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(54) Title: A METHOD AND DEVICE FOR CONFIGURING WIRELESS DEVICES IN AN ELEVATOR SYSTEM

(57) Abstract: According to an aspect, there is provided a method for configuring wireless devices (102A-102E) in an elevator system (100). The method comprises initiating, with a device (106) connected to a microphone (108), an audio handshake with at least one wireless device (102A-102E) one by one at a landing floor (114, 116, 118, 120, 122); receiving, with the microphone (108) from a wireless device (102A-102E) during the audio handshake, information identifying the wireless device (102A-102E); and transmitting, with the device (106) in response to receiving the information identifying the wireless device (102A-102E), configuration information to the wireless device (102A-102E), the configuration information assigning the wireless device (102A-102E) to a specific floor (114, 116, 118, 120, 122) and/ or area.

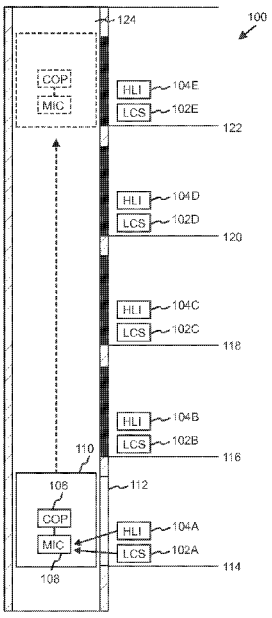

FIG. 1A

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A METHOD AND DEVICE FOR CONFIGURING WIRELESS DEVICES IN AN ELEVATOR SYSTEM

BACKGROUND

Wireless devices, for example, landing call stations (LCS), hall lantern indicators (HLI) and other signalization devices in an elevator system need to be configured before they can be taken into use as they do not possess built-in information about the physical location properties, such as in which floor the wireless device is physically located.

One solution for the configuration of the wireless devices is to perform the configuration manually. In the manual configuration, a technician uses a mobile device and manually configures each wireless device separately. The configuration information then maps a wireless device to a specific floor.

The above disclosed solution is, however, time consuming and error prone. Further, the configuration process has to be performed manually.

Thus, it would be beneficial to have a solution that would alleviate at least one of these drawbacks.

SUMMARY

A solution is provided that automates the configuration process.

According to a first aspect of the invention, there is provided a method for configuring wireless devices in an elevator system. The method comprises initiating, with a device connected to a microphone, an audio handshake with at least one wireless device one by one at a landing floor; receiving, with the microphone

from a wireless device during the audio handshake, information identifying the wireless device; and transmitting, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

In an embodiment, the method further comprises performing the audio handshake only with wireless devices from which a minimum sound level is received.

In an embodiment, the device is a portable wireless device.

In an embodiment, the method further comprises receiving, from a user of the device, a selection of an area to be configured.

In an embodiment, the device is an elevator car mounted wireless device.

In an embodiment, the method further comprises before initiating the audio handshake with the at least one wireless device, driving the elevator car to a floor and opening doors of the elevator car and/or landing doors; and transmitting, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor.

In an embodiment, the method further comprises initiating the audio handshake separately at each floor.

In an embodiment, the method further comprises performing an end-to-end run with the elevator car; determining local maxima of signals sent by the at least one wireless device, the local maxima identifying multiple floors; and initiating the audio handshake at each local maximum.

In an embodiment, the method further comprises stopping the elevator car at each local maximum.

In an embodiment, the method further comprises causing performance of an initial commissioning with the elevator car to identify floors.

According to a second aspect of the invention, there is provided a device for configuring wireless devices in an elevator system. The device comprises means for initiating with a microphone an audio handshake with at least one wireless device one by one at a landing floor; means for receiving during the audio handshake information identifying the wireless device; and means for transmitting in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

In an embodiment, the device further comprises means for performing the audio handshake only with wireless devices from which a minimum sound level is received.

In an embodiment, the device is a portable wireless device.

In an embodiment, the device further comprises means for receiving, from a user of the device, a selection of an area to be configured.

In an embodiment, the device is an elevator car mounted wireless device.

According to a third aspect of the invention, there is provided an elevator system. The elevator system comprises an elevator car configured to move in an elevator shaft; a plurality of wireless devices at a plurality of landing floors; a device of the second aspect mounted in the elevator car; and an elevator controller configured to control the device.

In an embodiment, before initiating the audio handshake with the at least one wireless device, the elevator controller is configured to drive the elevator car to a floor and to open doors of the elevator car and/or landing doors; and the elevator is configured cause transmission, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor.

In an embodiment, the elevator controller is configured to initiate the audio handshake separately at each floor.

In an embodiment, the elevator controller is configured to: perform an end-to-end run with the elevator car; determine local maxima of signals sent by the at least one wireless device, the local maxima identifying multiple floors; and initiate the audio handshake at each local maximum.

In an embodiment, the elevator control device is configured to stop the elevator car at each local maximum.

In an embodiment, the elevator controller is configured to cause performance of an initial commissioning with the elevator car to identify floors.

According to a fourth aspect of the invention, there is provided a computer program comprising program code, which when executed by at least one processing unit, causes at least one processing unit to perform the method of the first aspect.

According to a fifth aspect of the invention, there is provided a computer readable medium comprising a computer program comprising program code, which when executed by at least one processing unit, causes at least one processing unit to perform the method of any of the first aspect.

According to a sixth aspect of the invention, there is provided an apparatus for configuring wireless devices in an elevator system. The apparatus comprises at least one processor and at least one memory connected to the at least one processor. The at least one memory stores program instructions that, when executed by the at least one processor, cause the apparatus to initiate an audio handshake with at least one wireless device one by one at a landing floor; receive, with a microphone from a wireless device during the audio handshake, information identifying the wireless device; and transmit, in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

The above discussed means may be implemented, for example, using at least one processor, at least one processor and at least one memory connected to the at least one processor, or at least one processor, at least one memory connected to the at least one processor and an input/output interface connected to the at least one processor.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and constitute a part of this specification, illustrate embodiments of the invention and together with the description help to explain the principles of the invention. In the drawings:

FIG. 1A illustrates an elevator system according to an aspect.

FIG. 1B illustrates an elevator system according to another aspect.

FIG. 1C illustrates an elevator system according to another aspect.

FIG. 2 illustrates elements in an elevator system according to an aspect

FIG. 3A illustrates a block diagram of a device according to an aspect.

FIG. 3B illustrates a block diagram of a controller according to an aspect.

FIG. 4 illustrates a flow diagram of a method for configuring wireless devices in an elevator system according to an aspect.

DETAILED DESCRIPTION

FIG. 1A illustrates an elevator system 100 according to an aspect. The elevator system 100 comprises an elevator shaft 124 in which an elevator car 110 moves to serve different floors. Although FIG. 1A illustrates five floors 114, 116, 118, 120, 122, it is evident that there may be any number of floors. Similarly, although FIG. 1A illustrates only one elevator shaft 124, there may be more than one elevator shaft in the elevator system.

The elevator car 110 includes at least one elevator car mounted wireless device 106. The term "wireless device" used herein refers to a device that is able to receive or receive and transmit wireless signals, for example, from a controller of the elevator system. In one embodiment, the elevator car mounted wireless device 106 comprises a car operating panel (COP). It is evident that the elevator car mounted wireless device 106 may refer to any device in the elevator car 110 configured with wireless transmission/reception capabilities. A microphone 108 is also connected to the elevator car mounted wireless device 106. In another example, the microphone 108 may also be part of the elevator car mounted wireless device 106.

Each floor 114, 116, 118, 120, 122, includes at least one wireless device 102A-102E, 104A-104E. FIG. 1A illustrates an example in which a first wireless device 102A-102E may be a landing call station (LCS) and a second wireless device 104A-104E may be a hall lantern indicator (HLI). In other examples, a display or displays or any other appropriate wireless device needed at a floor may be arranged at all or only in specific floors.

When performing a configuration of the wireless devices 102A-102E, 104A-104E, an elevator control apparatus controlling the elevator system may first cause the elevator car 110 to perform an initial commissioning to identify the floors 114, 116, 118, 120, 122. The commissioning may be performed, for example, by performing an end-to-end travel with the elevator car 110 in the elevator shaft 124.

The configuration of the wireless devices 102A-102E, 104A-104E may then comprise a configuration sequence during which the elevator car 110 stops at each floor 114, 116, 118, 120, 122 and the elevator doors and the landing doors 112 are opened. FIG. 1A illustrates a situation in which the elevator car 110 has stopped at the first floor 114.

The elevator car mounted wireless device 106 is caused to initiate an audio handshake with at least one wireless device one by one at each landing floor 114, 116, 118, 120, 122. In one embodiment, the audio handshake is initiated with the wireless devices 102A, 104A one by one.

In an embodiment, the wireless devices 102A, 104A start transmitting audio signals as soon as they identify an initiation signal from the elevator car mounted wireless device 106. The initiation signal may be a wireless or audible initiation signal. In another embodiment, during the configuration of the wireless devices 102A-102E, 104A-104E, they are configured to operate in a configuration mode and they transmit audio signals without first receiving an initiation signal from the elevator car mounted wireless device 106. The configuration mode may be activated remotely so that it is activated in all wireless devices 102A-

102E, 104A-104E substantially simultaneously. In another embodiment, the configuration mode may be activated locally with the initiation signal from the elevator car mounted device 106 separately at each floor. In response to initiating the audio handshake with the wireless device 102A, the elevator car mounted wireless device 106 receives with the microphone 108 during the audio handshake information identifying the wireless device 102A. For example, the wireless device 102A may transmit audio signals (audible or non-audible by humans) to be captured by the microphone 108, where the audio signals comprise a unique identifier of the wireless device 102A. The unique identifier is, for example, a serial number or other identifier uniquely identifying the wireless device 102A among all the wireless devices 102A-102E, 104A-104E.

As the elevator car mounted wireless device 106 already possesses the floor information, it is able to assign the wireless device 102A to a correct floor. Therefore, the elevator car mounted wireless device 106 transmits configuration information to the wireless device 102A, the configuration information comprising the assigned floor information. A similar audio handshake process is repeated with the elevator car mounted wireless device 106 separately with each detected wireless device.

In one embodiment, the elevator car mounted wireless device 106 is configured to perform the audio handshake only with wireless devices from which a minimum sound level is received. As an example, a minimum threshold may be applied. The minimum threshold may be set so that signal levels from wireless devices possibly transmitting audio signals in floors other that the floor at which the elevator

car 110 is currently located, fall below the minimum threshold. This enables a solution in which the elevator car mounted wireless device 106 performs the audio handshake only with wireless devices in direct vicinity and omits other devices.

In one embodiment, the configuration of the wireless devices 102A-102E, 104A-104E is performed during the initial commissioning when identifying the floors 114, 116, 118, 120, 122. The wireless devices 102A-102E, 104A-104E may be configured to start transmitting audio signals when a configuration or an initial commissioning phase starts. When the elevator car 110 travels in the elevator shaft 124, the elevator car mounted wireless device 106 may simultaneously determine local maxima of signals sent by the wireless devices 102A-102E, 104A-104E. As an example, when the elevator car 110 is at a location or close to it where it normally stops at a specific floor, for example the floor 114, it receives signals from wireless devices 102A, 104A with a stronger signal level than for signals from wireless devices located at other floors 116, 118, 120, 122. Therefore, the signals reach the local maxima in locations where the elevator car 110 normally stops at the floor or close to them. As there are multiple floors, there are multiple local maximum points for the signals received from the wireless devices 102A-102E, 104A-104E. Therefore, in a combined solution, the configuration of the wireless devices 102A-102E, 104A-104E is performed during the initial commissioning when identifying the floors 114, 116, 118, 120, 122. During the configuration, the elevator car 110 may have to perform some position adjustments in the elevator shaft 124 after it has determined a local maximum so that it is located at the local maximum point before initiating the audio handshake procedure. Further, elevator car 110 may not even have

to open its doors if the signals from the wireless devices 102A-102E, 104A-104E are identifiable and strong enough. If the doors need not be opened, the configuration process is faster.

In another embodiment, the elevator car mounted wireless device 106 is first configured to perform the initial commissioning that includes also the determination of the local maxima. Then, subsequently the elevator car mounted wireless device 106 is configured to initiate the audio handshake at each local maximum during a subsequent end-to-end travel of the elevator car 110 in the elevator shaft 124. Before initiating the audio handshake, the elevator car 110 may or may not be configured to open its doors.

FIG. 1B illustrates an elevator system 130 according to another aspect. The difference between the aspects illustrated in FIGS. 1A and 1B is that in FIG. 1B the elevator car 110 is able to open its doors towards two different sides 126, 128. In the example illustrated in FIG. 1B, the elevator car 110 has opened its doors 132 towards the side 128 at the floor 116. The discussion already presented above for FIG. 1A applies also for FIG. 1B with the exception that it may not be reasonable to initiate the audio handshake process while keeping the doors of the elevator car 110 closed as there are now wireless device 102A-102J, 104A-104J on both sides 126, 128 of the elevator car 110. Therefore, in the example illustrated in FIG. 1B, the elevator car 110 initiates the audio handshake separately for both sides 126, 128 and opens only doors at one side at a time.

FIG. 1C illustrates an elevator system 140 according to another aspect. The elevator system comprises an elevator shaft 124 in which an elevator car 110 moves

to serve different floors. Although FIG. 1C illustrates five floors 114, 116, 118, 120, 122, it is evident that there may be any number of floors. Similarly, although FIG. 1C illustrates only one elevator shaft 124, there may be more than one elevator shaft in the elevator system.

Each floor 114, 116, 118, 120, 122, includes at least one wireless device 102A-102E, 104A-104E. FIG. 1C illustrates an example that a first wireless device 102A-102E may be a landing call station (LCS) and a second wireless device 104A-104E may be a hall lantern indicator (HLI). In other examples, a display or displays or any other appropriate wireless device needed at a floor may be arranged at all or certain floors.

In this aspect, the configuration of the wireless devices 102A-102E, 104A-104E with a portable wireless device 142 is carried by a commissioner 144. The portable wireless device 142 also comprises a microphone or an external microphone may be connected to the portable wireless device 142. As an example, the portable wireless device 142 may be a mobile phone.

In order to configure the wireless devices 102A, 104A, the portable wireless device 142 initiates an audio handshake with the wireless devices 102A, 104A one by one. Prior to initiating the audio handshake, the commissioner 144 may have selected an area and/or floor that he is about to configure with the portable wireless device 142. In response to initiating the audio handshake, the portable wireless device 142 receives with the microphone from a wireless device 102A, 104A information identifying the wireless device 102A, 104A. For example, the wireless device 102A may

transmit audio signals (audible or non-audible by humans) to be captured by the microphone, where the audio signals comprise a unique identifier of the wireless device 102A. The unique identifier is, for example, a serial number or other identifier uniquely identifying the wireless device 102A among all the wireless devices 102A-102E, 104A-104E. In response to receiving the information identifying the wireless device 102A, the portable wireless device 142 is configured to transmit configuration information to the wireless device 102A, the configuration information assigning the wireless device to a specific floor and/or area as selected earlier by the commissioner 144.

In an embodiment, the wireless devices 102A, 104A start transmitting audio signals as soon as they identify an initiation signal from the portable wireless device 142. In another embodiment, during the configuration of the wireless devices 102A-102E, 104A-104E, they are configured to operate in a configuration mode and they transmit audio signals without first receiving an initiation signal from the portable wireless device 142.

In an embodiment, the portable wireless device 142 is configured to perform the audio handshake only with wireless devices from which a minimum sound level is received. This avoids misconfiguring the wireless device to an incorrect floor and/or area and enables a solution in which the portable wireless device 106 performs the audio handshake only with wireless devices in direct vicinity and omits other devices.

FIG. 2 illustrates elements in an elevator system according to an aspect. The elevator system comprises an elevator controller 200 connected to at least one

wireless router 202. At least one wireless antenna 204 is connected to the at least one wireless router 202. Wireless devices illustrated in the embodiments of FIGS. 1A-1C, i.e. the elevator car mounted wireless device 106, the portable wireless device 142 and wireless devices 102A-102J, 104A-104J at the landing floors may be wirelessly connected to the at least one wireless antenna 204. The elevator controller 200 may control at least some of the operations performed by the elevator car mounted wireless device 106.

FIG. 3A illustrates a block diagram of a device 106, 142 according to an embodiment. The device 106, 142 comprises at least one processor 302 connected to at least one memory 300. The at least one memory 300 may comprise at least one computer program which, when executed by the processor 302 or processors, causes the device 106, 142 to perform the programmed functionality. In another embodiment, the at least one memory 300 may be an internal memory of the at least one processor 302. The device 106, 142 may also comprise a wireless transceiver 304. Via wireless transceiver 304, the device 106, 142 may be connected to at least one wireless device 102A-102J, 104A-104J. The at least one wireless device 102A-102J, 104A-104J comprises, for example, the wireless devices located at the landing floors. The device 106, 142 may be a portable wireless device 142 carried by a commissioner or an elevator car mounted wireless device 106. The illustrated components are not required or all-inclusive, as any components can deleted and other components can be added.

In an embodiment, the device 300 may comprise means for initiating with the microphone 308 an audio handshake with at least one wireless device one by one at a landing floor, means for receiving during the

audio handshake information identifying the wireless device and means for transmitting in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area. The means may be implemented, for example, using at least one processor 302, at least one processor 302 and at least one memory 300 connected to the at least one processor 302, or at least one processor 302, at least one memory 300 connected to the at least one processor 302 and a wireless transceiver 304 connected to the at least one processor 302.

FIG. 3B illustrates a block diagram of a controller 310 according to an aspect. The controller 310 is, for example, an elevator controller or an elevator group controller. The controller 310 comprises at least one processor 302 connected to at least one memory 312. The at least one memory 314 may comprise at least one computer program which, when executed by the processor 312 or processors, causes the controller 310 to perform the programmed functionality. In another embodiment, the at least one memory 314 may be an internal memory of the at least one processor 312. The controller 310 may also comprise an input/output interface 316. Via the input/output interface 316, the control apparatus may be connected to at least one wireless device 318. The at least one wireless device 318 comprises, for example, the elevator car mounted wireless device 106 and wireless devices 102A-102J, 104A-104J at the landing floors. The controller 310 may be used to control elevator car 110 and the elevator car mounted wireless device 106 and the wireless devices 102A-102J.

The illustrated components are not required or all-inclusive, as any components can deleted and other components can be added.

FIG. 4 illustrates a flow diagram of a method for configuring wireless devices in an elevator system according to an embodiment.

At 400, the method comprises initiating, with a device comprising a microphone, an audio handshake with at least one wireless device one by one at a landing floor.

At 402, the method comprises receiving, with the microphone of the device from a wireless device during the audio handshake, information identifying the wireless device.

At 404, the method comprises transmitting, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

The exemplary embodiments of the invention can be included within any suitable device, for example, including, servers, workstations, capable of performing the processes of the exemplary embodiments. The exemplary embodiments may also store information relating to various processes described herein.

Example embodiments may be implemented in software, hardware, application logic or a combination of software, hardware and application logic. The example embodiments can store information relating to various methods described herein. This information can be

stored in one or more memories, such as a hard disk, optical disk, magneto-optical disk, RAM, and the like. One or more databases can store the information used to implement the example embodiments. The databases can be organized using data structures (e.g., records, tables, arrays, fields, graphs, trees, lists, and the like) included in one or more memories or storage devices listed herein. The methods described with respect to the example embodiments can include appropriate data structures for storing data collected and/or generated by the methods of the devices and subsystems of the example embodiments in one or more databases.

All or a portion of the example embodiments can be conveniently implemented using one or more general purpose processors, microprocessors, digital signal processors, micro-controllers, and the like, programmed according to the teachings of the example embodiments, as will be appreciated by those skilled in the computer and/or software art(s). Appropriate software can be readily prepared by programmers of ordinary skill based on the teachings of the example embodiments, as will be appreciated by those skilled in the software art. In addition, the example embodiments can be implemented by the preparation of application-specific integrated circuits or by interconnecting an appropriate network of conventional component circuits, as will be appreciated by those skilled in the electrical art(s). Thus, the examples are not limited to any specific combination of hardware and/or software. Stored on any one or on a combination of computer readable media, the examples can include software for controlling the components of the example embodiments, for driving the components of the example embodiments, for enabling the components of the example embodiments to interact with a human

user, and the like. Such computer readable media further can include a computer program for performing all or a portion (if processing is distributed) of the processing performed in implementing the example embodiments. Computer code devices of the examples may include any suitable interpretable or executable code mechanism, including but not limited to scripts, interpretable programs, dynamic link libraries (DLLs), Java classes and applets, complete executable programs, and the like.

As stated above, the components of the example embodiments may include computer readable medium or memories for holding instructions programmed according to the teachings and for holding data structures, tables, records, and/or other data described herein. In an example embodiment, the application logic, software or an instruction set is maintained on any one of various conventional computer-readable media. In the context of this document, a "computer-readable medium" may be any media or means that can contain, store, communicate, propagate or transport the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer. A computer-readable medium may include a computer-readable storage medium that may be any media or means that can contain or store the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer. A computer readable medium can include any suitable medium that participates in providing instructions to a processor for execution. Such a medium can take many forms, including but not limited to, non-volatile media, volatile media, transmission media, and the like.

While there have been shown and described and pointed out fundamental novel features as applied to preferred embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices and methods described may be made by those skilled in the art without departing from the spirit of the disclosure. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the disclosure. Moreover, it should be recognized that structures and/or elements and/or method steps shown and/or described in connection with any disclosed form or embodiments may be incorporated in any other disclosed or described or suggested form or embodiment as a general matter of design choice. Furthermore, in the claims means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents, but also equivalent structures.

The applicant hereby discloses in isolation each individual feature described herein and any combination of two or more such features, to the extent that such features or combinations are capable of being carried out based on the present specification as a whole, in the light of the common general knowledge of a person skilled in the art, irrespective of whether such features or combinations of features solve any problems disclosed herein, and without limitation to the scope of the claims. The applicant indicates that the disclosed aspects/embodiments may consist of any such individual feature or combination of features. In view of the foregoing description it will be evident to a person

skilled in the art that various modifications may be made within the scope of the disclosure.

CLAIMS

1. A method for configuring wireless devices in an elevator system, the method comprising:

initiating, with a device connected to a microphone, an audio handshake with at least one wireless device one by one at a landing floor;

receiving, with the microphone from a wireless device during the audio handshake, information identifying the wireless device; and

transmitting, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

2. A method according to claim 1, further comprising:

performing the audio handshake only with wireless devices from which a minimum sound level is received.

3. A method according to any of claims 1 - 2, wherein the device is a portable wireless device.

4. A method according to claim 3, further comprising:

receiving, from a user of the device, a selection of an area to be configured.

5. A method according any of claims 1 - 2, wherein the device is an elevator car mounted wireless device.

6. A method according to claim 5, further comprising:

before initiating the audio handshake with the at least one wireless device, driving the elevator

car to a floor and opening doors of the elevator car and/or landing doors; and

transmitting, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor.

7. A method according to claim 6, further comprising:

initiating the audio handshake separately at each floor.

8. A method according to claim 5, further comprising:

performing an end-to-end run with the elevator car;

determining local maxima of signals sent by the at least one wireless device, the local maxima identifying multiple floors; and

initiating the audio handshake at each local maximum.

9. A method according to claim 8, further comprising:

stopping the elevator car at each local maximum.

10. A method according to any of claims 5 - 9, further comprising:

causing performance of an initial commissioning with the elevator car to identify floors.

11. A device for configuring wireless devices in an elevator system, the device comprising:

means for initiating with a microphone an audio handshake with at least one wireless device one by one at a landing floor;

means for receiving during the audio handshake information identifying the wireless device; and

means for transmitting in response to receiving the information identifying the wireless device configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor and/or area.

12. A device according to claim 11, further comprising:

means for performing the audio handshake only with wireless devices from which a minimum sound level is received.

13. A device according to any of claims 11 - 12, wherein the device is a portable wireless device.

14. A device according to claim 13, further comprising:

means for receiving, from a user of the device, a selection of an area to be configured.

15. A device according any of claims 11 - 12, wherein the device is an elevator car mounted wireless device.

16. An elevator system comprising:

an elevator car configured to move in an elevator shaft;

a plurality of wireless devices at a plurality of landing floors;

a device of any of claims 11 - 15 mounted in the elevator car; and

an elevator controller configured to control the device.

17. An elevator system according to claim 16, wherein:

before initiating the audio handshake with the at least one wireless device, the elevator controller is configured to drive the elevator car to a floor and to open doors of the elevator car and/or landing doors; and

the elevator controller is configured cause transmission, with the device in response to receiving the information identifying the wireless device, configuration information to the wireless device, the configuration information assigning the wireless device to a specific floor.

18. An elevator system according to claim 17, wherein the elevator controller is configured to initiate the audio handshake separately at each floor.

19. An elevator system according to claim 16, wherein the elevator controller is configured to:

perform an end-to-end run with the elevator car;

determine local maxima of signals sent by the at least one wireless device, the local maxima identifying multiple floors; and

initiate the audio handshake at each local maximum.

20. An elevator system according to claim 19, wherein the elevator controller is configured to stop the elevator car at each local maximum.

21. An elevator system according to any of claims 16 - 20, wherein the elevator controller is configured to cause performance of an initial commissioning with the elevator car to identify floors.

22. A computer program comprising program code, which when executed by at least one processing unit, causes at least one processing unit to perform the method of any of claims 1 - 10.

23. A computer readable medium comprising a computer program comprising program code, which when executed by at least one processing unit, causes at least one processing unit to perform the method of any of claims 1 - 10.

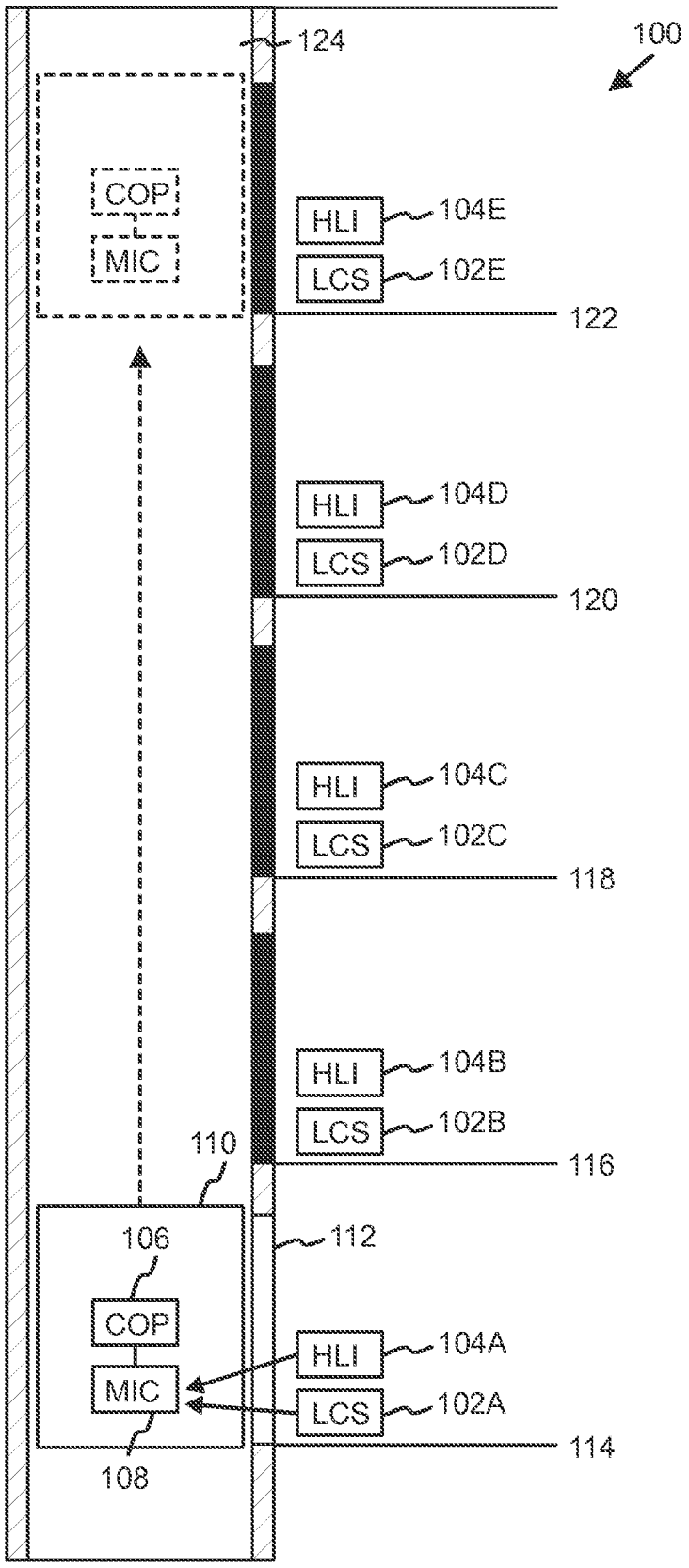
100
124
COP
MIC
HLI
104E
LCS
102E
122
HLI
104D
LCS
102D
120
HLI
104C
LCS
102C
118
HLI
104B
LCS
102B
116
110
106
112
COP
MIC
HLI
104A
LCS
102A
114
108

FIG. 1A

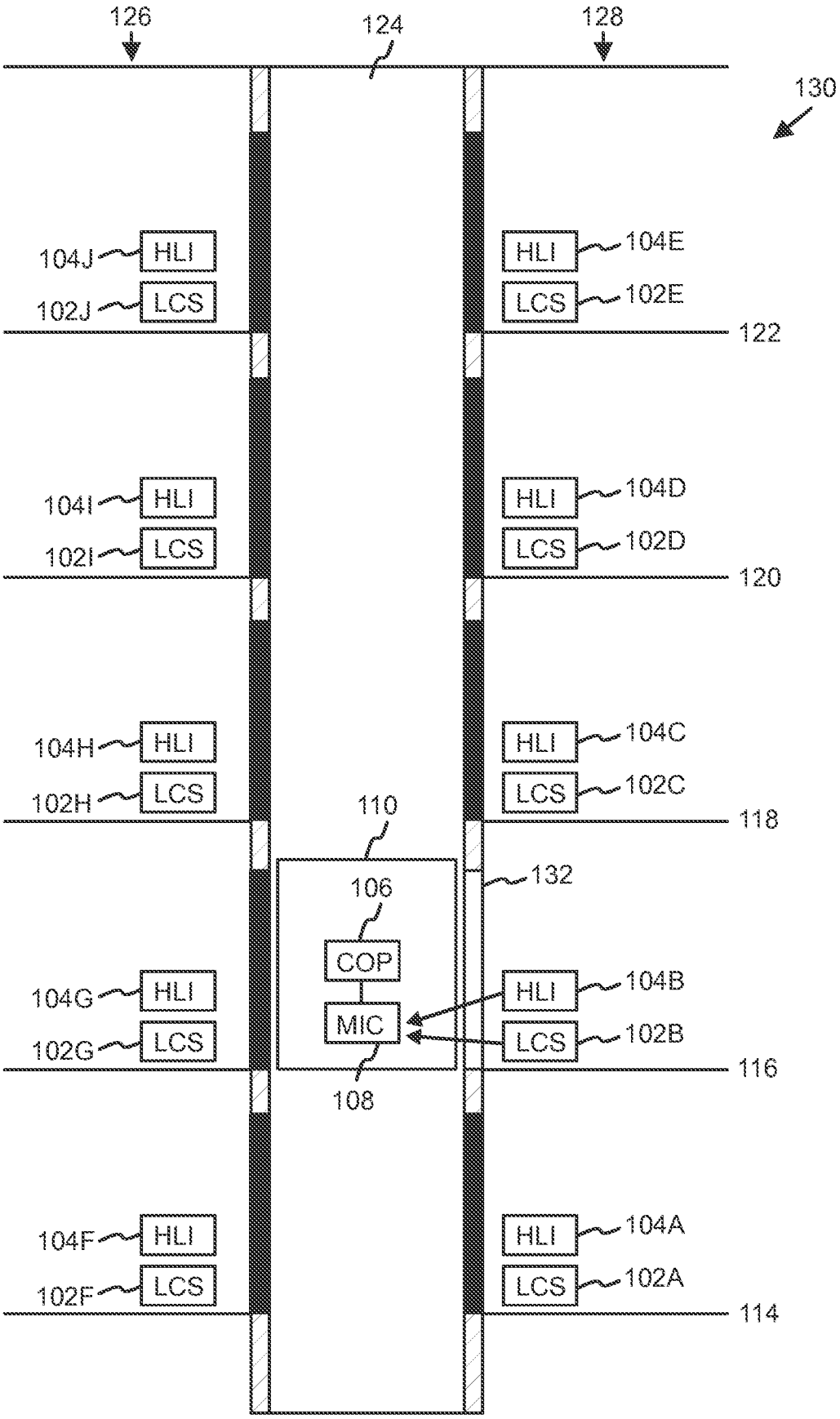
126
124
128
130
104J
HLI
102J
LCS
HLI
104E
LCS
102E
122
104I
HLI
102I
LCS
HLI
104D
LCS
102D
120
104H
HLI
102H
LCS
HLI
104C
LCS
102C
118
110
106
132
COP
MIC
104G
HLI
102G
LCS
HLI
104B
LCS
102B
116
108
104F
HLI
102F
LCS
HLI
104A
LCS
102A
114

FIG. 1B

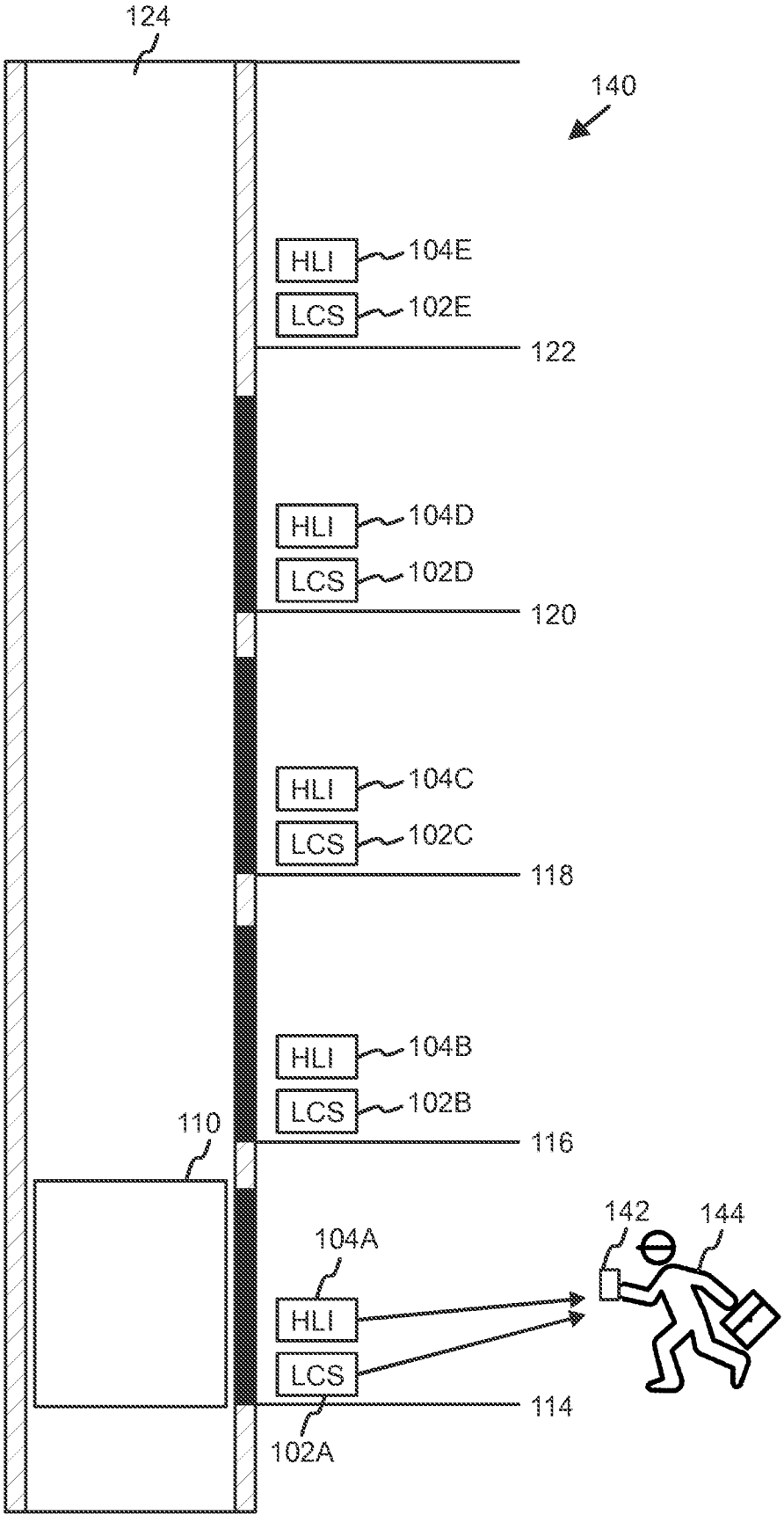
124
140
HLI
104E
LCS
102E
122
HLI
104D
LCS
102D
120
HLI
104C
LCS
102C
118
HLI
104B
LCS
102B
110
116
142
144
104A
HLI
LCS
114
102A

FIG. 1C

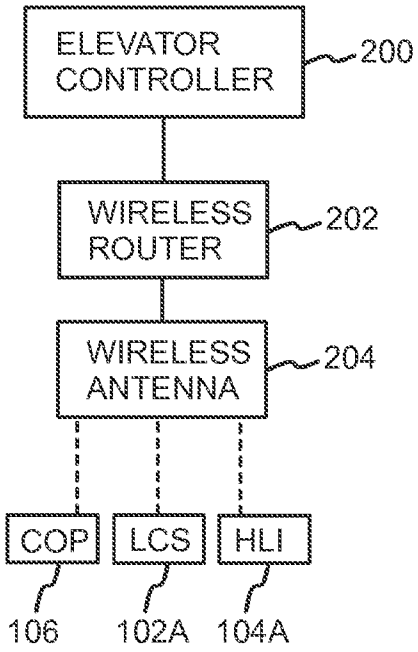
ELEVATOR CONTROLLER
200
WIRELESS ROUTER
202
WIRELESS ANTENNA
204
COP
LCS
HLI
106
102A
104A

FIG. 2

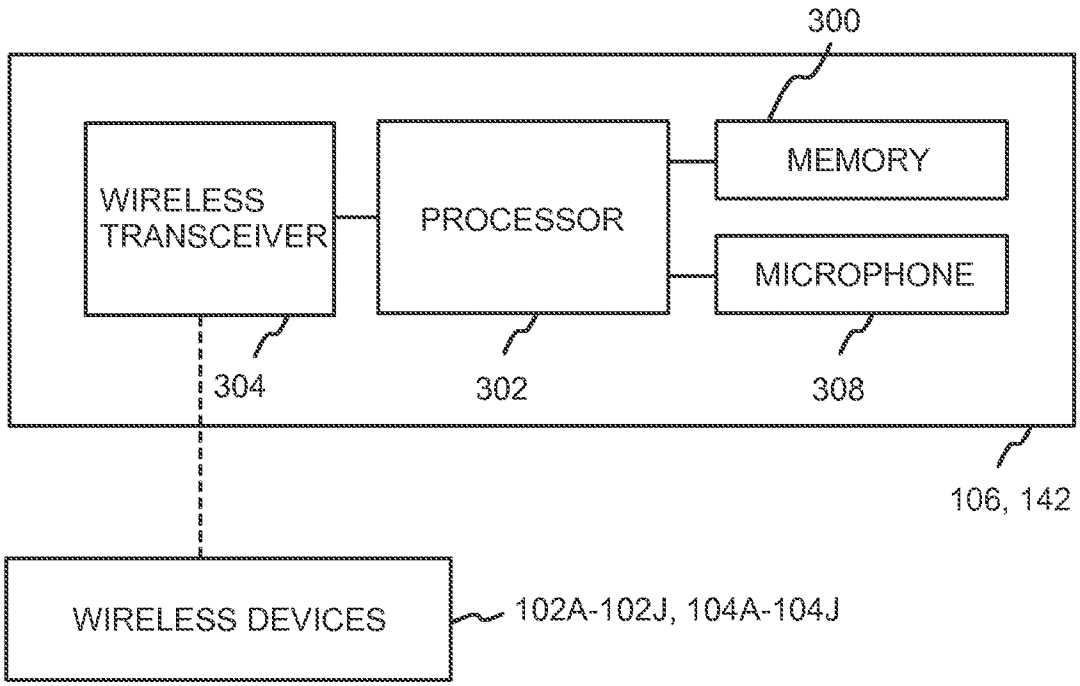
300
WIRELESS TRANSCEIVER
PROCESSOR
MEMORY
MICROPHONE
304
302
308
106, 142
WIRELESS DEVICES
102A-102J, 104A-104J

FIG. 3A

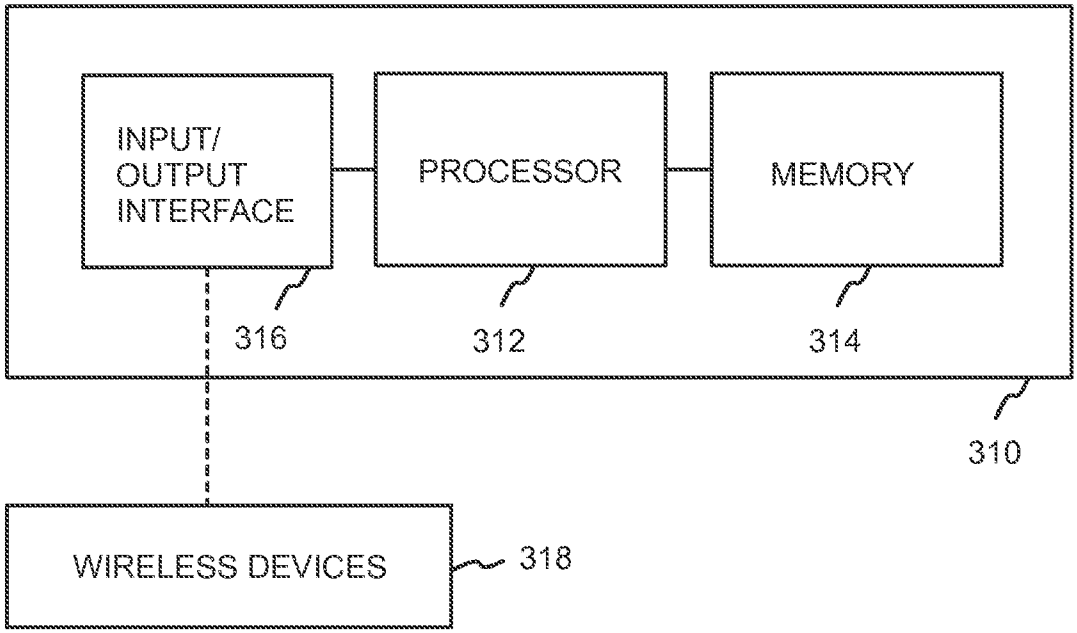
INPUT/
OUTPUT
INTERFACE
PROCESSOR
MEMORY
316
312
314
310
WIRELESS DEVICES
318

FIG. 3B

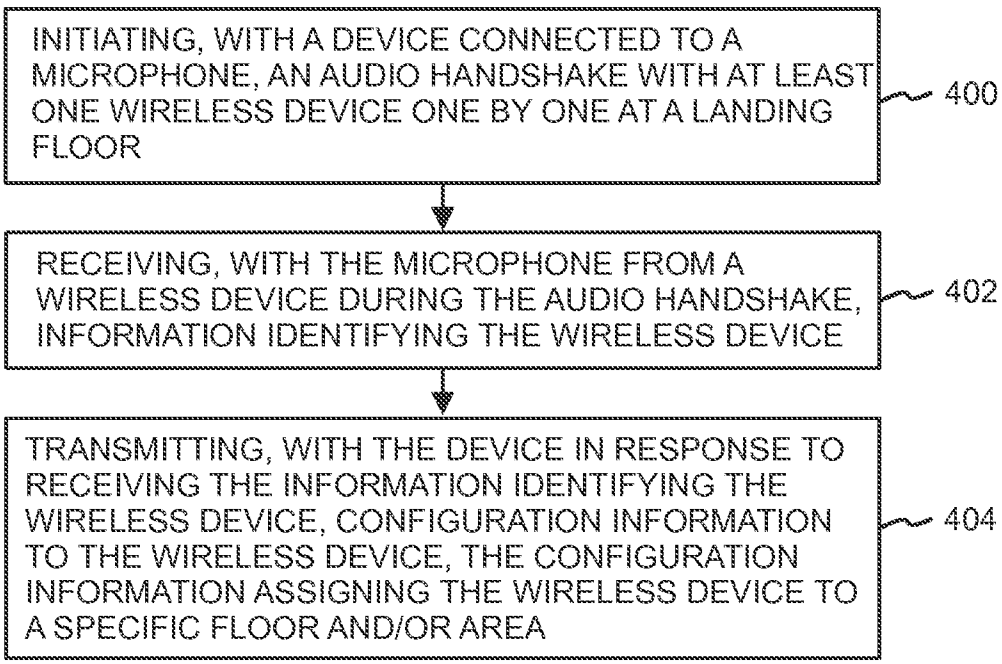
INITIATING, WITH A DEVICE CONNECTED TO A MICROPHONE, AN AUDIO HANDSHAKE WITH AT LEAST ONE WIRELESS DEVICE ONE BY ONE AT A LANDING FLOOR
400
RECEIVING, WITH THE MICROPHONE FROM A WIRELESS DEVICE DURING THE AUDIO HANDSHAKE, INFORMATION IDENTIFYING THE WIRELESS DEVICE
402
TRANSMITTING, WITH THE DEVICE IN RESPONSE TO RECEIVING THE INFORMATION IDENTIFYING THE WIRELESS DEVICE, CONFIGURATION INFORMATION TO THE WIRELESS DEVICE, THE CONFIGURATION INFORMATION ASSIGNING THE WIRELESS DEVICE TO A SPECIFIC FLOOR AND/OR AREA
404

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2017/050638

A. **CLASSIFICATION OF SUBJECT MATTER**

See extra sheet

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: B66B, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)

EPODOC, EPO-Internal full-text databases, Full-text translation databases from Asian languages, WPIAP, PRH-Internal, XP3GPP, XPAIP, XPESP, XPETSI, XPI3E, XPIEE, XPIETF, XPIOP, XPIPCOM, XPJPEG, XPMISC, XPOAC, XPRD, XPTK, COMPDX, INSPEC, TDB, NPL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2003146546 A (HITACHI LTD) 21 May 2003 (21.05.2003) & abstract [online] EPOQUENET EPODOC & WPI & English machine translation by Clarivate Analytics [online] [retrieved 25.1.2018] par. [0004], [0008], [0011]	1-23
X	WO 2017055177 A1 (INVENTIO AG [CH]) 06 April 2017 (06.04.2017) abstract; page 1, lines 14-23, page 4, lines 14-18, page 6, lines 4-32, page 8, lines 13-32; fig. 1	1-23
X	JP 2015157664 A (HITACHI LTD) 03 September 2015 (03.09.2015) & abstract [online] EPOQUENET EPODOC & WPI & English machine translation by Thomson Reuters [online] [retrieved 25.1.2018] par. [0020]-[0026], [0033]	1, 11, 16, 22-23
A	US 2007246306 A1 (TSCHUEMPERLIN ERICH [CH] et al.) 25 October 2007 (25.10.2007) abstract	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* 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
26 January 2018 (26.01.2018)	01 February 2018 (01.02.2018)

Name and mailing address of the ISA/FI
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Facsimile No. +358 29 509 5328

Authorized officer
Patrik Pousi
Telephone No. +358 29 509 5000

INTERNATIONAL SEARCH REPORT
Information on Patent Family Members

International application No.
PCT/FI2017/050638

Patent document cited in search report	Publication date	Patent family members(s)	Publication date
JP 2003146546 A	21/05/2003	None	
WO 2017055177 A1	06/04/2017	None	
JP 2015157664 A	03/09/2015	JP 6127004 B2	10/05/2017
US 2007246306 A1	25/10/2007	US 7699143 B2	20/04/2010
		AR 060553 A1	25/06/2008
		AU 2007201752 A1	08/11/2007
		AU 2007201752 B2	30/06/2011
		PI 0701523	31/08/2010
		CA 2585326 A1	20/10/2007
		CA 2585326 C	18/02/2014
		CN 101058380 A	24/10/2007
		CN 101058380 B	11/08/2010
		EP 1847499 A2	24/10/2007
		EP 1847499 B1	10/06/2015
		ES 2546938 T3	30/09/2015
		HK 1113922 A1	18/12/2015
		JP 2007290868 A	08/11/2007
		KR 20070104271 A	25/10/2007
		KR 101445385 B1	26/09/2014
		MX 2007004223 A	01/12/2008
		MY 144649 A	31/10/2011
		NO 20071982 A	22/10/2007
		NO 335677 B1	19/01/2015
		NZ 554562 A	28/11/2008
		RU 2007114838 A	27/10/2008
		RU 2437822 C2	27/12/2011
		SG 136905 A1	29/11/2007
		TW 200815272 A	01/04/2008
		TW I374848 B	21/10/2012
		ZA 200703161 B	27/05/2009

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2017/050638

CLASSIFICATION OF SUBJECT MATTER

IPC
B66B 1/34 (2006.01)
B66B 3/00 (2006.01)
B66B 1/46 (2006.01)
B66B 1/52 (2006.01)
H04B 7/24 (2006.01)