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**Description**

[0001] The present invention relates to a door communication system according to the preamble of Claim 1, an external appliance for such a door communication system, as well as a method for operating a door communication system.

[0002] Frequently, door communication systems are used for communication between a person in an external area of a building and a person in an internal area of the building, the external area being separable from the internal area by a door. For example, a conventional door communication system can comprise an intercom system, by means of which an inhabitant can communicate from the internal area with a visitor located within the external area before the inhabitant allows the visitor access to the internal area, if applicable, by opening the door.

[0003] Such door communication systems usually comprise at least one external appliance, which is intended for the fixed arrangement within the external area, and at least one internal appliance, which is spatially separate from the external appliance. Thereby, the internal appliance can be connected to the external appliance via a communication connection. In the case of conventional door communication systems, the internal appliance is frequently arranged in a fixed manner within the internal area and wired to the external appliance, for example, via two- or four-wire technology so that a cable-bound communication connection can be established for communication.

[0004] In the most recent background art, furthermore, door communication systems are known where data are at least transmitted wirelessly in parts. In this way, DE 20 2012 012 542 U1 describes a door intercom system with a door station, which is installed within a network together with a server computer and a WLAN base station. Thereby, the WLAN base station can be connected to a mobile computer, for example, a smartphone or tablet computer, via a wireless WLAN connection and the door station generates and/or receives data, which are transferred into the network. The server computer transmits data content generated by the door station to the mobile computer

via the network and the WLAN connection and data content generated by the mobile computer is transmitted to the door station via the WLAN connection over the network.

5 [0005] Door communication systems of the aforementioned type contribute to an increased level of security with regard to the access of people to the internal area by allowing a present inhabitant to communicate with the visitor before opening the door and, if applicable, receive a visual impression of the visitor via video in order to authenticate him/her, if applicable, as being authorised for access. Thereby, an active interaction of the inhabitant with the door communication system is required. In the  
10 event of absence of the inhabitant from the internal area or if the visitor is momentarily not within the vicinity of the internal appliance or does not have the opportunity to interact with the door communication system, an access-authorised visitor consequently does not obtain access to the internal area. On the other hand, in this case, an unauthorised person can get the impression that no inhabitant is at home and the internal area is  
15 momentarily being monitored accordingly, whereby the unauthorised person, if applicable, can be motivated to obtain unauthorised access to the internal area.

[0006] US 9 253 455 B1 describes a security system, which activates an electronic voice output when triggered by a motion sensor.

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[0007] The object of the present invention is to improve a door communication system, in particular, with respect to security and to overcome the aforementioned disadvantages.

25 [0008] The task is achieved by means of a door communication system according to Claim 1, by means of an external appliance for a door communication system according to Claim 7 as well as by means of a method for operating a door communication system according to Claim 9.

30 [0009] A first aspect of the invention relates to a door communication system for communication between a person in an external area of a building and a person in an

internal area of the building, the external area being separable from the internal area by a door, having

- at least one external appliance intended for fixed arrangement in the external area and
- 5 • at least one internal appliance, physically separate from the external appliance that is connectable at least from the internal area to the external appliance via at least one wireless communication connection.

Thereby, the communication between the person in the external area and the person in the internal area can take place via the wireless communication connection.

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[0010] According to the invention, the door communication system comprises at least one electronic control device, which is designed, depending on at least one triggering event, which is triggered by means of a person located in the external area and is detected by means of the external appliance, to generate control signals for controlling at least one presence simulation apparatus in order to simulate the presence of a person in the internal area in a manner perceptible to a person in the external area. Thereby, the at least one presence simulation apparatus comprises at least one electronically controllable voice output provided on the external appliance. The controllable voice output can, in particular, comprise a device for saving and for the audibly playing back a voice message.

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[0011] By means of the electronically controllable voice output, it can be simulated that an inhabitant communicates from the internal area with the person in the external area. For example, by means of the electronically controllable voice output depending on the control signals, a previously recorded voice message of the type "Can I help you?" can be output in order to awaken the impression in a person within the external area that the internal area is currently inhabited. Thus, an unauthorised person within the external area can be deterred from attempting a burglary within the internal area.

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[0012] In a variant, the at least one presence simulation apparatus can comprise at least one other electronically controllable device provided on the building and/or on the external appliance. For example, the presence simulation apparatus can comprise an

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illuminating device in or on the building. In addition or as an alternative, the presence simulation apparatus can, for example, comprise a music system, a television and/or blinds operable by means of external power.

5 [0013] The external appliance and/or the internal appliance can fully or at least partly comprise the electronic control device. Thus, the control device, for example, can be fully or at least partially formed by a printed circuit board arranged in the external appliance with a control logic implemented on it. In addition or as an alternative, the electronic control device can be fully or at least partly arranged within the internal  
10 appliance. In a variant, a separate unit, for example, a computer server, can be provided, which is preferably arranged in the internal area and fully or at least partially comprises the electronic control device.

[0014] In an embodiment, the external appliance is surrounded by a housing. Thereby,  
15 the at least one electronic control device can be arranged, for example, within the housing of the external appliance.

[0015] The internal appliance can, in particular, be a mobile appliance, such as a notebook, a tablet PC or a smartphone. Thereby, the control device can be fully or  
20 partially formed by a computer unit of the mobile appliance, within which a corresponding control logic is implemented. However, the internal appliance can also comprise fixed appliances, such as a desktop PC or a television. Even in the case of such a fixed internal appliance, the electronic control device can be fully or at least partially formed within a computer unit with a corresponding control logic. The internal appliance  
25 is designed to be connected to the external appliance at least from the internal area via a wireless communication connection. In accordance with a design variant however, it can also be provided that the wireless communication connection between the internal appliance and the external appliance can also be established if the internal appliance is located outside of the internal area. In this way, the inhabitant can also communicate  
30 with the external appliance, for example, via his/her smartphone if he/she is not at home.

[0016] In a favourable design variant, the control signals can be transmitted wirelessly

from the electronic control device to the presence simulation apparatus. For example, the electronic control device and a controlling unit of the presence simulation apparatus can be connected via a wireless communication network, such as a password-protected WLAN network. A particularly simple integration of the door communication system  
5 into an already existing wireless infrastructure of the building, if applicable, is thereby made possible. This allows for a flexible and inexpensive upgrading of a door communication system according to the invention on a building.

[0017] In another design variant, the electronic control device is furthermore designed  
10 to generate a release signal for operating at least one radio lock, which is arranged on the door, depending on the data that are provided by the external appliance and/or the internal appliance. Thereby, in particular, it can be provided that the release signal can at least in parts be transmitted wirelessly from the electronic control device to the radio  
15 lock. For example, the transmission of the release signal from the electronic control device to the radio lock can take place via a radio connection at least in parts. The release signal can, for example, be triggered by the inhabitant via manual entry on the internal appliance.

[0018] In addition or as an alternative, the release signal can also be triggered via entry  
20 on the external appliance. In this connection, in particular, it can be provided that the external appliance has at least one authentication interface for authenticating a person and/or a security token. The release signal for operating the radio lock can, for example, be generated depending on data, which are provided following an authentication of an authorised person on the authentication interface.

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[0019] In accordance with a preferred exemplary embodiment, the authentication interface thereby comprises at least one biometric detection unit, in particular, a fingerprint scanner. By means of such a biometric detection unit, authentication of an authorised person can take place in a particularly clear and reliable manner. In  
30 addition or as an alternative, the authentication interface can comprise at least one RFID ("radio-frequency identification") reader. By means of an RFID unit, for example, a

security token, which contains an associated RFID chip, and which is only handed over to authorised persons, can be detected and authenticated.

5 [0020] It is also within the scope of the invention that the external appliance comprises at least one signal operating element, like a bell button for example, which triggers a signal function on the internal appliance when operated. Thereby, it can be provided that, when operating the signal operating element, a trigger signal of the signal function is wirelessly transmitted from the external appliance to the internal appliance. For example, it is conceivable that, when operating the signal operating element, a push  
10 message is transmitted from the external appliance to a smartphone via a wireless communication connection, which acts as an internal appliance. In this way, a user of the smart phone can be pointed out that a person is located at the external appliance and desires entry into the internal area.

15 [0021] In accordance with a variant, a camera is arranged on the external appliance, by means of which, when operating the signal operating element, at least one image can be automatically recorded. In this way, for example, a digital photo and/or video of the person can be recorded within the external area who has operated the signal operating element. It can furthermore be provided that the recorded photo and/or video is  
20 wirelessly transmitted to the internal appliance in order to give the user of the internal appliance a visual impression of the person located in the external area.

[0022] It is also within the scope of the invention at the door communication system comprises other hardware components, in particular, at least one sensor to be arranged  
25 for building-automation technology applications. In accordance with a favourable embodiment, such a sensor can comprise a transmission device to transmit sensor data to the external appliance via a wireless communication connection, for example, radio, Bluetooth, ZigBee, Z-wave and/or DECT. Furthermore, it is conceivable that sensor data from there that reached the external appliance in this way are transmitted further onto  
30 the internal appliance via the wireless communication connection, for example, via WLAN. The internal appliance can thereby be a computer server arranged in the internal area with an Internet connection for example. In this way, an absent inhabitant can



remotely access "smart-home" applications via the Internet, which are based on the sensor data.

5 [0023] In addition or as an alternative to the at least one sensor, the door communication system can comprise at least one electronically controllable building-automation device. An absent inhabitant can control this remotely, wherein the control signals are transmitted between the external appliance and the electronically controllable device via the Internet, the computer server (as an internal appliance), the wireless communication connection (e.g. WLAN), the external appliance and another wireless communication  
10 connection (e.g. radio, Bluetooth, ZigBee, Z-Wave and/or DECT). The external appliance represents an interface for the "last mile" of communication, which is, for example, bridged via radio, Bluetooth, ZigBee, Z-Wave and/or DECT. In contrast, the internal appliance represents the interface for the remote communication, for example, via the Internet, wherein the external appliance and the internal appliance can  
15 communicate with each other via the at least one wireless communication connection.

[0024] A second aspect of the invention relates to an external appliance for a door communication system, wherein the external appliance is intended for fixed arrangement in an external area of a building that is separable from an internal area of the building by  
20 a door, and wherein the external appliance comprises at least one transmission interface to establish a wireless communication connection to an internal appliance of the communication system. Thereby, the external appliance is designed to detect a triggering event, which is triggered by a person located in the external area and, depending on the triggering event, to generate control signals for controlling at least one presence  
25 simulation apparatus in order to simulate the presence of a person in the internal area in a manner perceptible to a person in the external area. Thereby, the at least one presence simulation apparatus comprises at least one electronically controllable voice output provided on the external appliance.

30 [0025] An external appliance according to the invention can thereby be part of a door communication system according to the invention. Consequently, with regard to this, the

aforementioned and following advantages and features also apply to exemplary embodiments of an external appliance according to the invention and vice versa.

5 [0026] In accordance with an exemplary embodiment, the external appliance comprises at least one transmission interface for the wireless transmission of control signals to a controlling unit of the presence simulation apparatus or to an upstream electronic control device, which is spatially separate from the presence simulation apparatus. As has been described above with reference to the door communication system according to the invention, such an electronic control device can be fully or at least partially covered by  
10 the external appliance and/or internal appliance. In addition or as an alternative, a separate control device can be provided, which is also spatially separate from the external appliance as well as from the internal appliance. For example, the control device can be fully or at least partially formed by a server computer, which is preferably arranged within the internal area.

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[0027] In an embodiment, the external appliance is covered by a housing. Thereby, the external appliance can be designed to generate control signals by means of an electronic control device arranged within the housing.

20 [0028] In a design variant, the external appliance comprises at least one motion sensor to detect a movement as a triggering event for generating the control signals.

[0029] In accordance with a third aspect of the invention, a method for operating a door communication system is proposed. The method according to the invention entails

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- providing at least one external appliance, which is attached in a fixed manner within a building, wherein the external area is separable from an internal area of the building by a door;
  - providing at least one internal appliance, physically separate from the external appliance, that is connectable at least from the internal area to the external  
30 appliance via at least one wireless communication connection;
  - setting up the wireless communication connection for communication between a person in the external area and a person in the internal area as required;

- providing at least one presence simulation apparatus designed to simulate the presence of a person in the internal area in a manner perceptible to a person in the external area, wherein the at least one presence simulation apparatus comprises at least one electronically controllable voice output provided on the external appliance;
- detecting a triggering event by the external appliance, wherein the triggering event is triggered by a person located within the external area; and
- generating control signals by means of an electronic control device for controlling the presence simulation apparatus depending on the triggering event.

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[0030] A method according to the invention can thereby be implemented by a door communication system according to the invention, which, in turn, can comprise an external appliance according to the invention. Consequently, with regard to this, the aforementioned and following advantages and features of a door communication system and/or an external appliance according to the invention also apply to exemplary embodiments of a method according to the invention and vice versa.

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[0031] In an embodiment, the external appliance is surrounded by a housing. Thereby, the at least one electronic control device can, for example, be arranged within the housing.

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[0032] In a variant, it is provided that the establishment of the at least one wireless communication connection is only made possible if an authorised person and/or an authorised security token has been detected at least once on an authentication interface of the external appliance. For example, it can be provided that, before establishing a first connection, by means of a radio connection via a standard, such as Bluetooth or (password-protected) WLAN, a successful authentication interface of a correspondingly authorised person must take place on the authentication interface. Preferably, the authentication interface comprises a biometric detection unit, such as a fingerprint scanner for example.

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[0033] In accordance with a further embodiment of the method according to the

invention, a radio lock arranged on the door is automatically opened if an authorised person and/or an authorised security token is detected on an authentication interface of the external appliance.

5 [0034] Furthermore, within the scope of the method according to the invention, it can be provided that a signal function is triggered on the internal appliance if a signal operating element arranged on the external appliance is operated, such as a bell button, for example. In a design variant, operation of the signal operating element can result in at least one image, for example, a digital photo and/or video, automatically being recorded  
10 by means of a camera arranged on the external appliance and being transmitted to the internal appliance. The transmission of the at least one image preferably takes of via a wireless data connection.

[0035] In another design variant, the method comprises the following steps:

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- identifying, by means of control logic of an electronic control device that has a motion sensor provided on the external appliance has detected a movement in the external area, and
  - checking, by means of the control logic, whether within a predetermined period of time after the motion sensor is identified as having detected the movement,  
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    - the signal operating element is operated and/or
    - an authorised person and/or an authorised security token is detected on the authentication interface.

[0036] Thereby, furthermore, it can be provided that the presence simulation apparatus  
25 is automatically activated by the control device if the result of the check is that, within the predetermined period of time,

- the signal operating element has not been operated and
- no authorised person and no authorised security token have been detected on the authentication interface.

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[0037] In a further embodiment of the method described in the above, it can be provided that the control logic, after detecting by means of the control logic that the motion sensor

has detected a movement, furthermore checks if the motion sensor detects another movement within the predetermined period of time and that the presence simulation apparatus is automatically activated by the control device if the check results in that, within the predetermined period of time,

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- the motion sensor has detected a further movement,
  - the signal operating element has not been operated and
  - no authorised person and no authorised security token have been detected on the authentication interface.

10 **[0038]** In another favourable design variant, the method can comprise the following additional steps after activating the presence simulation apparatus:

- checking, by means of the control logic, whether within a predetermined period of time after the presence simulation apparatus is activated
    - the motion sensor detects a further movement,
    - 15 ○ the signal operating element is operated, and/or
    - an authorised person and/or an authorised security token is detected on the authentication interface, and
  - if the result of the check is that, within the predetermined period of time,
    - the motion sensor has detected a further movement,
    - 20 ○ the signal operating element has not been operated and
    - no authorised person and no authorised security token have been detected on the authentication interface,
- automatically recording at least one image by means of a camera arranged on the external appliance and transmitting the image to the internal appliance. Thereby,
- 25 the transmission of the at least one image from the external appliance to the internal appliance can preferably take place wirelessly.

**[0039]** The enclosed figures illustrate possible exemplary embodiments of the invention.

30 **[0040]** The figures show:

Figure 1 and exemplary embodiment of a door communication system according to the invention with an external appliance, and internal appliance and a plurality of presence simulation apparatuses;

5 Figure 2 schematically and with other details, the external appliance of the door communication system in Figure 1;

Fig 3A an exemplary embodiment of an external appliance in an inner view when the housing is open and

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Figure 3B a frontal view of the external appliance from Figure 3A when the housing is closed.

[0041] Figure 1 schematically shows a door communication system 1 on a building 5, wherein the building defines an internal area 52 and an external area 51. Thereby, the external area 51 can be separated from the internal area 52 by a door 9. For example, the building 5 can have to do with a single-family home or an apartment with a home or apartment door 9. For the communication between a person located in the external area 51 (also referred to in the following as "visitor") and a person located in the internal area 52 (also referred to in the following as "inhabitant"), an external appliance 2 is arranged in a fixed manner while an internal appliance 3 is provided in the internal area 52. The internal appliance 3 can be connected to the external appliance 2 via a wireless communication connection 7 from the internal area 52 in order to make a communication between the between the inhabitant and the visitor.

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[0042] In the exemplary embodiment in accordance with Figure 1, the internal appliance 3 is a smartphone. In other embodiments (not shown), the internal appliance 3 can be another mobile appliance other than a smart phone, for example, a notebook or a tablet PC. However, it is also conceivable that a fixed appliance such as a desktop PC or a television, for example, is used as an internal appliance 3 of the door communication system 1.

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[0043] In order to make the communication between the inhabitant and the visitor possible, the internal appliance 3 comprises acoustical and/or optical communication interfaces 31. For example, a camera 31 provided on the smartphone 3 can be used as an optical communication interface. A loudspeaker 31 as well as a microphone 31 of the smartphone 3 can be used as acoustical communication interfaces 31.

[0044] The external appliance 2, which, for example, can be arranged in the vicinity of the door 9 on the building 5 also comprises such acoustical and/or optical communication interfaces 21-1, 21-2. Both the internal appliance 3 as well as the external appliance 2 comprise means to establish a wireless communication connection 7 to one another. For example, the wireless communication connection 7 can be established by means of a radio connection and/or a password-protected WLAN connection within the scope of a wireless infrastructure of the building 5, which is already available if applicable. By means of the wireless communication connection 7, a voice and/or image-based communication can take place between the visitor on the external appliance 2 and the inhabitant, which has the internal appliance 3.

[0045] In Figure 2, the external appliance 2 is shown in greater detail. In the exemplary embodiment shown, the external appliance 2 comprises a display area 23 as a design element for displaying the house number "58" as well as the name of the inhabitant. Above the display area 23, a microphone 21-1 is provided as an acoustical communication interface. In the vicinity of the microphone 21-1, furthermore, a motion sensor 26 is arranged in the upper region of the external appliance 2 to detect a movement in the vicinity of the external appliance 2. On one side face of the external appliance 2, a loudspeaker 21-2 is provided for acoustical communication. The external appliance 2 comprises a fingerprint scanner 221 is an authentication interface 22 on the front side beneath the display area 23. In addition or as an alternative to the fingerprint scanner 221, a biometric detection unit and/or, for example, an RFID reader can be provided on the external appliance 2 as an authentication interface 22. By means of such authentication interfaces 22, a person and/or a security token can be authenticated and, if applicable checked for an access authorisation to the internal area 52.

[0046] Furthermore, a camera 24 is arranged on the front side of the external appliance 2, which is used as an optical communication interface for communication. The camera 24 can be designed to take digital photos and/or videos.

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[0047] In addition, the external appliance 2 comprises a signal operating element 28 in the form of a bell button on its front side in the lower region. In operation of the bell button 28 can, for example, trigger a bell signal that is audible within the internal area 52 of the building 5. In addition or as an alternative to this, when operating the bell button 28, a signal function can be triggered on the internal appliance 3. For example, when operating the bell button 28, a trigger signal can be wirelessly transmitted from the external appliance 2 to the internal appliance 3 in order to trigger the signal function. The trigger signal can, for example, transmit a push message to the smartphone 3 of the inhabitant in order to signal to this inhabitant that a visitor at the door 9 desires entry within the internal area 52.

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[0048] The aforementioned elements of the external appliance 2 are all arranged in or on a housing 20 of the external appliance 2. Thereby, the external appliance 2 can be arranged within the external area 51 as a compact unit, for example, in the proximity of the door 9.

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[0049] Figure 3A shows an interior view of an external appliance 2 according to the invention from the front as an example in the case of an open housing 20, from which a favourable arrangement of the aforementioned elements 21-1, 221, 26, 28, 4 is evident. For the sake of facilitated association, this illustration in Figure 3B is compared with a corresponding frontal view of the external appliance 2 from Figure 3A in the case of a closed housing 20.

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[0050] Within the interior of the housing 20, the external appliance 2 furthermore comprises an electronic control device 4, which is designed to generate control signals 80 for controlling one or a plurality of presence simulation apparatuses 8 in order to

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simulate the presence of a person in the internal area 52 in a manner perceptible to a person in the external area 51.

[0051] In the exemplary embodiment shown in Figure 1, a plurality of electronically controllable devices 81, 82, 83, 84, 85 are provided as presence simulation apparatuses 8. In this way, an illuminating device 81, blinds operable by means of external power 82, a music system 83 as well as a television 84 are provided in the internal area 52 as presence simulation apparatuses 8. In addition, the external appliance 2 comprises an electronically controllable voice output 85 as another presence simulation apparatus 8. The electronically controllable voice output 85 can be arranged within the housing 20 of the external appliance 2, as is illustrated in Fig. 1 to 3A. Thereby, the electronic voice output 85, for example, can be arranged within the region of the microphone 21-1 and/or the motion sensor 26, as is indicated in Fig. 1 to 3A. However, it can also be provided in an embodiment that the electronic voice output 85 is arranged in the region of the loudspeaker 21-2 (cf. Fig. 1-3A) or comprises the loudspeaker 21-2 and is used for the audible playback of a stored voice message.

[0052] The external appliance 2 has a transmission interface for the wireless transmission of the control signals 80 to the respective controlling units of the presence simulation apparatuses 81, 82, 83, 84 arranged in the internal area 52. Thereby, the control signals 80 are generated by the electronic control device 4 depending on a triggering event, which is triggered by a person located in the external area 51 and is detected by the external appliance 2. For example, the triggering event can be a movement of an object within the vicinity of the external appliance 2, which is detected by the motion sensor 26.

[0053] In another design variant, the control device 4 can, in addition or as an alternative to the arrangement within the external appliance 2, be at least partially arranged in the internal appliance 3, as is shown in Figure 1. In another design variant, a control device 4 that is spatially separate from the external appliance 2 and the internal appliance 3 can be provided, which is preferably arranged in the internal area 52. For example, a computer server (not shown) can be used as such a separate control device 4.

[0054] A radio lock 91 is arranged on the door 9, which can be operated on a release signal 90 generated by the control device 4 in order to open the door 9 in a remotely controlled manner. Thereby, the release signal 90 can be wirelessly transmitted by the electronic control device 4 to the radio lock 90. For example, the release signal 90 for the operation of the radio lock 91 can automatically be generated by the electronic control device 4 if an authorised person and/or an authorised security token is detected on the fingerprint scanner 221 or on another authentication interface 22 of the external appliance 2.

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[0055] By means of the internal appliance 3, the inhabitant also has the possibility to generate a release signal 90 to open the radio lock 91. For example, an application software can be installed on the smartphone 3, which provides the inhabitant a virtual button for operating the radio lock 91 on a touchscreen of the smartphone 3, meaning in order to generate and transmit the release signal 90.

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[0056] In the following, further details of a method according to the invention for operating the door communication system 1 shown in Figure 1 will be described.

[0057] If a visitor in the external area 51 approaches the house door 9 - and thereby, the external appliance 2 arranged in the vicinity of the house door 9 - the movement of the visitor is detected by the motion sensor 26. This triggering event is detected by the control logic 41 of the electronic control device 4. As a result, the external appliance 2 awakens from a standby mode, wherein the camera 24 is activated. In the case of darkness, thereby, a light system for illuminating the vicinity of the external appliance 2 can additionally be automatically activated in order to make image recordings of the visitor possible by means of the camera 24.

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[0058] If the visitor is authorised to access the internal area 51, he/she can therefore be identified on the fingerprint scanner 221 based on a previously taught-in fingerprint. In addition or as an alternative, an authentication can take place by means of a security token on an RFID reader, which can be provided as an authentication interface 22 on the

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external appliance 2. After successful authentication of an authorised person and/or an authorised security token, the radio lock 91 is operated to open the house door 9 automatically. For this purpose, a release signal 90 for the operation of the radio lock 91 is automatically generated by the electronic control device 4 and wirelessly transmitted to the radio lock 91 if an authorised person and/or an authorised security token is detected on the fingerprint scanner 221 or on another authentication interface 22 of the external appliance 2.

[0059] As an alternative to an authentication at the authentication interface 22, the visitor can operate the bell button 28 and, by means of this, trigger an audible bell signal in the internal area 52 of the building 5. When operating the bell button 28, a signal function is triggered on the internal appliance 3. For example, when operating the bell button 28, a trigger signal can be wirelessly transmitted from the external appliance 2 to the internal appliance 3 in order to trigger the signal function on the internal appliance 3. The trigger signal can, for example, transmit a push message to the smartphone 3 of the inhabitant in order to signal to the inhabitant that a visitor is at the door 9 and desires entry within the internal area 52.

[0060] Upon operating the signal operating element 28, a digital photo and/or video of the visitor is recorded and wirelessly transmitted to the smartphone 3 in order to convey a visual impression of the visitor to the inhabitant. Via the smartphone 3, the wireless communication connection 7 and the external appliance 2, the inhabitant can enter into dialogue with the visitor, wherein audio and image data can be exchanged via the respective acoustical and/or optical communication interfaces 21-1, 21-2, 31 and the wireless communication connection 7.

[0061] In order to make a voice and/or an image-based dialogue between the visitor and the inhabitant possible, for example, a corresponding application software can be installed on the smartphone 3. As an alternative, the communication can also take place via a browser-based application, wherein a corresponding browser window is displayed on a touchscreen of the smartphone 3.

[0062] If the inhabitant identifies the visitor as authorised for access based on the visual impression and/or of the dialogue and would like to give him/her access to the internal area 52, he/she can trigger a release signal 90 to open the radio lock 91 by means of manual entry on the smartphone 3. The release signal 90 is generated by the control device 4 and wirelessly transmitted from the smartphone 3 to the radio lock 91. For this purpose, within the scope of the application software or in the browser window, a virtual button can be provided to operate the radio lock 91, meaning to generate and transmit the release signal 90.

10

[0063] After the control logic 41 of the control device 4 has detected that the motion sensor 26 has detected a movement as a triggering event, it is checked by the control logic 41 if, within a predetermined period of time, which can, for example, be 15 seconds,

- 15
- the motion sensor 26 detects a further movement within the predetermined period of time,
  - the signal operating element 28 is operated, and/or
  - an authorised person and/or an authorised security token is detected on the fingerprint scanner 221 or on another authentication interface 22.

20

[0064] If the result of the check is that, within the predetermined period of time,

- the motion sensor 26 has detected no further movement,
- the signal operating element 28 has not been operated and
- no authorised person and no authorised security token have been detected on the fingerprint scanner 221 or on another authentication interface 22,

25

the control device 4 sets the external appliance 2 into standby mode again. The absence of another movement within the detection area of the motion sensor 26 is interpreted in such a way in this case that the visitor has already gone away, or it has to do with an error when detecting the first movement.

30

[0065] If the result of the check is that, within the predetermined period of time,

- the motion sensor 26 has detected a further movement,

- the signal operating element 28 has not been operated and
- no authorised person and no authorised security token have been detected on the fingerprint scanner 221 or on another authentication interface 22,

a digital photo and/or video of the vicinity of the external appliance 2 can automatically  
5 be transmitted wirelessly by means of a camera 24 and transmitted from the external  
appliance 2 to the smartphone 3 by means of a push message. For example, thereby, a  
live video surveillance can be started by means of the camera 24. By means of this, a  
visual impression of a - possibly unexpected - visitor can be conveyed. To attract the  
attention of the inhabitant, the push message can also simultaneously trigger a signal  
10 function on the smartphone 3.

[0066] In addition, in the case of the latter checking result of the control device 4, at  
least one of the presence simulation apparatuses 8, 81, 82, 83, 84, 85 is activated in order  
to simulate the presence of a person in the internal area 52 in a manner perceptible to a  
15 person in the external area 51. For example, the control device 4 can operate the  
illuminating device 81, the blinds 82 operable by means of external power, the music  
system 83 or the television 84. Thereby, the illuminating device 81, the music system 83  
or the television 84 can be arranged in the internal area 52 in such a way that they have  
an effect reaching into the external area 51 in an optical and/or acoustically perceivable  
20 manner.

[0067] The operation of the presence simulation apparatus 8 can, in particular comprise  
the activation of the electronically controllable voice output 85 provided on the external  
appliance 2. For example, by means of the electronically controllable voice output 85, a  
25 previously recorded voice message of the type "Can I help you?" can be output in order  
to awaken the impression of a person within the external area 51 that the internal area  
52 is not currently occupied. In this way, an unexpected visitor can be deterred from  
attempting a burglary within the internal area 51.

30 [0068] Furthermore, the control logic 41 can check at a further step if the motion sensor  
detects a further movement within another predetermined period of time (e.g. in turn, 15

seconds) after activating at least one of the presence simulation apparatuses 8, 81, 82, 83, 84, 85,

- the motion sensor 26 detects a further movement,
- the signal operating element 28 is operated and/or
- 5 • an authorised person and/or an authorised security token is detected on the authentication interface 22, 221.

[0069] If the result of the check is that, within the predetermined period of time,

- the motion sensor 26 has detected a further movement,
- 10 • the signal operating element 28 has not been operated and
- no authorised person and no authorised security token have been detected on the authentication interface 22, 221,

the electronic control device 41 triggers the recording of a digital photo or video of the vicinity of the external appliance 2 by means of the camera 24 arranged on the external  
15 appliance 2 as well as the transmission of the digital photo or video to the smartphone 3 of the inhabitant. As described above, the digital photo and/or video can be transmitted wirelessly by means of a push message by the external appliance 2 to the smartphone 3. For example, a live video surveillance can be started by means of the camera 24. By means of this, a visual impression of a - possibly unexpected - visitor can be conveyed.  
20 In order to attract the attention of the inhabitant, the push message can simultaneously trigger a single function on the smartphone 3, such as a "silent alarm" for example.

[0070] The previously described functionality of the internal appliance 3 within the scope of the door communication system 1 according to the invention can be optimally  
25 connected to diverse "smart-home" applications in a flexible way, which are, in themselves, known from building-automation technology. Thus, the internal appliance 3 can, for example, additionally be used for arming or disarming that alarm system and/or foreign automated light, blind, electricity and/or heating control. In addition or as an alternative, the internal appliance 3 can be used for health relevant monitoring  
30 functions, which, for example, concern an ambient temperature, and ambient humidity or an oxygen, carbon dioxide and/or pollutant content of the ambient air. Safety relevant monitoring functions, such as a smoke, fire and/or glass breakage alarm function can be

integrated with the door communication system 1 via the internal appliance 3 and, if applicable, a corresponding application software.

[0071] It is also within the scope of the invention at the door communication system  
5 comprises other hardware components, in particular, at least one sensor for the building-  
automation technology applications mentioned in the above as examples. In accordance  
with a favourable embodiment, such a sensor can comprise a transmission device to  
transmit sensor data to the external appliance 2 via a wireless communication  
connection, for example, radio, Bluetooth, ZigBee, Z-wave and/or DECT. Furthermore,  
10 it is conceivable that sensor data from their reaching the external appliance in this way  
are transmitted further onto the internal appliance 3 via the wireless communication  
connection 7, for example, via WLAN. The internal appliance 3 can thereby be a  
computer server arranged in the internal area 52 with an Internet connection for example.  
In this way, an absent inhabitant can remotely access "smart-home" applications via the  
15 Internet, which are based on the sensor data.

[0072] In addition or as an alternative to the at least one sensor, the door communication  
system can comprise at least one electronically controllable building-automation device.  
An absent inhabitant can control this remotely, wherein the control signals are  
20 transmitted between the external appliance 2 and the electronically controllable device  
via the Internet, the computer server (as an internal appliance), the wireless  
communication connection 7 (e.g. WLAN), the external appliance and another wireless  
communication connection (e.g. radio, Bluetooth, ZigBee, Z-Wave and/or DECT). The  
external appliance 2 represents an interface for the "last mile" of the communication,  
25 which is, for example, bridged via radio, Bluetooth, ZigBee, Z-Wave and/or DECT. In  
contrast, the internal appliance 3 represents the interface for the remote communication,  
for example, via the Internet, wherein the external appliance 2 and the internal appliance  
3 can communicate with each other via the wireless communication connection 7.

**[0073] List of reference numerals**

5	1	door communication system
	2	external appliance
	20	housing
	21-1	microphone
10	21-2	loudspeaker
	22	authentication interface
	221	biometric detection unit
	23	display area
	24	camera
15	26	motion sensor
	28	signal operating element
	3	internal appliance
	31	communication interface
20		
	4	electronic control device
	41	control logic
	5	building
25	51	external area
	52	internal area
	8	presence simulation apparatus
	80	control signal
30	81	illuminating device
	82	blinds operable by means of external power
	83	music system



- 84 television
- 85 electronically controlled voice output
  
- 9 door
- 5 90 release signal
- 91 radio lock

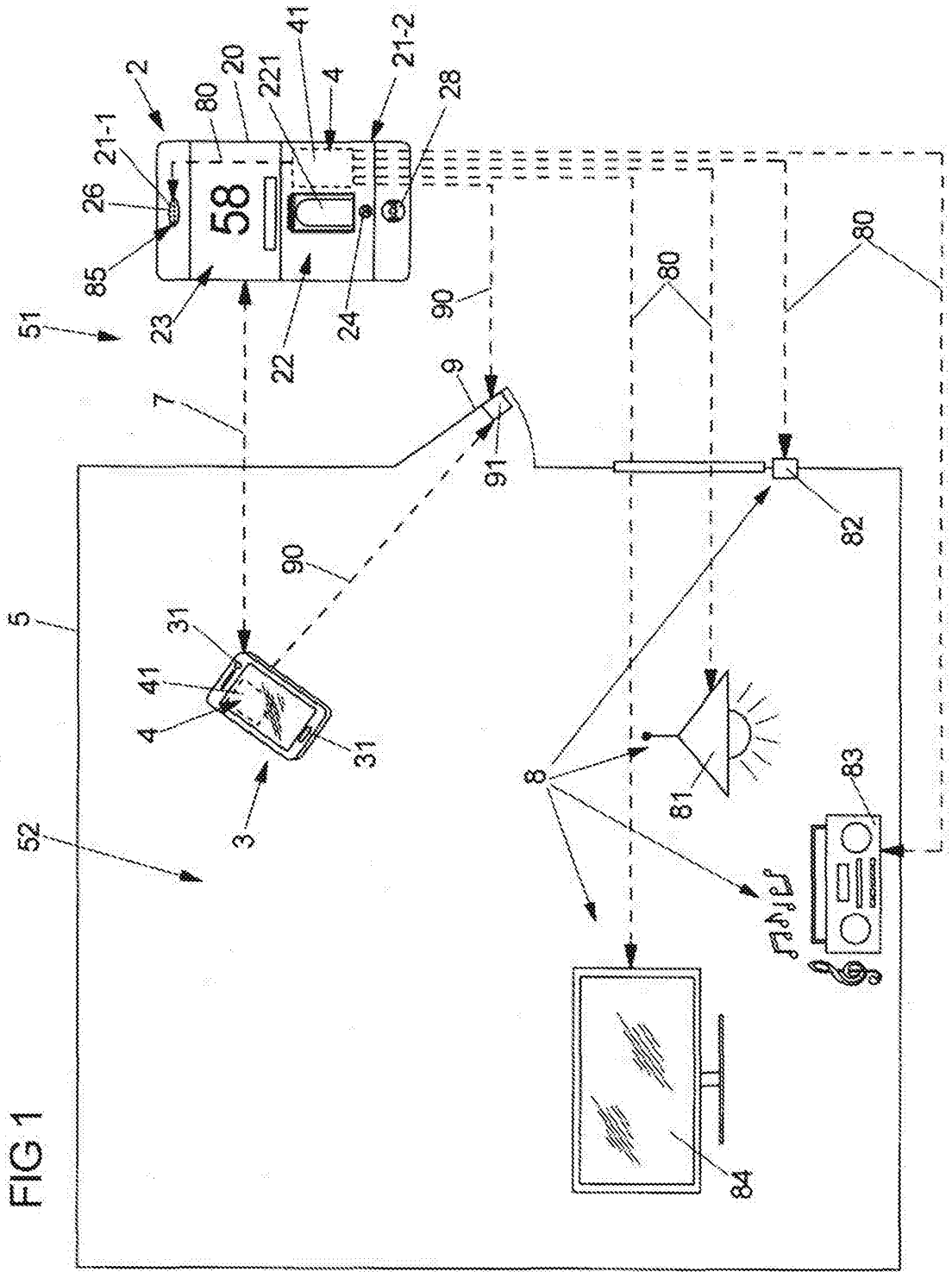


FIG 2

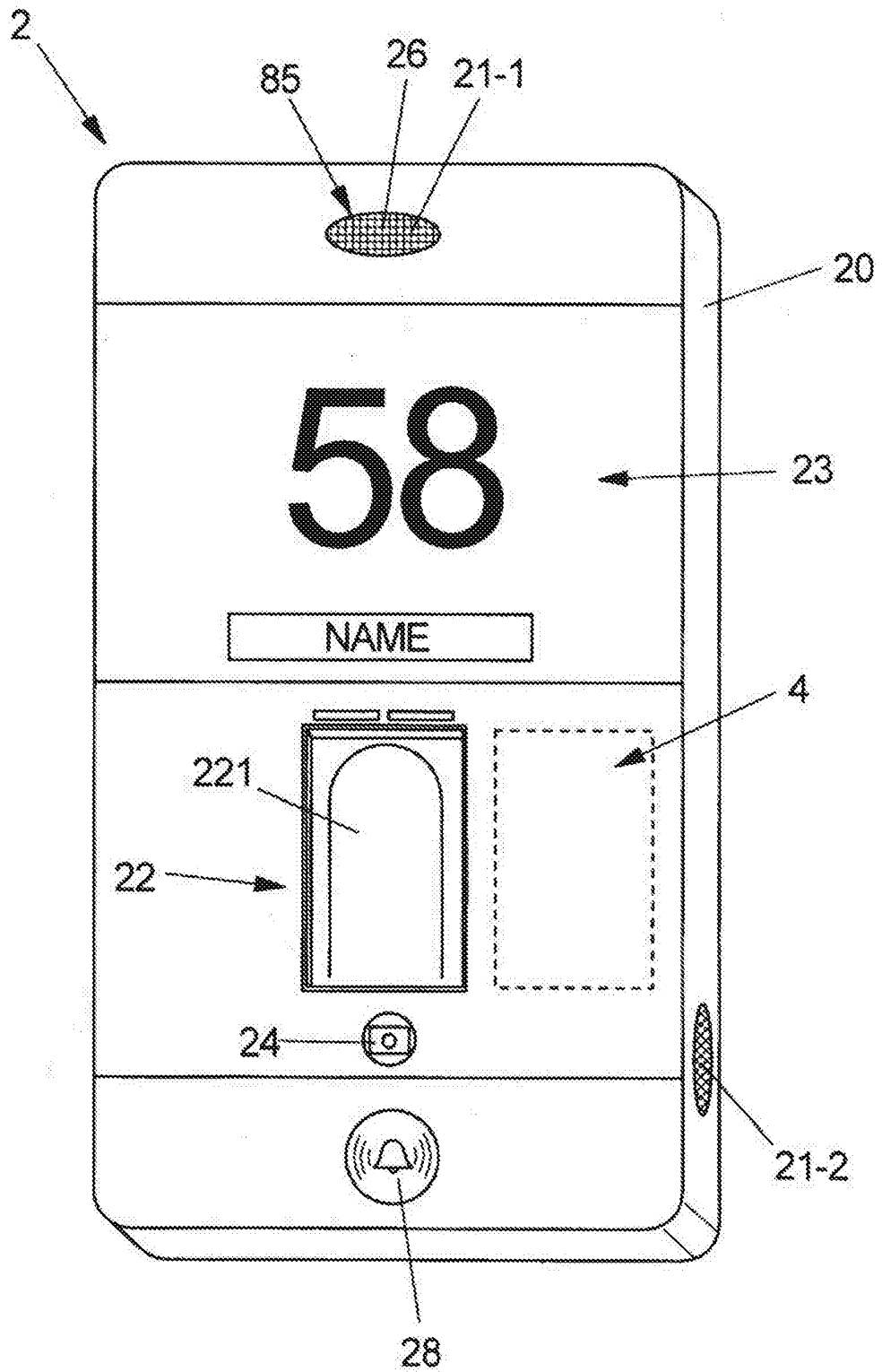


FIG 3A

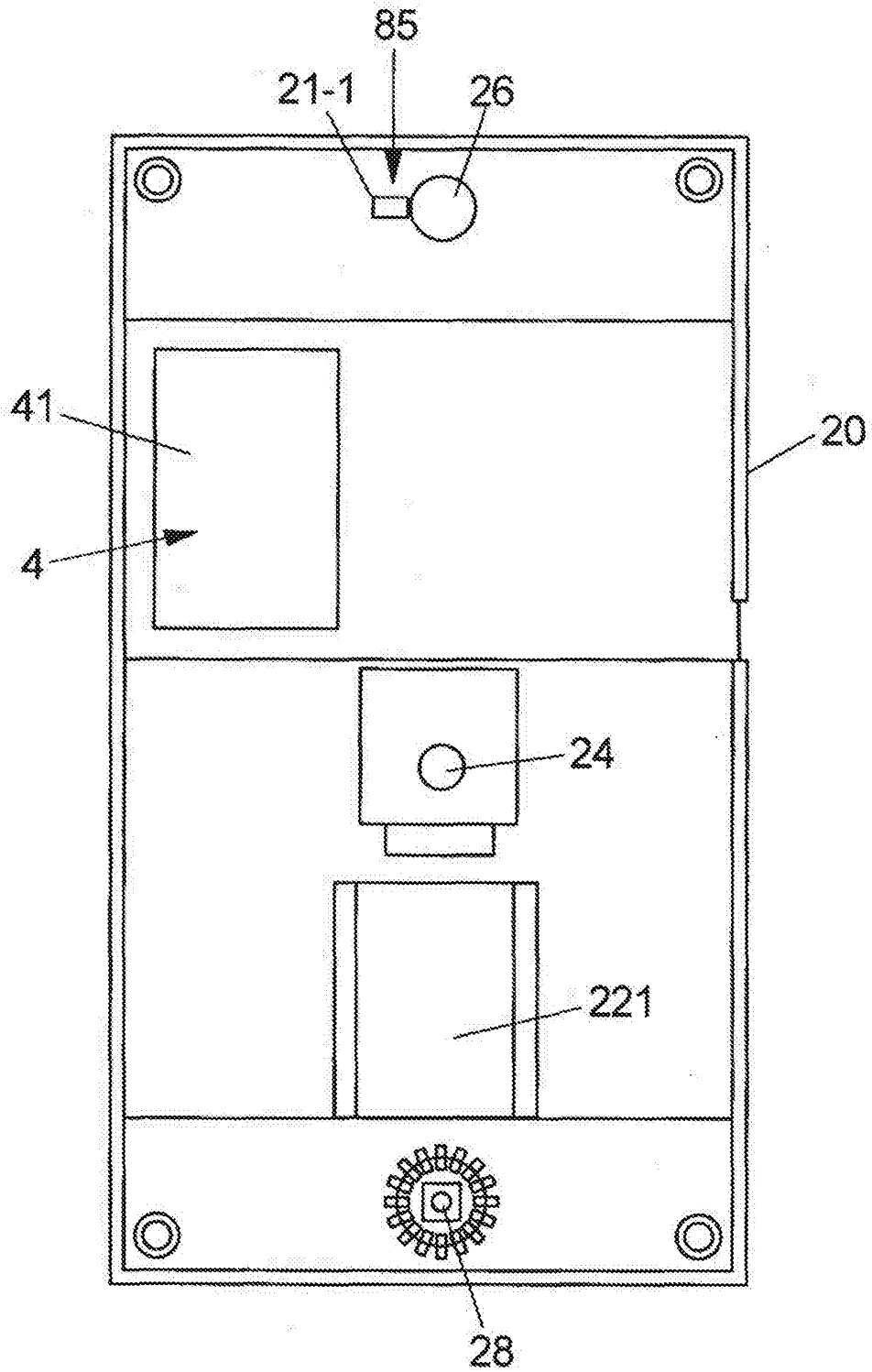
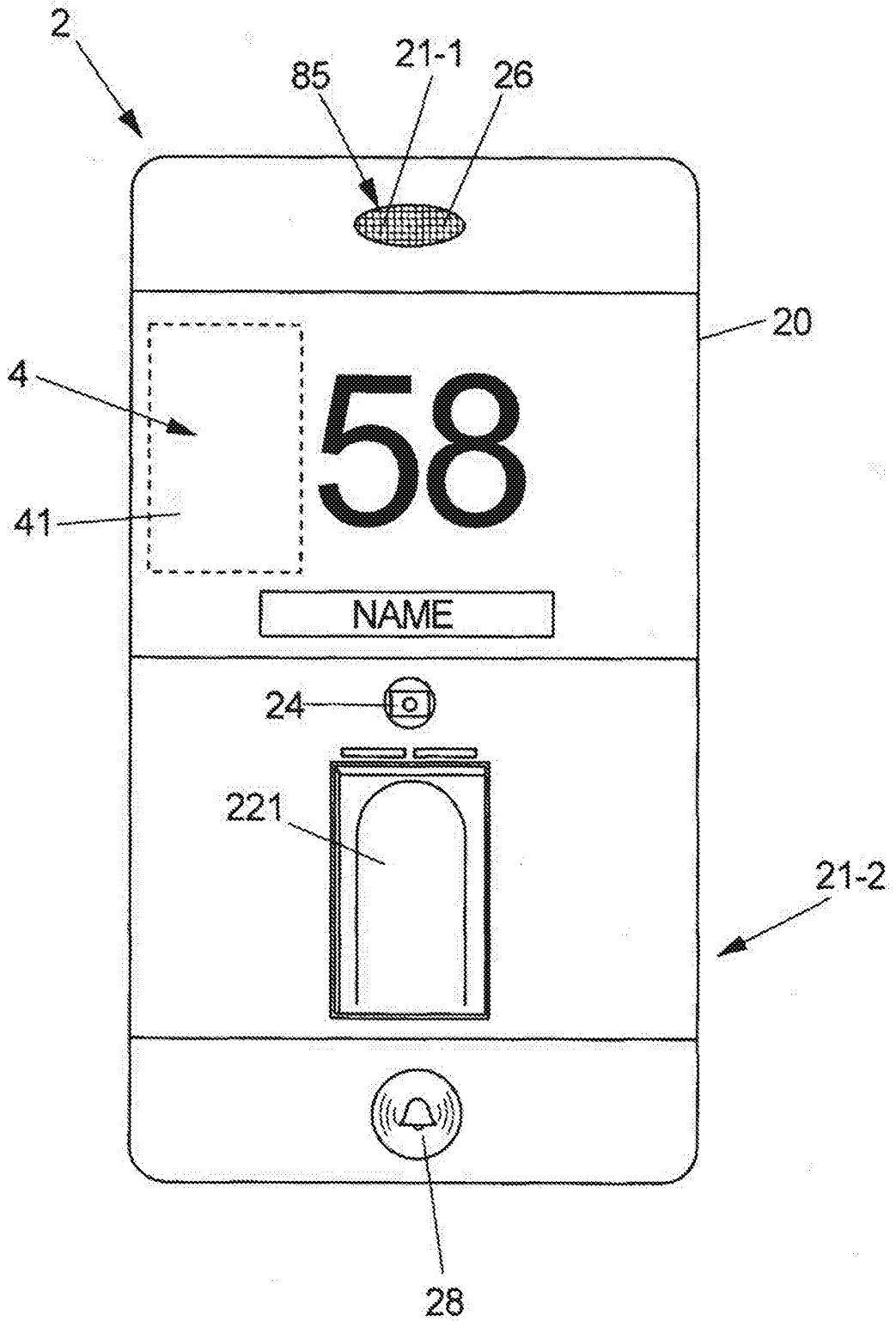


FIG 3B



## Patentkrav

1. Dørkommunikationssystem (1) til kommunikation mellem en person der befinder sig i et udendørsområde (51) af en bygning (5), og en person der befinder sig i et indendørsområde (52) af bygningen (5), hvilket udendørsområde (51) er adskilt fra indendørsområdet (52) ved en dør (9), hvilket system omfatter:

- et udendørsapparat (2) der er planlagt til stationær placering i udendørsområdet (51) og som omfatter følgende:
- et signalbetjeningselement (28) til udløsning af en signalfunktion på indendørsapparatet (3),
- et autentifikationsgrænseflade (22, 221) til autentifikation af en person og/eller en sikkerhedstoken, og
- en bevægelsessensor (26) til detektion af en bevægelse i udendørsområdet (51),
- mindst et indendørsapparat (3) der er rumligt adskilt fra udendørsapparatet (2), som mindst kan forbindes fra indendørsområdet (52) til udendørsapparatet (2) via mindst en trådløs kommunikationsforbindelse (7),
- en elektronisk styreindretning (4) der er designet og indrettet til at generere et frigivelsessignal (90) til åbning af en radiolås (91), der er anbragt på døren (9), når en autoriseret person og/eller en autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221),
- mindst en tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) der er designet til at simulere tilstedeværelsen af en person i indendørsområdet (52) på en måde, der kan opfattes af en person som befinder sig i udendørsområdet (51), hvilken mindst ene tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) omfatter

mindst et elektronisk styrbart stemmeoutput (85), der er tilvejebragt på udendørsapparatet (2),

**kendetegnet ved, at**

den elektroniske styreindretning (4) er designet og indrettet til at udføre følgende trin:

- at genkende ved hjælp af en styrelogik (41), at bevægelsessensoren (26) har detekteret en bevægelse,
- at kontrollerer ved hjælp af styrelogikken (41), inden for en forudbestemt tidsperiode efter genkendelsen, at bevægelsessensoren (26) har detekteret bevægelsen, om:
  - bevægelsessensoren (26) registrerer en yderligere bevægelse og/eller
  - signalbetjeningselementet (28) betjenes og/eller
  - en autoriseret person og/eller en autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221), og
- at generere styresignaler (80) og som følge heraf aktivering af tilstedeværelsessimuleringsindretningen (8, 81, 82, 83, 84, 85), hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at:
  - bevægelsessensoren (26) har detekteret en yderligere bevægelse og
  - signalbetjeningselementet (28) er ikke blevet betjent, og
  - ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221).

**2. Dørkommunikationssystemet (1) ifølge krav 1, kendetegnet ved, at** den elektroniske styreindretning (4) er designet og indrettet til at udføre følgende yderligere trin:

- at kontrollere ved hjælp af styrelogikken (41), inden for en forudbestemt

periode efter tilstedeværelsessimuleringsindretningen (8, 81, 82, 83, 84, 85) er aktiveret, om:

- bevægelsessensoren (26) detekterer en yderligere bevægelse og/eller
- signalbetjeningselementet (28) betjenes og/eller
- en autoriseret person og/eller et autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221), og
- hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at:
  - bevægelsessensoren (26) har detekteret en yderligere bevægelse og
  - signalbetjeningselementet (28) er ikke betjent og
  - ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221),

automatisk at optage mindst ét billede ved hjælp af et kamera (24) der er anbragt på udendørsapparatet (2), og at overføre billedet til indendørsapparatet (3).

**3.** Dørkommunikationssystem (1) ifølge krav 1 eller 2, **kendetegnet ved, at** det mindst ene tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) har mindst en yderligere elektronisk styrbar indretning (81, 82, 83, 84, 85), der er tilvejebragt på bygningen (5) og/eller på udendørsapparatet (2).

**4.** Dørkommunikationssystem (1) ifølge et af de foregående krav, **kendetegnet ved, at** autentifikationsgrænsefladen (22, 221) omfatter mindst en fingeraftryksscanner.

**5.** Dørkommunikationssystem (1) ifølge et af de foregående krav, **kendetegnet ved, at** udendørsapparatet (2) er omfattet af et hus (20), hvor den elektroniske



styreindretning (4) er anbragt i huset (20).

**6. Dørkommunikationssystem (1) ifølge et af de foregående krav, **kendetegnet ved** mindst en sensor til anvendelse af bygningsautomatiseringen og/eller mindst en elektronisk aktiverbar indretning til en anvendelse af bygningsautomatiseringen, hvor den mindst ene sensor og/eller den mindst ene elektronisk aktiverbare indretning kan forbindes til udendørsapparatet (2) via mindst en trådløs kommunikationstilslutning.**

**7. Udendørsapparat (2) til et dørkommunikationssystem (1), hvilket udendørsapparat (2) er planlagt til stationær placering i et udendørsområde (51) af en bygning (5), der kan adskilles fra et indendørsområde (52) af bygningen (5) ved en dør (9), og hvilket udendørsapparat (2) omfatter følgende:**

- mindst en overførselsgrænseflade til at tilvejebringe en trådløs kommunikationsforbindelse (7) til et indendørsapparat (3) af dørkommunikationssystemet (1),
- et signalbetjeningselement (28) til udløsning af en signalfunktion på indendørsapparatet (3),
- en autentifikationsgrænseflade (22, 221) til autentifikation af en person og/eller en sikkerhedstoken,
- en elektronisk styreindretning (4) der er designet til at generere et frigivelsessignal (90) til åbning af en radiolås (91), som er anbragt på døren (9), hvis en autoriseret person og/eller en autoriseret sikkerhedstoken registreres i autentifikationsgrænsefladen (22, 221), og
- en bevægelsessensor (26) til detektion af en bevægelse i udendørsområdet (51),

**kendetegnet ved, at**

den elektroniske styreindretning (4) er designet og indrettet til at udføre følgende trin:

- at genkende ved hjælp af en styrelogik (41), at bevægelsessensoren (26) har detekteret en bevægelse,
- at kontrollere ved hjælp af styrelogikken (41), inden for en forudbestemt tidsperiode efter genkendelse, at bevægelsessensoren (26) har detekteret bevægelsen, om
- bevægelsessensoren (26) registrerer en yderligere bevægelse og/eller
- signalbetjeningselementet (28) betjenes og/eller
- en autoriseret person og/eller en autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221), og
- at generere styresignaler (80) til aktivering af mindst et tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85), hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at:
- bevægelsessensoren (26) har detekteret en yderligere bevægelse og
- signalbetjeningselementet (28) ikke er blevet betjent og
- ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221),

hvor den mindst ene tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) omfatter mindst et elektronisk styrbart stemmeoutput (85), der er tilvejebragt på udendørsapparatet (2) og designet til at simulere tilstedeværelsen af en person i indendørsområdet (52) på en måde, der kan opfattes af en person i udendørsområdet (51).

**8. Udendørsapparatet (2) ifølge krav 7, kendetegnet ved, at den elektroniske styreindretning (4) er designet og indrettet til at udføre følgende yderligere trin:**

- at kontrollere ved hjælp af styrelogikken (41), inden for en forudbestemt periode efter at tilstedeværelsessimuleringsindretningen (8, 81, 82, 82,

84, 85) er aktiveret, om:

- bevægelsessensoren (26) detekterer en yderligere bevægelse og/eller
- signalbetjeningselementet (28) betjenes og/eller
- en autoriseret person og/eller et autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221), og
- hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at:
  - bevægelsessensoren (26) har detekteret en yderligere bevægelse og
  - signalbetjeningselementet (28) er ikke betjent og
  - ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221),

automatisk at optage mindst ét billede ved hjælp af et kamera (24) der er anbragt på udendørsapparatet (2), og at overføre billedet til indendørsapparatet (3).

**9.** Fremgangsmåde til drift af et dørkommunikationssystem (1), hvilket dørkommunikationssystem omfatter følgende:

- mindst et udendørsapparat (2) der er anbragt stationært i et udendørsområde (51) af en bygning (5), hvilket udendørsområde (51) kan adskilles fra et indendørsområde (52) af bygningen (5) ved en dør (9),
- mindst et indendørsapparat (3) der er rumligt adskilt fra udendørsapparatet (2), som mindst kan forbindes fra indendørsområdet (52) til udendørsapparatet (2) via mindst en trådløs kommunikationsforbindelse (7),

- mindst en tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) der er designet til at simulere tilstedeværelsen af en person i indendørsområdet (52) på en måde, der kan opfattes af en person som befinder sig i udendørsområdet (51), hvilket mindst ene tilstedeværelsessimuleringsindretning (8, 81, 82, 83, 84, 85) omfatter mindst et elektronisk styrbart stemmeoutput (85), der er tilvejebragt på udendørsapparatet (2);

hvilken fremgangsmåde omfatter følgende:

- at indstille den trådløse kommunikationsforbindelse (7) til kommunikation mellem en person i udendørsområdet (51) og en person i indendørsområdet (52) efter behov,
- automatisk at åbne en radiolås (91) der er anbragt på døren (9), hvis en autoriseret person og/eller et autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221) af udendørsapparatet (2), og
- at udløse en signalfunktion på indendørsapparatet (3), hvis et signalbetjeningsselement (28) på udendørsapparatet (2) betjenes,

**kendetegnet ved følgende trin:**

- at genkende ved hjælp af en styrelogik (41) af en elektronisk styreindretning (4), at en bevægelsessensor (26) der er tilvejebragt på udendørsapparatet (2), har detekteret en bevægelse i udendørsområdet,
- at kontrollere ved hjælp af styrelogikken (41), inden for en forudbestemt tidsperiode efter genkendelsen, at bevægelsessensoren (26) har detekteret bevægelsen, om:
  - bevægelsessensoren (26) registrerer en yderligere bevægelse og/eller
  - signalbetjeningsselementet (28) betjenes og/eller
  - en autoriseret person og/eller et autoriseret sikkerhedstoken registreres

på autentifikationsgrænsefladen (22, 221); og

- at generere styresignaler (80) ved hjælp af den elektroniske styreindretning (4) og som følge heraf aktivering af tilstedeværelsessimuleringsindretningen (8, 81, 82, 83, 84, 85), hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at
- bevægelsessensoren (26) har detekteret en yderligere bevægelse og
- signalbetjeningselementet (28) er ikke betjent og
- ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221).

**10.** Fremgangsmåden ifølge krav 9, **kendetegnet ved, at** drift af signalbetjeningselementet (28) resulterer i, at mindst et billede automatisk registreres ved hjælp af et kamera (24) der er anbragt på udendørsapparatet (2), og overføres til indendørsapparatet (3).

**11.** Fremgangsmåden ifølge krav 9, **kendetegnet ved** følgende yderligere trin:

- at kontrollere via styrelogikken (41), inden for en forudbestemt periode efter aktivering af tilstedeværelsessimuleringsindretningen (8, 81, 82, 83, 84, 85), om:
- bevægelsessensoren (26) detekterer en yderligere bevægelse og/eller
- signalbetjeningselementet (28) betjenes og/eller
- en autoriseret person og/eller et autoriseret sikkerhedstoken registreres på autentifikationsgrænsefladen (22, 221), og
- hvis inden for den forudbestemte tidsperiode, resultatet af kontrollen er, at:
- bevægelsessensoren (26) har detekteret en yderligere bevægelse og

- signalbetjeningselementet (28) er ikke blevet betjent og
- ingen autoriseret person og ingen autoriseret sikkerhedstoken er blevet registreret på autentifikationsgrænsefladen (22, 221),

automatisk at optage mindst ét billede ved hjælp af et kamera (24) der er anbragt på udendørsapparatet (2), og at overføre billedet til indendørsapparatet (3).

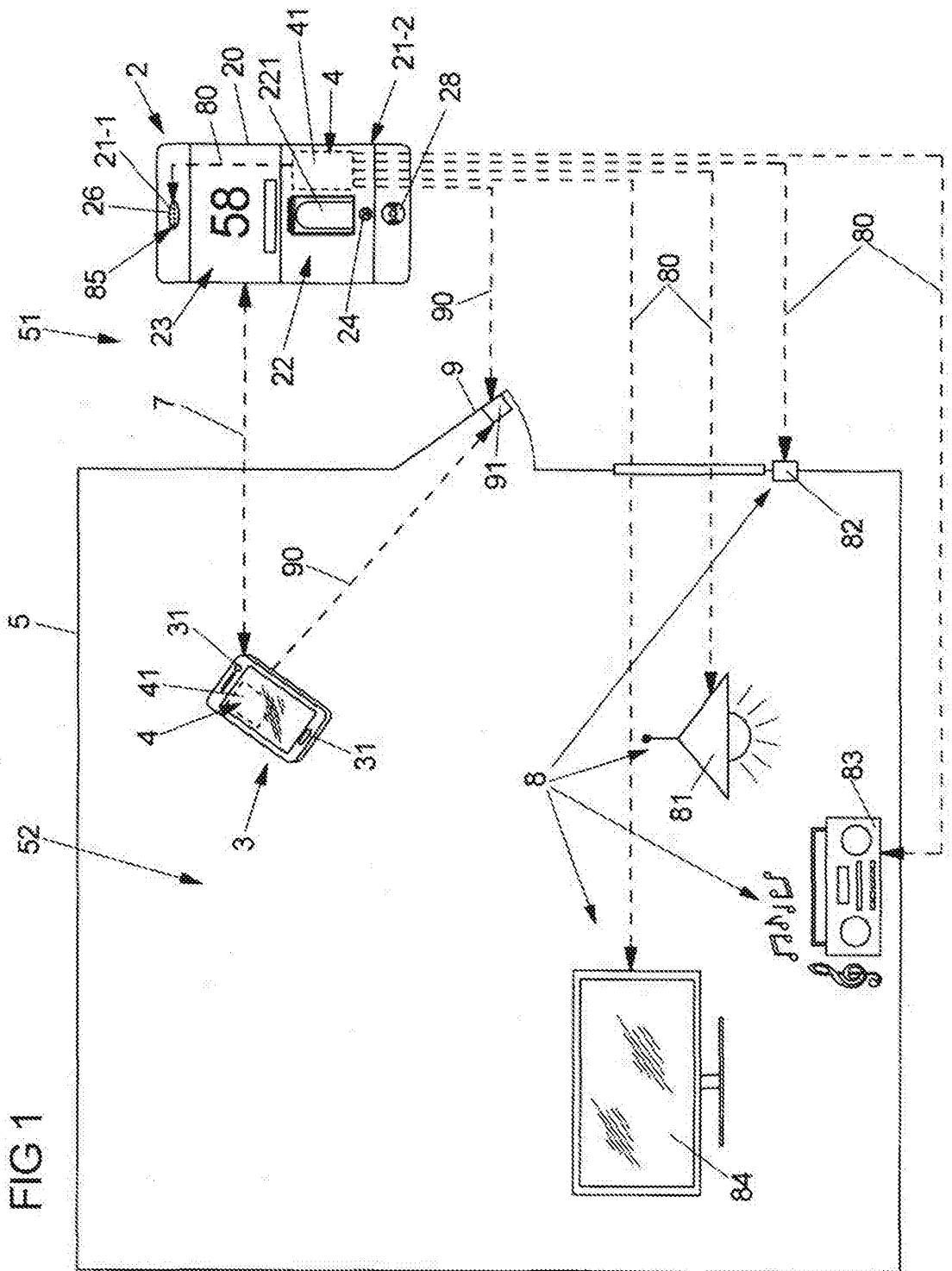


FIG 2

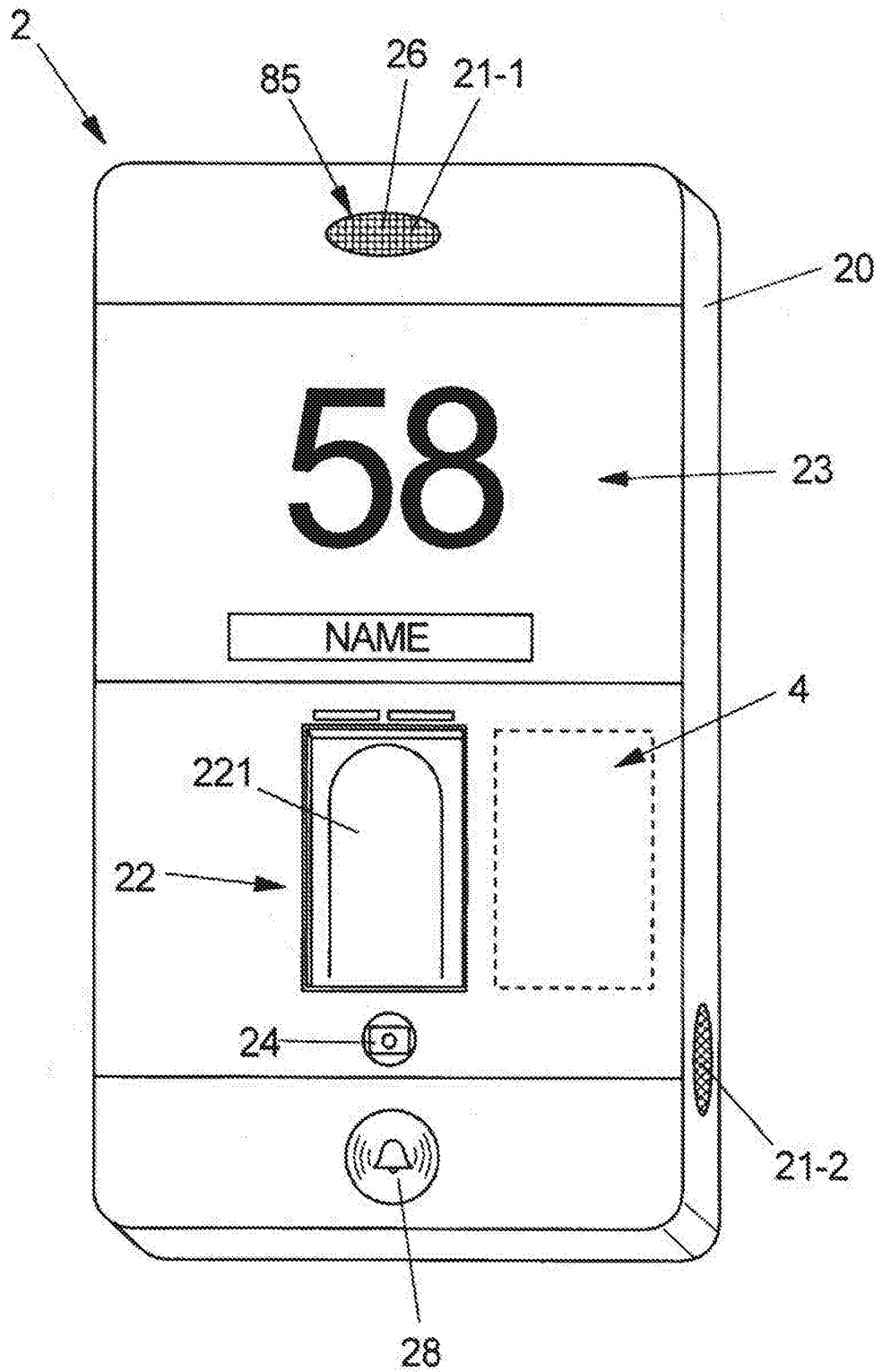




FIG 3A

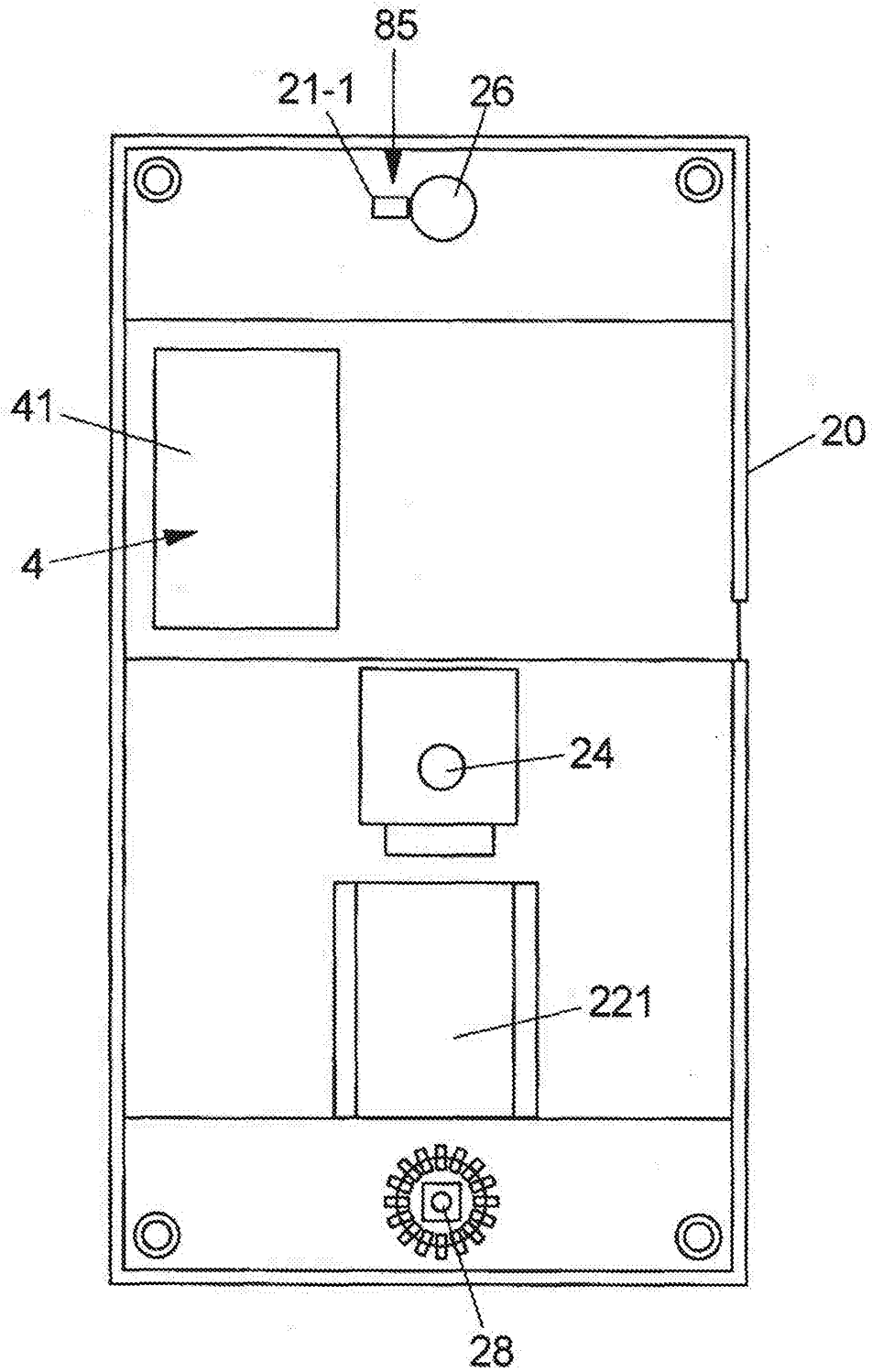


FIG 3B

