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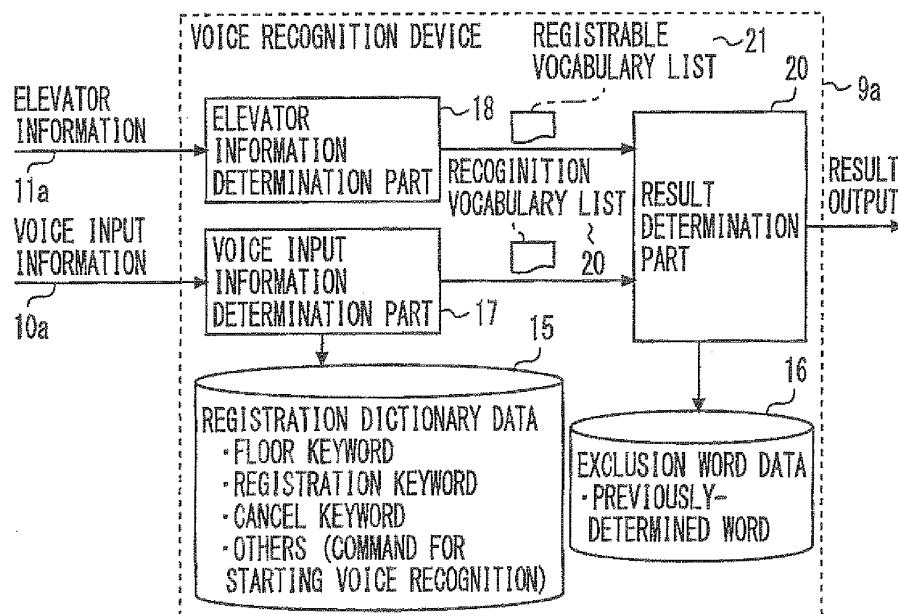
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(54) **ELEVATOR CALL REGISTRATION DEVICE**

(57) There is provided a call registration device for an elevator, in which the voice recognition performance at the time when a user utters his/her word again can be improved. For this purpose, the call registration device includes a storage part that stores a plurality of vocabularies concerning the call registration of elevator, and a recognition part that compares the vocabulary corresponding to a voice inputted to a microphone provided in a car or a hall of the elevator with the plurality of vo-

cabularies concerning the call registration to recognize the voice. In the case where the recognition result of the voice becomes invalid, and the voice inputted again to the microphone is recognized again, the recognition part excludes the vocabulary corresponding to the recognition result that has become invalid from the plurality of vocabularies concerning the call registration at the time when being compared with the vocabulary corresponding to the voice inputted again to the microphone.

FIG. 4



Description

Technical Field

[0001] The present invention relates to a call registration device for an elevator.

Background Art

[0002] As a call registration device for an elevator, there has been proposed a device that calls upon a user to correct misrecognition or mistaken operation instruction by displaying a voice recognition result (for example, refer to Patent Literature 1).

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Patent Laid-Open No. 3-31176

Summary of Invention

Technical Problem

[0004] Unfortunately, in the device described in Patent Literature 1, the voice recognition performance is fixed. Therefore, even if a user utters his/her word again, the possibility of misrecognition is high. For example, in the case where the user utters "ikkai" (first floor), and his/her utterance is misrecognized as "nikai" (second floor), even if the user utters "ikkai" again, his/her utterance may be recognized as "nikai" again.

[0005] The present invention has been made to solve the above problem, and accordingly an object thereof is to provide a call registration device for an elevator, in which the voice recognition performance at the time when a user utters his/her word again can be improved.

Means for Solving the Problems

[0006] A call registration device for an elevator of the present invention includes a storage part which stores a plurality of vocabularies concerning the call registration of elevator; and a recognition part which compares the vocabulary corresponding to a voice inputted to a microphone provided in a car or a hall of the elevator with the plurality of vocabularies concerning the call registration to recognize the voice, wherein in the case where the recognition result of the voice becomes invalid, and the voice inputted again to the microphone is recognized again, the recognition part excludes the vocabulary corresponding to the recognition result which has become invalid from the plurality of vocabularies concerning the call registration at the time when being compared with the vocabulary corresponding to the voice inputted again to the microphone.

Advantageous Effect of Invention

[0007] According to the present invention, the voice recognition performance at the time when a user utters his/her word again can be improved.

Brief Description of the Drawings

[0008]

Figure 1 is a block diagram of a call registration device for an elevator in accordance with a first embodiment of the present invention.

Figure 2 is a chart showing the registration dictionary data for the call registration device for an elevator in accordance with the first embodiment of the present invention.

Figure 3 is a data transition diagram of the call registration device for an elevator in accordance with the first embodiment of the present invention.

Figure 4 is a block diagram of the voice recognition device for the call registration device for an elevator in accordance with the first embodiment of the present invention.

Figure 5 is a flowchart for explaining the method for registering a service floor in the call registration device for an elevator in accordance with the first embodiment of the present invention.

Description of Embodiment

[0009] An embodiment of the present invention will now be described with reference to the accompanying drawings. In the drawings, the same signs are applied to the same or equivalent elements, and duplicated explanation thereof is simplified or omitted as appropriate.

First embodiment

[0010] Figure 1 is a block diagram of a call registration device for an elevator, in accordance with a first embodiment of the present invention.

[0011] In Figure 1g reference sign 1 denotes a shaft of the elevator. Above the shaft 1, a machine room 2 is provided. In the machine room 2, a control device 3 is provided. The control device 3 has a function of controlling the elevator.

[0012] In the shaft 1, a car 4 is disposed. To the shaft 1, a hall 5 faces. In the car 4, a voice output device 6a, an indication device 7a, a microphone 8a, and a voice recognition device 9a are provided. In the hall 5, a voice output device 6b, an indication device 7b, a microphone 8b, and a voice recognition device 9b are provided.

[0013] The voice output device 6a has a function of generating a voice. The indication device 7a has a function of displaying an image. The microphone 8a has a function of delivering a voice signal corresponding to the input of voice uttered by a user in the car 4.

[0014] The voice recognition device 9a has a function of storing registration dictionary data. The voice recognition device 9a has a function of recognizing a voice by comparing the vocabulary corresponding to the voice signal with the vocabulary in the registration dictionary data. The voice recognition device 9a has a function of registering a service floor based on the voice recognition result. The voice recognition device 9a has a function of controlling the voice output device 6a and the indication device 7a based on the voice recognition result.

[0015] The voice output device 6b has a function of generating a voice. The indication device 7b has a function of displaying an image. The microphone 8b has a function of delivering a voice signal corresponding to the input of voice uttered by a user in the hall 5.

[0016] The voice recognition device 9b has a function of storing registration dictionary data. The voice recognition device 9b has a function of recognizing a voice by comparing the vocabulary corresponding to the voice signal with the vocabulary in the registration dictionary data. The voice recognition device 9b has a function of registering a service floor based on the voice recognition result. The voice recognition device 9b has a function of controlling the voice output device 6b and the indication device 7b based on the voice recognition result.

[0017] Next, referring to Figure 2, the registration dictionary data stored in the voice recognition devices 9a and 9b are explained.

[0018] Figure 2 is a chart showing the registration dictionary data for the call registration device for an elevator in accordance with the first embodiment of the present invention.

[0019] The items of the registration dictionary data consist of floor keywords, registration keywords, cancel keywords, and others.

[0020] The floor keywords are a vocabulary group for recognizing service floors. For example, the floor keywords are "1st floor", "2nd floor", "B1 floor", "rooftop floor", "ticket gate floor", and the like. The registration keywords are a vocabulary group for registering a recognized floor. For example, the registration keywords are "registration", "confirmation", and the like.

[0021] The cancel keywords are a vocabulary group for canceling a recognized floor. For example, the cancel keywords are "undoing", "cancel" and the like. The others are a vocabulary group for performing special operation, including a command for starting voice recognition. For example, the others are "start", "voice operation" "with voice", and the like,

[0022] Next, referring to Figure 3, the basic motion of the call registration device for an elevator is explained.

[0023] Figure 3 is a data transition diagram of the call registration device for an elevator in accordance with the first embodiment of the present invention.

[0024] First, the case where a user utters a voice in the car 4 is explained. In this case, the voice is collected by the microphone 8a. Based on the collected voice, the microphone 8a generates voice input information 10a as

analog data or digital data. The microphone 8a sends the voice input information 10a to the voice recognition device 9a.

[0025] Based on the running state of the car 4, the stop position of the car 4, the travel direction of the car 4, the floor at which the car 4 can stop, the floor at which the car 4 cannot stop, the number of floors in the building, and the like, the control device 3 generates elevator information 11a. The control device 3 sends the elevator information 11a to the voice recognition device 9a.

[0026] Based on the voice input information 10a and the elevator information 11a, the voice recognition device 9a recognizes the voice collected by the microphone 8a. Based on the information for urging the user to perform the next operation and the information concerning the recognition result and the motion result of the voice recognition device 9a, the voice recognition device 9a generates recognition state information (notification) 12a and recognition state information (indication) 13a.

[0027] For example, the voice recognition device 9a generates information for urging the user to utter a voice concerning a floor, vocabulary information determined by the voice recognition device 9a, information that the voice recognition device 9a has registered a floor, and the like information as the recognition state information (notification) 12a and the recognition state information (indication) 13a. The voice recognition device 9a sends the recognition state information (notification) 12a to the voice output device 6a, and also sends the recognition state information (indication) 13a to the indication device 7a.

[0028] Based on the recognition state information (notification) 12a, the voice output device 6a announces the relevant recognition result and motion result with voice, or sounds a buzzer. Based on the recognition state information (indication) 13a, the indication device 7a indicates the relevant recognition result and motion result with a word or an icon. By such motions of the voice output device 6a and the indication device 7a, the relevant recognition result and motion result are told to the user.

[0029] In the case where a service floor is registered based on the recognition result of voice, the voice recognition device 9a sends destination registration information 14a to the control device 3, the destination registration information 14a including information on the floor at which the car 4 is to be stopped. The control device 3 recognizes the floor corresponding to the destination registration information 14a as the service floor of the car 4.

[0030] Next, the case where a user utters a voice in the hall 5 is explained. In this case, the voice is collected by the microphone 8b. Based on the collected voice, the microphone 8b generates voice input information 10b as analog data or digital data. The microphone 8b sends the voice input information 10b to the voice recognition device 9b.

[0031] Based on the running state of the car 4, the stop position of the car 4, the travel direction of the car 4, the

floor at which the car 4 can stop, the floor at which the car 4 cannot stop, the number of floors in the building, and the like, the control device 3 generates elevator information 11b. The control device 3 sends the elevator information 11b to the voice recognition device 9b.

[0032] Based on the voice input information 10b and the elevator information 11b, the voice recognition device 9b recognizes the voice collected by the microphone 8b. Based on the information for urging the user to perform the next operation and the information concerning the recognition result and the motion result of the voice recognition device 9b, the voice recognition device 9b generates recognition state information (notification) 12b and recognition state information (indication) 13b.

[0033] For example, the voice recognition device 9b generates information for urging the user to utter a voice concerning a floor, vocabulary information determined by the voice recognition device 9b, information that the voice recognition device 9b has registered a floor, and the like information as the recognition state information (notification) 12b and the recognition state information, (indication) 13b. The voice recognition device 9b sends the recognition state information (notification) 12b to the voice output device 6b, and also sends the recognition state information (indication) 13b to the indication device 7b.

[0034] Based on the recognition state information (notification) 12b, the voice output device 6b announces the relevant recognition result and motion result with voice, or sounds a buzzer. Based on the recognition state information (indication) 13b, the indication device 7b indicates the relevant recognition result and motion result with a word or an icon. By such motions of the voice output device 6b and the indication device 7b, the relevant recognition result and motion result are told to the user.

[0035] In the case where a service floor is registered based on the recognition result of voice, the voice recognition device 9b sends destination registration information 14b to the control device 3, the destination registration information 14b including information on the floor at which the car 4 is to be stopped. The control device 3 recognizes the floor corresponding to the destination registration information 14b as the service floor of the car 4.

[0036] Next, referring to Figure 4, the voice recognition devices 9a and 9b are explained. The voice recognition devices 9a and 9b are configured in the same way. In the following, therefore, the voice recognition device 9a is explained.

[0037] Figure 4 is a block diagram of the voice recognition device for the call registration device for an elevator in accordance with the first embodiment of the present invention.

[0038] The voice recognition device 9a is provided with a first storage part 15, a second storage part 16, a voice input information determination part 17, an elevator information determination part (selection part) 18, and a

result determination part (recognition part) 19.

[0039] The first storage part 15 has a function of storing the registration dictionary data. The second storage part 16 has a function of storing exclusion word data. The voice input information determination part 17 has a function of preparing a recognition vocabulary list 20 by collating the vocabulary corresponding to the voice input information 10a with the vocabulary in the registration dictionary data. On the recognition vocabulary list 20, a plurality of determined vocabularies are arranged in order of descending recognition rate (probability),

[0040] The elevator information determination part 18 has a function of preparing a registrable vocabulary list 21 based on the elevator information 11a and the state of voice recognition. For example, if the state of voice recognition is at the stage at which a service floor is recognized, the elevator information determination part 18 excludes, from the registrable vocabulary list 21, the vocabulary corresponding to the floor at which the car 4 is positioned and the floors existing in the direction opposite to the travel direction of the car 4. In this case, the elevator information determination part 18 excludes the vocabularies such as "registration" and "cancel", which are not used at the stage at which a service floor is recognized, from the registrable vocabulary list 21. That is, the registrable vocabulary list 21 is prepared only by the vocabularies corresponding to the floors existing in the travel direction of the car 4.

[0041] The result determination part 19 has a function of determining whether or not the vocabularies on the recognition vocabulary list 20 are listed on the registrable vocabulary list 21 in order of descending recognition rate. If the vocabulary to be determined is not listed on the registrable vocabulary list 21, the result determination part 19 determines whether or not the vocabulary of the next order has been listed on the registrable vocabulary list 21. If the vocabulary to be determined has been listed on the registrable vocabulary list 21, the result determination part 19 outputs that vocabulary as a recognition result of voice.

[0042] At this time, the result determination part 19 also determines whether or not the vocabulary to be determined has been listed in the second storage part 16. In the case where the vocabulary to be determined has been listed in the exclusion word data even if having been listed on the registrable vocabulary list 21, the result determination part 19 transfers to a determination as to whether or not the vocabulary of the next order has been listed on the registrable vocabulary list 21.

[0043] The recognition result of voice can be made invalid by a predetermined operation. For example, in the case where the vocabulary corresponding to a service floor is inputted again into the microphone 8a when the state of voice recognition is at the stage at which the service floor is recognized, the recognition result of voice just before this input becomes invalid. The vocabulary corresponding to the recognition result that has become invalid is stored in the second storage part 16 as the

exclusion word data. The exclusion word data is erased each time the state of voice recognition changes. Specifically, the exclusion word data is erased each time the processing in the flowchart of Figure 5, explained hereunder, is ended. Also, the number of vocabularies stored in the second storage part 16 can be set optionally. If the number of vocabularies in the exclusion word data becomes a preset number or larger, the oldest vocabulary is erased, and a new vocabulary is registered.

[0044] Next, the method for registering a service floor is explained. The methods for registering a service floor in the car 4 and in the hall are the same. In the following, therefore, the method for registering a service floor in the car 4 is explained.

[0045] Figure 5 is a flowchart for explaining the method for registering a service floor in the call registration device for an elevator in accordance with the first embodiment of the present invention.

[0046] In Step S1, when a user utters the keyword of voice recognition start in the car 4, the microphone 8a generates a voice signal corresponding to the utterance. Thereafter, the process proceeds to Step S2, where the voice recognition device 9a starts the processing for recognizing the keyword of voice recognition start by using the recognition vocabulary list 20, registrable vocabulary list 21, and the exclusion word data,

[0047] If the keyword of voice recognition start is not recognized, the process returns to Step S1. If the keyword of voice recognition start is recognized, the process proceeds to Step S3.

[0048] In Step S3, the voice recognition device 9a makes the voice output device 6a and the indication device 7a give notification for urging the user to utter a floor keyword. Thereafter, the process proceeds to Step S4, where the user utters the word of service floor. Then, the process proceeds to Step S5, where the voice recognition device 9a determines whether or not the service floor has been recognized.

[0049] If the service floor has not been recognized, the process proceeds to Step S6. In Step S6, the voice recognition device 9a judges whether or not the user has uttered the word of service floor again. If the user has not uttered the word of service floor again and specific time has elapsed, the processing is ended. If the user has uttered the word of service floor again, the process returns to Step S5, where the voice recognition device 9a judges again whether or not the service floor has been recognized.

[0050] If the service floor has been recognized in Step S5, the process proceeds to Step S7. In Step S7, the voice recognition device 9a makes the voice output device 6a and the indication device 7a notify the user of the recognized service floor. Thereafter, the process proceeds to Step S8, where the user performs action according to the notification of the voice output device 6a and the indication device 7a.

[0051] If the user utters a registration keyword or waits for specific time without uttering as the action in Step S8,

the process proceeds to Step S9. In Step S9, the voice recognition device 9a registers the recognized service floor.

[0052] If the user utters a cancel keyword as the action in Step S8, the process proceeds to Step S10. In Step S10, the voice recognition device 9a performs recognition processing of the cancel keyword. If the cancel keyword is recognized, the processing is ended. If the cancel keyword is not recognized, the process proceeds to Step S9, where, after specific time has elapsed, the voice recognition device 9a registers the service floor recognized in Step S5.

[0053] If the user utters the word of service floor again as the action in Step S8, the process proceeds to Step S11. In Step S11, the voice recognition device 9a again performs recognition processing of the service floor. At this time, the vocabulary corresponding to the recognition result before re-utterance is stored in the second storage part 16.

[0054] If the service floor is recognized, the actions in and after Step S7 are performed. If the service floor is not recognized, the process proceeds to Step S9, where, after the specific time has elapsed, the voice recognition device 9a registers the service floor recognized in Step S5.

[0055] According to the first embodiment explained above, the vocabulary corresponding to the recognition result that has become invalid is excluded from the list of vocabularies concerning call registration for comparing with the voice inputted again to the microphone 8 or the like. Therefore, the voice recognition performance at the time of re-utterance can be improved. Accordingly, the number of re-utterances can be reduced.

[0056] Also, according to the state of elevator, a valid vocabulary is selected from the vocabulary list concerning call registration. For example, on the vocabulary list concerning call registration, the vocabulary corresponding to the floor at which the car 4 is positioned and the vocabulary corresponding to the floor existing in the direction opposite to the travel direction of the car 4 are invalid, whereas the vocabulary corresponding to the floor existing in the travel direction of the car 4 is valid. Therefore, the voice recognition performance can be improved.

[0057] The control device 3 may be provided in the shaft 1, the car 4, the hall 5, or the like. The call registration device may be provided in only either one of the car 4 and the hall 5. In the car 4, only either one of the voice output device 6a and the indication device 7a may be provided. In the hall 5, only either one of the voice output device 6b and the indication device 7b may be provided.

Industrial Applicability

[0058] As described above, the call registration device for an elevator in accordance with the present invention can be applied to an elevator in which the voice recognition performance at the time when a user utters his/her

word again is improved.

Description of symbols

[0059]

1	shaft	5
2	machine room	
3	control device	
4	car	10
5	hall	
6a, 6b	voice output device	
7a, 7b	indication device	
8a, 8b	microphone	
9a, 9b	voice recognition device	15
10a, 10b	voice input information	
11a, 11b	elevator information	
12a, 12b	recognition state information (notification)	
13a, 13b	recognition state information (indication)	
14a, 14b	destination registration information	20
15	first storage part	
16	second storage part	
17	voice input information determination part	
18	elevator information determination part	
19	result determination part	25
20	recognition, vocabulary list	
21	registrable vocabulary list	

Claims

1. A call registration device for an elevator, comprising:

a storage part which stores a plurality of vocabularies concerning the call registration of elevator; and
 a recognition part which compares the vocabulary corresponding to a voice inputted to a microphone provided in a car or a hall of the elevator with the plurality of vocabularies concerning the call registration to recognize the voice, wherein
 in the case where the recognition result of the voice becomes invalid, and the voice inputted again to the microphone is recognized again, the recognition part excludes the vocabulary corresponding to the recognition result which has become invalid from the plurality of vocabularies concerning the call registration at the time when being compared with the vocabulary corresponding to the voice inputted again to the microphone.

2. The call registration device for an elevator according to claim 1, wherein the call registration device further comprises a selection part which selects a valid vocabulary from the plurality of vocabularies concerning the call registra-

tion based on the state of the elevator; and
 the recognition part compares the vocabulary corresponding to the voice inputted to the microphone with the valid vocabulary to recognize the voice.

3. The call registration device for an elevator according to claim 2, wherein the selection part makes the vocabulary corresponding to the floor at which the car is positioned and the vocabulary corresponding to the floor existing in the direction opposite to the travel direction of the car invalid, and makes the vocabulary corresponding to the floor existing in the travel direction of the car valid.

FIG. 1

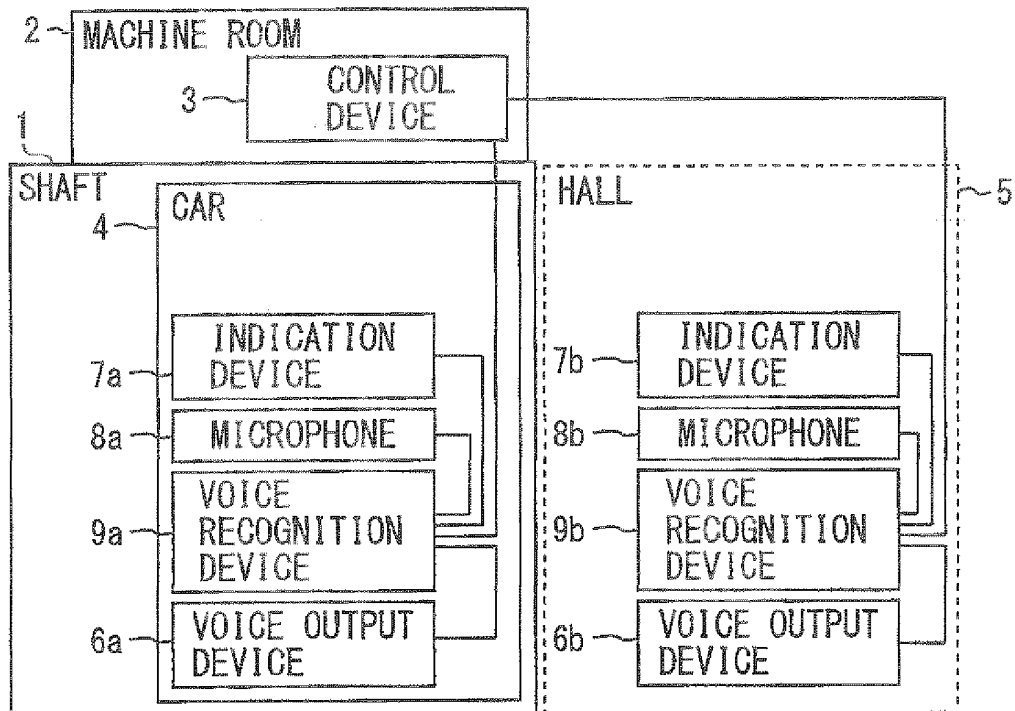


FIG. 2

ITEM	MEANING	CONCRETE EXAMPLE
FLOOR KEYWORD	VOCABULARY FOR RECOGNIZING SERVICE FLOOR	1ST FLOOR, 2ND FLOOR, B1 FLOOR, ROOFTOP FLOOR, TICKET GATE FLOOR
REGISTRATION KEYWORD	VOCABULARY FOR REGISTERING RECOGNIZED FLOOR	REGISTRATION, CONFIRMATION
CANCEL KEYWORD	VOCABULARY FOR CANCELING RECOGNIZED FLOOR	UNDOING, CANCEL
OTHERS	VOCABULARY FOR PERFORMING SPECIAL OPERATION INCLUDING VOCABULARY FOR STARTING VOICE RECOGNITION	START, VOICE OPERATION, WITH VOICE

FIG. 3

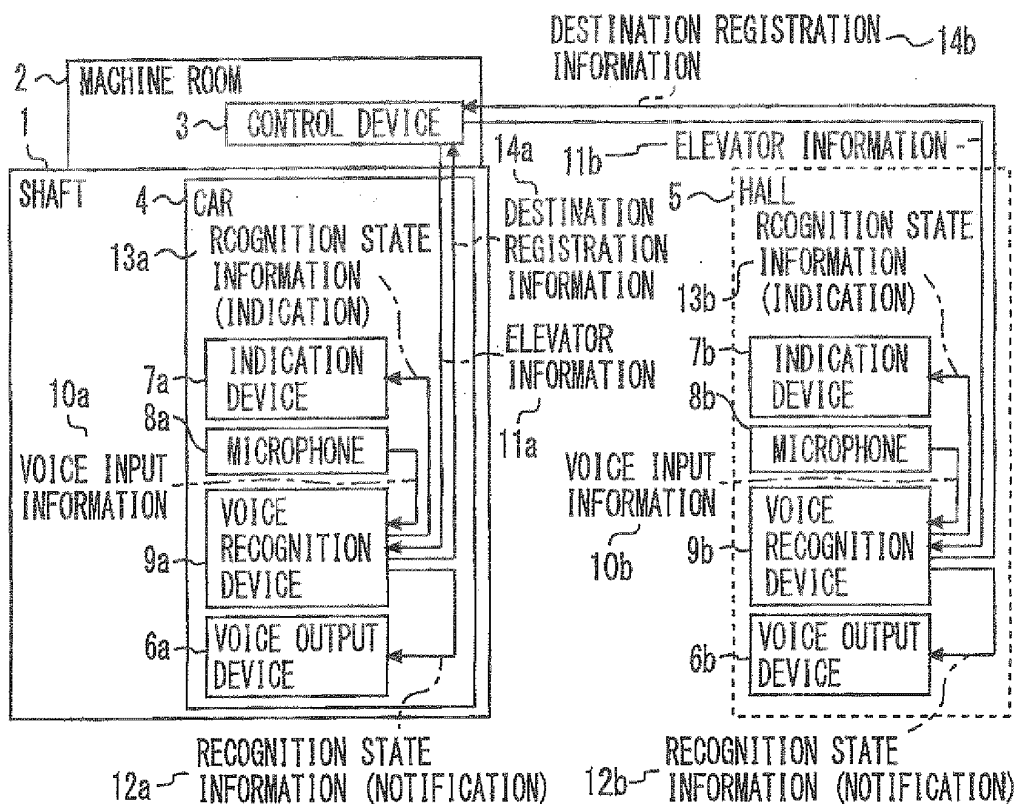


FIG. 4

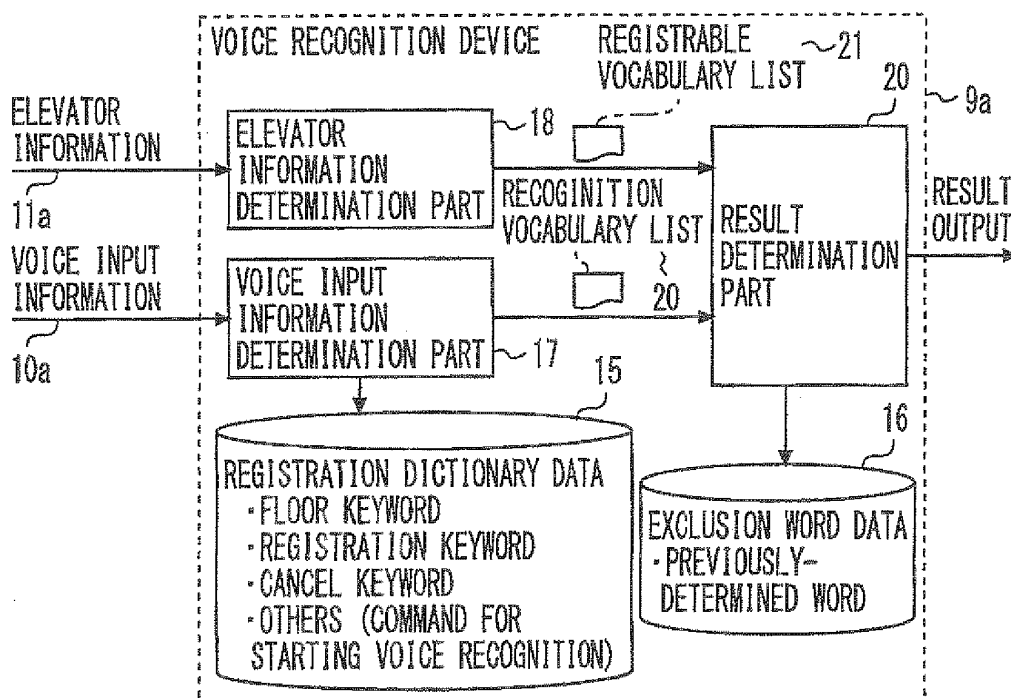
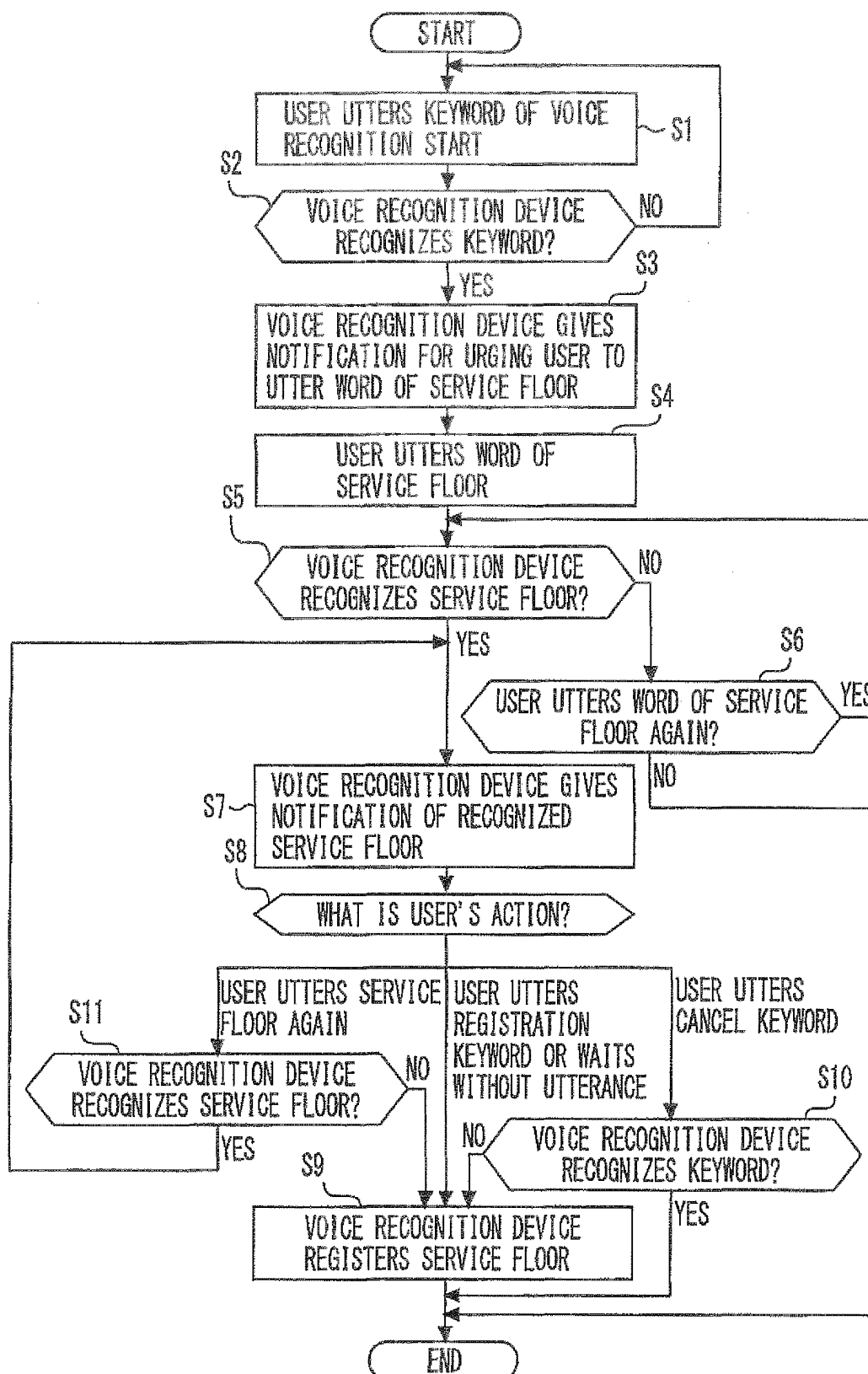


FIG. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/055811

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 1996-2011 Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011		
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 03-31176 A (Toshiba Corp.), 08 February 1991 (08.02.1991), page 2, lower left column, line 1 to lower right column, line 7; fig. 6 (Family: none)	1-3
Y	JP 10-39892 A (Denso Corp.), 13 February 1998 (13.02.1998), paragraphs [0036] to [0041], [0045] to [0047], [0053] to [0057]; fig. 1 to 3 (Family: none)	1-3
Y	JP 2009-15148 A (Panasonic Corp.), 22 January 2009 (22.01.2009), paragraphs [0034] to [0043]; fig. 1 to 2 (Family: none)	1-3
☒ 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 01 November, 2011 (01.11.11)		Date of mailing of the international search report 15 November, 2011 (15.11.11)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/055811

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	JP 2825272 B2 (Toshiba Corp.), 18 November 1998 (18.11.1998), claim 1 (Family: none)	2-3

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REFERENCES CITED IN THE DESCRIPTION

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