds that the chime 302 can emit when someone "rings" the doorbell 202 or is detected by the doorbell 202.

As illustrated in Figure 15, the chime 302 may receive backup or primary power from a power source of a building 300 and/or a battery 462b located within the chime. As well, the chime 302 may include various components to detect different events within the vicinity of the chime 302. For example, embodiments may include a motion detector 218 configurable to detect motion along an inside portion of the building 300. The chime 302 may also include a camera assembly 208b configurable to capture an image along the inside portion of the building 300. As well, the chime 302 may include a speaker 488b configurable to emit sounds and a microphone 484b configurable to receive an audible message spoken by a user.

Even still, in embodiments, the chime 302 may include additional components including, but not limited to, a thermometer 512b configurable to determine temperature along the inside portion of the building 300 and a humidity sensor 305 configurable to determine humidity along the inside portion of the building 300. The chime 302 may include a detection system 528b that may include miscellaneous detection components to monitor and detect various other events. As well, the chime 302 may include a communication system 504b configurable to communicatively couple the chime to the doorbell 202, the remote computing device 204, and/or any other communication device. The communication system 504b may communicate via WiFi, Bluetooth, Bluetooth Low Energy, Thread, ZigBee, and the like. It should be appreciated that the chime 302 may utilize none, some, or all the same components as utilized by the doorbell 202.

A user can select a sound to be emitted by the chime 302 on her remote computing device 204 by using a control application 600. The remote computing device 204 can then send the sound to the chime 302 via the doorbell 202 (and/or via a server 206 and a wireless network 308). The sound can be a song, a greeting recorded by the user, or any other type of sound. Some embodiments include using a remote computing device 204 to download a sound from the Internet, sending the sound (or data associated with the sound) to the doorbell 202 (e.g., in response to using the remote computing device 204 to select the sound), sending the sound (or data associated with the sound) from the doorbell 202 to the chime 302, and/or emitting the sound from the chime 302.

As shown in Figures 17 and 18, the chime 302 can include an electrical plug 307. The plug 307 can be mechanically and electrically coupled to a power outlet 309 (as shown in Figure 18). Figure 17 illustrates embodiments of the chime 302 that include at least one plug 307 that may be electrically and/or communicatively coupled to a power outlet 309. The one plug 307 can thereby electrically and/or communicatively couple the doorbell 202 to the wires of the power outlet 309.

As illustrated in Figures 19 and 20, the doorbell 202 can serve as a communication bridge between the remote computing device 204 and the chime 302. The doorbell 202 can be used to enable the remote computing device 204 to control the chime 302. A user can select an option (e.g., a song or a chime setting) on the remote computing device 204, then the system can send information regarding the option to and/or from the computing device 204. Then, the system can send information regarding the option from the doorbell 202 to the chime 302 in response to the user selecting the option via the remote computing device 204. The communication 230 between the computing device 204 and the doorbell 202 can be wireless. The communication 230 between the doorbell 202 and the chime 302 can be wireless.

As illustrated in Figure 21, the chime 302 can serve as a communication bridge between the remote computing device 204 and the doorbell 202. This can be especially helpful when the doorbell 202 cannot access the wireless network 308 of the building 300 to which the doorbell is mechanically and/or electrically coupled. The chime 302 can be located inside the building 300, and thus, is more likely to access the wireless network 308 of the building 300 (due to a superior signal strength of the wireless network 308 at the chime 302 compared to the signal strength at the doorbell 202, which can be located much farther from a router of the wireless network 308). Some embodiments include configuring the chime 302 to serve as a communication bridge between the remote computing device 204 and the doorbell 202 in response to a first wireless signal strength of the wireless network 308 at a first location of the chime 302 being greater than a second wireless signal strength of the wireless network 308 at a second location of the doorbell 202.

The system 200 can be configured to communicate in various manners. In some embodiments, the remote computing device 204 communicates directly with the doorbell 202, while the doorbell 202 communicates directly with the chime 302. In some embodiments, the remote computing device 204 communicates directly with the chime 302, while the doorbell 202

communicates directly with the chime. Generally, it should be understood that the user can configure the system 200 in any manner.

Referring now to Figure 22, a doorbell chime system may include, among other things, an electronic monitor 1000, a doorbell 202, and a transceiver 301. Electronic monitors 1000 (e.g., baby monitors) can detect whether a person 1012 (e.g., a baby) is sleeping. The electronic monitor 1000 can include a microphone 1002 (e.g., to listen for breathing indicative of sleep), a video camera 1004 (e.g., to watch for a lack of motion, a sleeping position, or other behavior indicative of sleep), an under-mattress movement monitor 1006 (e.g., to detect whether a person is located in a bed and/or to detect movement behavior indicative of sleep), a breath monitor 1008 (e.g., to detect breathing indicative of sleep), and/or other sensors 1010 configured to determine whether a person 1012 is asleep.

Electronic monitors 1000 can be activity trackers such as the Jawbone UP2 made by Jawbone Inc., which has an office in San Francisco, California. Electronic monitors 1000 can also be Apple Watches made by Apple Inc., which has an office in Cupertino, California. Jawbone UP2 and an Apple Watch can determine whether the person to which they are attached is asleep.

Electronic monitors 1000 can also be motion detectors configured to determine if a person is asleep. Lack of motion for over 15 minutes can be indicative of a person being asleep.

Electronic monitors 1000 can also be under-mattress monitors. The Angelcare AC1100 is an example of an embodiment of an electronic monitor. The AC1100 includes a video camera, sound monitor, and an under-mattress monitor, which can be configured to detect whether a person is asleep. The AC1100 is made by Angelcare Monitors Inc., which has an office in Candiac, Quebec, Canada.

The Mimo Smart Baby Movement Monitor is an example of an electronic monitor 1000. The Mimo is made by Rest Devices, Inc., which has an office in Boston, Massachusetts.

The Spoutling is an example of an electronic monitor 1000. The Spoutling company has an office in San Francisco, California.

The Owlet is an example of an electronic monitor 1000. The Owlet is made by Owlet Baby Care, which has an office in Provo, Utah.

There are many different ways to detect whether a person is asleep. For example, a motion detection system can determine that a person is sleeping if the person does not move. A

radar system can sense breathing patterns indicative of sleeping. An activity tracker can detect sleeping due to accelerations indicative of sleeping or simply via detecting a lack of movement. A camera can watch a person to see if the person is sleeping (e.g., via a lack of movement or being located in a bed). The motion detection system could be part of a baby monitoring device (i.e. a device worn by the baby). Alternatively a doorbell system can include a button for a user to indicate that a person is sleeping.

The electronic monitor 1000 can be located inside a building (e.g., inside a bedroom, near a baby's crib). The chime 302 can be located inside the same building. The doorbell 202 can be coupled to an exterior surface of the building (e.g., near an entryway). The electronic monitor 1000, the doorbell 202, and/or the chime 302 can be communicatively coupled (e.g., via wireless communications 230).

The electronic monitor 1000, the doorbell 202, and/or the chime 302 can be connected to the same wireless network 308. In some embodiments, the electronic monitor 1000, the doorbell 202, and/or the chime 302 are communicatively coupled (to enable communication between them), but are not connected to the same wireless network 308.

If the doorbell 202 detects a visitor (e.g., a visitor pushes the button of the doorbell 202), the doorbell 202 can send a signal (which can be data or simply electricity) to a transceiver 301 (e.g. a chime 302). The chime 302 can emit a notification sound in response to receiving the signal from the doorbell 202.

If the person 1012 is asleep inside the building 300 (shown in Figure 3) to which the doorbell 202 and/or the transceiver 301 is attached, then the system can automatically modify the notification sound emitted by the chime 302 or turn off the chime 302. Modifying the notification sound could include blocking the chime 302 from emitting the notification sound or reducing the volume of the notification sound, among other things. Once the system detects that the person 1012 is no longer sleeping, then the system can be configured to automatically modify the notification sound emitted by the chime 302 or turn on the chime 302. Modifying the notification sound emitted by the chime 302 may include enabling the chime 302 to emit the notification sound or turning up the volume of the notification sound. In some embodiments once the system detects that the person 1012 is no longer sleeping, the system can be configured to cause the chime 302 to emit a second notification sound.

In some embodiments, the system disables emitting notification sounds in response to the electronic monitor 1000 detecting that a baby is asleep. In several embodiments, the system blocks emitting notification sounds in response to the electronic monitor 1000 detecting that an adult is asleep.

The electronic monitor 1000 (e.g., a sleep detection system) can detect if a person 1012 (e.g., a baby) is asleep. The sleep detection system 1000 can communicate directly via wireless communication 230 with the doorbell chime 302 to configured the chime 302 to not emit the notification sound (so the chime does not emit a notification sound from the speaker 488b). In some embodiments, the sleep detection system 1000 communicating with the doorbell chime 302 comprises the sleep detection system 1000 sending a modifying signal to the doorbell chime 302.

In some embodiments, the sleep detection system 1000 cannot communicate directly with the chime 302. In some embodiments, the sleep detection system 1000 communicates with the doorbell 202 (which includes a camera) and/or with a communication hub 314 via wireless communication 230. Then, the doorbell 202 or the communication hub 314 can send a wireless communication 230 (i.e. a modifying signal) to the chime 302 to configure the chime 302 to not emit the notification sound or lower the volume of the notification sound. A communication hub 314 may be configured to receive signals (e.g., wireless communication 230) from other components of the doorbell system (i.e., the doorbell 202, the chime 302, or the electronic monitor 1000).

Referring now to Figure 23, in some embodiments the transceiver 301 may be a communication hub 314. The communication hub 314 may be communicatively coupled to the other components of the doorbell system (i.e. doorbell 202, doorbell chime 302, and electronic monitor 1000). The communication hub 314 may enable communication between different parts of the doorbell chime system. For example, in some embodiments the doorbell 202, doorbell chime 302, and electronic monitor may be communicatively coupled to the communication hub 314, but not to each other. In some embodiments the doorbell 202, doorbell chime 302, and electronic monitor 1000 can communicate only with the communication hub 314. For example, the doorbell 202 may send a signal to the communication hub 314 in response to detecting a visitor. Then, the communication hub may send a signal to the doorbell chime 302 to cause the doorbell chime 302 to emit a notification sound. The communication hub 314 may also receive a signal from the electronic monitor 1000 in response to the electronic monitor 1000 detecting that

a person 1012 is asleep. In response to the communication hub 314 receiving a signal from the electronic monitor 1000 that a person is asleep, the communication hub may send a signal to the doorbell chime 302 to modify the notification sound emitted by the doorbell chime 302. In some embodiments the transceiver 301 may be the doorbell 202.

In order to modify the notification sound emitted by the doorbell chime 302 a modifying signal may be sent to the doorbell chime in response to the doorbell 202 receiving the first signal.

In some embodiments, the sensor 1010 can be a radar detector configured to sense a person's breathing. In response to detecting that the person 1012 is not breathing, the system can notify a third party (e.g., police, emergency services, ambulance dispatch, a relative). Not breathing could be a sign of cardiac arrest, so the system can be a cardiac-arrest detection system.

INTERPRETATION

None of the steps described herein is essential or indispensable. Any of the steps can be adjusted or modified. Other or additional steps can be used. Any portion of any of the steps, processes, structures, and/or devices disclosed or illustrated in one embodiment, flowchart, or example in this specification can be combined or used with or instead of any other portion of any of the steps, processes, structures, and/or devices disclosed or illustrated in a different embodiment, flowchart, or example. The embodiments and examples provided herein are not intended to be discrete and separate from each other.

The section headings and subheadings provided herein are nonlimiting. The section headings and subheadings do not represent or limit the full scope of the embodiments described in the sections to which the headings and subheadings pertain. For example, a section titled "Topic 1" may include embodiments that do not pertain to Topic 1 and embodiments described in other sections may apply to and be combined with embodiments described within the "Topic 1" section.

Some of the devices, systems, embodiments, and processes use computers. Each of the routines, processes, methods, and algorithms described in the preceding sections may be embodied in, and fully or partially automated by, code modules executed by one or more computers, computer processors, or machines configured to execute computer instructions. The code modules may be stored on any type of non-transitory computer-readable storage medium or

tangible computer storage device, such as hard drives, solid state memory, flash memory, optical disc, and/or the like. The processes and algorithms may be implemented partially or wholly in application-specific circuitry. The results of the disclosed processes and process steps may be stored, persistently or otherwise, in any type of non-transitory computer storage such as, e.g., volatile or non-volatile storage.

The various features and processes described above may be used independently of one another, or may be combined in various ways. All possible combinations and subcombinations are intended to fall within the scope of this disclosure. In addition, certain method, event, state, or process blocks may be omitted in some implementations. The methods, steps, and processes described herein are also not limited to any particular sequence, and the blocks, steps, or states relating thereto can be performed in other sequences that are appropriate. For example, described tasks or events may be performed in an order other than the order specifically disclosed. Multiple steps may be combined in a single block or state. The example tasks or events may be performed in serial, in parallel, or in some other manner. Tasks or events may be added to or removed from the disclosed example embodiments. The example systems and components described herein may be configured differently than described. For example, elements may be added to, removed from, or rearranged compared to the disclosed example embodiments.

Conditional language used herein, such as, among others, "can," "could," "might," "may," "e.g.," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular embodiment. The terms "comprising," "including," "having," and the like are synonymous and are used inclusively, in an open-ended fashion, and do not exclude additional elements, features, acts, operations and so forth. Also, the term "or" is used in its inclusive sense (and not in its exclusive sense) so that when used, for example, to connect a list of elements, the term "or" means one, some, or all of the elements in the list. Conjunctive language such as the phrase "at least one of X, Y, and Z," unless specifically stated otherwise, is otherwise understood with the context as used in general

to convey that an item, term, etc. may be either X, Y, or Z. Thus, such conjunctive language is not generally intended to imply that certain embodiments require at least one of X, at least one of Y, and at least one of Z to each be present.

The term "and/or" means that "and" applies to some embodiments and "or" applies to some embodiments. Thus, A, B, and/or C can be replaced with A, B, and C written in one sentence and A, B, or C written in another sentence. A, B, and/or C means that some embodiments can include A and B, some embodiments can include A and C, some embodiments can include B and C, some embodiments can only include A, some embodiments can include only B, some embodiments can include only C, and some embodiments can include A, B, and C. The term "and/or" is used to avoid unnecessary redundancy.

While certain example embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions disclosed herein. Thus, nothing in the foregoing description is intended to imply that any particular feature, characteristic, step, module, or block is necessary or indispensable. Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions, and changes in the form of the methods and systems described herein may be made without departing from the spirit of the inventions disclosed herein.

THE FOLLOWING IS CLAIMED:

1. A delivery parcel detection system, the system comprising:

a doorbell having a first wireless communication system and a radio-frequency identification reader;

a remote computing device communicatively coupled with the doorbell via the first wireless communication system; and

a delivery parcel having a radio-frequency identification tag, wherein the doorbell is configured to detect the delivery parcel by the radio-frequency identification reader reading the radio-frequency identification tag of the delivery parcel.

2. The system of Claim 1, further comprising a first communication sent from the doorbell to a remote computer system in response to the doorbell detecting the delivery parcel, wherein the remote computer system comprises a database having information regarding the delivery parcel.

3. The system of Claim 2, further comprising a second communication sent from the remote computer system to the doorbell in response to the remote computer system receiving the first communication, wherein the second communication comprises the information regarding the delivery parcel.

4. The system of Claim 3, further comprising a third communication sent from the doorbell to the remote computing device in response to the doorbell receiving the second communication, wherein the third communication comprises the information.

5. The system of Claim 4, wherein the third communication comprises a time indicative of when the doorbell first detected the delivery parcel.

6. The system of Claim 4, further comprising a fourth communication sent from the doorbell to the remote computing device in response to the doorbell receiving the second

communication, wherein the fourth communication comprises a first picture taken by a camera of the doorbell.

7. The system of Claim 6, wherein the first picture shows the delivery parcel.

8. The system of Claim 4, further comprising a fourth communication sent from the doorbell to the remote computing device in response to the doorbell detecting the delivery parcel, wherein the fourth communication comprises a first picture taken by a camera of the doorbell.

9. The system of Claim 8, wherein the first picture shows the delivery parcel.

10. The system of Claim 1, further comprising a first notification sent from the doorbell to the remote computing device in response to the doorbell detecting the radio-frequency identification tag of the delivery parcel.

11. The system of Claim 10, wherein the first notification comprises a first picture taken by a camera of the doorbell in response to the doorbell detecting the radio-frequency identification tag of the delivery parcel.

12. The system of Claim 11, wherein the remote computing device comprises a display screen, the system further comprising at least a portion of the first picture displayed on the display screen such that the system is configured to enable a user of the remote computing device to see the delivery parcel on the display screen in response to the first notification.

13. The system of Claim 10, further comprising a second notification sent from the doorbell to the remote computing device in response to the doorbell determining that the radio-frequency identification tag of the delivery parcel is no longer detected by the doorbell such that the system is configured to detect a removal of the delivery parcel from a detection range of the radio-frequency identification reader of the doorbell.

14. The system of Claim 13, wherein the second notification comprises a second picture taken by a camera of the doorbell in response to the doorbell determining that the radio-frequency identification tag of the delivery parcel is no longer detected by the doorbell.

15. The system of Claim 10, further comprising a second notification sent from the doorbell to the remote computing device in response to the doorbell detecting a removal of the delivery parcel.

16. The system of Claim 10, further comprising a first signal of the radio-frequency identification tag detected by the doorbell at a first time, a second signal of the radio-frequency identification tag detected by the doorbell at a second time, and a second notification sent from the doorbell to the remote computing device in response to the doorbell detecting a removal of the delivery parcel by determining that the second signal is weaker than the first signal.

17. The system of Claim 16, wherein the second notification comprises a second picture taken by a camera of the doorbell in response to the doorbell detecting the removal.

18. The system of Claim 1, wherein the radio frequency identification tag is a passive tag.

19. The system of Claim 1, wherein the radio frequency identification tag is an active tag.

20. The system of Claim 1, wherein the doorbell is configured to detect the delivery parcel by the radio-frequency identification reader reading a passive radio-frequency identification tag of the delivery parcel.

21. The system of Claim 1, wherein the doorbell is configured to detect the delivery parcel by the radio-frequency identification reader reading an active radio-frequency identification tag of the delivery parcel.

22. A method of using a delivery parcel detection system, the method comprising:

obtaining a doorbell having a first wireless communication system and a radio-frequency identification reader;

detecting, by the doorbell, a delivery parcel having a radio-frequency identification tag; and

sending, by the doorbell, a first notification regarding the delivery parcel to a remote computing device,

wherein detecting, by the doorbell, the delivery parcel comprises reading, by the radio-frequency identification reader of the doorbell, the radio-frequency identification tag of the delivery parcel.

23. The method of Claim 22, further comprising sending, by the doorbell, a second notification regarding an arrival of the delivery parcel to a sender of the delivery parcel in response to detecting, by the doorbell, the delivery parcel.

24. The method of Claim 23, further comprising receiving, by the doorbell, information associated with the delivery parcel from the sender.

25. The method of Claim 24, wherein the first notification to the remote computing device contains the information associated with the delivery parcel such that the doorbell is configured to receive the information associated with the delivery parcel in response to detecting the delivery parcel and the doorbell is configured to send the information associated with the delivery parcel to a recipient of the delivery parcel in response to detecting the delivery parcel.

26. The method of Claim 24, wherein the information associated with the delivery parcel includes at least a description of contents of the delivery parcel.

27. The method of Claim 22, wherein detecting, by the doorbell, the delivery parcel further comprises detecting, by the doorbell, that the delivery parcel has entered a radio frequency identification reading distance of the doorbell.

28. The method of Claim 27, further comprising sending, by the doorbell, a third notification to the remote computing device in response to the doorbell detecting that the delivery parcel has been removed from a detection area of the doorbell.

29. The method of Claim 27, further comprising taking, by the doorbell, a picture in response to the doorbell detecting that the delivery parcel has been moved.

30. The method of Claim 22, further comprising detecting, by the doorbell, that the delivery parcel has been removed.

31. A delivery parcel detection system, the system comprising:

a doorbell having a first wireless communication system; and

a floor covering configured for placement on an entryway floor, the floor covering comprising a sensor configured to detect a first indication of a delivery parcel on the floor covering, wherein the floor covering is communicatively coupled to the doorbell.

32. The system of Claim 31, further comprising a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel, and further comprising a second communication sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

33. The system of Claim 32, wherein the floor covering is a mat.

34. The system of Claim 32, wherein the second communication comprises a first picture taken by the doorbell such that the doorbell is configured to send the first picture to the remote computing device in response to the floor covering detecting the first indication of the delivery parcel.

35. The system of Claim 34, wherein the first picture shows the delivery parcel.

36. The system of Claim 32, wherein the first indication is associated with an arrival of the delivery parcel to the floor covering.

37. The system of Claim 32, further comprising a first alert regarding the delivery parcel, wherein the first alert is displayed on the remote computing device in response to the remote computing device receiving the second communication from the doorbell.

38. The system of Claim 32, further comprising a graphical user interface displayed on the remote computing device, wherein the graphical user interface is configured to display information regarding the delivery parcel.

39. The system of Claim 32, further comprising a graphical user interface displayed on the remote computing device, wherein the doorbell comprises at least one light, and the graphical user interface is configured to enable changing at least one setting of the light of the doorbell.

40. The system of Claim 39, wherein the setting comprises a color of the light.

41. The system of Claim 39, wherein the setting comprises a brightness of the light.

42. The system of Claim 39, wherein the system automatically changes the setting in response to the floor covering detecting the first indication of the delivery parcel.

43. The system of Claim 32, wherein the first communication is a first wireless communication, and the second communication is a second wireless communication.

44. The system of Claim 32, wherein the doorbell comprises an electrical power consumption rate that increases in response to the floor covering detecting the first indication of the delivery parcel.

45. The system of Claim 32, wherein the doorbell comprises a camera configured to take at least one picture in response to the floor covering detecting the first indication of the delivery parcel.

46. The system of Claim 32, wherein the sensor comprises a pressure sensor configured such that placing the delivery parcel on the floor covering enables the pressure sensor to detect the first indication.

47. The system of Claim 31, further comprising a camera electrically coupled to at least one of the doorbell and the floor covering, and further comprising a video taken by the camera in response to the system detecting a removal of the delivery parcel.

48. The system of Claim 47, further comprising a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel, and further comprising a second communication sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

49. The system of Claim 31, further comprising a camera electrically coupled to at least one of the doorbell and the floor covering, and further comprising a video taken by the camera in response to the camera detecting an object that has moved into a field of view of the camera during a period when the system has determined the delivery parcel is located on the floor covering.

50. The system of Claim 31, further comprising a motion detector and a camera electrically coupled to at least one of the doorbell and the floor covering, and further comprising a video taken by the camera in response to the motion detector detecting a motion indication during a period when the system has determined the delivery parcel is located on the floor covering.

51. The system of Claim 50, further comprising a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel.

52. The system of Claim 51, further comprising a second communication sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

53. The system of Claim 51, further comprising a second communication sent from the doorbell to a remote computing device in response to the motion detector detecting the motion indication, wherein the second communication comprises the video.

54. The system of Claim 31, wherein the first indication is associated with a removal of the delivery parcel from the floor covering, the system further comprising a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication, and further comprising a second communication sent from the doorbell to a remote computing device in response to the doorbell receiving the first communication.

55. The system of Claim 54, further comprising a camera electrically coupled to at least one of the doorbell and the floor covering, wherein the second communication comprises a picture taken by the camera within five seconds of the sensor detecting the first indication.

56. The system of Claim 31, further comprising a camera electrically coupled to the doorbell, a first communication sent from the floor covering to the doorbell in response to the floor covering detecting the first indication of the delivery parcel, and a picture taken by the camera in response to the floor covering detecting a removal of the delivery parcel from the floor covering.

57. The system of Claim 56, further comprising a second communication sent from the doorbell to the remote computing device in response to the floor covering detecting the removal of the delivery parcel from the floor covering, wherein the second communication comprises the picture.

58. The system of Claim 31, further comprising a warning sound emitted from the doorbell in response to the system detecting a removal of the delivery parcel from the floor covering.

59. The system of Claim 31, further comprising at least one of a warning light and a warning sound emitted from at least one of the doorbell and the floor covering in response to the system detecting at least one of a motion and an object that has moved into a field of view of a camera of the doorbell, and in response to the system determining the delivery parcel is located on the floor covering.

60. The system of Claim 32, further comprising at least one of a warning light and a warning sound emitted from at least one of the doorbell and the floor covering in response to the system detecting a removal of the delivery parcel from the floor covering during a period when the system has determined that the remote computing device is at least one of not located within a predetermined distance of the doorbell and not located within a detection range of the doorbell.

61. A method for using a doorbell chime system, the method comprising:

detecting, by an electronic monitor, that a person is asleep;

receiving a first signal, by a transceiver, in response to the electronic monitor detecting that the person is asleep; and

modifying a first notification sound emitted by a doorbell chime in response to detecting, by the electronic monitor, that the person is asleep.

62. The method of Claim 61, further comprising:

detecting, by the electronic monitor, that the person is awake;

receiving a second signal, by the transceiver, in response to the electronic monitor detecting that the person is awake; and

modifying, by the system, a second notification sound emitted by the doorbell chime in response to detecting, by the electronic monitor, that the person is awake.

63. The method of Claim 62, wherein modifying the second notification sound emitted by the doorbell chime comprises increasing the volume of the notification sound.

64. The method of Claim 62, wherein modifying the second notification sound emitted by the doorbell chime comprises enabling the second notification sound.

65. The method of Claim 61, wherein modifying the first notification sound emitted by the doorbell chime comprises decreasing the volume of the first notification sound.

66. The method of Claim 61, wherein the system comprises a doorbell having the transceiver and a button configured to trigger the doorbell chime to emit the first notification sound, wherein modifying the first notification sound emitted by the doorbell chime comprises disabling the button of the doorbell such that pressing the button does not cause the doorbell chime to emit the first notification sound.

67. The method of Claim 61, wherein the doorbell chime comprises the transceiver, the method further comprising modifying, by the system, the first notification sound emitted by the doorbell chime in response to the transceiver of the doorbell chime receiving the first signal.

68. The method of Claim 61, wherein the system comprises a doorbell having the transceiver, the method further comprising blocking, by the doorbell, the doorbell chime from emitting the first notification sound.

69. The method of Claim 68, wherein the system comprises a doorbell having the transceiver, wherein modifying the first notification sound emitted by the doorbell chime comprises:

sending, by the doorbell, a modifying signal to the doorbell chime in response to the doorbell receiving the first signal; and

blocking, by the doorbell chime, the first notification sound in response to receiving the modifying signal.

70. The method of Claim 61, wherein the system comprises a doorbell, and the transceiver is a communication hub located remotely from the doorbell and the doorbell chime, wherein modifying the first notification sound emitted by the doorbell chime comprises:

sending, by the communication hub, a modifying signal to at least one of the doorbell and the doorbell chime in response to the communication hub receiving the first signal; and

blocking, by at least one of the doorbell and the doorbell chime, the first notification sound in response to at least one of the doorbell and the doorbell chime receiving the modifying signal.

71. The method of Claim 61, wherein the system comprises a doorbell, wherein at least one of the doorbell and the doorbell chime comprise the transceiver that receives the first signal, the method further comprising modifying, by the system, the first notification sound emitted by the doorbell chime in response to at least one of the doorbell and the doorbell chime receiving the first signal.

72. The method of Claim 61, wherein the electronic monitor is a camera.

73. The method of Claim 61, wherein the electronic monitor is an activity tracker.

74. The method of Claim 61, wherein the electronic monitor is a motion detector.

75. The method of Claim 61, wherein the electronic monitor is an under-mattress monitor.

76. A doorbell system comprising:

a doorbell;

a doorbell chime configured to emit a notification sound in response to receiving a visitor indication from the doorbell;

a sleep detection system having a sensor configured to determine whether a person is asleep, wherein the doorbell, the doorbell chime, and the sleep detection system are communicatively coupled such that, in response to the sleep detection system determining that the person is asleep, the doorbell chime is configured to modify the notification sound emitted by the doorbell chime; and

a wireless communication from the sleep detection system to configure the doorbell system to prevent the doorbell chime from emitting the notification sound.

77. The doorbell system of Claim 76, further comprising a communication hub, wherein the communication hub, doorbell, doorbell chime, and the sleep detection system are communicatively coupled to the communication hub.

78. The doorbell system of Claim 76, wherein the doorbell system, in response to the sleep detection system determining that the person is awake, is configured to modify the notification sound emitted by the doorbell chime.

79. A doorbell system comprising:

a doorbell;

a doorbell chime configured to emit a notification sound in response to receiving a visitor indication from the doorbell; and

a sleep detection system having a sensor configured to determine whether a person is asleep, wherein the doorbell chime and the sleep detection system are communicatively coupled to a transceiver such that, in response to the sleep detection system determining that the person is asleep, the doorbell chime is configured to modify the notification sound emitted by the doorbell chime.

80. The doorbell system of Claim 79, wherein the doorbell system is further configured to, in response to the sleep detection system determining that the person is awake, modify the notification sound emitted by the doorbell chime.

81. The doorbell system of Claim 80, wherein modifying the notification sound emitted by the doorbell chime includes enabling the notification sound.

82. The doorbell system of Claim 80, wherein modifying the notification sound emitted by the doorbell chime includes increasing the volume of the notification sound.

83. The doorbell system of Claim 79, wherein the transceiver is a communication hub.

84. The doorbell system of Claim 79, wherein the transceiver is the doorbell.

85. The doorbell system of Claim 79, wherein the transceiver is the doorbell chime.

86. The doorbell system of Claim 79, wherein modifying the notification sound emitted by the doorbell chime includes blocking the notification sound.

87. The doorbell system of Claim 79, wherein modifying the notification sound emitted by the doorbell chime includes decreasing the volume of the notification sound.

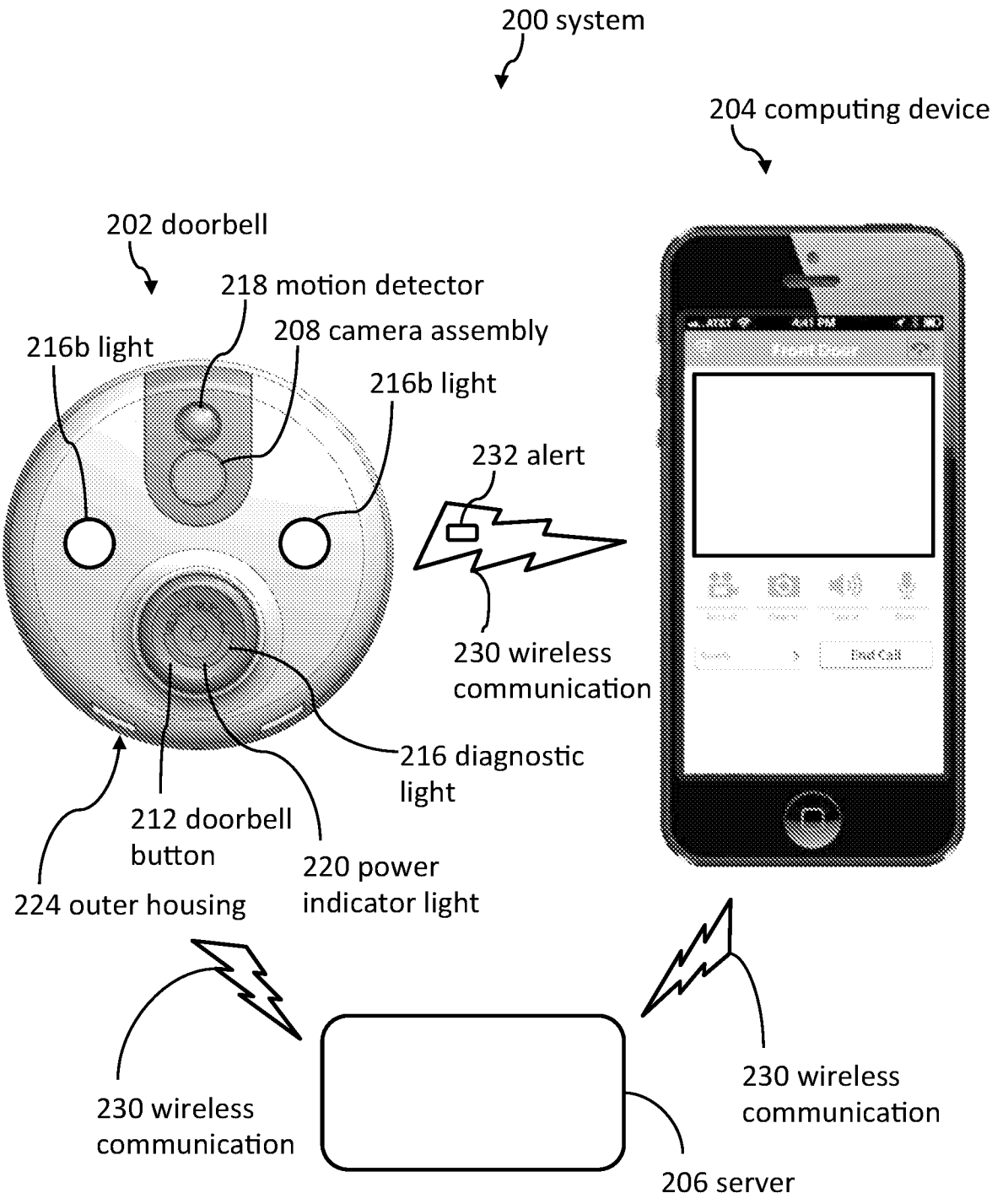

200 system
204 computing device
202 doorbell
218 motion detector
208 camera assembly
216b light
216b light
232 alert
230 wireless communication
216 diagnostic light
212 doorbell button
220 power indicator light
224 outer housing
230 wireless communication
230 wireless communication
206 server

Figure 1

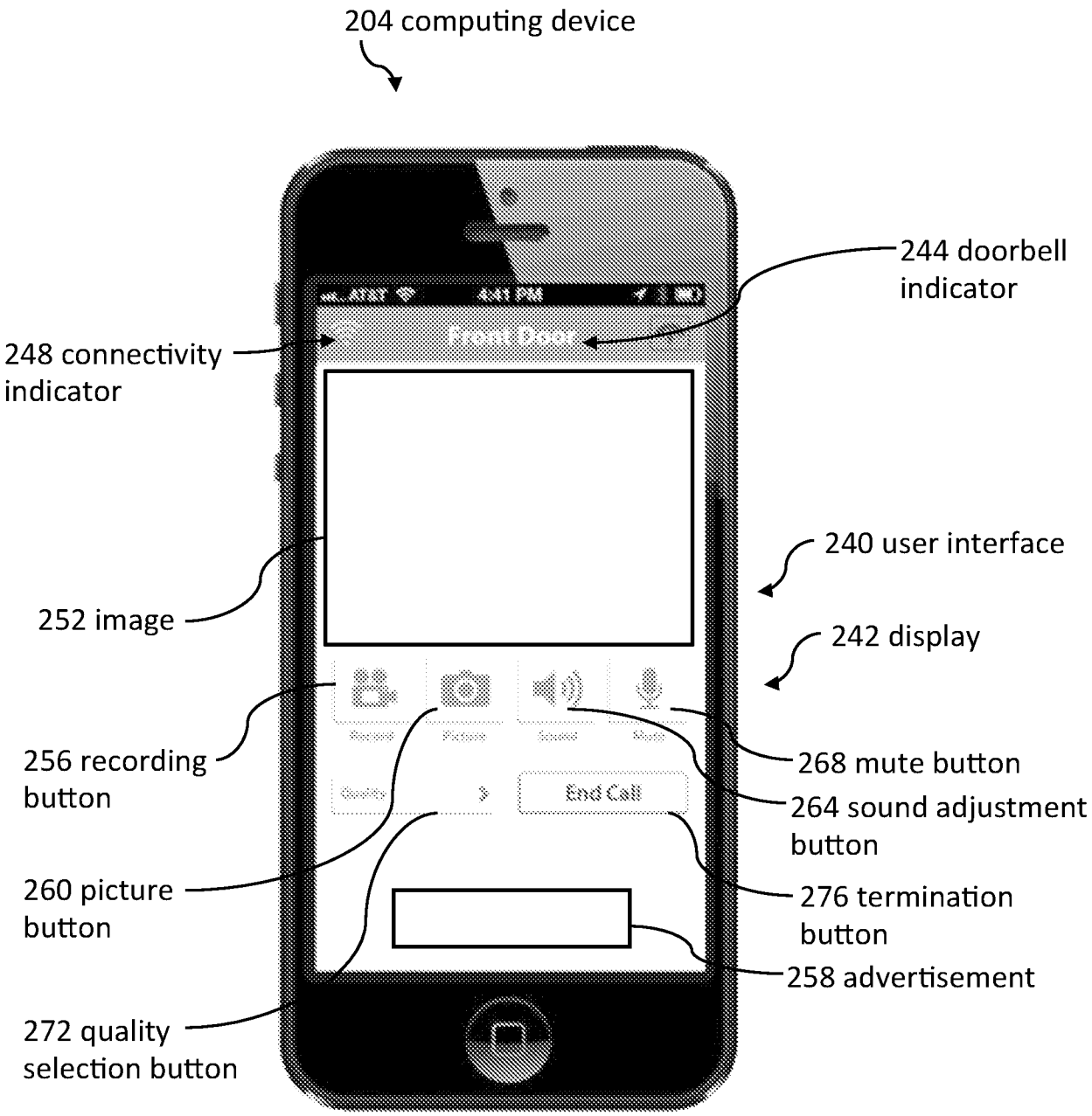

204 computing device
244 doorbell indicator
248 connectivity indicator
Front Door
240 user interface
252 image
242 display
256 recording button
268 mute button
264 sound adjustment button
End Call
276 termination button
260 picture button
258 advertisement
272 quality selection button

Figure 2

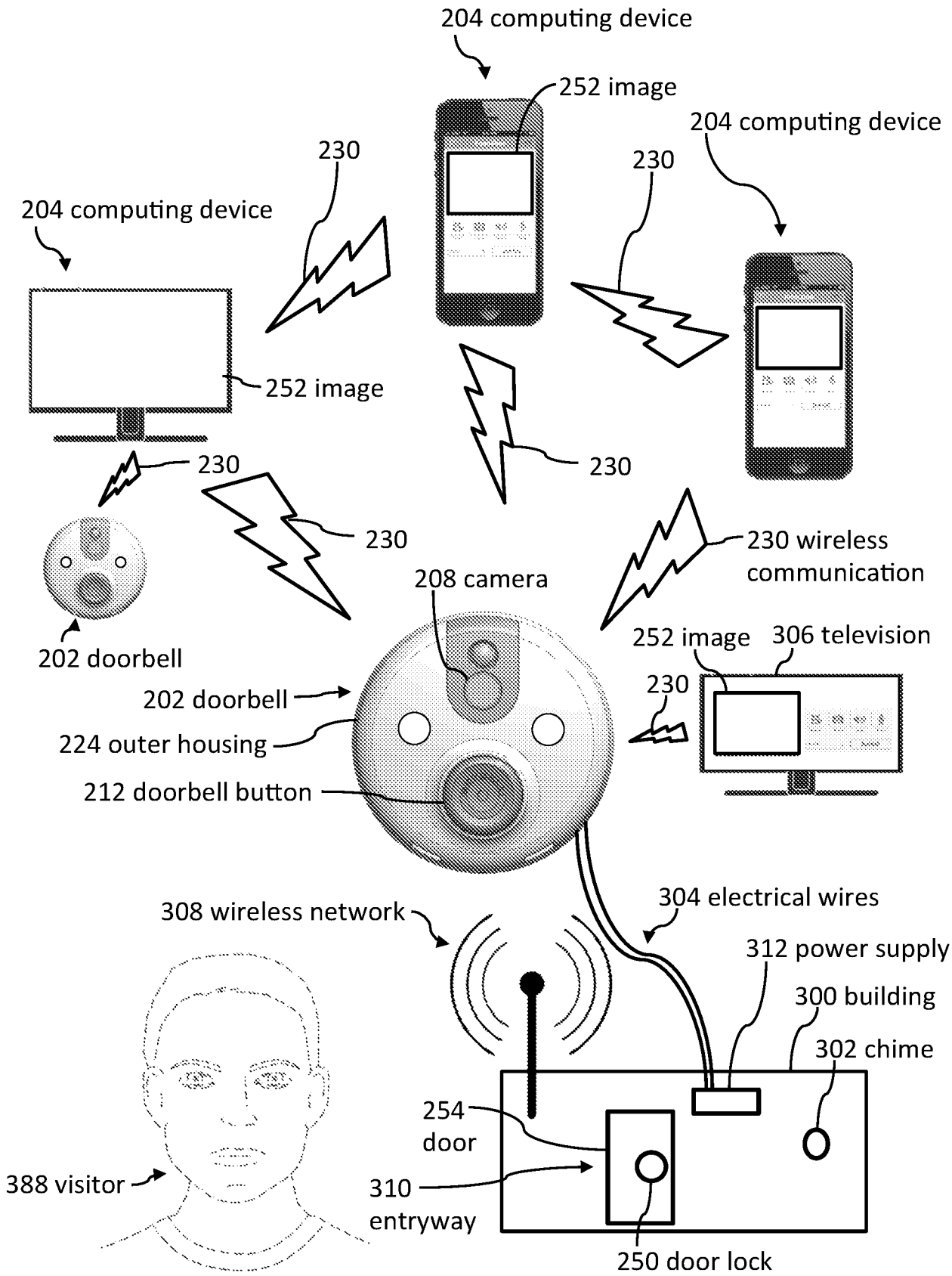

204 computing device
252 image
204 computing device
230
230
204 computing device
252 image
230
230
230
230
230 wireless communication
208 camera
202 doorbell
252 image
306 television
230
202 doorbell
224 outer housing
212 doorbell button
304 electrical wires
308 wireless network
312 power supply
300 building
302 chime
254 door
388 visitor
310 entryway
250 door lock

Figure 3

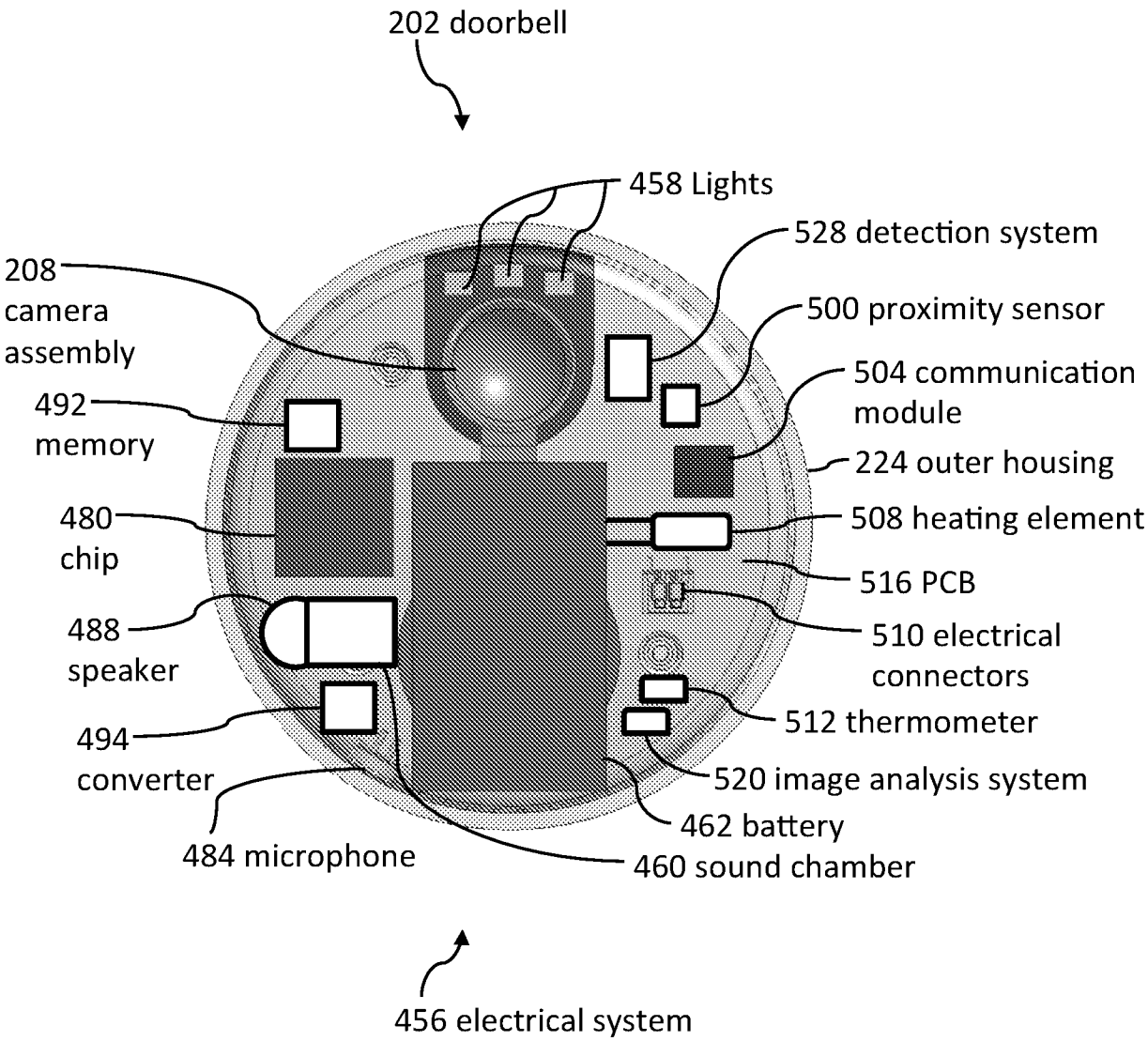

202 doorbell
458 Lights
528 detection system
208
camera
assembly
500 proximity sensor
504 communication
module
492
memory
224 outer housing
480
chip
508 heating element
516 PCB
488
speaker
510 electrical
connectors
494
converter
512 thermometer
520 image analysis system
462 battery
484 microphone
460 sound chamber
456 electrical system

Figure 4

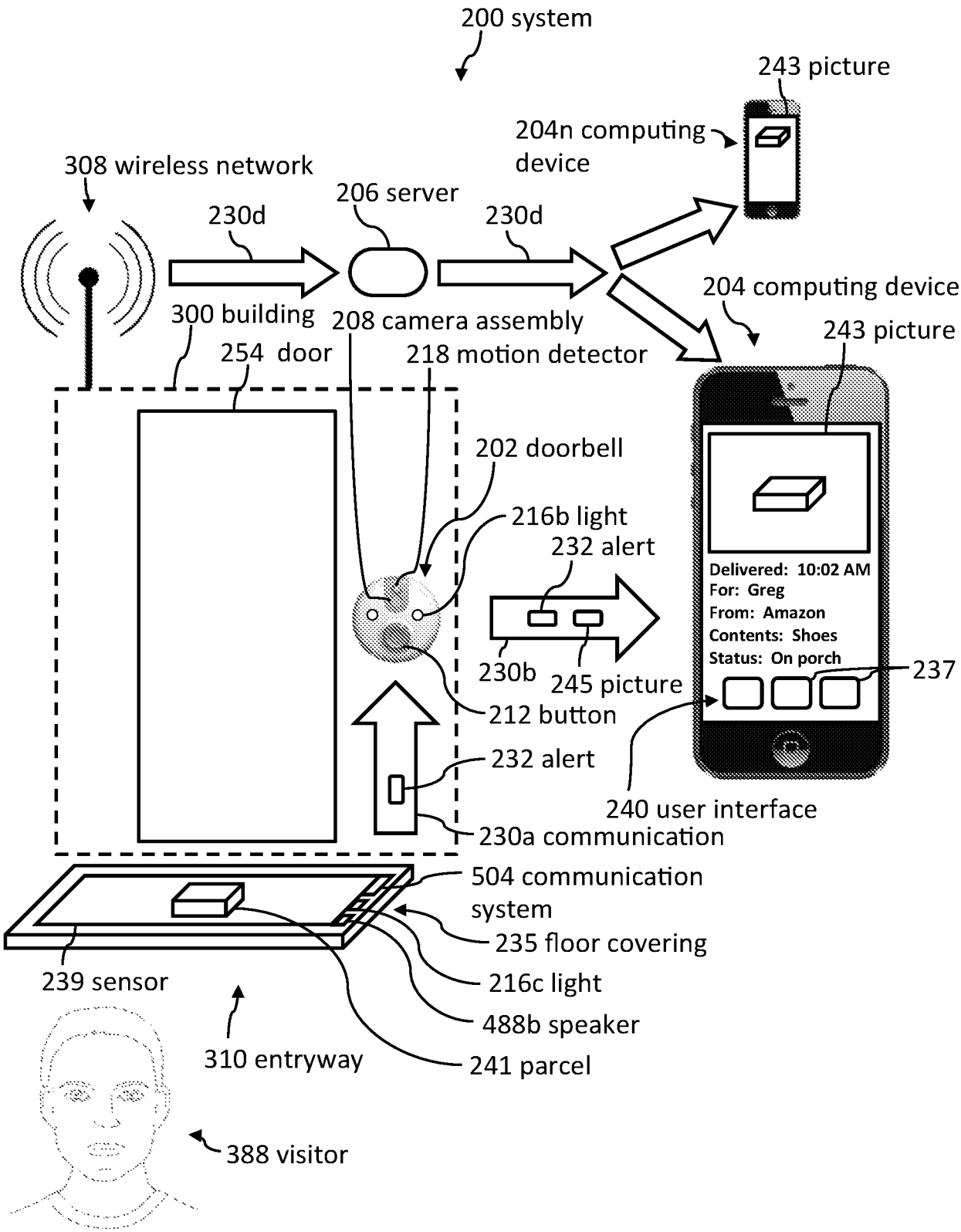

200 system
243 picture
204n computing device
308 wireless network
206 server
230d
230d
204 computing device
300 building
208 camera assembly
243 picture
254 door
218 motion detector
202 doorbell
216b light
232 alert
Delivered: 10:02 AM
For: Greg
From: Amazon
Contents: Shoes
Status: On porch
237
230b
245 picture
212 button
232 alert
240 user interface
230a communication
504 communication system
235 floor covering
239 sensor
216c light
488b speaker
310 entryway
241 parcel
388 visitor

Figure 5

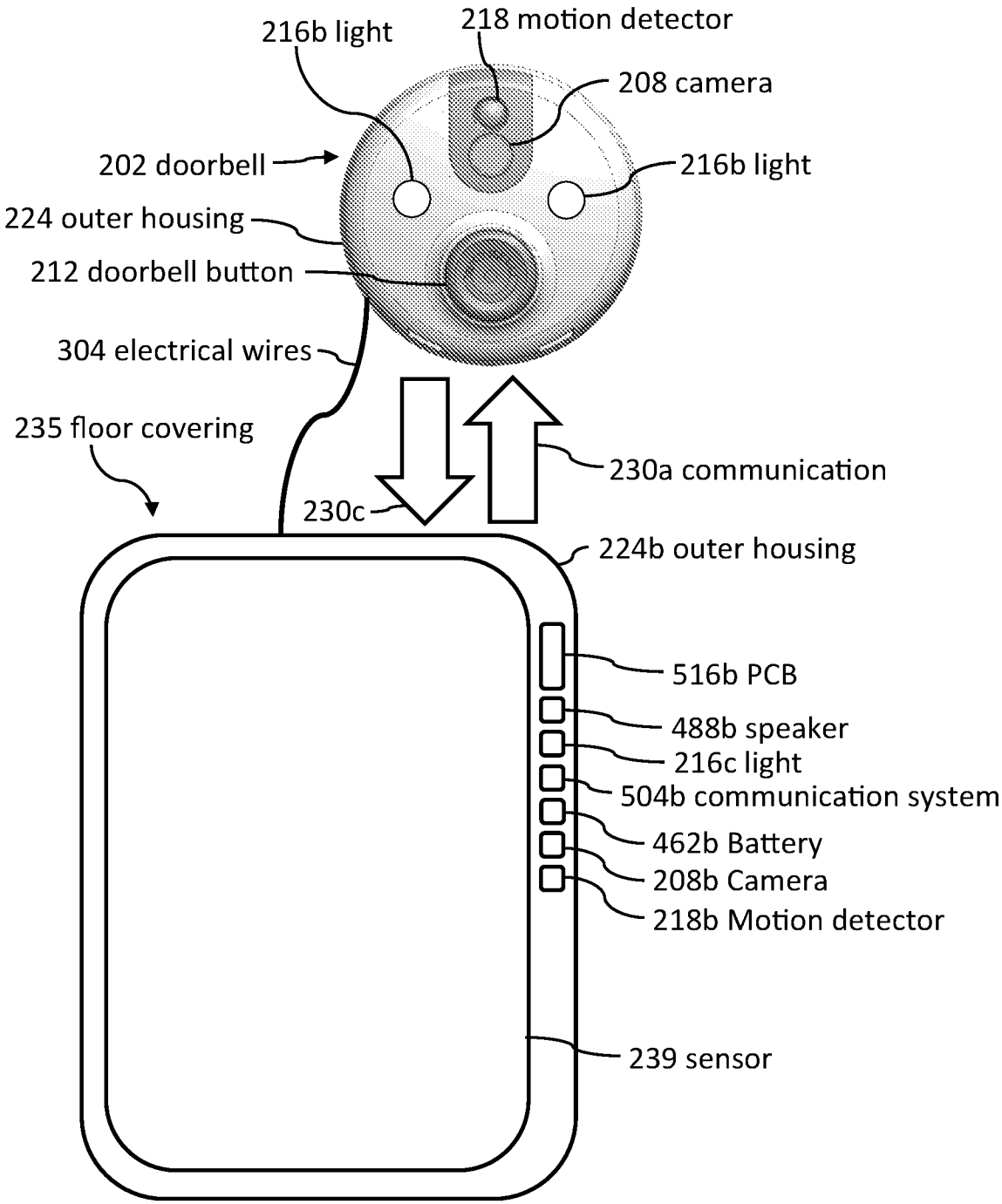

216b light
218 motion detector
208 camera
202 doorbell
216b light
224 outer housing
212 doorbell button
304 electrical wires
235 floor covering
230a communication
230c
224b outer housing
516b PCB
488b speaker
216c light
504b communication system
462b Battery
208b Camera
218b Motion detector
239 sensor

Figure 6

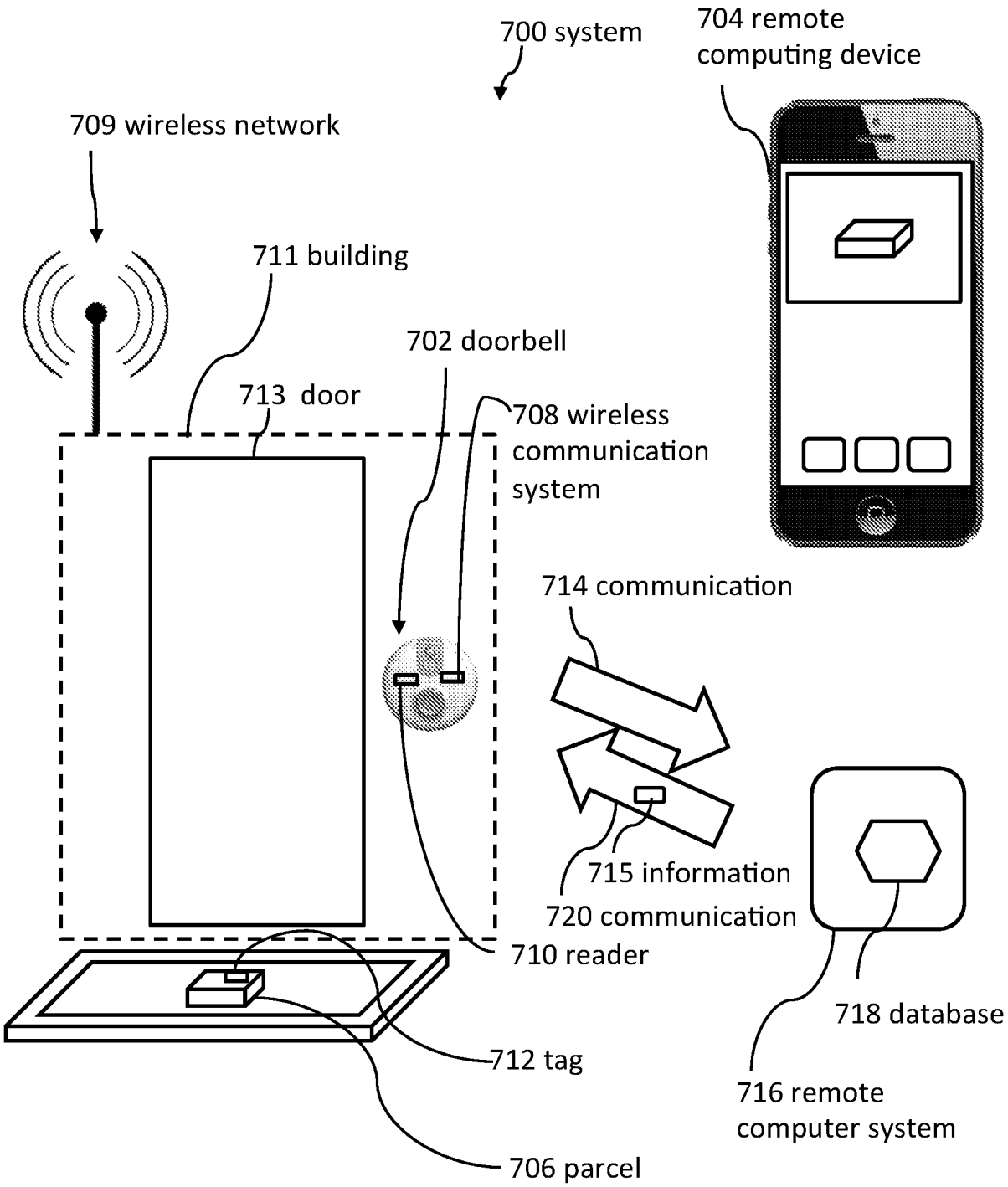

700 system
704 remote computing device
709 wireless network
711 building
702 doorbell
713 door
708 wireless communication system
714 communication
715 information
720 communication
710 reader
718 database
712 tag
716 remote computer system
706 parcel

Figure 7

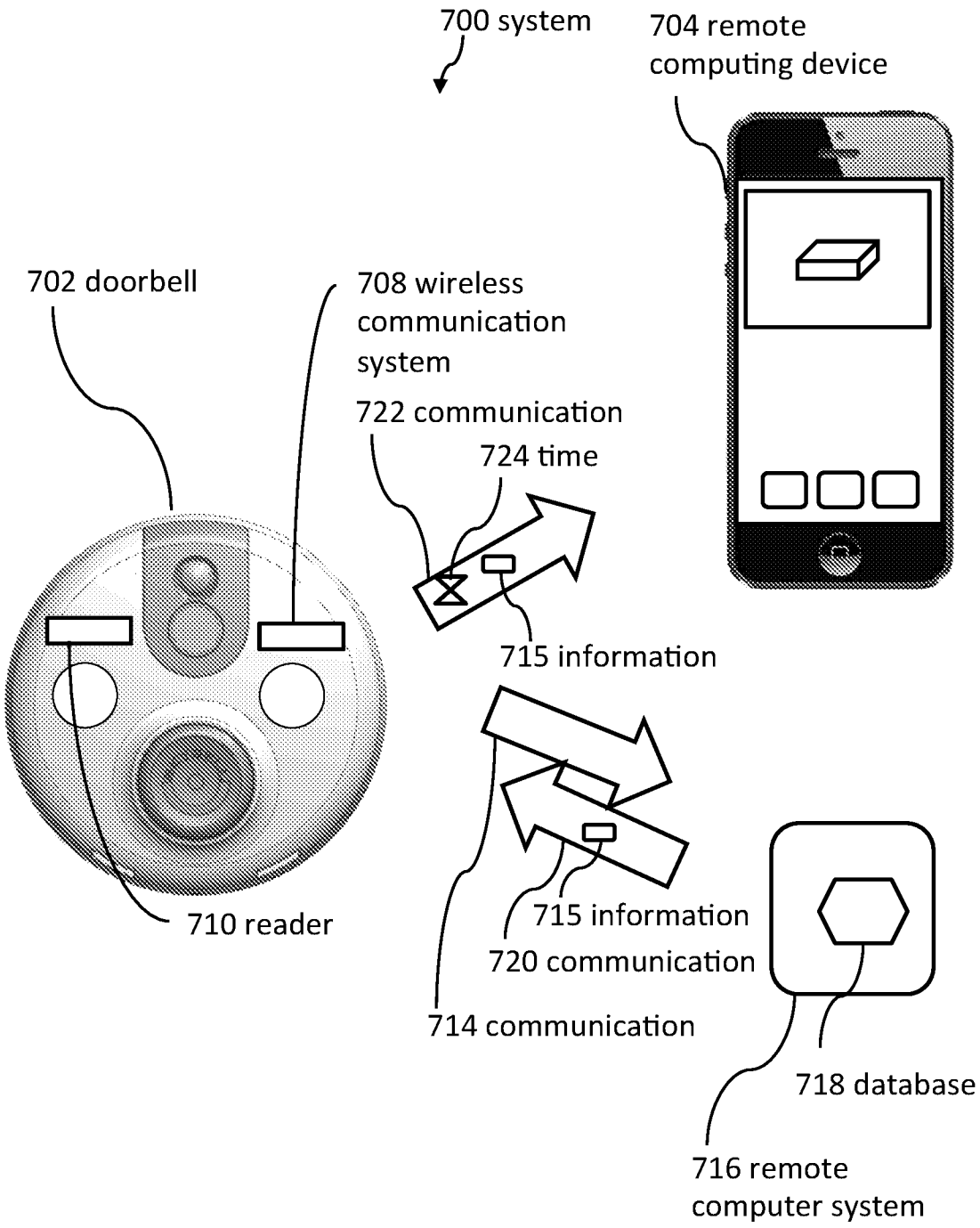

700 system
704 remote computing device
702 doorbell
708 wireless communication system
722 communication
724 time
715 information
710 reader
715 information
720 communication
714 communication
718 database
716 remote computer system

Figure 8

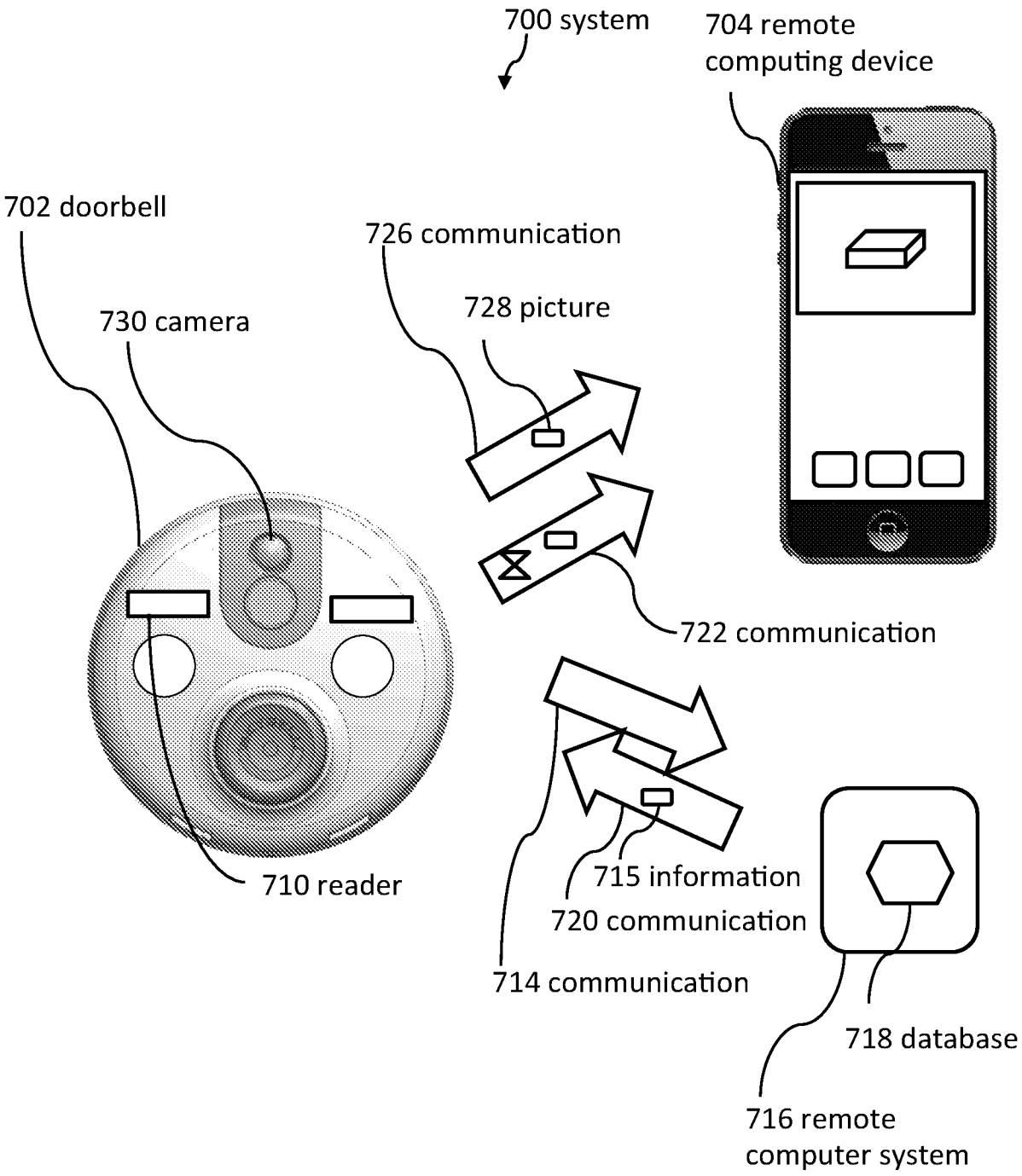

700 system
704 remote computing device
702 doorbell
726 communication
730 camera
728 picture
722 communication
710 reader
715 information
720 communication
714 communication
718 database
716 remote computer system

Figure 9

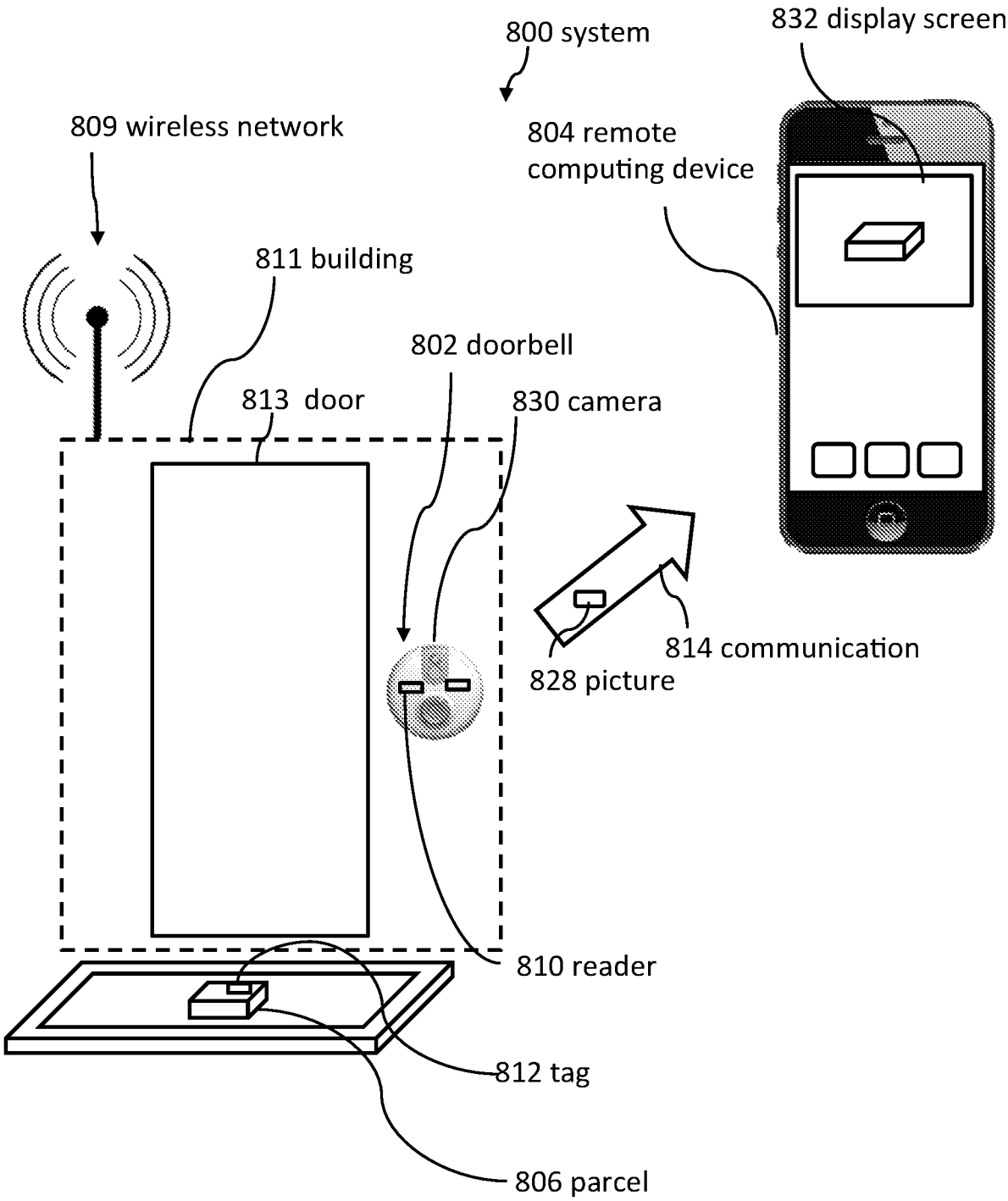

800 system
832 display screen
809 wireless network
804 remote computing device
811 building
802 doorbell
813 door
830 camera
814 communication
828 picture
810 reader
812 tag
806 parcel

Figure 10

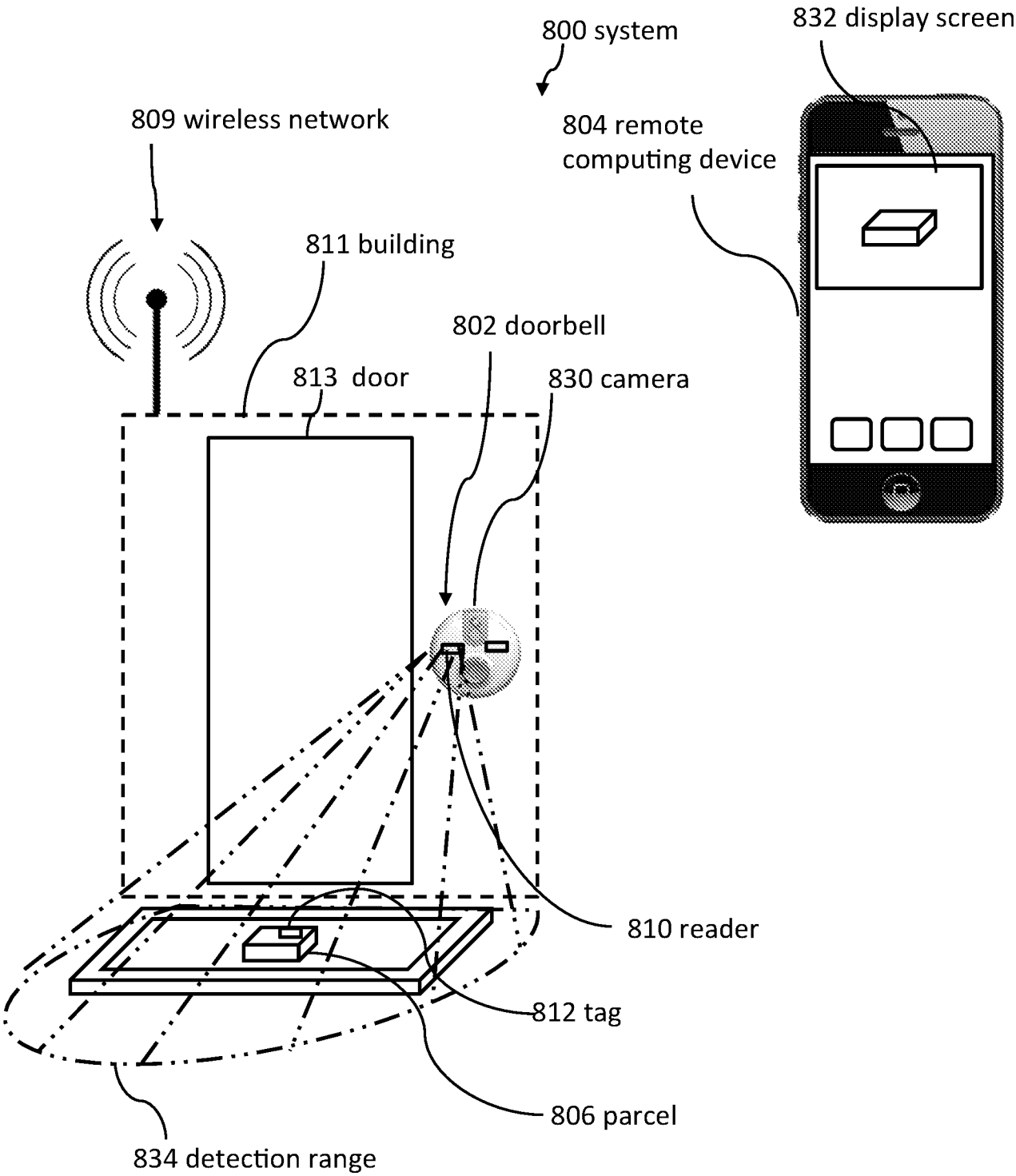

800 system
832 display screen
809 wireless network
804 remote computing device
811 building
802 doorbell
813 door
830 camera
810 reader
812 tag
806 parcel
834 detection range

Figure 11

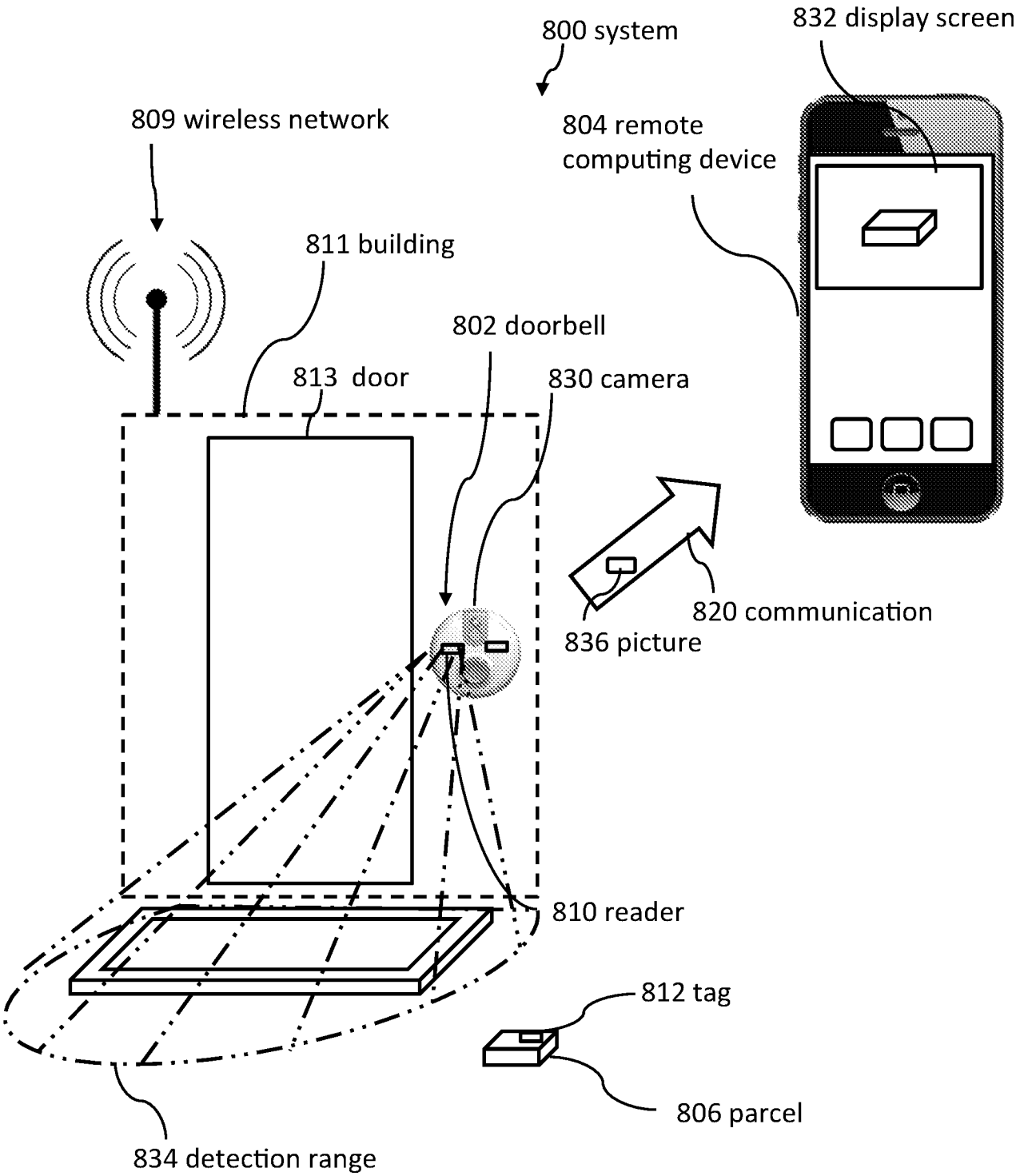

800 system
832 display screen
809 wireless network
804 remote computing device
811 building
802 doorbell
813 door
830 camera
820 communication
836 picture
810 reader
812 tag
806 parcel
834 detection range

Figure 12

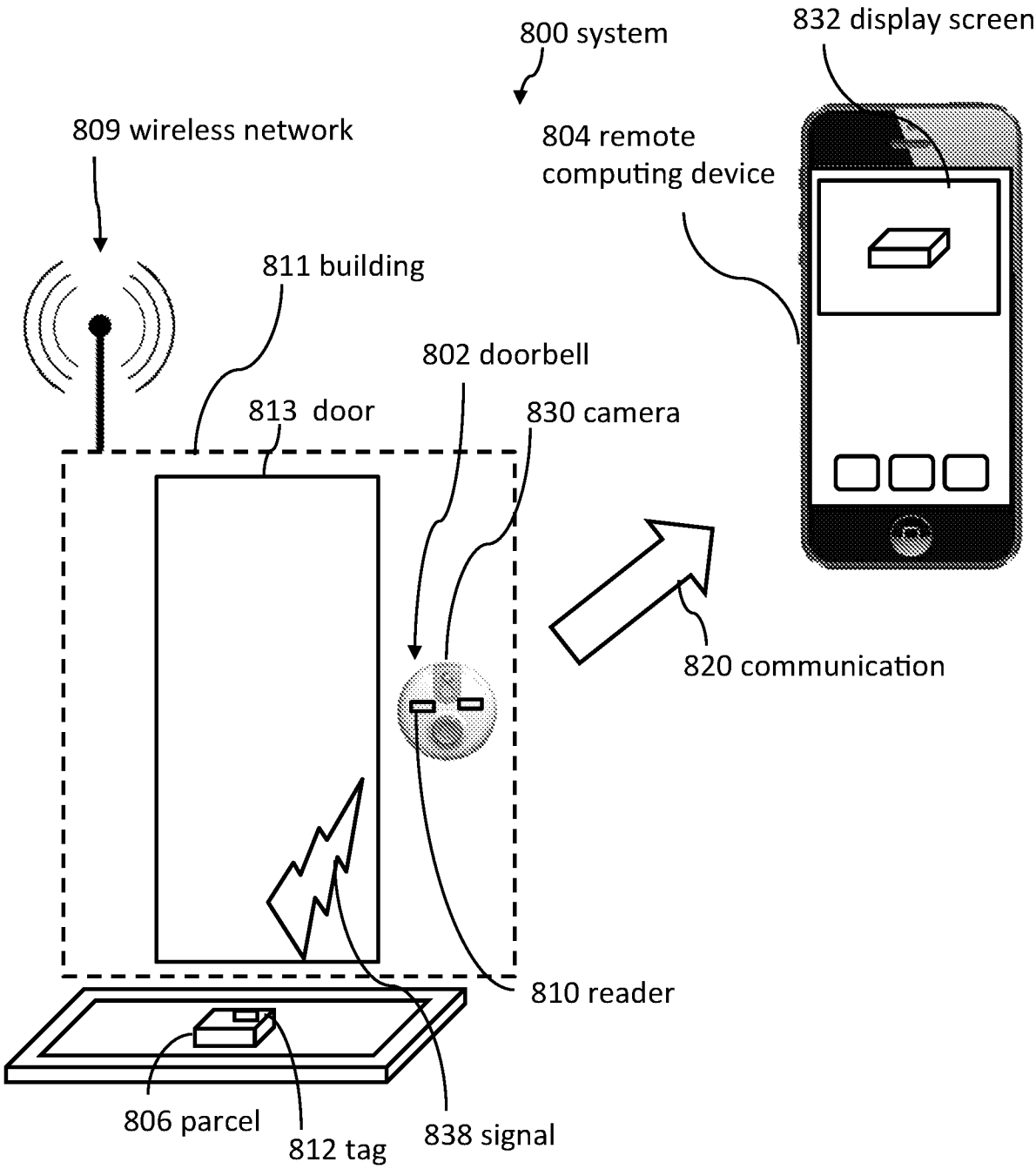

800 system
832 display screen
809 wireless network
804 remote computing device
811 building
802 doorbell
813 door
830 camera
820 communication
810 reader
806 parcel
812 tag
838 signal

Figure 13

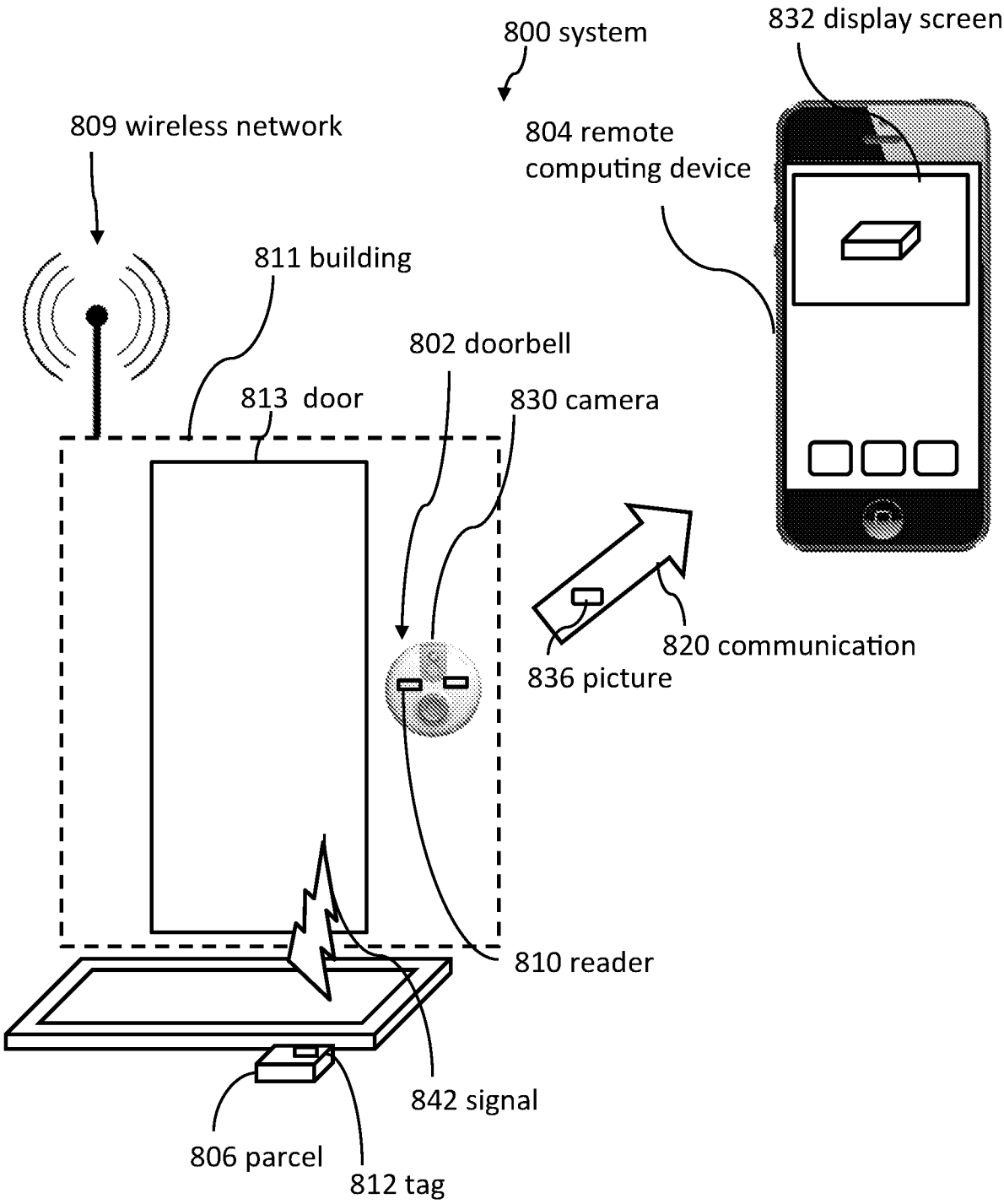

800 system
832 display screen
809 wireless network
804 remote computing device
811 building
802 doorbell
813 door
830 camera
820 communication
836 picture
810 reader
842 signal
806 parcel
812 tag

Figure 14

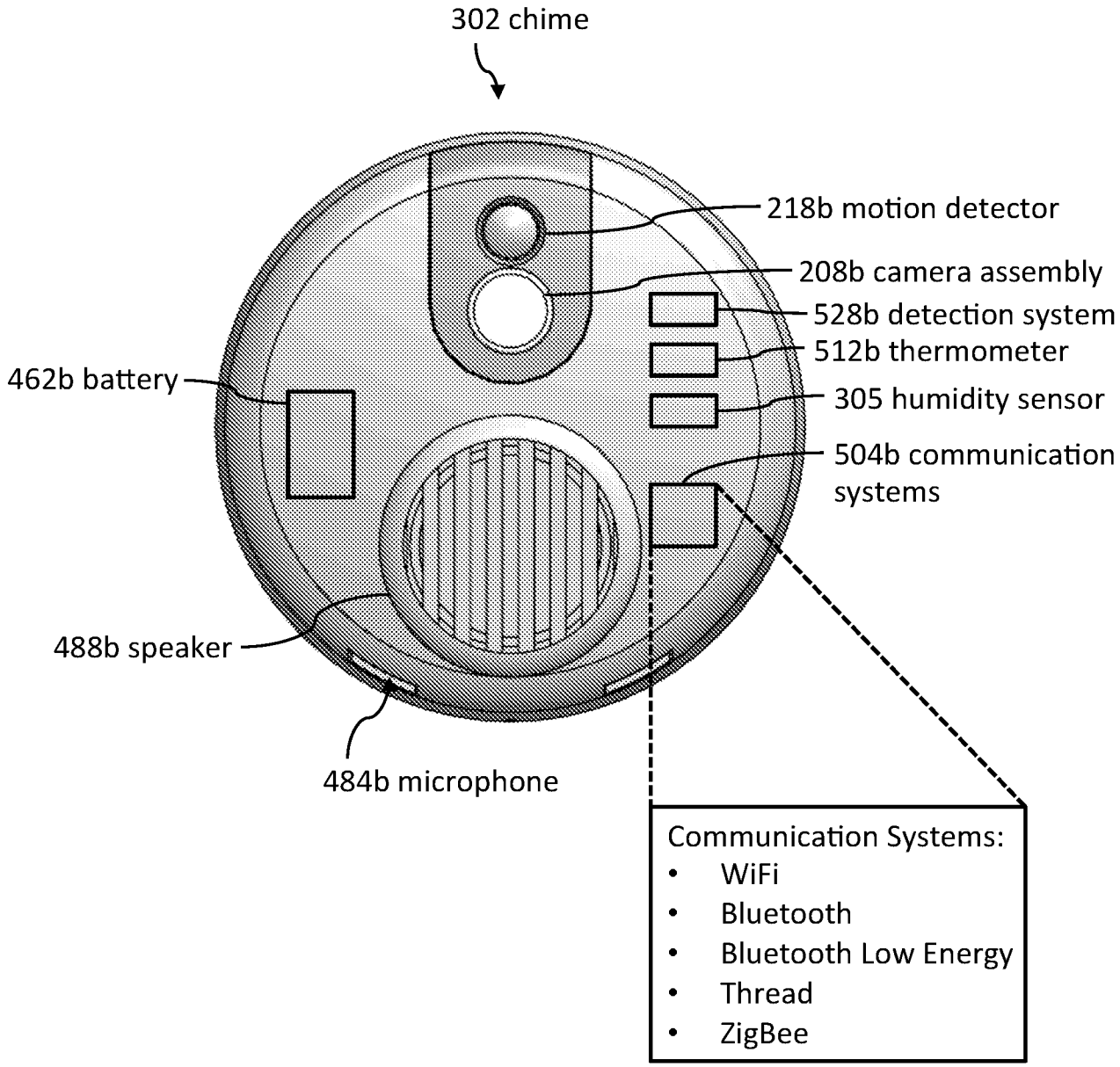

302 chime
218b motion detector
208b camera assembly
528b detection system
512b thermometer
305 humidity sensor
504b communication systems
462b battery
488b speaker
484b microphone
Communication Systems:
• WiFi
• Bluetooth
• Bluetooth Low Energy
• Thread
• ZigBee

Figure 15

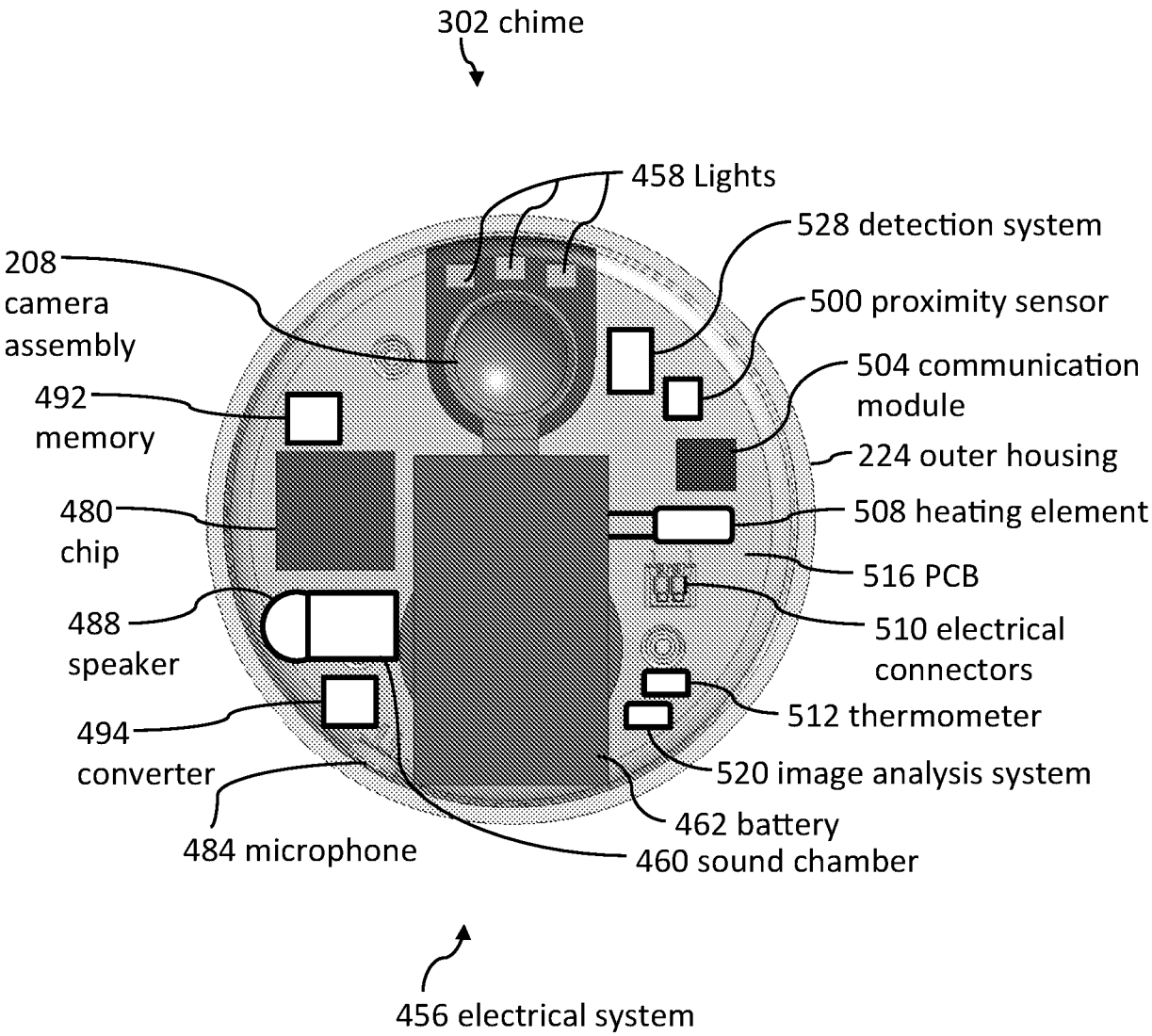

302 chime
458 Lights
528 detection system
208
camera
assembly
500 proximity sensor
504 communication
module
492
memory
224 outer housing
480
chip
508 heating element
516 PCB
488
speaker
510 electrical
connectors
494
converter
512 thermometer
520 image analysis system
462 battery
484 microphone
460 sound chamber
456 electrical system

Figure 16

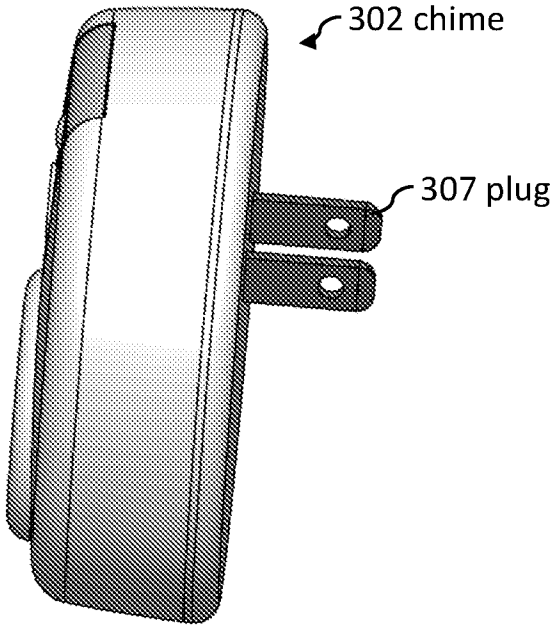


Figure 17

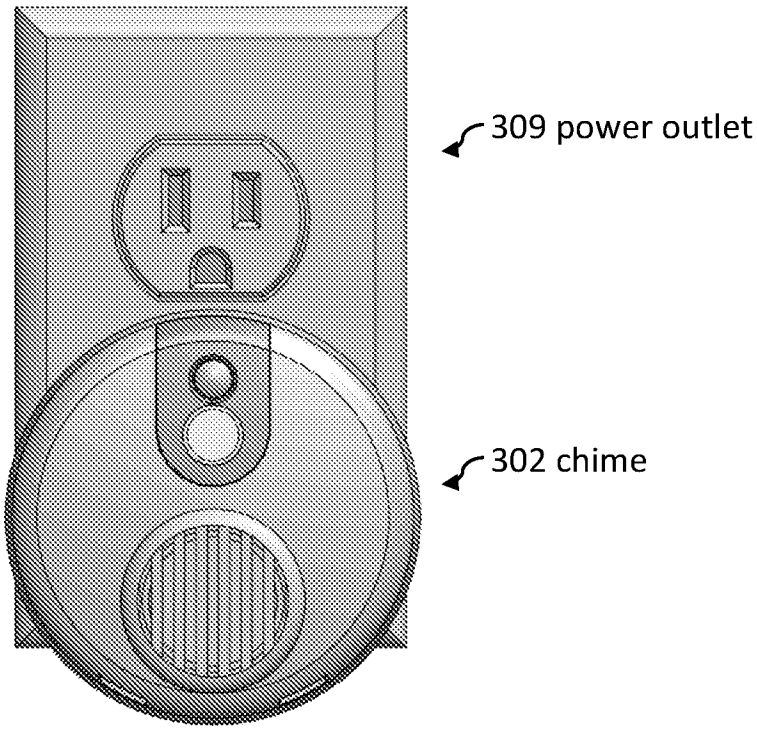


Figure 18

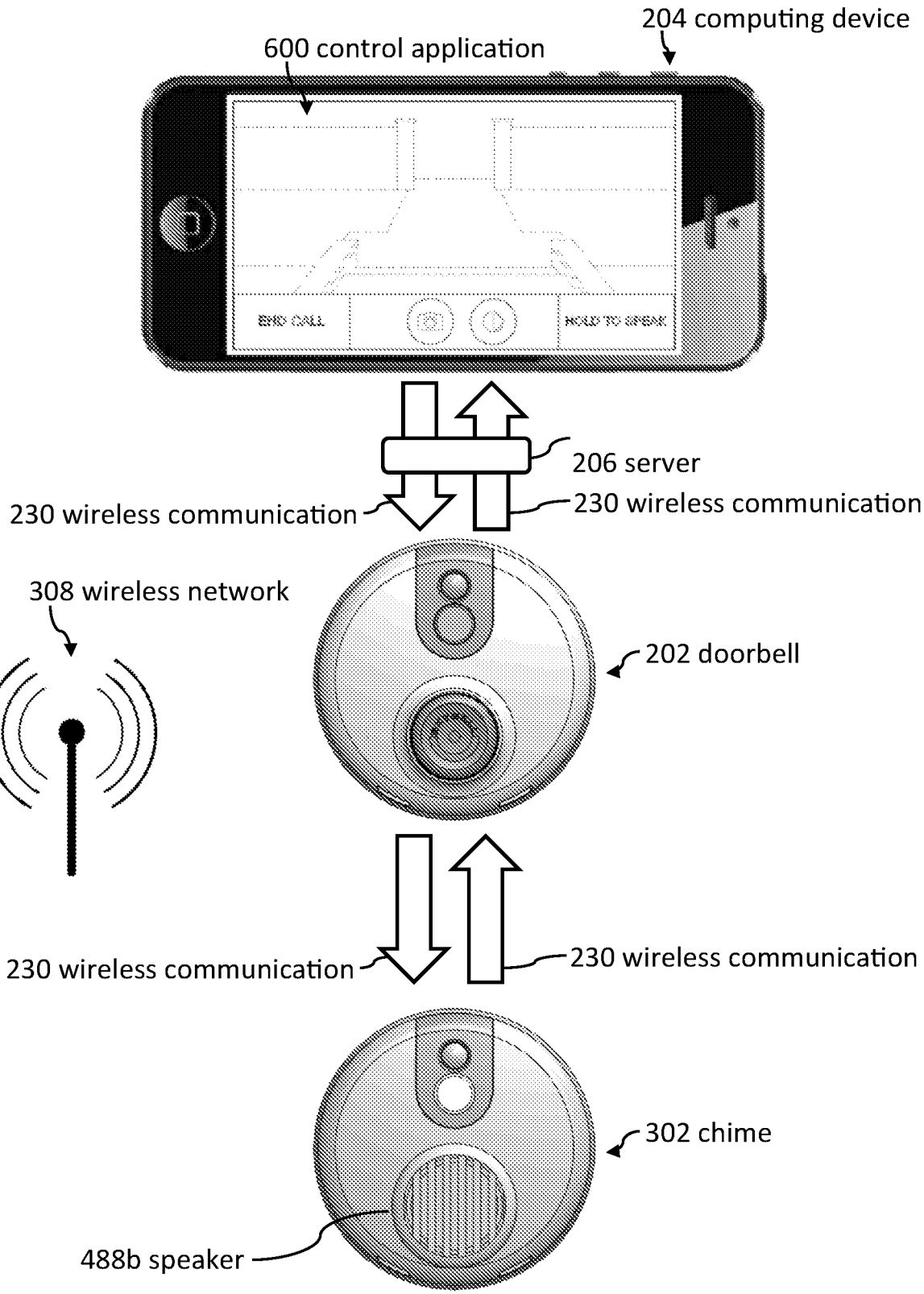

204 computing device
600 control application
206 server
230 wireless communication
230 wireless communication
308 wireless network
202 doorbell
230 wireless communication
230 wireless communication
302 chime
488b speaker

Figure 19

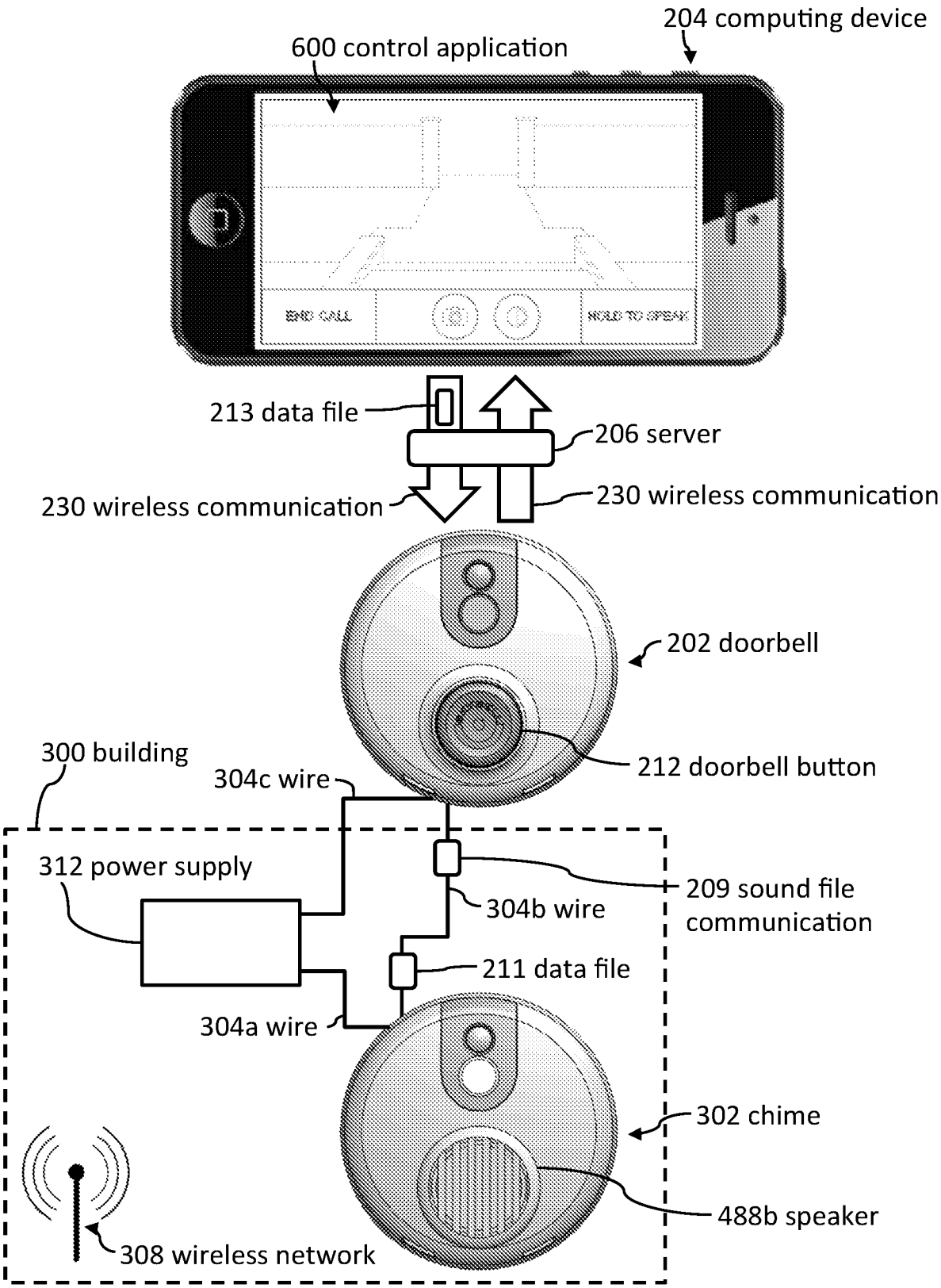

204 computing device
600 control application
END CALL
HOLD TO SPEAK
213 data file
206 server
230 wireless communication
230 wireless communication
202 doorbell
212 doorbell button
300 building
304c wire
312 power supply
209 sound file communication
304b wire
211 data file
304a wire
302 chime
488b speaker
308 wireless network

Figure 20

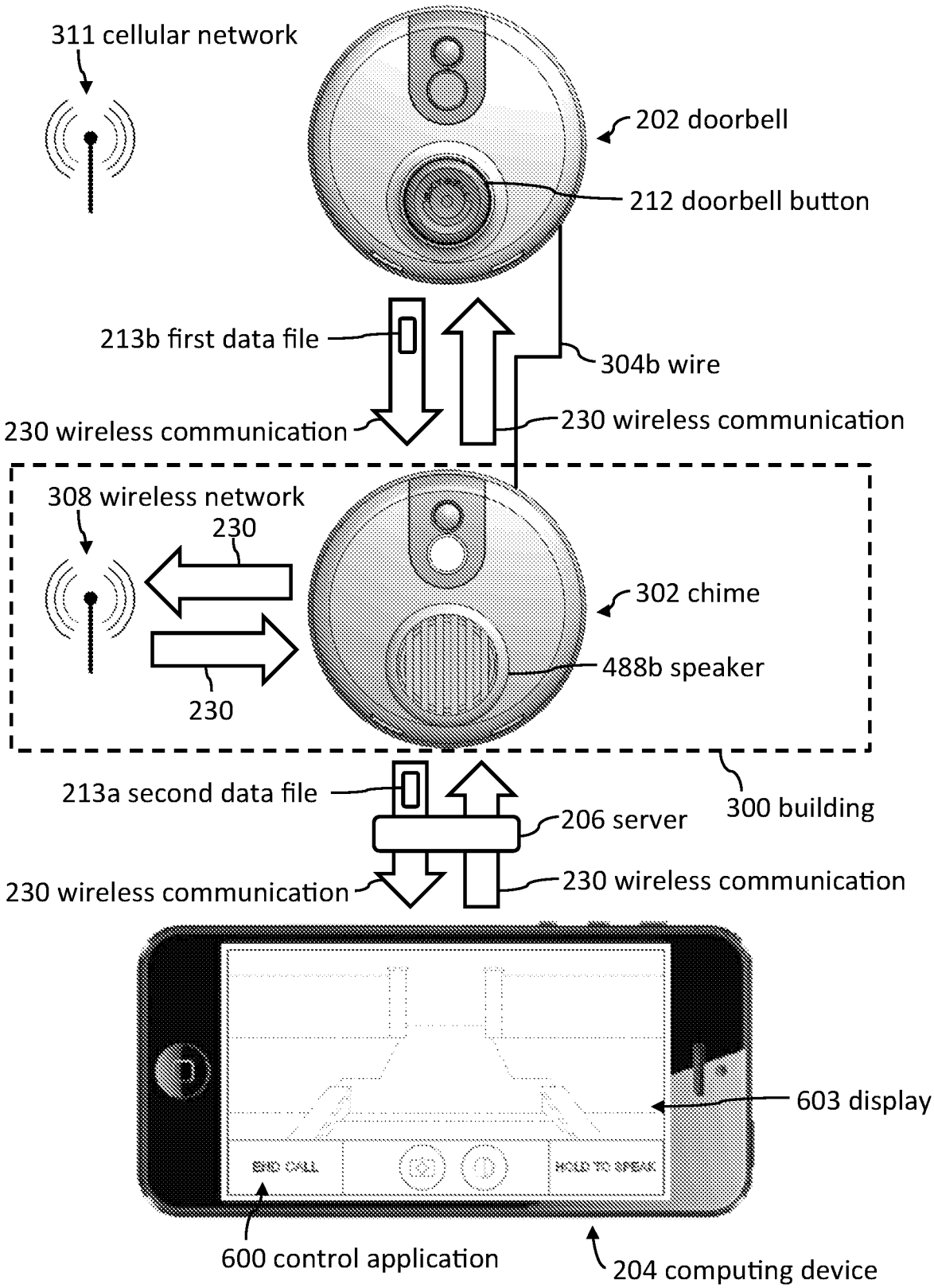

311 cellular network
202 doorbell
212 doorbell button
213b first data file
304b wire
230 wireless communication
230 wireless communication
308 wireless network
230
302 chime
488b speaker
230
213a second data file
206 server
300 building
230 wireless communication
230 wireless communication
603 display
600 control application
204 computing device

Figure 21

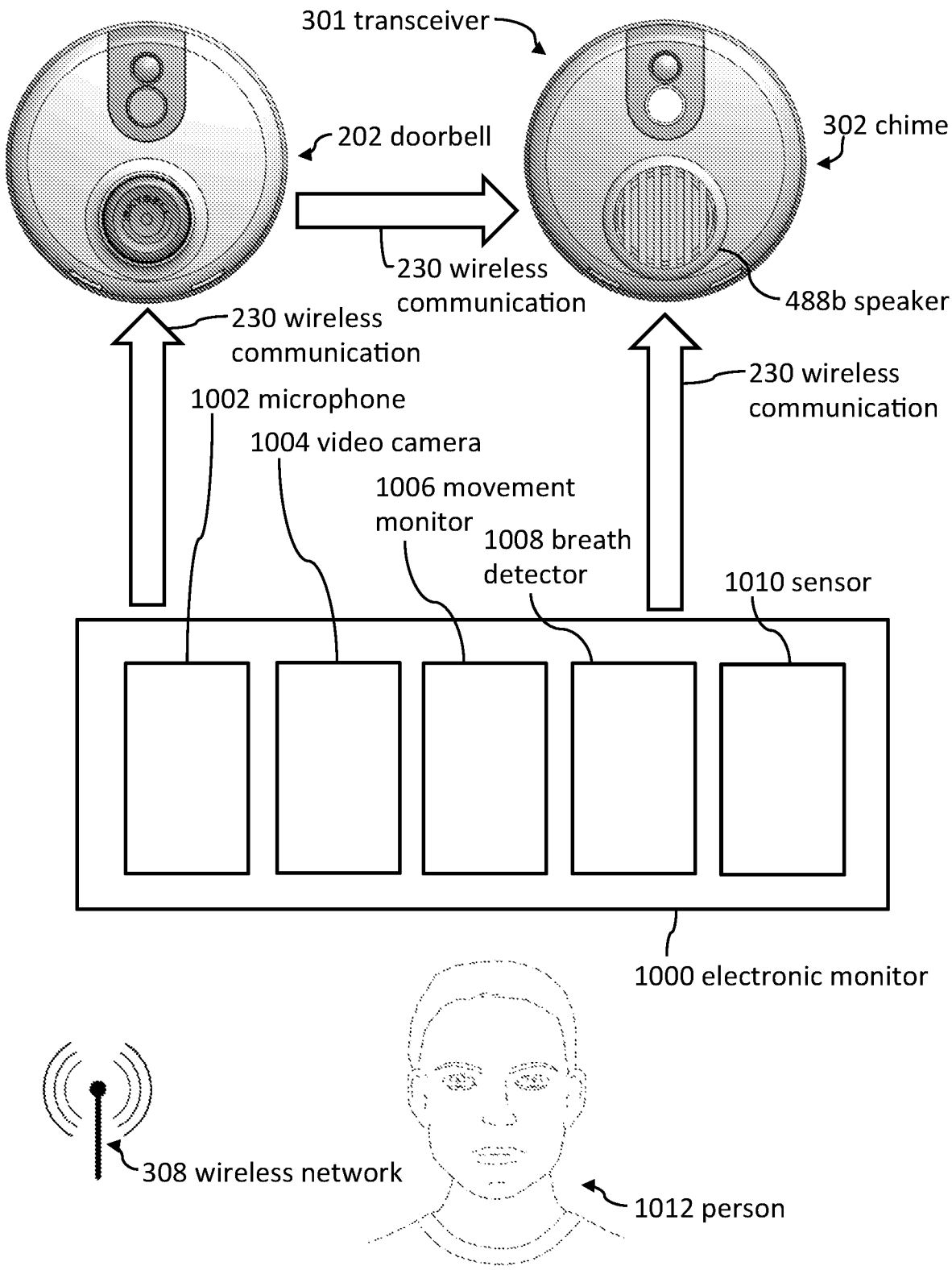

301 transceiver
202 doorbell
302 chime
230 wireless communication
488b speaker
230 wireless communication
230 wireless communication
1002 microphone
1004 video camera
1006 movement monitor
1008 breath detector
1010 sensor
1000 electronic monitor
308 wireless network
1012 person

Figure 22

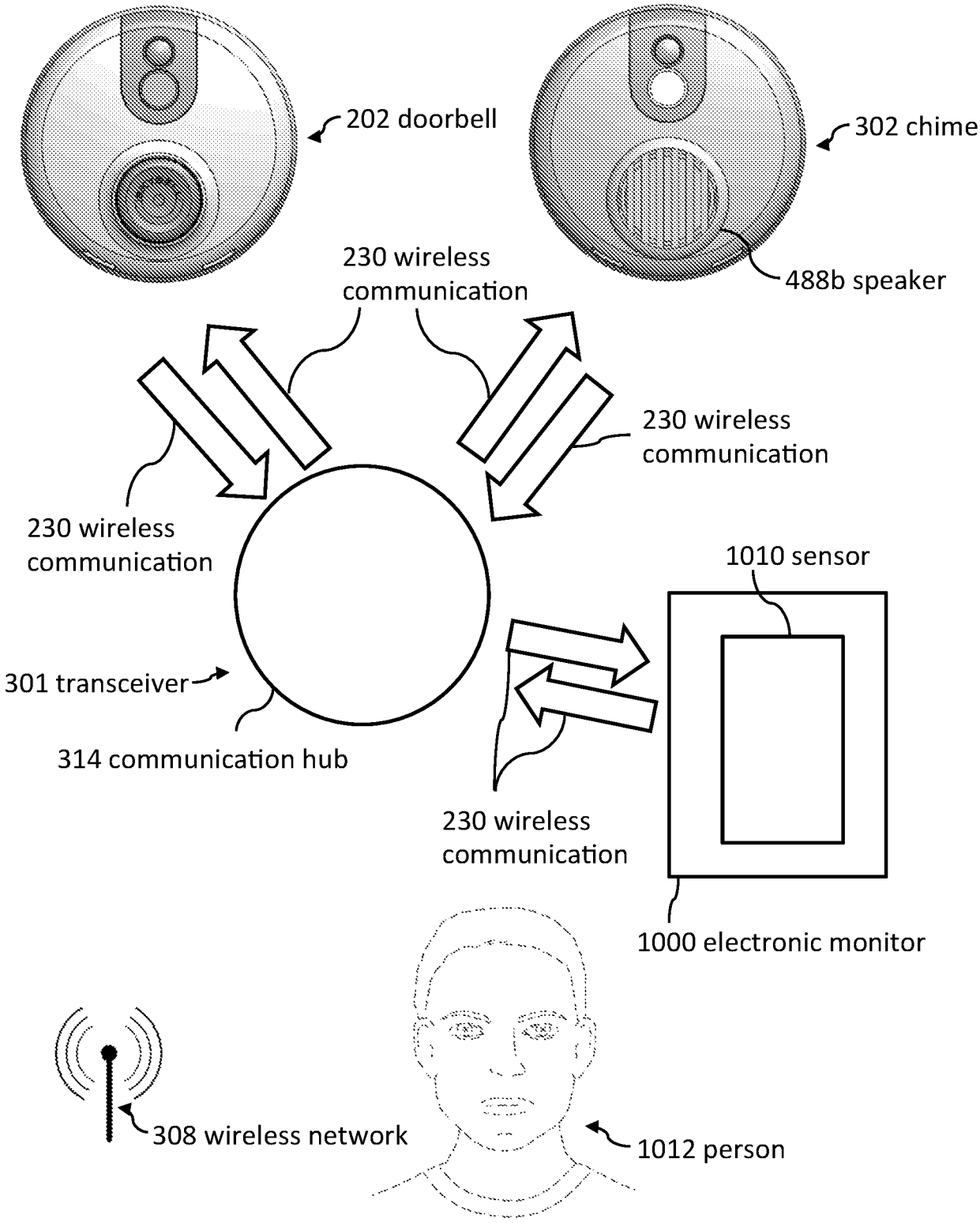

202 doorbell
302 chime
488b speaker
230 wireless communication
230 wireless communication
230 wireless communication
1010 sensor
301 transceiver
314 communication hub
230 wireless communication
1000 electronic monitor
308 wireless network
1012 person

Figure 23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 16/63833

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04M 11/00, H04Q 5/22, G05B 11/01 (2017.01)
CPC - H04M11/025, E05B19/0005, H04M11/007, H04L12/2818
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - H04M 11/00, H04Q 5/22, G05B 11/01 (2017.01)
CPC - H04M11/025, E05B19/0005, H04M11/007, H04L12/2818

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC: G06K7/0008, G06K19/0723, G08C17/02, H04N7/186
USPC: 379/102.01, 379/102.06, 340/10.1, 340/12.51, 348/E7.089

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Electronic Database Searched: Patbase, Google Patents, Google Scholar
Search Terms Used: Delivery parcel, detection, doorbell, wireless, RFID reader, RFID tag, notification, remote, sender, contents, description, picture/ camera/image, time, display screen, passive/active tag

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2015/0120598 A1 (Fadell et al.) 30 April 2015 (30.04.2015); entire document, especially, FIG. 1, 8a-8c, 15, 20, para [0059], [0286], [0323], [0326], [0345], [0346], [0348]-[0352], [0371], [0397], [0425]	1-30
Y	US 2007/0012602 A1 (Baldassari et al.) 18 January 2007 (18.01.2007); entire document, especially, Abstract, FIG. 1, para [0033], [0034], [0039]	1-30
A	US 2012/0030133 A1 (Rademaker) 02 February 2012 (02.02.2012); entire document	1-30
A	US 2010/0109903 A1 (Carrick) 06 May 2010 (06.05.2010); entire document	1-30
A	US 2008/0004995 A1 (Klingenberg et al.) 03 January 2008 (03.01.2008); entire document	1-30

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
13 February 2017	07 APR 2017
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 16/63833

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-30 drawn to a delivery parcel detection system utilizing a RFID reader.

Group II: Claims 31-60 drawn to a delivery parcel detection system utilizing a floor covering sensor.

Group III: Claims 61-87 drawn to a doorbell system configured to modify the notification sound in response to a sleep detection system.

---See Continuation on Supplemental Page--

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-30

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 16/63833

Continuation of Box No. III - Observations where unity of invention is lacking

The inventions listed as Groups I through III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2 they lack the same or corresponding special technical features for the following reasons:

Groups II and III do not require a radio-frequency identification reader; a remote computing device communicatively coupled with the doorbell via the first wireless communication system; and a delivery parcel having a radio-frequency identification tag, wherein the doorbell is configured to detect the delivery parcel by the radio-frequency identification reader reading the radio-frequency identification tag of the delivery parcel, as required by group I.

Groups III and I do not require a floor covering configured for placement on an entryway floor, the floor covering comprising a sensor configured to detect a first indication of a delivery parcel on the floor covering, wherein the floor covering is communicatively coupled to the doorbell, as required by group II.

Groups I and II do not require a doorbell chime configured to emit a notification sound in response to receiving a visitor indication from the doorbell; a sleep detection system having a sensor configured to determine whether a person is asleep, wherein the doorbell, the doorbell chime, and the sleep detection system are communicatively coupled such that, in response to the sleep detection system determining that the person is asleep, the doorbell chime is configured to modify the notification sound emitted by the doorbell chime; and a wireless communication from the sleep detection system to configure the doorbell system to prevent the doorbell chime from emitting the notification sound, as required by group III.

The only feature shared by Groups I through III that would otherwise unify the groups is a doorbell having a wireless communication system. However, this shared technical feature does not represent a contribution over prior art, because the shared technical feature is anticipated by US 8,780,201 B1, entitled "Doorbell Communication Systems and Methods", published 15 July 2014 (15.07.2014), to SCALISI et al. (hereinafter ' Scalisi'), where a doorbell has a wireless communication system (col 2, ln 5-9, "The doorbell system can include a wireless communication assembly capable of communicating with a wireless network to enable the doorbell system to communicate with a remotely located computing device."). As the technical feature was known in the art at the time of the invention, this cannot be considered a special technical feature that would otherwise unify the groups.

Groups I through III therefore lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.