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(54) ELEVATOR DEVICE

(57) There is provided an elevator system capable of operating an elevator so that users having various attributes can use the elevator easily. For this purpose, the elevator system is configured so as to include input means provided in a car or a hall of an elevator, notification means provided in the hall to notify an elevator user of a usage method of the input means for operating the elevator according to an attribute of the elevator user and control means for changing a operation of the elevator according to a usage result of the input means.

FIG. 1

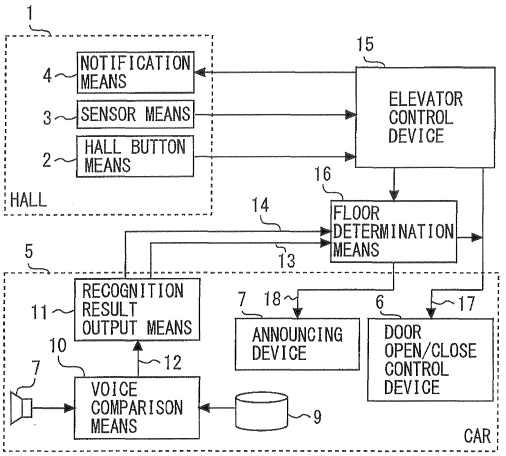

FIG. 2

REGISTERED VOICE SIGNAL ID	FIRST REGISTERED VOICE SIGNAL AND SECOND REGISTERED VOICE SIGNAL
0x01	1ST FLOOR
0x02	2ND FLOOR
...	...
0x10	16TH FLOOR
...	...
0x3F	63RD FLOOR
0x81	UNIVERSAL 1ST FLOOR
0x82	UNIVERSAL 2ND FLOOR
...	...
0x90	UNIVERSAL 16TH FLOOR
...	...
0xBF	UNIVERSAL 63RD FLOOR

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Description

Technical Field

[0001] The present invention relates to an elevator system.

Background Art

[0002] Elevators are used by users having various attributes. Therefore, as a call registering device for, for example, visually disabled users, a portable call registering device has been proposed (for example, refer to Patent Literature 1).

[0003] According to this call registering device, a visually disabled user can register a call in an elevator hall or in an elevator car by utilizing radio signals. At this time, the visually disabled user can check whether or not the registered call corresponds to his/her destination floor by utilizing an announcement or the sounds or vibrations generated from the call registering device itself.

[0004] Unfortunately, for the call registering device described in Patent Literature 1, the visually disabled user must carry the call registering device always when he/she uses an elevator. Also, when using a call registering device first, or when having lost the call registering device, the visually disabled user must make an application for usage.

[0005] In contrast to this, there has been proposed a call registering device for registering a service floor by voice recognition by operating a call registration button in a hall by using a preset procedure. According to this device, the visually disabled user can register a service floor without carrying the call registering device or without making an application for usage (for example, refer to Patent Literature 2).

Citation List

Patent Literature

[0006]

Patent Literature 1: Japanese Patent No. 3394368
Patent Literature 2: Japanese Patent Laid-Open No. 2006-327739

Summary of Invention

Technical Problem

[0007] For the call registering device described in Patent Literature 2, the call registration button in a hall must be operated by using the preset procedure. Therefore, it is difficult especially for a visually disabled user to register a service floor.

[0008] The present invention has been made to solve the above-described problem, and accordingly an object thereof is to provide an elevator system capable of operating an elevator so that users having various attributes can use the elevator easily.

Means for Solving the Problems

[0009] An elevator system of the present invention includes input means provided in a car or a hall of an elevator, notification means provided in the hall to notify an elevator user of a usage method of the input means for operating the elevator according to an attribute of the elevator user and control means for changing a operation of the elevator according to a usage result of the input means.

Advantageous Effect of Invention

[0010] According to the present invention, an elevator can be operated so as to be used easily by users having various attributes.

Brief Description of the Drawings

[0011]

Figure 1 is a block diagram of an elevator system in accordance with a first embodiment of the present invention.
Figure 2 is a chart for explaining the specific examples of the registered voice signal ID and registered voice signal used in the elevator system in accordance with the first embodiment of the present invention.

Description of Embodiment

[0012] An embodiment for carrying out 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

[0013] Figure 1 is a block diagram of an elevator system in accordance with a first embodiment of the present invention.
In Figure 1, reference sign 1 denotes a hall of an elevator. The hall 1 is provided at each floor of a building in which the elevator is installed. In each hall 1, a hall button means 2, a sensor means 3, and a notification means 4 are provided.

[0014] The hall button means 2 includes a button (not shown) corresponding to the rising direction and a button (not shown) corresponding to the lowering direction. The button corresponding to the rising direction functions, when being pushed, as an input means for registering a

hall call toward the rising direction to that hall 1. The button corresponding to the lowering direction functions, when being pushed, as an input means for registering a hall call toward the lowering direction to that hall 1.

[0015] The sensor means 3 includes a sensor (not shown) corresponding to the rising direction and a sensor (not shown) corresponding to the lowering direction. The sensor corresponding to the rising direction functions as an input means for registering a hall call in the rising direction to that hall 1 when an object gets close to a detection range (for example, 1m). The sensor corresponding to the lowering direction functions as an input means for registering a hall call in the lowering direction to that hall 1 when an object gets close to a detection range (for example, 1m).

[0016] The notification means 4 has a function of notifying the user of guides. The notification means 4 consists of, for example, an announcing device. In this case, the notification means 4 notifies the user of guides by means of voice. The notification means 4 may be an indication device such as a liquid crystal display. In this case, the notification means 4 notifies the user of guides by displaying a message image and the like.

[0017] Reference sign 5 denotes a car of the elevator. The car 5 is disposed in a shaft (not shown) of the elevator. The car 5 is provided with an indicator (not shown), a door open/close control device 6, an announcing device 7, a microphone 8, a storage means 9, a voice comparison means 10, and a recognition result output means 11.

[0018] The indicator has a function of indicating which floor the car 5 is running through. The door open/close control device 6 has a function of controlling the opening and closing of an elevator door. The announcing device 7 has a function of notifying the users of guides by means of voice. The microphone 8 is provided with an analog/digital (A/D) converter. The A/D converter functions as an input means for converting the voice in the car 5 into a digital signal. The storage means 9 has a function of storing a registered voice signal ID and a registered voice signal so as to correspond to each other.

[0019] The voice comparison means 10 has a function of determining whether or not the digital signal converted by the microphone 8 coincides with the registered voice signal stored in the storage means 9. When the digital signal coincides with the registered voice signal, the voice comparison means 10 has a function of delivering the registered voice signal ID caused to correspond to the coinciding registered voice signal.

[0020] The recognition result output means 11 has a function of reading floor information and user ID information from the registered voice signal ID sent from the voice comparison means 10 via a signal line 12. The recognition result output means 11 has a function of delivering the floor information and the user ID information that have been read.

[0021] Reference sign 15 denotes an elevator control device. The control device 15 is provided in a machine room (not shown) of the elevator. The control device 15 has a function of grasping the hall call registered by the hall button means 2 or the sensor means 3. The control device 15 has a function of registering the service floor based on the floor information delivered from the voice comparison means 10. The control device 15 has a function of controlling the door open/close control device 6 when the car 5 arrives at the hall 1.

[0022] Between the control device 15 and the announcing device 7, a floor determination means 16 is connected. The floor determination means 16 has a function of always receiving car position information from the control device 15 as information indicating which floor the car is running through. The floor determination means 16 has a function of receiving, via signal lines 13 and 14, the floor information and the user ID information that are delivered from the voice comparison means 10.

[0023] The floor determination means 16 has a function of determining whether or not the car position information coincides with the floor information. When the car position information coincides with the floor information, the floor determination means 16 has a function of delivering a control instruction signal to the door open/close control device 6 via a signal line 17 according to the user ID information, and also delivering the floor information and the control instruction signal to the announcing device 7 via a signal line 18 according to the user ID information.

[0024] In the elevator system configured as described above, the door open/close control device 6 controls the open/close speed and the door open continuation time of the elevator door based on the control instruction signal. The announcing device 7 determines notification contents based on the floor information and the control instruction signal.

[0025] Next, with reference to Figure 2, specific examples of the registered voice signal ID and the registered voice signal stored in the storage means 9 are explained. Figure 2 is a chart for explaining the specific examples of the registered voice signal ID and registered voice signal used in the elevator system in accordance with the first embodiment of the present invention.

[0026] The registered voice signal is divided into a first registered voice signal and a second registered voice signal. The first registered voice signal consists of only a floor name, such as the "first floor" and "second floor". The second registered voice signal consists of a combination of a keyword and a floor, such as the "universal first floor" and "universal second floor". The registered voice signal ID is caused to correspond to these registered voice signals one-to-one.

[0027] The registered voice signal ID consists of 8-bit data. The most significant one bit of the registered voice signal ID indicates the user ID information. The user ID information indicates the presence or absence of keyword. Specifically, "0" of the most significant one bit indicates that a keyword is absent. "1" of the most significant one bit indicates that a keyword is present. The seven bits other than the most significant bit of the registered

voice signal ID indicate the floor information.

[0028] For example, to the "first floor" of the first registered voice information, 0 × 01 (00000001) is caused to correspond. To the "universal second floor" of the second registered voice information, 0 × 82 (10000010) is caused to correspond.

[0029] Next, with reference to Figure 1 again, how to use the elevator is explained. The notification means 4 notifies the user of the usage method for operating the elevator according to the elevator user's attribute upon the instruction given from the control device 15.

[0030] For example, the notification means 4 notifies the user of the positions of the hall button means 2 and the sensor means 3. The notification means 4 notifies the user that the hall call in the rising direction can be registered if the button corresponding to the rising direction is depressed. The notification means 4 notifies the user that the hall call in the lowering direction can be registered if the button corresponding to the lowering direction is depressed.

[0031] The notification means 4 notifies the user that the hall call in the rising direction can be registered if the user's hand or the like is held in front of the sensor corresponding to the rising direction. The notification means 4 notifies the user that the hall call in the lowering direction can be registered if the user's hand or the like is held in front of the sensor corresponding to the lowering direction.

[0032] The notification means 4 notifies the user that the service floor is registered automatically, and the door opening and closing are performed usually at the service floor when the user gets off the car 5 if the user voices only the floor to which the user wants to go after he/she has gotten in the car 5. The notification means 4 notifies the user that the service floor is registered automatically, the door opening and closing at the service floor are performed at a speed lower than usual, and the door open continuation time becomes longer than usual if the user voices the floor to which the user wants to go following universal after he/she has gotten in the car 5.

[0033] The user has only to perform an action such as to depress the button of the rising direction or the lowering direction lying on the hall button means 2 or to hold his/her hand or the like in front of the sensor indicating the rising direction or the lowering direction lying on the sensor means 3 in accordance with the notification contents of the notification means 4.

[0034] For example, a visually disabled user has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body or baggage in front of the sensor in accordance with the guidance contents of the position of the sensor means 3. A wheel chaired user has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body or baggage in front of the sensor without getting close to the distance at which the user's hand reaches the hall button means 2. A user pushing a baby buggy has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body or baggage in front of the sensor without removing his/her hand from the baby buggy.

[0035] An aged user using a rollator or a walking stick has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body or baggage in front of the sensor without removing his/her hand from the rollator or the walking stick. A user carrying big baggage has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body or baggage in front of the sensor without removing his/her hand from the baggage. A user careful about hygiene has only to get close to the detection range of the sensor means 3 and to hold a part of his/her body in front of the sensor.

[0036] When these operations are performed, the information of that hall call is sent to the control device 15. The control device 15 causes the notification means 4 to notify the user of the registered direction (the rising direction or the lowering direction) of the hall call. At the same time, the control device 15 runs the car 5 toward that hall 1 in response to that hall call.

[0037] In the case where the information of that hall call is one sent from the sensor means 3, when the car 5 arrives at the floor on which that sensor means 3 is installed, the control device 15 delivers a control instruction signal to the door open/close control device 6. Based on this control instruction signal, the door open/close control device 6 opens the elevator door at a speed lower than usual, and closes the door at a speed lower than usual after the door has been held in a door opening state for a time period longer than usual. The user has only to get in the car 5 before the door is closed.

[0038] Thereafter, the user having gotten in the car 5 has only to utter a voice in accordance with the notification contents of the notification means 4. The uttered voice is converted into a digital signal by the microphone 8. That digital signal is delivered to the voice comparison means 10. The voice comparison means 10 determines whether or not the digital signal coincides with the registered voice signal. If coinciding, the voice comparison means 10 delivers the registered voice signal ID corresponding to that registered voice signal to the recognition result output means 11.

[0039] For example, when the user utters a voice of "first floor", 0 × 01 is delivered as the registered voice signal ID. On the other hand, when the user utters a voice of "universal second floor", 0 × 82 is delivered as the registered voice signal ID.

[0040] The recognition result output means 11 delivers the floor information and the user ID information, which have been read from the value of the registered voice signal ID, to the floor determination means 16. Specifically, when the value of the most significant one bit of the registered voice signal ID is "0", the recognition result output means 11 delivers "0" as the user ID information. On the other hand, when the value of the most significant one bit of the registered voice signal ID is "1", the recog-

nition result output means 11 delivers "1" as the user ID information. The recognition result output means 11 delivers values indicated by the remaining seven bits as the floor information.

[0041] When the user ID information is "I ", the floor determination means 16 delivers the control instruction signal and the floor information to the announcing device 7. When the user ID information is "1", the floor determination means 16 delivers the control instruction signal to the door open/close control device 6.

[0042] On receipt of the control instruction signal and the floor information, the announcing device 7 notifies the user of the floor name by means of voice just before the car 5 arrives at the floor corresponding to the floor information. On receipt of the control instruction signal, the door open/close control device 6 opens the door at a speed lower than usual when the car 5 arrives at the floor corresponding to the floor information, and closes the door at a speed lower than usual after the door has been held in a door opening state for a time period longer than usual. The user has only to get off the car 5 before the door is closed.

[0043] According to the first embodiment described above, the usage methods of the hall button means 2, the sensor means 3, the microphone 8, and the like are guided. In this case, the user has only to use the hall button means 2, the sensor means 3, the microphone 8, and the like in accordance with the guide. As the result, according to the usage results of the hall button means 2, the sensor means 3, the microphone 8, and the like, the operation of the elevator is changed. Therefore, the elevator can be operated so as to be used easily by the users having various attributes.

[0044] For example, the user is notified of the position of the sensor means 3 and of that if the user gets close to the sensor means 3, the hall call can be registered. Therefore, a visually disabled user need not grope for the hall button means 2 and the like. Also, the safety and comfort of a wheelchaired user, a user pushing a baby buggy, an aged user using a rollator or a walking stick, a user carrying big baggage can be improved. Also, to a user careful about hygiene, an elevator capable of being used cleanly without touching the hall button means 2 can be offered.

[0045] Also, only in the case where the hall call is registered by using the sensor means 3 or in the case where the voice input result at the microphone 8 corresponds to the attribute of the user who takes much time for getting on and off the car 5, when the car 5 arrives at the service floor of the user, the open/close speed of elevator door becomes low, and the door open continuation time of elevator is prolonged. Therefore, the safety and comfort of a user having a disabled part of body, an injured user, a user carrying big baggage such as a bicycle or furniture, and the like can be improved while the influence on the elevator operation efficiency is reduced.

[0046] Also, in the case where the registration result of service floor corresponds to the attribute of the user who takes much time for getting on and off the car 5, just before the car 5 arrives at that service floor, the announcing device 7 notifies the user of the arrival floor. Therefore, even a visually disabled user who is difficult to see the indicator or a wheelchaired user who is boarding the car 5 with his/her back to the indicator can begin to prepare beforehand for getting off.

[0047] In the first embodiment, the microphone 8, the storage means 9, the voice comparison means 10, and the recognition result output means 11 are provided in the car 5. However, the microphone 8, the storage means 9, the voice comparison means 10, and the recognition result output means 11 may be provided in the hall 1. In this case as well, the same effect as that of the first embodiment can be achieved.

[0048] In this case, the sensor means 3 is unnecessary. That is, based on the floor on which the microphone 8 is provided and the service floor recognized from the voice uttered by the user, the control device 15 has only to determine the direction of the hall call, and to deliver the control instruction signal to the door open/close control device 6.

[0049] For example, in the case where the user utters a voice of universal fifth floor toward the microphone 8 on the first floor, the service floor is above the floor on which the user is present. In this case, the hall call in the rising direction has only to be registered (the button of the rising direction lights up) in the hall button means 2 on the first floor. The configuration has only to be made such that, thereafter, when the elevator going in the rising direction arrives at the first floor, the door is opened at a speed lower than usual, and after the door has been held in a door opening state for a time period longer than usual, the door is closed at a speed lower than usual. Thereafter, when the car 5 begins to go up, the service floor (the fifth floor in the above-described specific example) has only to be registered automatically. When the user gets off the car 5, the same operation as that in the first embodiment has only to be performed.

[0050] Also, in the first embodiment, explanation has been given of the case where the user utters a voice consisting of a combination of the keyword and the floor. However, even if the user utters voices of keyword and floor separately, the same effect can be achieved. In this case, the storage means 9 has only to beforehand prepare the registered voice signal and the registered voice signal ID that correspond to the keyword only.

[0051] Specifically, the user has only to voice a keyword only. Thereby, the voice comparison means 10 is caused to recognize the keyword. Thereafter, the user has only to voice a service floor such as the sixteenth floor. In this case, the voice comparison means 10 has only to deliver 0×90, which corresponds to universal sixteenth floor, as the registered voice signal ID in accordance with the correspondence shown in Figure 2.

Industrial Applicability

[0052] As described above, the elevator system in accordance with the present invention can be used for an elevator that is easily used by users having various attributes.

Description of symbols

[0053]

1 hall
2 hall button means
3 sensor means
4 notification means
5 car
6 door open/close control device
7 announcing device
8 microphone
9 storage means
10 voice comparison means
11 recognition result output means
12-14 signal line
15 control device
16 floor determination means
17, 18 signal line

Claims

1. An elevator system comprising:

input means provided in a car or a hall of an elevator;
notification means provided in the hall to notify an elevator user of a usage method of the input means for operating the elevator according to an attribute of the elevator user; and
control means for changing a operation of the elevator according to the usage result of the input means.

2. The elevator system according to claim 1, wherein
the elevator system further comprises sensor means which is provided in the hall and registers a hall call corresponding to the hall when an object gets close to the sensor means, and
the notification means notifies the user of a position of the sensor means and of that a hall call corresponding to the hall can be registered if an object gets close to the sensor means.

3. The elevator system according to claim 1 or 2, wherein in the case where the usage result corresponds to a attribute of an user requiring much time for getting on and off the car, when the car arrives at a service floor of the user, the control means makes an open/close speed of a door of the elevator low, and also prolongs the door open continuation time of the elevator.

4. The elevator system according to any one of claims 1 to 3, wherein
the elevator system further comprises an announcing device provided in the car,
the notification means notifies a user of a registration method of service floor according to the user requiring much time for getting on and off the car, and
in the case where a registration result of the service floor corresponds to a attribute of the user requiring much time for getting on and off the car, when the car arrives at the service floor, the control means causes the announcing device to notify the user of the arrival floor.

FIG. 1

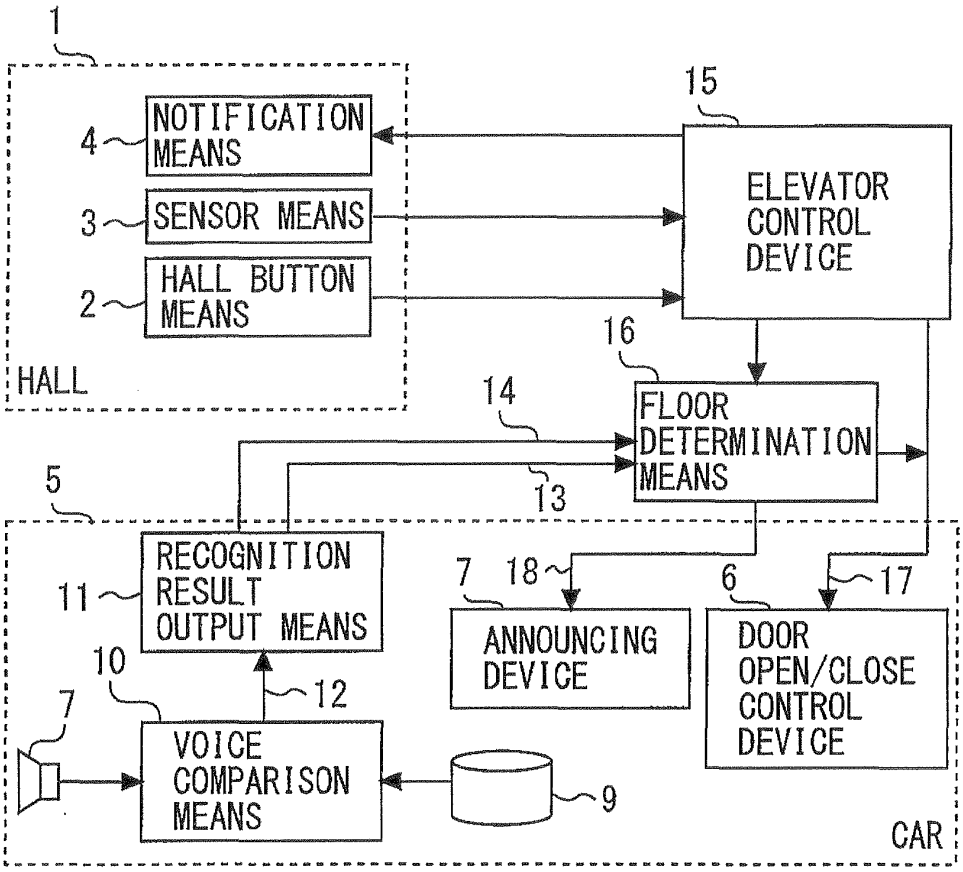

FIG. 2

REGISTERED VOICE SIGNAL ID	FIRST REGISTERED VOICE SIGNAL AND SECOND REGISTERED VOICE SIGNAL
0x01	1ST FLOOR
0x02	2ND FLOOR
...	...
0x10	16TH FLOOR
...	...
0x3F	63RD FLOOR
0x81	UNIVERSAL 1ST FLOOR
0x82	UNIVERSAL 2ND FLOOR
...	...
0x90	UNIVERSAL 16TH FLOOR
...	...
0xBF	UNIVERSAL 63RD FLOOR

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/051434

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.
X Y	JP 7-285749 A (Hitachi Building Systems & Service Engineering Ltd.), 31 October 1995 (31.10.1995), paragraphs [0016] to [0022] (Family: none)	1 2-4
Y	JP 2-255487 A (Mitsubishi Electric Corp.), 16 October 1990 (16.10.1990), page 3, upper left column, line 4 to upper right column, line 4 (Family: none)	2-3
Y	JP 2006-137560 A (Mitsubishi Electric Corp.), 01 June 2006 (01.06.2006), paragraphs [0010] to [0011] (Family: none)	2

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 April, 2011 (11.04.11)	19 April, 2011 (19.04.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/051434

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 1-98583 A (Mitsubishi Electric Corp.), 17 April 1989 (17.04.1989), page 3, upper left column, line 3 to lower left column, line 18; fig. 1 to 2 (Family: none)	4

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/051434

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The invention in claim 1 cannot be considered to have a special technical feature, since the invention does not make a contribution over the prior art in the light of the contents disclosed in JP 7-285749 A.

Consequently, any same or corresponding special technical feature cannot be found between the invention in claim 1 and the inventions in claims 2 - 4.

In conclusion, the invention in claim 1 and the inventions in claims 2 - 4 are not relevant to a group of inventions that comply with the requirement of unity of invention.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3394368 B **[0006]**
- JP 2006327739 A **[0006]**