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(72) Inventor: **KURODA, Shinichi**
Tokyo 100-8310 (JP)

(71) Applicant: **Mitsubishi Electric Corporation**
Tokyo 100-8310 (JP)

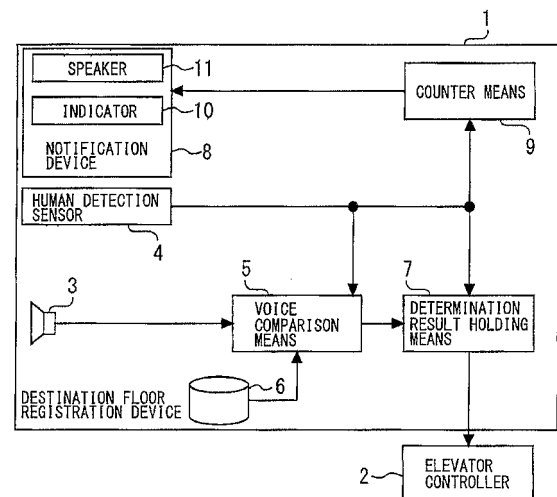
(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(54) **DESTINATION FLOOR REGISTRATION DEVICE FOR ELEVATOR**

(57) In a destination floor registration device which permits the voice input of a destination floor in the hall of an elevator, passengers are positively prevented from staying in front of the sensor which detects the presence of passengers.

A microphone for voice input, a sensor for detecting the presence of a passenger present in a prescribed range in the vicinity of the microphone and a notification device are installed in a hall of an elevator. Also, there are provided voice comparison means which identifies a destination floor of a passenger on the basis of a voice signal from the microphone while the sensor is detecting the presence of a passenger and holding means which holds information on a destination floor identified by the voice comparison means while the sensor is detecting the presence of a passenger and thereafter outputs the held information on a destination floor to a controller of the elevator when the sensor ceases to detect the presence of a passenger. The period of time during which the sensor continues to detect the presence of a passenger is measured and the notification device is caused to notify a prescribed guidance to prompt the passenger to move away from the microphone when the measured period of time exceeds a prescribed threshold value.

Fig. 1



Description

Technical Field

5 **[0001]** The present invention relates to a destination floor registration device installed in the hall of an elevator and, particularly, to a destination floor registration device in which the input of a destination floor can be performed by voice.

Background Art

10 **[0002]** There are destination floor registration devices of an elevator in which the input of a destination floor can be performed by voice (refer to Patent Literature 1, for example).

In the destination floor registration device of an elevator described in Patent Literature 1, a microphone for voice input and a sensor for detecting a person in front of the microphone are installed in the hall of the elevator. The identification of a destination floor is carried out on the basis of the voice signal inputted from the microphone while the presence of
15 the person is being detected by the above-described sensor. In this destination floor detection device, while the sensor is detecting the presence of a person, the result of the above-described identification (the destination floor) is kept in a suspended condition, and when the passenger moves away from the microphone and the sensor ceases to detect the presence of the person, the result of the identification is transmitted to a controller of the elevator.

20 Citation List

Patent Literature

[0003]

25 Patent Literature 1: Japanese Patent Laid-Open No. 3-73775

Summary of Invention

30 Technical Problem

[0004] In the destination floor registration device of an elevator described in Patent Literature 1, a prescribed lamp is caused to blink when the identification of a destination floor is performed on the basis of a voice signal and thereafter, when the result of the identification is transmitted to a controller, the above-described lamp is switched to constant
35 lighting, thereby notifying the passenger of the difference.

[0005] However, a passenger who is not accustomed to the operation of this destination floor registration device cannot understand the above-described difference and sometimes keeps standing in front of the microphone after he or she has uttered his or her destination floor. In such a case, the destination floor is not registered while the presence of the passenger is being detected by the sensor, posing the problem that this passenger cannot use an elevator for a long time.

40 **[0006]** Incidentally, problems as described above can occur similarly in the case where the belongings of a passenger continue to be detected by the sensor.

[0007] The present invention was made to solve the problem described above and an object of the invention is to provide a destination floor registration device of an elevator which permits the input of a destination floor by voice in the hall of an elevator and can positively prevent passengers from staying in front of the sensor which detects the presence
45 of passengers.

Solution to Problem

[0008] A destination floor registration device of an elevator according to the invention is a destination floor registration device which comprises a microphone for voice input installed in a hall of an elevator, a sensor for detecting the presence of a passenger present in a prescribed range in the vicinity of the microphone, voice comparison means which identifies a destination floor of the passenger on the basis of a voice signal inputted from the microphone while the sensor is detecting the presence of the passenger, holding means which holds information on a destination floor identified by the voice comparison means while the sensor is detecting the presence of the passenger and thereafter outputs the held
50 information on a destination floor to a controller of the elevator when the sensor ceases to detect the presence of the passenger, a notification device installed in the hall, and measurement means which measures the period of time during which the sensor continues to detect the presence of the passenger and causes the notification device to notify a prescribed guidance to prompt the passenger to move away from the microphone when the measured period of time
55

exceeds a prescribed threshold value.

Advantageous Effect of Invention

5 **[0009]** According to the present invention, in a destination floor registration device of an elevator which permits the voice input of a destination floor in the hall of an elevator, it becomes possible to positively prevent passengers from staying in front of the sensor which detects the presence of passengers.

Brief Description of Drawings

10 **[0010]**

Figure 1 is a block diagram showing a destination floor registration device of an elevator in a first embodiment according to the present invention.

15 Figure 2 is a flowchart showing the actions of the destination floor registration device of an elevator in the first embodiment according to the present invention.

Figure 3 is a block diagram showing the destination floor registration device of an elevator in a second embodiment according to the present invention.

20 Figure 4 is a flowchart showing the actions of the destination floor registration device of an elevator in the second embodiment according to the present invention.

Description of Embodiments

25 **[0011]** The present invention will be described in more detail with reference to the accompanying drawings. Incidentally, in each of the drawings, like numerals refer to like or similar parts and redundant descriptions of these parts are appropriately simplified or omitted.

First embodiment

30 **[0012]** Figure 1 is a block diagram showing a destination floor registration device of an elevator in a first embodiment according to the present invention.

In Figure 1, reference numeral 1 denotes a destination floor registration device installed in each hall of an elevator, and reference numeral 2 denotes a controller which performs the whole operation control of the elevator, such as the running control of a car which passengers board.

35 **[0013]** The destination floor registration device 1 has the function of allowing a passenger of an elevator to input a destination floor by voice. Specifically, the essential part of the destination floor registration device 1 is made up of a microphone 3, a human detection sensor 4, voice comparison means 5, storage means 6, determination result holding means 7, a notification device 8 and counter means (measurement means) 9.

40 **[0014]** The microphone 3 is installed in the hall of an elevator and is intended for use in voice input. The microphone 3 is arranged, for example, in a place near the entrance of the elevator. A voice signal inputted from the microphone 3 is converted to a digital signal via an analog/digital (A/D) converter provided in the interior thereof, and is inputted to the voice comparison means 5.

[0015] The human detection sensor 4 has the function of detecting humans (objects to be detected) present in a prescribed detection range. Specifically, the human detection sensor 4 is provided in order to detect a passenger who is going to input voice from the microphone 3, and the detection range thereof is set to a prescribed range in the vicinity of the microphone 3. That is, the human detection sensor 4 is installed in a place in the proximity of the microphone 3 and when a human stands in front of the microphone 3 the human detection sensor 4 detects the presence of a passenger and outputs a prescribed signal (for example, an ON (= 1) signal). In the case when there is no person in front of the microphone 3 and the human detection sensor 4 cannot detect the presence of a passenger, the human detection sensor 4 outputs another prescribed signal (for example, an OFF (= 0) signal). An output signal from the human detection sensor 4 is inputted to each of the voice comparison means 5, the determination result holding means 7 and the counter means 9.

50 **[0016]** The voice comparison means 5 has the function of identifying the destination floor of a passenger on the basis of the voice signal inputted from the microphone 3 while the human detection sensor 4 is detecting the presence of the passenger. In the destination floor registration device 1, the names of the floors at which the car is to stop are registered beforehand in the storage means 6 as a registered voice signal (a digital signal) and when the presence of a passenger is detected by the human detection sensor 4, the voice comparison means 5 starts voice comparison processing on the basis of the registered voice signals stored in this storage means 6.

[0017] Specifically, the voice comparison means 5 makes a determination as to whether or not there is a voice signal

in agreement with the above-described registered voice signal under prescribed conditions among the voice signals inputted from the microphone 3 and in the case where there is a voice signal in agreement, the voice comparison means 5 identifies a destination floor corresponding to the registered voice signal as the destination floor of the passenger. After the identification of the destination floor of the passenger, the voice comparison means 5 outputs the information on the identified destination floor (hereinafter referred to also as "identification information") to the determination result holding means 7.

[0018] Incidentally, as long as the above-described identification information is information representing the destination floor identified by the voice comparison means 5, this information can have any form. For example, the identification information may be text information comprising floor names such as "*nikai* (second floor)" and "*sankai* (third floor)" and may also be an ID number assigned to each registered voice signal.

[0019] The determination result holding means 7 has the function of keeping the above-described identification information in a suspended condition while a passenger is performing the input of a destination floor by voice and transmitting the above-described identification information to a controller 2 when the destination floor of the passenger has been determined. Specifically, upon input of identification information from the voice comparison means 5 the determination result holding means 7 holds the identification information in the interior thereof while the human detection sensor 4 is detecting passengers. Thereafter when the presence of a passenger has ceased to be detected by the human detection sensor 4, the determination result holding means 7 transmits the held identification information to the controller 2. Incidentally, because the determination result holding means 7 erases the held identification information when the determination result holding means 7 has transmitted the identification information to the controller 2, the determination result holding means 7 clears the held contents.

[0020] Upon receipt of the identification information from the determination result holding means 7, on the basis of the received contents, the controller 2 causes the hall buttons (the UP button and the DOWN button, neither is shown in the figures) of the hall where the passenger is present to light up, and notifies the passenger that the destination floor has been registered. Also, upon receipt of the identification information from the determination result holding means 7, the controller 2 determines an assigned car by performing the registration of the destination floor and causes the assigned car to respond to a call. That is, the controller 2 causes the car to stop at the hall where the passenger is present, performs door opening and closing operations, and thereafter causes the car to run toward the destination floor of the passenger.

[0021] The notification device 8 is installed in a hall in order to provide passengers with prescribed information. This notification device 8 is, for example, made up of an indicator 10 (an LED display, a liquid crystal display and the like) for indicating letters, figures and patterns, and the like and a speaker 11 which provides voice guidance. Incidentally, letter data and figure and pattern data for performing indication on the indicator 10 and voice data for making an announcement from the speaker 11 are stored beforehand in the notification device 8.

[0022] The counter means 9 has the function of measuring the period of time during which the human detection sensor 4 continues to detect the presence of a passenger, and outputs a signal corresponding to this measured period of time (i.e., the period of time during which ON signals continue to be received from the human detection sensor 4) to the notification device 8. For example, a first threshold value (TH1) and a second threshold value (TH2, TH2 > TH1) which is larger than this first threshold value are stored beforehand in the counter means 9. When the above-described measured period of time exceeds the first threshold value, the counter means 9 outputs a first control signal to the notification device 8. Upon receipt of the first control signal from the counter means 9, the notification device 8 indicates a prescribed guidance on the indicator 10 to prompt the passenger to move away from the microphone 3.

[0023] When the above-described measured period of time exceeds the second threshold value, the counter means 9 outputs a second control signal to the notification device 8. Upon receipt of the second control signal from the counter means 9, the notification device 8 provides a prescribed voice guidance from the speaker 11 to prompt the passenger to move away from the microphone 3.

[0024] Next, referring also to Figure 2, a concrete description will be given of the actions of the destination floor registration device 1 having the above-described configuration. Figure 2 is a flowchart showing the actions of the destination floor registration device of an elevator in the first embodiment according to the present invention and shows a concrete processing flow of the above-described counter means 9.

[0025] As described above, the counter means 9 has the function of measuring the period of time during which the human detection sensor 4 continues to detect the presence of a passenger, i.e., a timer function. For this reason, the counter means 9, first, performs the initialization of a timer (S101) and continues to wait until an ON signal is inputted from the human detection sensor 4 (S102).

[0026] When an elevator passenger stands in front of the microphone 3 in order to perform the voice input of a destination floor and the presence of this passenger is detected by the human detection sensor 4, the human detection sensor 4 outputs an ON signal. Upon receipt of the ON signal from the human detection sensor 4 (Yes in S102), the counter means 9 starts measuring the period of time during which the ON signal continues to be received (hereinafter referred to merely as "the receiving time") (S103). Incidentally, after the start of the measurement of the receiving time,

the counter means 9 makes a determination as to whether or not ON signals continue to be received at periodical intervals, for example, of 10 milliseconds (S 104). When ON signals from the human detection sensor 4 are interrupted, that is, upon receipt of OFF signals from the human detection sensor 4 (No in S104), the counter means 9 stops measuring the receiving time and the flow of processing returns to S 101, where the counter means 9 initializes the timer.

[0027] On the other hand, when the continuous receipt of ON signals from the human detection sensor 4 is ascertained in the determination of S 104, the counter means 9 makes a comparison between the receiving time at which the measurement was started in S103 and the above-described first threshold value (TH1) (S105). Incidentally, when in S105 the following formula (1) holds, the flow of processing returns to the processing of S104:

$$\text{Receiving time of ON signals} < \text{TH1} \dots (1)$$

[0028] When in S105 the following formula (1) does not hold, next, the counter means 9 makes a comparison between the above-described receiving time and the second threshold value (TH2) on the basis of the following formula (2) (S106):

$$\text{TH1} \leq \text{Receiving time of ON signals} < \text{TH2} \dots (2)$$

[0029] When in S 106 the above-described formula (2) holds, the counter means 9 outputs a first control signal to the notification device 8 (S107) and causes the indicator 10 to provide a prescribed guidance. For example, upon receipt of the first control signal from the counter means 9, the indicator 10 indicates letters such as "please move away from the microphone" and figures, patterns and the like showing the contents. Incidentally, after the first control signal is outputted in S107, the flow of processing returns to S104, where the counter means 9 carries out the above-described determination again. For this reason, while the above-described formula (2) holds, the above-described contents continue to be indicated on the indicator 10 until OFF signals are outputted from the human detection sensor 4.

[0030] On the other hand, when in S106 the above-described formula (2) does not hold, the counter means 9 outputs a second control signal to the notification device 8 (S108) and causes the speaker 11 to provide a prescribed voice guidance. For example, upon receipt of the second control signal from the counter means 9, the speaker 11 carries out the announcement of "please move away from the microphone" and the like. Incidentally, after the second control signal is outputted in S108, the flow of processing returns to S104, where the counter means 9 carries out the above-described determination again. For this reason, when the above-described formulas (1) and (2) do not hold, the above-described contents continue to be announced from the speaker 11 until OFF signals are outputted from the human detection sensor 4.

[0031] According to the first embodiment of the present invention, it is possible to positively prevent passengers from staying in front of the human detection sensor 4 installed in a hall of an elevator. For this reason, after a passenger carries out a voice input of a destination floor in a hall, it is possible to carry out a car assignment by immediately transmitting the information on the destination floor of the passenger to the controller 2 and provide service excellent in convenience. Incidentally, even in the case where the presence of the passenger's belongings continues to be detected by the human detection sensor 4, the passenger can move his or her belongings from in front of the microphone 3 by looking at the indication of the indicator 10 or listening to the announcement from the speaker 11.

[0032] When the presence of the passenger continues to be detected by the human detection sensor 4, an indication guidance by the indicator 10 is first carried out and thereafter a voice guidance from the speaker 11 is carried out. Therefore, it also positively prevents the situation that a wrong destination floor is inputted by the response of the voice comparison means 5 to the voice from the speaker 11.

Second embodiment

[0033] Figure 3 is a block diagram showing the destination floor registration device of an elevator in a second embodiment according to the present invention. The destination floor registration device 1 in this embodiment is further provided with sensor output adjustment means 12 in addition to the components shown in Figure 1. The sensor output adjustment means 12 has the function of adjusting signals outputted from the human detection sensor 4. For this reason, in this embodiment, output signals (ON signals and OFF signals) from the human detection sensor 4 are inputted to the sensor output adjustment means 12.

[0034] In addition to the first threshold value (TH1) and the second threshold value (TH2), a third threshold value (TH3, $\text{TH3} > \text{TH2}$) which is larger than the second threshold value is stored beforehand in the counter means 9. When the period of time during which the human detection sensor 4 continues to detect the presence of a passenger (the above-

described measured period of time) exceeds the third threshold value, the counter means 9 outputs a third control signal to the sensor output adjustment means 12.

[0035] Upon input of an ON signal or an OFF signal from the human detection sensor 4, in normal times the sensor output adjustment means 12 outputs the inputted signal as it is. Incidentally, the output signal from the sensor output adjustment means 12 is inputted to each of the voice comparison means 5, the determination result holding means 7 and the counter means 9. On the other hand, upon receipt of the third control signal from the counter means 9, regardless of the actual detection result of the human detection sensor 4, the sensor output adjustment means 12 outputs a signal to the determination result holding means 7 to the effect that the presence of a passenger has ceased to be detected by the sensor 4. That is, upon receipt of the third control signal from the counter means 9, the sensor output adjustment means 12 outputs an OFF signal regardless of the input of an OFF signal from the human detection sensor 4 and causes the determination result holding means 7 to forcibly output the held identification signal to the controller 2.

Other components and functions are the same as in the first embodiment.

[0036] Next, referring also to Figure 4, a concrete description will be given of the actions of the destination floor registration device 1 having the above-described configuration. Figure 4 is a flowchart showing the actions of the destination floor registration device of an elevator in the second embodiment according to the present invention. Incidentally, the processing of S201 to S207 of Figure 4 is the same as the processing shown in S101 to S107 of Figure 2 and hence concrete descriptions thereof are omitted.

[0037] When in 5206 the above-described formula (2) does not hold, the counter means 9 makes a comparison between the period of time during which ON signals continue to be received and the third threshold value (TH3) on the basis of the following formula (3) (5208):

$$TH2 \leq \text{Receiving time of ON signals} < TH3 \dots (3)$$

[0038] When in S208 the above-described formula (3) holds, the counter means 9 outputs a second control signal to the notification device 8 (S209) and causes the speaker 11 to carry out a prescribed voice guidance in the same manner as in S 108 of Figure 2.

[0039] On the other hand, when in 5208 the above-described formula (3) does not hold, the counter means 9 outputs a third control signal to the sensor output adjustment means 12 (S210). Incidentally, OFF signals are forcibly transmitted from the sensor output adjustment means 12 to the determination result holding means 7 by the output of the third control signal to the sensor output adjustment means 12 and, therefore, after the output of the third control signal the flow of processing returns to 5201, where the counter means 9 carries out the initialization of the timer.

[0040] According to the second embodiment of the present invention, the determination result holding means 7 inevitably transmits the held identification information to the controller 2 by the time when a prescribed time elapses after the detection of the presence of a passenger by the human detection sensor 4. For this reason, for example, even when a passenger does not become aware that his or her belongings continue to be detected by the human detection sensor 4, it is possible to positively prevent this passenger from not using an elevator for a long time, making it possible to provide service excellent in convenience.

Industrial Applicability

[0041] The destination floor registration device of an elevator according to the present invention can be applied to a destination floor registration device which can perform the input of a destination floor by voice.

Reference Signs List

[0042]

- 1 destination floor registration device
- 2 controller
- 3 microphone
- 4 human detection sensor
- 5 voice comparison means

- 6 storage means
- 7 determination result holding means
- 5 8 notification device
- 9 counter means
- 10 indicator
- 10 11 speaker
- 12 sensor output adjustment means

Claims

1. A destination floor registration device of an elevator, comprising:

20 a microphone for voice input installed in a hall of an elevator;
a sensor for detecting the presence of a passenger present in a prescribed range in the vicinity of the microphone;
voice comparison means which identifies a destination floor of the passenger on the basis of a voice signal
inputted from the microphone while the sensor is detecting the presence of the passenger;
holding means which holds information on a destination floor identified by the voice comparison means while
25 the sensor is detecting the presence of the passenger and thereafter outputs the held information on a destination
floor to a controller of the elevator when the sensor ceases to detect the presence of the passenger;
a notification device installed in the hall; and
measurement means which measures the period of time during which the sensor continues to detect the presence
of the passenger and causes the notification device to notify a prescribed guidance to prompt the passenger
30 to move away from the microphone when the measured period of time exceeds a prescribed threshold value.

2. The destination floor registration device of an elevator according to claim 1, wherein
the notification device comprises:

35 an indicator installed in the hall; and
a speaker installed in the hall, and

the measurement means causes the indicator to indicate a prescribed guidance when the measured period of time
has exceeded a prescribed first threshold value and causes the speaker to provide a prescribed voice guidance
40 when the measured period of time has exceeded a prescribed second threshold value which is a value larger than
the first threshold value.

3. The destination floor registration device of an elevator according to claim 2, further comprising:

45 adjustment means which causes the holding means to forcibly output held information on a destination floor
to the controller when the measured period of time measured by the measurement means has exceeded a
prescribed third threshold value which is a value larger than the second threshold value.

4. The destination floor registration device of an elevator according to claim 3, wherein the adjustment means outputs
50 a signal to the holding means which indicates that the sensor has ceased to detect the presence of the passenger
regardless of an actual detection result of the sensor when the measured period of time measured by the measure-
ment means has exceeded the prescribed third threshold value.

Fig. 1

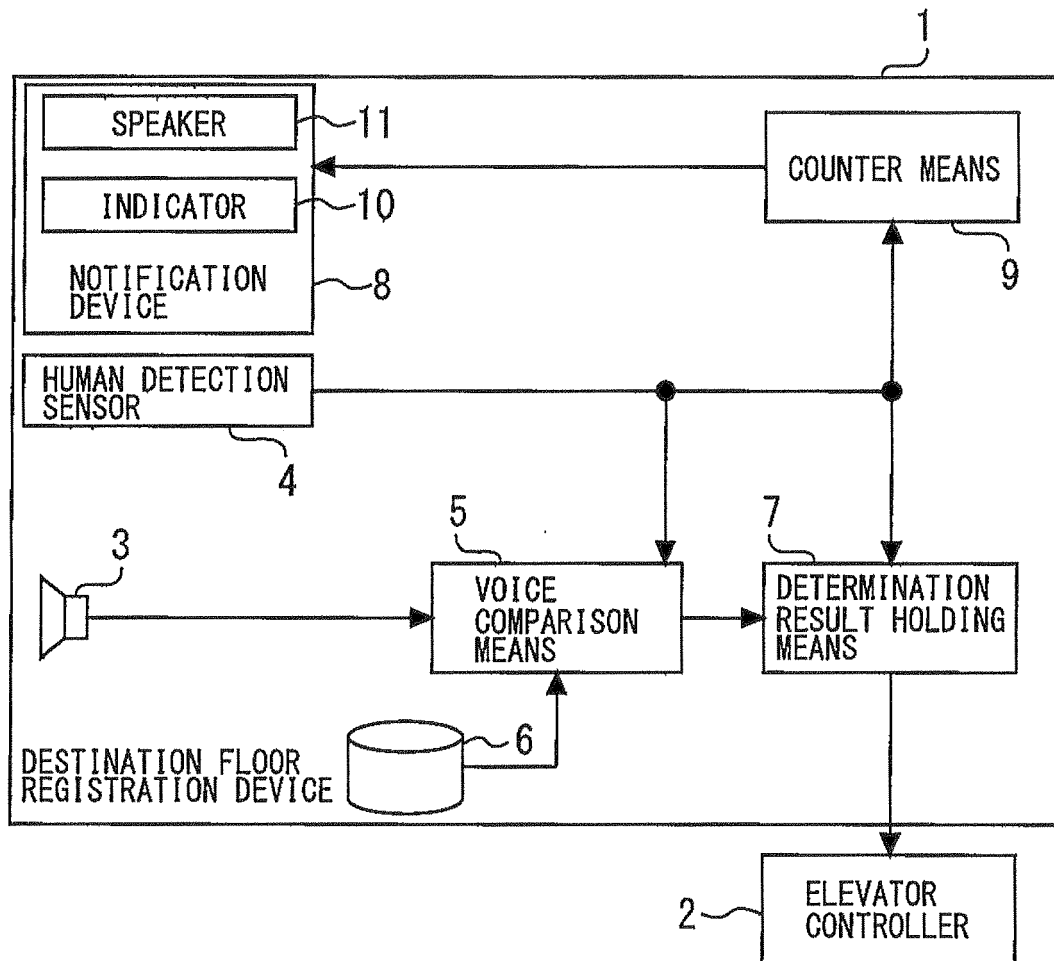


Fig. 2

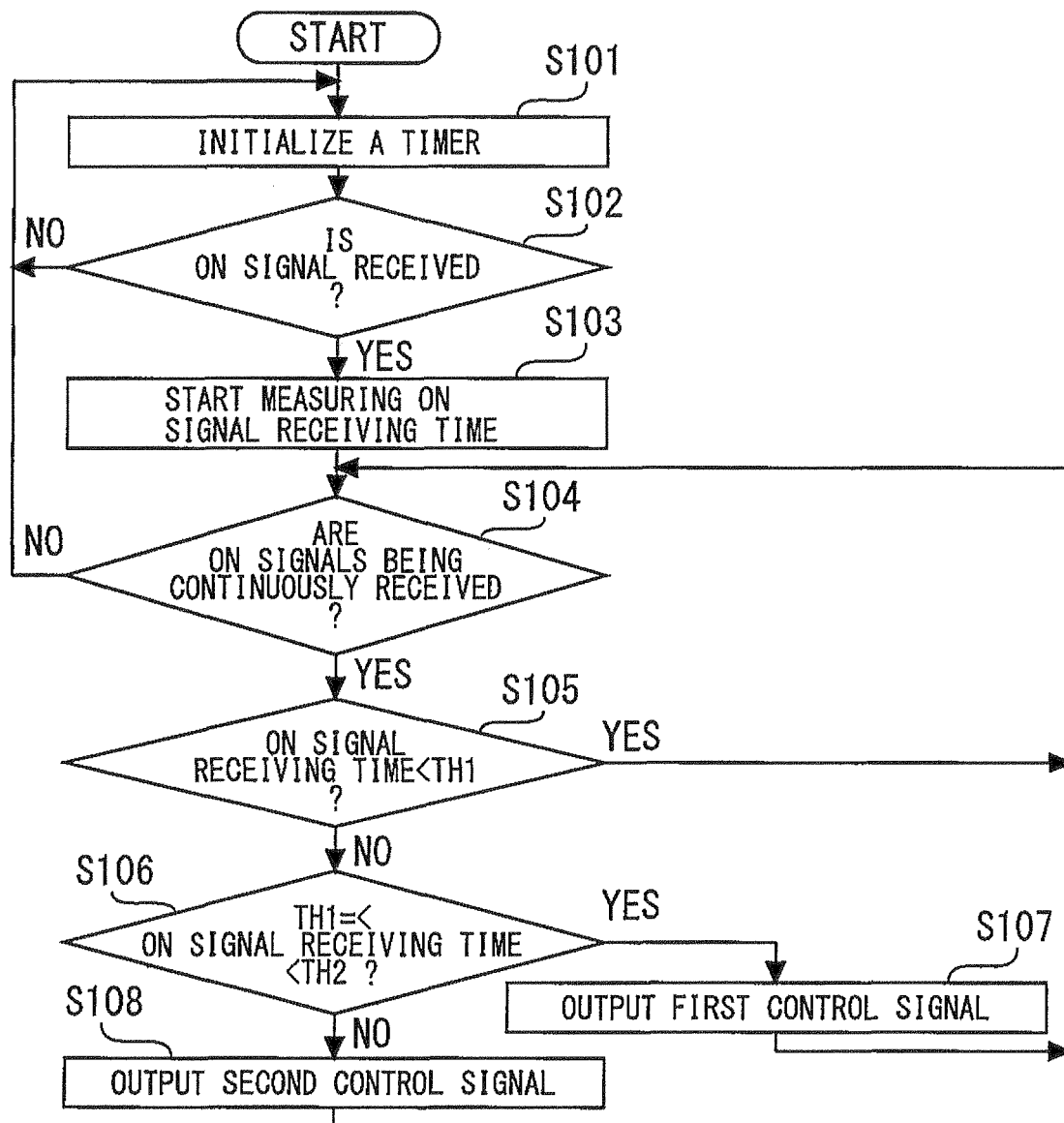


Fig. 3

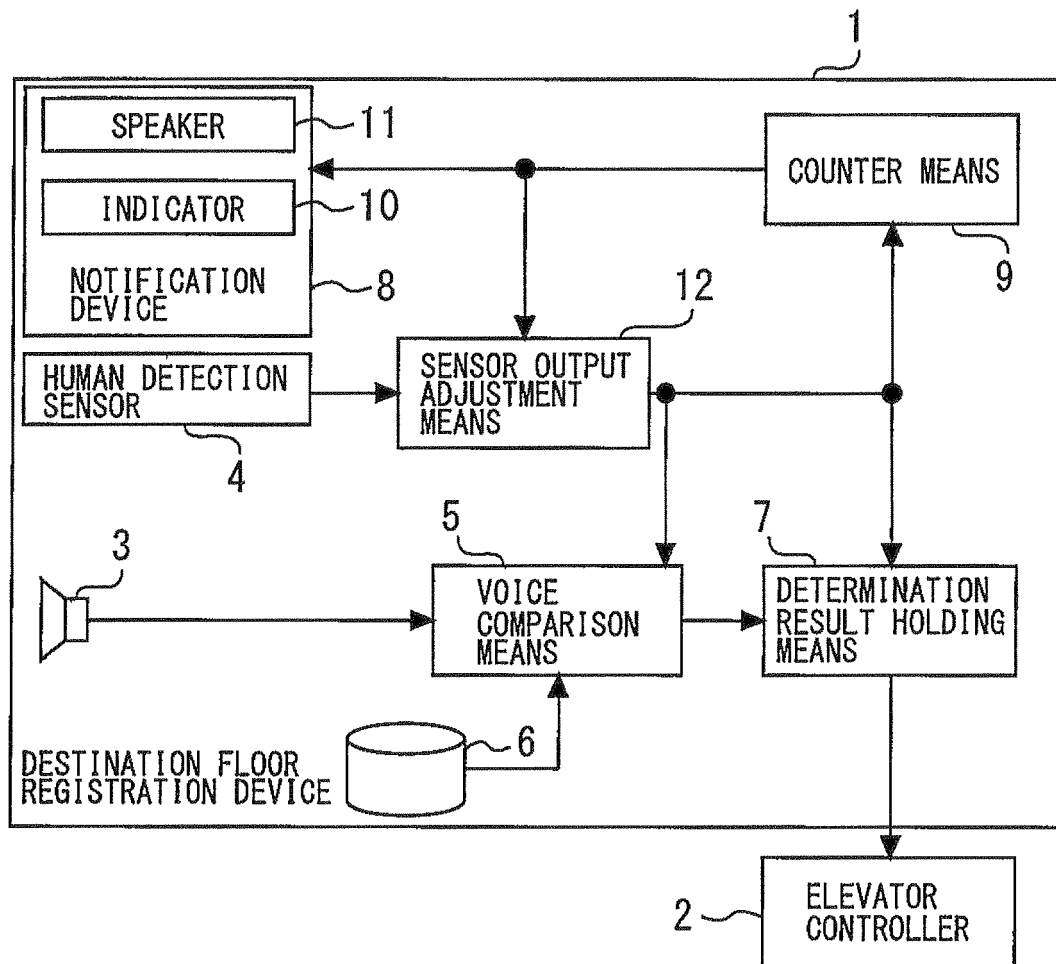
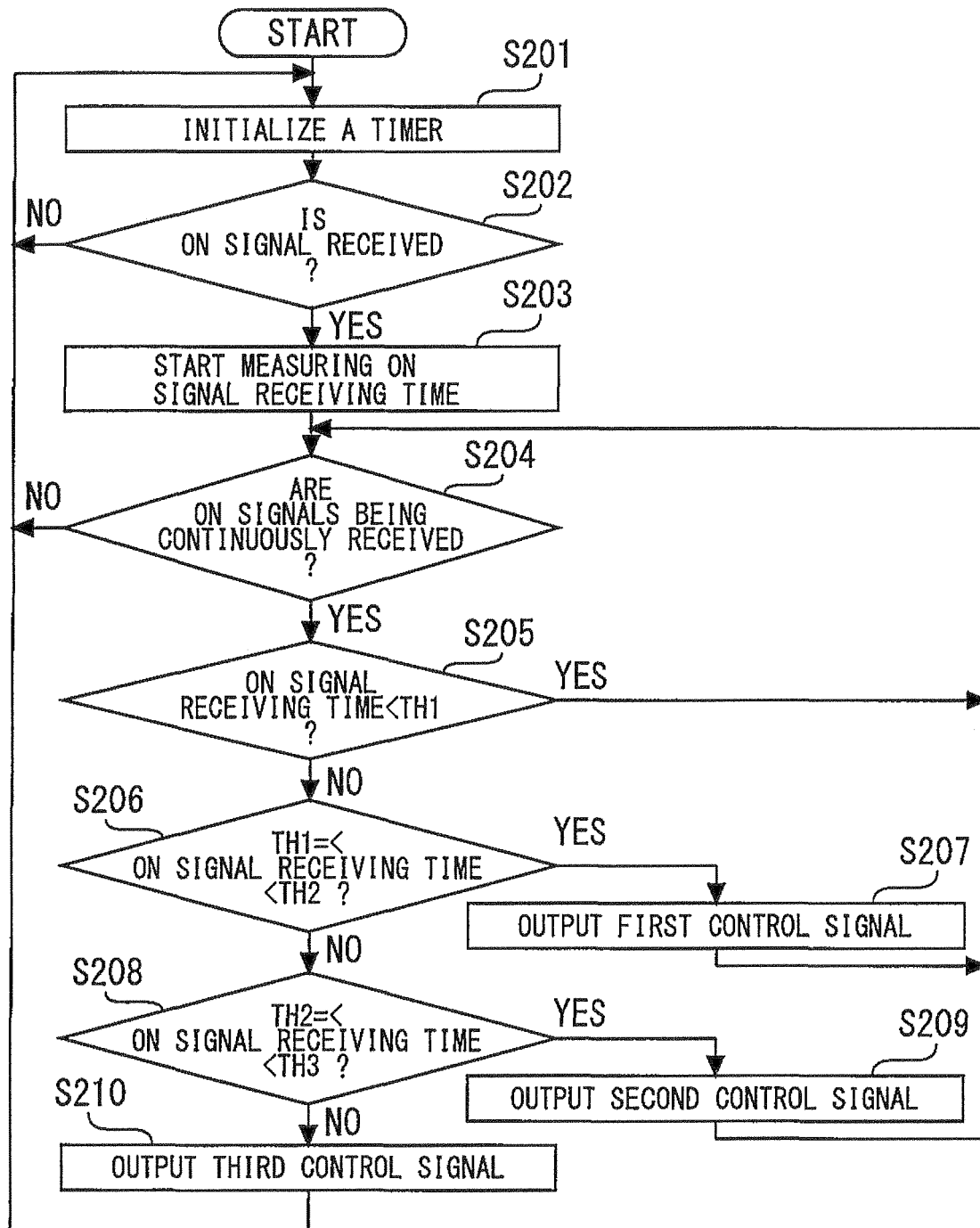


Fig. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/052762

A. CLASSIFICATION OF SUBJECT MATTER B66B3/00(2006.01) i		
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) B66B3/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010 Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 3-73775 A (Toshiba Corp.), 28 March 1991 (28.03.1991), entire text; fig. 1 to 6 & GB 2237410 A & HK 110795 A & KR 10-1994-0011703 B	1-4
Y	JP 11-335045 A (Hitachi Building Systems Co., Ltd.), 07 December 1999 (07.12.1999), entire text; fig. 1 to 3 (Family: none)	1-4
Y	JP 2003-40562 A (Mitsubishi Electric Corp.), 13 February 2003 (13.02.2003), paragraphs [0011] to [0012], [0016] to [0018] (Family: none)	3-4
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> 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 13 May, 2010 (13.05.10)		Date of mailing of the international search report 25 May, 2010 (25.05.10)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/052762

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 6-72648 A (Hitachi Building Systems & Service Engineering Ltd.), 15 March 1994 (15.03.1994), entire text; fig. 1 to 2 (Family: none)	1-4

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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