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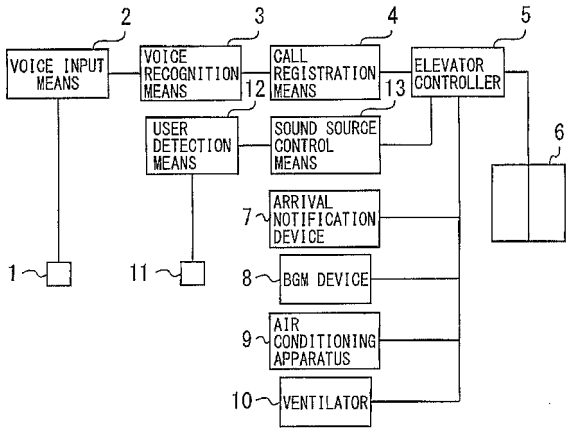
(54) ELEVATOR DEVICE

(57) In an elevator apparatus having the function of performing call registration through the use of the voice recognition technology, wrong recognition of voices is prevented from occurring due to sounds generated during the arrival of a car at a hall.

This elevator apparatus is provided with a microphone installed in a hall, a sensor for detecting a user present in a prescribed range in the vicinity of the microphone, call registration means which performs call registration on the basis of a voice signal inputted from the microphone, and an arrival notification device which makes prescribed notification by sound when a car of the elevator arrives at the hall. In the case where the sensor is detecting a user upon arrival of the car at the hall, the sound volume used during the notification from the arrival notification device is lowered from the sound level used at the time when the sensor is not detecting a user.

Fig. 1



EP 2 551 227 A1

Description

Technical Field

[0001] The present invention relates to an elevator apparatus which enables a user to perform the registration of a call by voice.

Background Art

[0002] In general elevators, a user registers a hall call by pressing an upward or downward hall button in a hall of an elevator and calls the car of the elevator to the hall. That is, in such an elevator, it is necessary for a user to perform actions such as operating (pressing) the hall button in order to register a hall call. However, because elevators are used by various users, such as wheelchair users, users having disabled hands and physically unimpaired persons whose both hands are engaged with the persons[1] belongings, it is difficult for some users to operate the hall button and they sometimes feel inconvenience.

[0003] Therefore, in recent years, with an improvement in the voice recognition technology for recognizing the voices uttered by unspecified speakers, also in elevators, proposals have been made to perform the registration of calls (hall calls, destination calls) by using this voice recognition technology. However, because elevators are installed in various kinds of buildings, facilities and the like, voice recognition is not correctly carried out in some surrounding environments and the like, sometimes posing problems such as registering no calls or registering wrong calls.

[0004] As conventional techniques for an elevator apparatus in which such voice recognition technology is used, there are, for example, those proposed in Patent Literature 1 and Patent literature 2, which will be described below. Patent Literature 1 and Patent literature 2 disclose techniques for accurately performing voice recognition in an elevator.

[0005] Specifically, in the elevator apparatus described in Patent Literature 1, a sensor for detecting a user present in front of a microphone is installed in a hall of an elevator, whereby the voice recognition function is made effective only when a user is being detected by this sensor, and the registration of a call is performed.

In the elevator apparatus described in Patent Literature 2, the voice recognition function is made ineffective while announcements are being made from the speaker of a call registration device.

Citation List

Patent Literature

[0006]

Patent Literature 1: Japanese Patent No. 2557939

Patent Literature 2: Japanese Patent No. 2647207

Summary of Invention

Technical Problem

[0007] In an elevator which performs call registration by using the voice recognition technology, a microphone for voice input is often installed in the vicinity of a hall entrance. For this reason, when a car arrives at the hall while a user is performing call registration by voice, various sounds generated by the arrival of the car are caught by the microphone, sometimes causing wrong registration of calls.

[0008] For example, if a chime which sounds when the car arrives at the hall or an operation announcement which makes the arrival known to users is caught by the microphone, there is a possibility that the voice uttered by the users is not correctly recognized. Furthermore, in the case where the sound generated by a BGM device, an air conditioning apparatus, or a ventilator in the car is caught by the microphone, the same problem occurs.

[0009] Incidentally, these problems were incapable of being solved with the elevator apparatuses described in Patent Literature 1 and Patent Literature 2.

[0010] The present invention has been made to solve the problems described above, and an object of the invention is to provide an elevator apparatus having the function of performing call registration through the use of the voice recognition technology which can positively prevent wrong recognition of voices from occurring due to sounds generated during the arrival of a car at a hall.

Solution to Problem

[0011] An elevator apparatus of the invention is an elevator apparatus which comprises a microphone installed in a hall of an elevator, a sensor for detecting a user present in a prescribed range in the vicinity of the microphone, call registration means which performs call registration on the basis of a voice signal inputted from the microphone, an arrival notification device installed in the hall which performs prescribed notification by sound when a car of the elevator arrives at the hall, and sound source control means which lowers a sound volume used during the notification from the arrival notification device from a sound level used at the time when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

[0012] An elevator apparatus of the invention is an elevator apparatus which comprises a microphone installed in a hall of an elevator, a sensor for detecting a user present in a prescribed range in the vicinity of the microphone, call registration means which performs call registration on the basis of a voice signal inputted from the microphone, an arrival notification device installed in the hall which performs prescribed notification by sound when a car of the elevator arrives at the hall, and sound

source control means which causes the notification from the arrival notification device to be made later by a prescribed time than at the time when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

[0013] An elevator apparatus of the invention is an elevator apparatus which comprises a microphone installed in a hall of an elevator, a sensor for detecting a user present in a prescribed range in the vicinity of the microphone, call registration means which performs call registration on the basis of a voice signal inputted from the microphone, a prescribed sound source device which is provided in a car of the elevator and can become a sound generation source, and sound source control means which causes an action of the sound source device to be changed temporarily so that a sound volume generated from the sound source device decreases from a level used when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

Advantageous Effect of Invention

[0014] According to the present invention, in an elevator apparatus having the function of performing call registration through the use of the voice recognition technology, it becomes possible to positively prevent wrong recognition of voices from occurring due to sounds generated during the arrival of a car at a hall.

Brief Description of Drawings

[0015]

Figure 1 is a block diagram showing an elevator apparatus in a first embodiment according to the present invention.

Figure 2 is a flowchart showing the actions of the elevator apparatus in the first embodiment according to the present invention.

Figure 3 is a flowchart showing the actions of the elevator apparatus in a second embodiment according to the present invention.

Figure 4 is a flowchart showing the actions of the elevator apparatus in a third embodiment according to the present invention.

Figure 5 is a flowchart showing the actions of the elevator apparatus in a fourth embodiment according to the present invention.

Description of Embodiments

[0016] 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 corresponding parts and redundant descriptions of these parts are appropriately simplified or omitted.

First embodiment

[0017] Figure 1 is a block diagram showing an elevator apparatus in a first embodiment according to the present invention. This elevator apparatus has the function of call registration which involves using the voice recognition technology. That is, an elevator user can register a desired call (a hall call, a destination call) by uttering an appropriate voice without performing button operations in a hall.

In the following, a concrete description will be given by taking the case where a destination call can be registered from a hall as an example.

[0018] In Figure 1, reference numeral 1 denotes a microphone installed in a hall of an elevator. The microphone 1 is provided for voice input in the hall and is installed in the vicinity of the hall entrance of the elevator or in other places (for example, in the vicinity of a hall jamb). Sounds caught by the microphone 1 are inputted to voice input means 2 and signal conversion and the like are performed as required.

[0019] Voice recognition means 3 and call registration means 4 are intended for performing call registration on the basis of a voice signal inputted from the microphone 1.

The voice recognition means 3 is the part which carries out the voice recognition function in this apparatus. Incidentally, the voice recognition function by the voice recognition means 3 may be of any method so long as the destination floor of a user (in the case where a destination call is registered) or the direction in which a user wants to go (in the case where a hall call is registered) can be identified from a voice signal. For example, the voice recognition means 3 makes a determination as to whether or not there is a voice signal which is in agreement with a voice signal which has already been registered under prescribed conditions among the voice signals inputted from the voice input means 2 (i.e., the microphone 1) and, if there is a voice signal in agreement, the voice recognition means 3 identifies a destination floor corresponding to the registered voice signal as the destination floor of the user.

[0020] The call registration means 4 has the function of performing call registration on the basis of the recognition result by the voice recognition means 3. For example, when the voice recognition means 3 has identified the destination floor of the user, the call registration means 4 performs the registration of a call (a destination call) corresponding to the floor on which the microphone 1 is installed, by use of which voice input has been carried out, and the destination floor identified by the voice recognition means 3, and transmits the registered signal to a controller 5 of the elevator.

[0021] The controller 5 carries out the operation control of the whole elevator, such as the run control of the car 6 of the elevator. Specifically, when a destination call has been registered by the call registration means 4, the controller 5 performs door opening operations after causing

the car 6 to run to the hall in which a user is present and causing the car 6 to stop. Also, the controller 5 carries out door closing operations after the door opening and causes the car 6 to run to the destination floor of the user.

[0022] Furthermore, the controller 5 has also the function of controlling an arrival notification device 7 installed in the hall of the elevator and a BGM device 8, an air conditioning apparatus 9 and a ventilator 10 provided in the car 6.

[0023] The arrival notification device 7 has the function of providing prescribed notification by sound to a user present in a hall when the car 6 arrives at the hall (in a prescribed period of time including any time before a prescribed time at which the car 6 stops at the hall to a time immediately after the stop). For example, upon registration of a destination call by the call registration means 4, the controller 5 causes the arrival notification device 7 of the hall to sound an arrival chime or to make an operation announcement immediately before the stop of the car 6 in the hall, thereby providing the user with the information to the effect that the car 6 will arrive soon.

[0024] The BGM device 8 which plays music in the car 6, the air conditioning apparatus 9 composed of an air conditioner, an air cleaning device or the like, and the ventilator 10 having a fan are shown as examples of a device which is installed in the car 6 and can become a generation source of sound (a sound source device). Incidentally, the air conditioning apparatus 9 and the ventilator 10 may be integrally made as an air conditioning/ventilation apparatus, for example. The controller 5 has also the function of controlling the actions of such sound source devices on the basis of input signals from various kinds of switches and the like.

[0025] Reference numeral 11 denotes a human detection sensor installed in the hall in order to detect persons (objects) present in a prescribed detection range. Specifically, the human detection sensor 11 is provided in order to detect the user who is going to input voice from the microphone 1, and the detection range there of is set at a prescribed range in the vicinity of the microphone 1. For example, as with the microphone 1, the human detection sensor 11 is installed in the vicinity of the hall jamb or the like and detects the presence of a user who stands in front of the microphone 1.

Incidentally, the microphone 1 and the human detection sensor 11 may be installed in all of the halls at which the car 6 stops or may also be installed only in part of the halls.

[0026] User detection means 12 has the function of making a determination of the presence or absence of users on the basis of a detection signal from the human detection sensor 11. Upon determination of the presence or absence of a user from the detection result of the human detection sensor 11, the user detection means 12 outputs the identified contents to sound source control means 13.

[0027] The sound source control means 13 is provided in order to prevent voices from being wrongly recognized by the voice recognition means 3 due to various kinds of sounds generated when the car 6 arrives at the hall. Specifically, the sound source control means 13 has the function of changing the actions of the arrival notification device 7 and the sound source device from ordinary actions to special actions, as required, on the basis of the condition of the elevator obtained from the controller 5 and the determination result of the user detection means 12. For example, in the case where when the car 6 arrives at a hall, the human detection sensor 11 of the hall is detecting a user, the sound source control means 13 outputs instructions for action to the controller 5, and causes the notification made by the arrival notification device 7 installed in that hall to be suspended.

[0028] Next, referring to Figure 2 also, a concrete description will be given of the actions of the elevator apparatus having the above-described configuration. Figure 2 is a flowchart showing the actions of the elevator apparatus in the first embodiment according to the present invention and shows the concrete processing flow of the above-described sound source control means 13.

[0029] First, on the basis of the information on the condition of the elevator obtained from the controller 5, the sound source control means 13 makes a determination as to whether or not it has been decided that the car 6 stops at a hall (S101). For example, when a destination call has been registered by the call registration means 4 and a response to the registered call has been started by the controller 5, the sound source control means 13 makes a determination to the effect that the stop of the car 6 has been decided (Yes in S101).

Incidentally, when the decision on the stop is not made in S101, the sound source control means 13 finishes the processing.

[0030] When the sound source control means 13 makes a determination to the effect that in S101 the stop of the car 6 is decided, the sound source control means 13 makes a determination as to whether or not the human detection sensor 11 is detecting a user in the hall (the service floor) at which the car 6 stops next (S102). At this time, if there is no user in front of the microphone 1 installed on the service floor and the human detection sensor 11 of the service floor does not detect a user, information to the effect that there is no user is inputted from the user detection means 12 to the sound source control means 13 (No in S102). In this case, the sound source control means 13 allows the notification of the arrival to be made from the arrival notification device 7 installed on the service floor, and finishes the processing (S103). That is, immediately before the stop of the car 6 at the service floor or on other occasions, the controller 5 causes an arrival chime to be sounded or an operation announcement to be made from the arrival notification device 7 at a prescribed ordinary sound volume, and notifies the user on the service floor that the car 6 will arrive soon.

[0031] On the other hand, when a user stands in front of the microphone 1 installed on the service floor and this user is detected by the human detection sensor 11 of the

service floor, the information that there is a user is inputted from the user detection means 12 to the sound source control means 13 (Yes in S102). In this case, the sound source control means 13 prohibits the notification of the arrival from the arrival notification device 7 installed on the service floor and finishes the processing (S 104). That is, the controller 5 suspends the notification of the arrival from the arrival notification device 7, which is performed in normal times, to ensure that the sounds from the arrival notification device 7 are not caught by the microphone 1 while the user is uttering voices to the microphone 1.

[0032] According to the first embodiment of the present invention, in an elevator apparatus having the function of performing call registration through the use of the voice recognition technology, it becomes possible to positively prevent wrong recognition of voices from occurring due to sounds generated from the arrival notification device 7 during the arrival of the car 6 at a hall.

[0033] In addition, in an elevator apparatus of the above-described configuration, when the car 6 arrives at a hall, it is unnecessary to make a voice recognition function, namely the function of call registration by voice ineffective and hence there is no danger of the convenience of elevators being impaired. Furthermore, because prescribed notification is made by the arrival notification device 7 unless a user is detected by the human detection sensor 11 when the car 6 arrives at the hall, there is no danger of the notification function of the arrival notification device 7 being impaired without reason, either.

[0034] Incidentally, in this embodiment, the description has been given of the case where the notification from the arrival notification device 7 is suspended in order to prevent wrong recognition of voices from occurring. However, if the above-described effect can be produced even when the sound volume of the arrival notification device 7 is not reduced to zero, it is unnecessary to suspend the notification from the arrival notification device 7. In this case, when the human detection sensor 11 of a hall is detecting a user upon arrival of the car 6 at the hall, the sound source control means 13 causes the arrival notification device 7 to perform prescribed notification by lowering the sound volume from the sound level used at the time when the human detection sensor 11 is not detecting a user. Such a configuration can become effective means, for example, in the case where there is a distance to some extent between the arrival notification device 7 and the microphone 1.

Second embodiment

[0035] The sound source control means 13 in this embodiment has the function of changing the notification time of the arrival notification device 7 as required. Specifically, when the human detection sensor 11 of a hall is detecting a user upon arrival of the car 6 at the hall, the sound source control means 13 outputs operation instructions to the controller 5 and causes the notification from the arrival notification device 7 to be made later by a prescribed time than at the time when the human detection sensor 11 is not detecting a user.

[0036] In the following, referring to Figure 3, a concrete description will be given of the actions of the elevator apparatus having the above-described configuration. Figure 3 is a flowchart showing the actions of the elevator apparatus in a second embodiment according to the present invention and shows the concrete processing flow of the sound source control means 13 in this embodiment.

[0037] First, on the basis of the information on the condition of the elevator obtained from the controller 5, the sound source control means 13 makes a determination as to whether or not it has been decided that the car 6 stops at the hall (S201). Incidentally, when the decision on the stop of the car 6 is not made in S201, the sound source control means 13 finishes the processing.

[0038] When in S201 the stop of the car 6 is decided, next, the sound source control means 13 makes a determination as to whether or not the human detection sensor 11 is detecting a user in the service floor (S202). When in S202 the human detection sensor 11 of the service floor is not detecting a user, the sound source control means 13 allows the arrival notification device 7 installed in the service floor to notify the arrival, and finishes the processing (S203). That is, immediately before the stop of the car 6 at the service floor or on other occasions, the controller 5 causes an arrival chime to be sounded or an operation announcement to be made from the arrival notification device 7 at a prescribed ordinary sound volume and at usual timing, and notifies the user on the service floor that the car 6 will arrive soon.

[0039] On the other hand, in the case where the human detection sensor 11 of the service floor is detecting a user in S202, the sound source control means 13 causes the notification of the arrival performed from the arrival notification device 7 of the service floor to be delayed from the above-described usual timing, and finishes the processing (S204). That is, after a prescribed delay time has elapsed since the above-described usual timing, the controller 5 causes an arrival chime to be sounded or an operation announcement to be made from the arrival notification device 7 of the service floor at a prescribed ordinary sound volume, and notifies the user that the car 6 will arrive soon.

[0040] Other configurations and the functions of the configurations are the same as in the first embodiment.

[0041] Also in the elevator apparatus having the above-described configuration, it is possible to produce the same effect as in the first embodiment. That is, even in the case where a user is performing voice input on the service floor for which the stop of the car 6 has been decided, the user can finish the voice input before the notification is made by the arrival notification device 7. For this reason, it is possible to positively prevent wrong recognition of voices from occurring due to sounds generated by the arrival notification device 7 and wrong calls from being registered.

[0042] In addition, in an elevator apparatus having the above-described configuration, the notification function of the arrival notification device 7 is not impaired and there is no danger of the convenience thereof decreasing.
Incidentally, in the case where the notification from the arrival notification device 7 is delayed, furthermore, the sound volume at which the notification is made may be reduced from the above-described ordinary sound volume.

Third embodiment

[0043] The sound source control means 13 in this embodiment has the function of temporarily changing the actions of the sound source device as required. Specifically, the sound source control means 13 outputs instructions for action to the controller 5 when the human detection sensor 11 of a hall is detecting a user upon arrival of the car 6 at the hall, and temporarily changes the actions of the sound source device so that the sound volume generated from the sound source device is lowered from sound level used at the time when the human detection sensor 11 is not detecting a user.

[0044] In the following, referring to Figure 4, a concrete description will be given of the actions of the elevator apparatus having the above-described configuration. Figure 4 is a flowchart showing the actions of the elevator apparatus in a third embodiment according to the present invention and shows the concrete processing flow of the sound source control means 13 in this embodiment.

[0045] First, on the basis of the information on the condition of the elevator obtained from the controller 5, the sound source control means 13 makes a determination as to whether or not it has been decided that the car 6 stops at the hall (S301). Incidentally, when the decision on the stop of the car 6 is not made in S301, the sound source control means 13 finishes the processing.

[0046] When in S301 the stop of the car 6 is decided, next, the sound source control means 13 makes a determination as to whether or not the human detection sensor 11 is detecting a user on the service floor (S302). When in S302 the human detection sensor 11 of the service floor is not detecting a user, the sound source control means 13 allows music and the like to be played from the BGM device 8 of the car 6, and finishes the processing (S303). That is, the controller 5 performs the ordinary control of the BGM device 8 also when the car 6 stops at the service floor, and for example, the controller 5 continues to cause music to be played at a prescribed sound volume also during the door opening time at the service floor.

[0047] On the other hand, in the case where in S302 the human detection sensor 11 of the service floor is detecting a user, the sound source control means 13 causes the actions of the BGM device 8 to be suspended temporarily, and finishes the processing (S304). For example, the controller 5 suspends the BGM device 8 only during a prescribed period of time until the departure of the car 6 from the service floor, thereby ensuring that the sounds from the BGM device 8 are not caught by the microphone 1 while the user is uttering voices to the microphone 1.

[0048] Other configurations and the functions of the configurations are the same as in the first embodiment.

[0049] Also in the elevator apparatus having the above-described configuration, it is possible to produce the same effect as in the first embodiment. That is, it is possible to positively prevent wrong recognition of voices from occurring due to sounds generated by the BGM device 8 upon arrival of the car 6 at the hall and wrong calls from being registered.

[0050] Incidentally, in this embodiment, the concrete description has been given of the case where only the BGM device 8 is installed in the car 6. In the case where any of the BGM device 8, the air conditioning apparatus 9 and the ventilator 10 or a combination of these is installed in the car 6 as the sound source device, it is possible to carry out the same processing as described above for the sound source device which is installed.

[0051] If it is possible to produce the above-described effect without reducing the sound volume generated from the sound source device to zero, it is unnecessary to stop the actions of the sound source device. In this case, in the case where the human detection sensor 11 of a hall is detecting a user, when the car 6 arrives at the hall, the sound source control means 13, for example, makes the sound volume of the BGM device 8 small or causes the air conditioning apparatus 9 and the ventilator 10 to operate at a low speed in order to lower the generated sound volume.

[0052] In the case where the arrival notification device 7 is installed in a hall, in addition to the above-described action to the sound source device, the actions described in the first or second embodiment may be carried out by the sound source control means 13. As a result of this, it is possible to appropriately control the sounds generated both on the hall side and on the car 6 side upon arrival of the car 6, making it possible to positively prevent wrong recognition of voices.

Fourth embodiment

[0053] The sound source control means 13 in this embodiment corresponds to an example in which in the sound source control means described in the first to third embodiments, the timing conditions for changing the actions of the arrival notification device 7 and the sound source device to special actions are further limited. Specifically, the sound source control means 13 changes the actions of the arrival notification device 7 and the sound source device from ordinary actions to special actions in the case where the human detection sensor 11 of a hall is detecting a user upon arrival of the car 6 at the hall only in the case where a prescribed period of time has not elapsed since the start of the detection of the user

by the human detection sensor 11.

[0054] In the following, referring to Figure 5, a concrete description will be given of the actions of the elevator apparatus having the above-described configuration. Figure 5 is a flowchart showing the actions of the elevator apparatus in a fourth embodiment according to the present invention and shows the concrete processing flow of the sound source control means 13 in this embodiment.

[0055] First, on the basis of the information on the condition of the elevator obtained from the controller 5, the sound source control means 13 makes a determination as to whether or not it has been decided that the car 6 stops at the hall (S401). Incidentally, when the decision on the stop of the car 6 is not made in S401, the sound source control means 13 finishes the processing.

[0056] When in S401 the stop of the car 6 is decided, next, the sound source control means 13 makes a determination as to whether or not the human detection sensor 11 is detecting a user on the service floor (S402). When in S402 the human detection sensor 11 of the service floor is not detecting a user, the sound source control means 13 allows the arrival notification device 7 installed in the service floor to notify the arrival, and finishes the processing (S403). That is, immediately before the stop of the car 6 at the service floor or on other occasions, the controller 5 causes an arrival chime to be sounded or an operation announcement to be made at a predetermined ordinary sound volume and at usual timing, and notifies the user on the service floor that the car 6 will arrive soon.

[0057] When in S402 the human detection sensor 11 of the service floor is detecting a user, next, the sound source control means 13 makes a determination of the duration time during which a user is being detected by the human detection sensor 11 of the service floor (S404). Specifically, the sound source control means 13 makes a determination as to whether or not a prescribed standard time has elapsed since the detection of a user by the human detection sensor 11 of the service floor. When the elapsed time after the start of the detection of the user exceeds the above-described standard time, the sound source control means 13 allows the arrival notification device 7 installed on the service floor to make the notification of the arrival, and finishes the processing (S403).

[0058] On the other hand, when in S404 the elapsed time after the start of the detection of the user does not exceed the above-described standard time, the sound source control means 13 causes the notification of the arrival made by the arrival notification device 7 installed on the service floor to be delayed from the above-described ordinary timing, and finishes the processing (S405). That is, after an elapse of a prescribed delay time from the above-described ordinary timing, the controller 5 causes an arrival chime to be sounded or an operation announcement to be made from the arrival notification device 7 of the service floor at a prescribed ordinary sound volume, and notifies the user that the car 6 will arrive soon.

[0059] Other configurations and the functions of the configurations are the same as in the first embodiment.

[0060] According to the first embodiment of the present invention, it is possible to prevent wrong recognition of voices from occurring by causing the notification from the arrival notification device 7 to be delayed only when the probability that a user is performing voice input from the microphone 1 is very high. For example, in the case where a user remains near the microphone 1 even after voice input, the notification from the arrival notification device 7 is made at ordinary timing. For this reason, it is possible to make the notification from the arrival notification device 7 at ordinary timing as far as possible, making it possible to prevent a decrease in convenience.

[0061] Incidentally, in this embodiment, the concrete description has been given of the case where the above-described function of the sound source control means 13 is applied to the configuration described in the second embodiment, i.e., the configuration in which the notification by the arrival notification device 7 is caused to be delayed. However, this shows only an example and it is needless to say that the above-described function of the sound source control means 13 can be applied also to the configurations described in the first and third embodiments.

Industrial Applicability

[0062] The elevator apparatus of the present invention can be applied to an elevator apparatus having the function of performing call registration through the use of the voice recognition technology.

Reference Signs List

[0063]

1	microphone
2	voice input means
3	voice recognition means
4	call registration means
5	controller
6	car
7	arrival notification device
8	BGM device
9	air conditioning apparatus
10	ventilator

11 human detection sensor

12 user detection means

13 sound source control means

Claims

1. An elevator apparatus comprising:

a microphone installed in a hall of an elevator;
a sensor for detecting a user present in a prescribed range in the vicinity of the microphone;
call registration means which performs call registration on the basis of a voice signal inputted from the microphone;
an arrival notification device installed in the hall which performs prescribed notification by sound when a car of the elevator arrives at the hall; and
sound source control means which lowers a sound volume used during the notification from the arrival notification device from a sound level used at the time when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

2. The elevator apparatus according to claim 1, wherein the sound source control means suspends the notification from the arrival notification device in the case where the sensor is detecting a user upon arrival of the car at the hall.

3. The elevator apparatus according to claim 1 or 2, wherein in the case where the sensor is detecting a user upon arrival of the car at the hall, the sound source control means lowers the sound volume used during the notification from the arrival notification device only when a prescribed period of time has not elapsed since the start of the detection of the user by the sensor.

4. An elevator apparatus comprising:

a microphone installed in a hall of an elevator;
a sensor for detecting a user present in a prescribed range in the vicinity of the microphone;
call registration means which performs call registration on the basis of a voice signal inputted from the microphone;
an arrival notification device installed in the hall which performs prescribed notification by sound when a car of the elevator arrives at the hall; and
sound source control means which causes the notification from the arrival notification device to be made later by a prescribed time than at the time when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

5. The elevator apparatus according to claim 4, wherein in the case where the sensor is detecting a user upon arrival of the car at the hall, the sound source control means causes the notification from the arrival notification device to be made later by a prescribed time only when a prescribed period of time has not elapsed since the start of the detection of the user by the sensor.

6. The elevator apparatus according to any of claims 1 to 5, further comprising:

a prescribed sound source device which is provided in the car and can become a sound generation source,
wherein in the case where the sensor is detecting a user upon arrival of the car at the hall, the sound source control means causes an action of the sound source device to be changed temporarily so that a sound volume generated from the sound source device decreases from a level used when the sensor is not detecting a user.

7. An elevator apparatus comprising:

a microphone installed in a hall of an elevator;
a sensor for detecting a user present in a prescribed range in the vicinity of the microphone;
call registration means which performs call registration on the basis of a voice signal inputted from the microphone;
a prescribed sound source device which is provided in a car of the elevator and can become a sound generation source; and
sound source control means which causes an action of the sound source device to be changed temporarily so that a sound volume generated from the sound source device decreases from a level used when the sensor is not detecting a user in the case where the sensor is detecting a user upon arrival of the car at the hall.

8. The elevator apparatus according to claim 7, wherein in the case where the sensor is detecting a user upon arrival of the car at the hall, the sound source control means causes an action of the sound source device to be suspended temporarily.

9. The elevator apparatus according to claim 7 or 8, wherein in the case where the sensor is detecting a user upon arrival of the car at the hall, the sound source control means temporarily changes the action of the sound source device only when a prescribed period of time has not elapsed since the start of the detection of the user by the sensor.

10. The elevator apparatus according to any of claims 7 to 9, wherein the sound source device is at least any one of a BGM device, an air conditioning apparatus, and a ventilator which are provided in the car.

Fig. 1

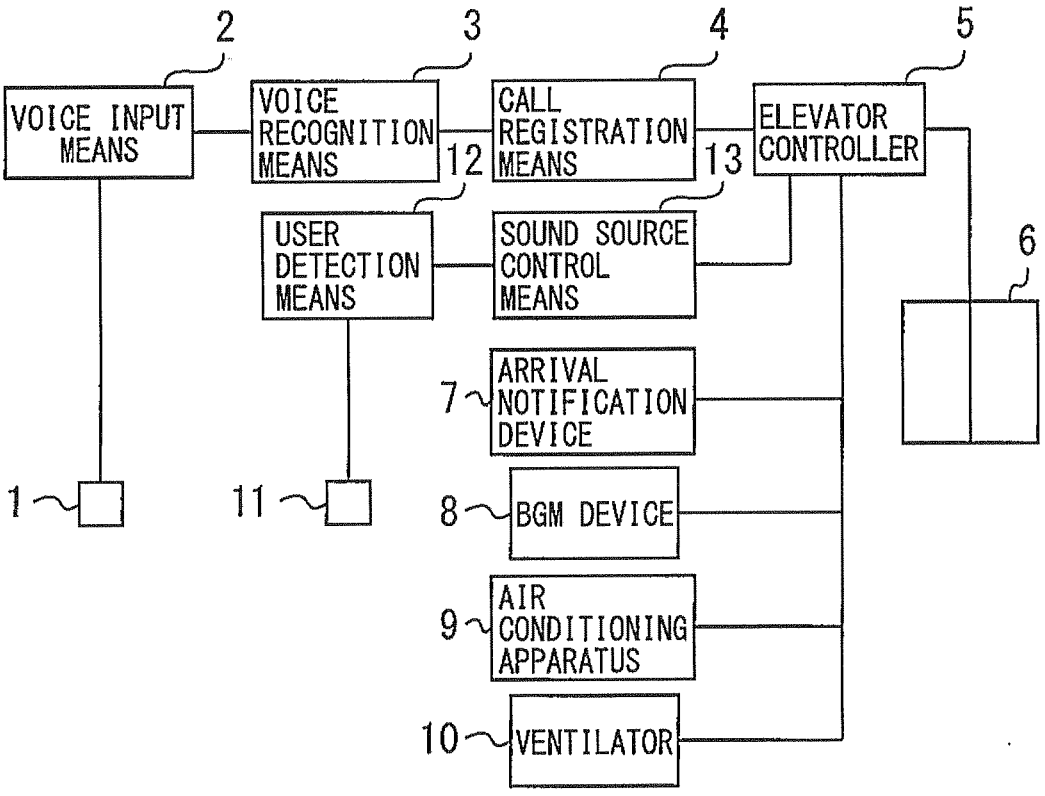

2
3
4
5
VOICE INPUT MEANS
VOICE RECOGNITION MEANS
CALL REGISTRATION MEANS
ELEVATOR CONTROLLER
12
13
USER DETECTION MEANS
SOUND SOURCE CONTROL MEANS
6
7
ARRIVAL NOTIFICATION DEVICE
1
11
8
BGM DEVICE
9
AIR CONDITIONING APPARATUS
10
VENTILATOR

Fig. 2

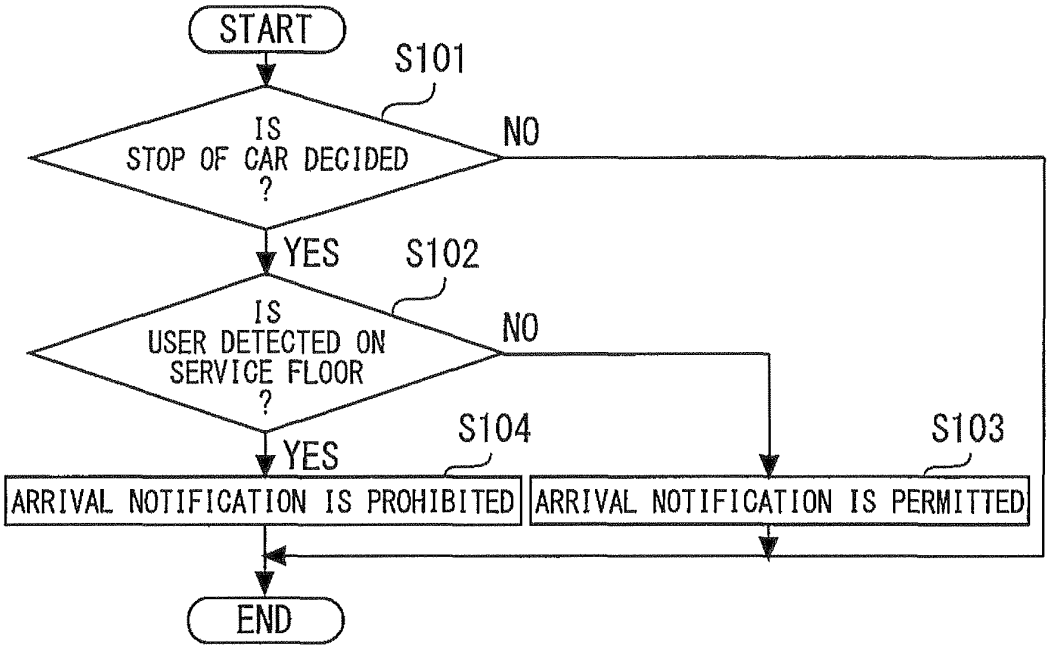

START
S101
IS STOP OF CAR DECIDED ?
NO
YES
S102
IS USER DETECTED ON SERVICE FLOOR ?
NO
YES
S104
S103
ARRIVAL NOTIFICATION IS PROHIBITED
ARRIVAL NOTIFICATION IS PERMITTED
END

Fig. 3

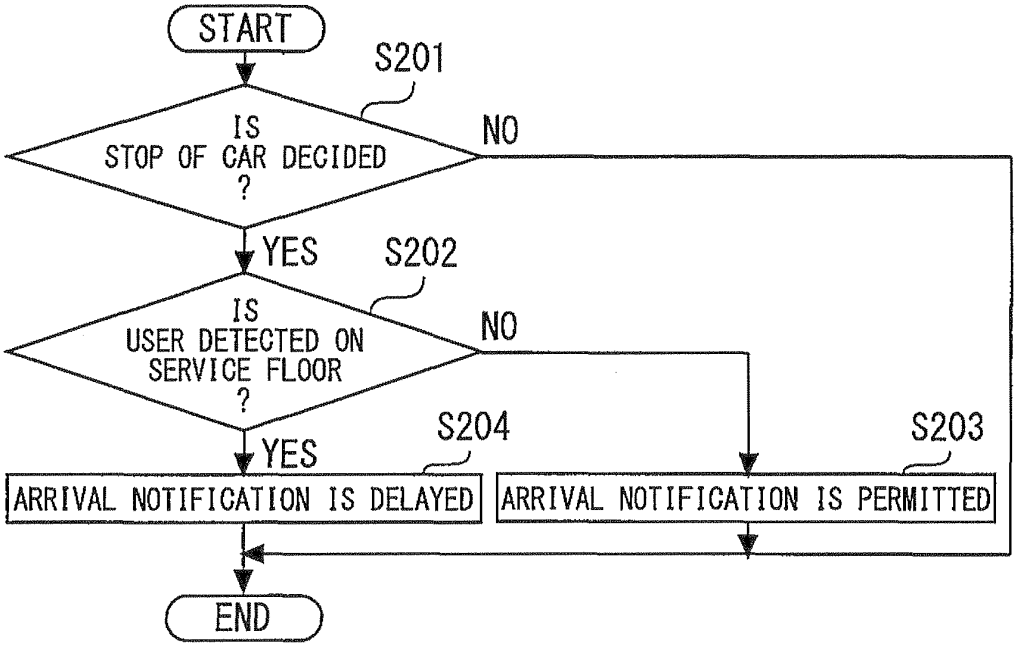

START
S201
IS STOP OF CAR DECIDED ?
NO
YES
S202
IS USER DETECTED ON SERVICE FLOOR ?
NO
YES
S204
S203
ARRIVAL NOTIFICATION IS DELAYED
ARRIVAL NOTIFICATION IS PERMITTED
END

Fig. 4

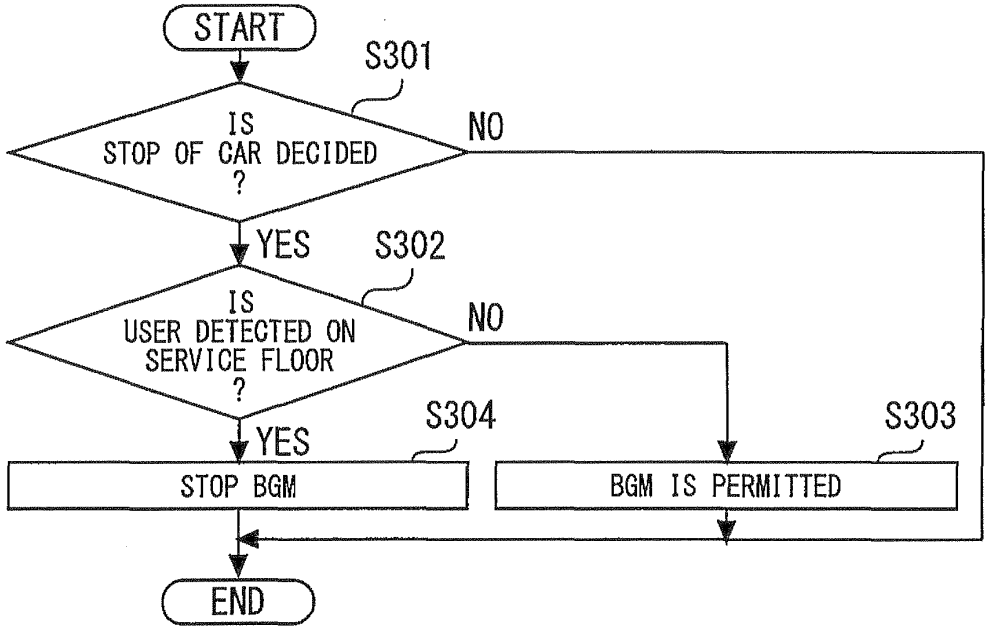
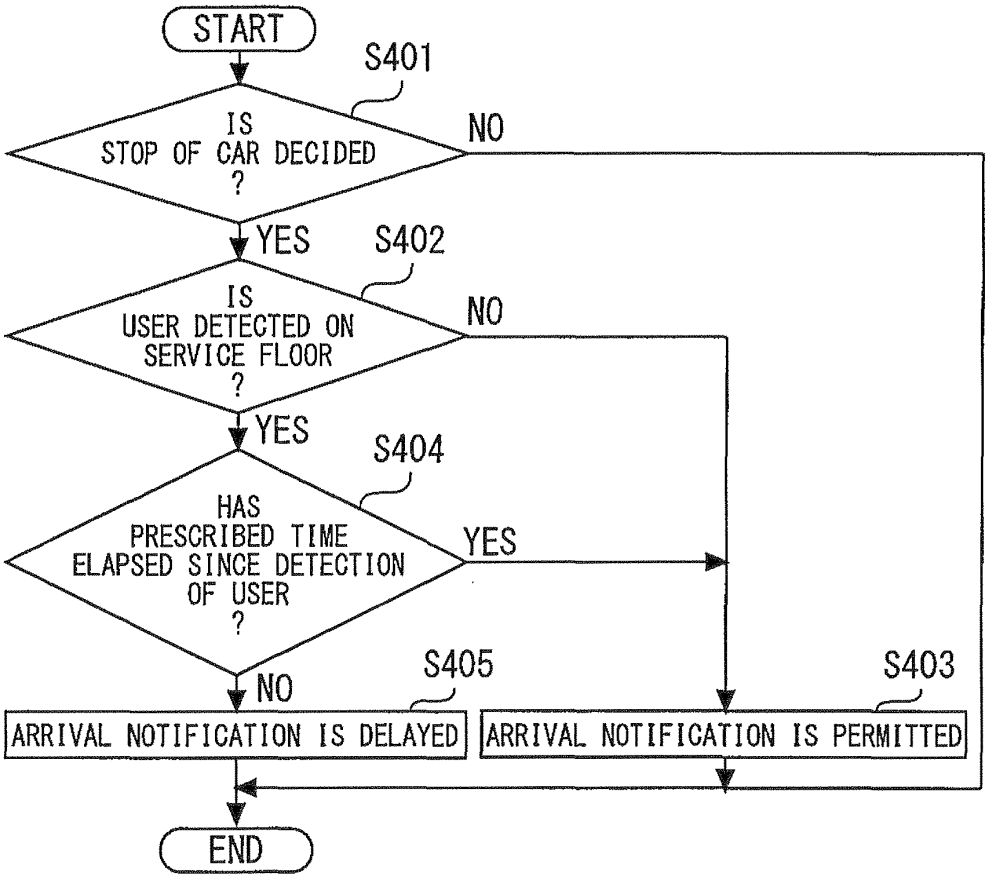

START
S301
IS STOP OF CAR DECIDED ?
NO
YES
S302
IS USER DETECTED ON SERVICE FLOOR ?
NO
YES
S304
S303
STOP BGM
BGM IS PERMITTED
END

Fig. 5


START
S401
IS STOP OF CAR DECIDED ?
NO
YES
S402
IS USER DETECTED ON SERVICE FLOOR ?
NO
YES
S404
HAS PRESCRIBED TIME ELAPSED SINCE DETECTION OF USER ?
YES
NO
S405
S403
ARRIVAL NOTIFICATION IS DELAYED
ARRIVAL NOTIFICATION IS PERMITTED
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/055358

A. CLASSIFICATION OF SUBJECT MATTER
B66B3/00(2006.01)i, *B66B1/14*(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, B66B1/14

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 A	JP 05-40053 Y2 (Hitachi Building Systems & Service Engineering Ltd.), 12 October 1993 (12.10.1993), entire text; all drawings (Family: none)	1-3,7-10 4-6
Y A	JP 62-79187 A (Toshiba Corp.), 11 April 1987 (11.04.1987), claim 1 (Family: none)	1-3,7-10 4-6
Y A	JP 2009-517305 A (Otis Elevator Co.), 30 April 2009 (30.04.2009), paragraphs [0016], [0019] to [0020]; fig. 1 to 2 & US 2009/0290726 A1 & WO 2007/064319 A1	1-3,7-10 4-6

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 September, 2010 (02.09.10)	14 September, 2010 (14.09.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/055358

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 04-75992 A (Mitsubishi Electric Corp.), 10 March 1992 (10.03.1992), claim 1 (Family: none)	1-3,7-10 4-6
Y A	JP 10-279207 A (Mitsubishi Electric Corp.), 20 October 1998 (20.10.1998), paragraphs [0041] to [0043] (Family: none)	1-3,7-10 4-6
Y A	JP 63-3319 Y2 (Toyota Motor Corp.), 27 January 1988 (27.01.1988), entire text; all drawings (Family: none)	1-3,7-10 4-6
Y A	JP 2001-154694 A (Matsushita Electric Industrial Co., Ltd.), 08 June 2001 (08.06.2001), paragraphs [0035] to [0040]; fig. 5 & EP 1085500 A3 & DE 60032982 D & CN 1298173 A	1-3,7-10 4-6
Y A	JP 59-92875 A (Hitachi, Ltd.), 29 May 1984 (29.05.1984), entire text; all drawings (Family: none)	7-10 4-6
A	JP 2647207 B2 (Toshiba Corp.), 09 May 1997 (09.05.1997), claim 1 (Family: none)	1-10

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2557939 B **[0006]**
- JP 2647207 B **[0006]**