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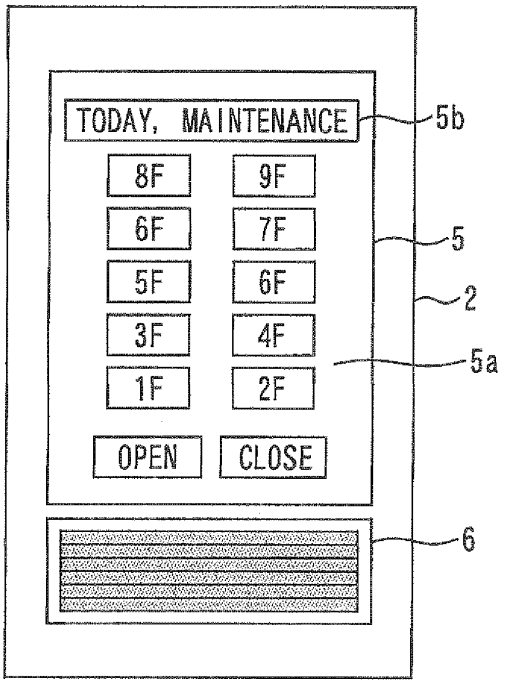
(54) **DESTINATION FLOOR REGISTRATION DEVICE FOR ELEVATOR**

(57) There is provided a destination floor registration device of an elevator, in which a visually disabled person is assisted in searching for the target operation button on a touch panel, and thereby the operability is improved. For this purpose, the destination floor registration device of an elevator includes a touch panel provided on the front of an operating panel; a Braille display capable of indicating arbitrary Braille characters, which is arranged separately from the touch panel so as not to lap over the touch panel as viewed from the front of the operating panel; a storage section which stores in advance screen arrangement information on the arrangement of the operation buttons displayed on the screen of the touch panel; a screen information preparation section which prepares, based on touch coordinates by the touch operation onto the touch panel and the screen arrangement information stored in the storage section, information on the indication contents on the periphery of the touch coordinates, and on the distance from the touch coordinates to the indication contents; and a Braille display control device which causes the prepared information to be displayed in Braille on the Braille display.

FIG. 2



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Description

Technical Field

[0001] The present invention relates to a destination floor registration device of an elevator.

Background Art

[0002] Conventionally, as a destination floor registration device of an elevator for offering arbitrary floor information and destination floor information in Braille or the like by using a Braille display, there has been known a destination floor registration device that includes an operating panel having touch-panel operation buttons, a display cover arranged on the indication of a panel display constituted by a touch panel of the operating panel, and a sheet-shaped Braille display that is provided integrally with or separately from the display cover and arbitrarily enables Braille notation, and is configured so that when the Braille display or the display cover near the Braille display is depressed by pressing the Braille display or the display cover, the touch panel is operated (for example, refer to Patent Literature 1).

[0003] Also, conventionally, as a destination floor registration device of an elevator for allowing a visually disabled person difficult to understand Braille characters to operate buttons on an operating panel (destination floor registration device) of an elevator without anxiety, there has been known a destination floor registration device in which sign parts expressing the indication contents of operation buttons in Braille are provided for the operation buttons on the operating panel of the elevator, and the indication contents of a touched sign part are told by means of voice by using a loudspeaker (for example, refer to Patent Literature 2).

[0004] As a Braille display arbitrarily enabling Braille notation, in addition to the sheet-shaped Braille display described in Patent Literature 1, there has conventionally been known a Braille display including a main body having a display surface in which holes are arranged in a lattice shape and projection part expression rods provided concentrically and insertably in the respective holes in the display surface (for example, refer to Patent Literature 3). In the Braille display described in Patent Literature 3, the projection part expression rod is moved back and forth by using a coil or the like: the tip of the projection part expression rod is projected slightly from the hole in the display surface to represent a projection part, and the tip of the projection part expression rod is retracted so as to be flush with the display surface to represent a plane. By selectively executing projection representation and plane representation by using the plurality of projection part expression rods, an arbitrary Braille character is represented.

Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Patent Laid-Open No. 2007-314300
Patent Literature 2: Japanese Patent Laid-Open No. 2004-269196
Patent Literature 2: Japanese Patent Laid-Open No. 05-019680

Summary of Invention

Technical Problem

[0006] Unfortunately, in the conventional destination floor registration device of an elevator described in Patent Literature 1, the Braille display is arranged on the indication of the panel display, and this Braille display incorporates a flexible printed circuit board. Therefore, the place at which the Braille display is arranged is invisible because the indication of the touch panel is obstructed by the flexible printed circuit board. For this reason, the Braille display cannot be arranged on the whole of the touch panel, and therefore, on the touch panel, there occur a location in which the Braille display is arranged and a location in which the Braille display is not arranged.

[0007] In the above-described configuration, when the contents displayed on the touch panel are changed, the contents must be changed considering the arrangement of the Braille display (so as to avoid the location in which the Braille display is arranged), so that there arises a problem that the degree of freedom of layout of the contents displayed on the touch panel becomes low. Alternately, it is thought that the arrangement of the Braille display is changed so as to match the changed contents. In this case, however, there arises a problem that the change of the arrangement of Braille display that is made each time the contents are changed is very troublesome and requires much time and labor.

[0008] Also, in the conventional destination floor registration device of an elevator described in Patent Literature 2, when the sign part provided adjacent to each of the operation buttons is touched, the information of that operation button is offered by means of voice. That is, only the information on the operation button of the place, which is being touched at present, is offered by means of voice. Therefore, there arises a problem that when an area in which the operation button is absent is touched, the information of that place cannot be obtained. Also, there arises a problem that when a user touches a place that is not the target operation button, the user cannot obtain the information on the place at which the target operation button is present.

[0009] Further, in either of the conventional destination floor registration devices of an elevator described in the

above-described Patent Literatures, the visually disabled person cannot know the destination floor of the already registered call, so that there arises a problem that even when the call to the target destination floor has already been registered, there exists a trouble in that a call registering operation must be performed again.

[0010] The present invention has been made to solve the above problems, and accordingly a first object thereof is to provide a destination floor registration device of an elevator, in which on an operating panel provided with both of a touch panel and a Braille display, a change of contents displayed on the touch panel can be accommodated flexibly without impairing the degree of freedom of indication layout on the touch panel.

[0011] Also, a second object of the present invention is to provide a destination floor registration device of an elevator, in which when a user who is a visually disabled person touches a place that is not the target operation button on the touch panel, by offering the information on the periphery of the place, which is being touched at present, to the user, the user can be assisted in searching for the target operation button, and thereby the operability can be improved.

Means for Solving the Problems

[0012] A destination floor registration device of an elevator according to the present invention, which is connected to an elevator control device and is provided with an operating panel having touch-panel operation buttons, comprises: a touch panel provided on the front of the operating panel; a Braille display capable of indicating arbitrary Braille characters, which is provided on the front of the operating panel separately from the touch panel, and is arranged so as not to lap over the touch panel as viewed from the front of the operating panel; a storage section which stores in advance screen arrangement information on the arrangement of the operation buttons displayed on the screen of the touch panel; a screen information preparation section which prepares, when touch operation is performed on the touch panel, based on touch coordinates through the touch operation onto the touch panel and the screen arrangement information stored in the storage section, information on the indication content of the screen of the touch panel at the touch coordinates, and information on the indication content of the screen of the touch panel in the upward, downward, right, and left directions as viewed from the touch coordinates and on the distance from the touch coordinates to the indication content on the screen of the touch panel; and a Braille display control device which causes the information prepared by the screen information preparation section to be displayed in Braille on the Braille display.

Advantageous Effects of Invention

[0013] The destination floor registration device of an elevator in accordance with the present invention achieves an effect that on an operating panel provided with both of a touch panel and a Braille display, a change of contents displayed on the touch panel can be accommodated flexibly without impairing the degree of freedom of indication layout on the touch panel.

[0014] Also, there is additionally achieved an effect that when a user who is a visually disabled person touches a place that is not the target operation button on the touch panel, information on the periphery of the place, which is being touched at present, is offered to the user, whereby the user can be assisted in searching for the target operation button, and thereby the operability can be improved.

Brief Description of the Drawings

[0015]

Figure 1 is a schematic view showing a general configuration of an elevator provided with a destination floor registration device relating to first embodiment of the present invention.

Figure 2 is a front view of an operating panel of the destination floor registration device of the elevator relating to first embodiment of the present invention.

Figure 3 is a front view of a Braille display provided on the operating panel of the destination floor registration device of the elevator relating to first embodiment of the present invention.

Figure 4 is a block diagram showing a whole configuration of the destination floor registration device of the elevator relating to first embodiment of the present invention.

Figure 5 is a block diagram showing a configuration of a touch-panel control device relating to first embodiment of the present invention.

Figure 6 is a block diagram showing a configuration of a Braille display control device relating to first embodiment of the present invention.

Figure 7 is a flowchart showing processing in a touch pattern judgment means provided on the touch panel control device relating to first embodiment of the present invention.

Figure 8 is a flowchart showing processing in an operating mode control means provided on the touch panel control device relating to first embodiment of the present invention.

Figure 9 is a flowchart showing processing in an operating mode judgment means provided on the Braille display control device relating to first embodiment of the present invention.

Figure 10 is a front view for explaining one example of motion in a screen information preparation means provided on the touch panel control device relating to first embodiment of the present invention.

Description of Embodiment

[0016] 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

[0017] Figures 1 to 10 relate to a first embodiment of the present invention. Figure 1 is a schematic view showing a general configuration of an elevator, Figure 2 is a front view of an operating panel, Figure 3 is a front view of a Braille display provided on the operating panel, Figure 4 is a block diagram showing a whole configuration of a destination floor registration device of the elevator, Figure 5 is a block diagram showing a configuration of a touch-panel control device, Figure 6 is a block diagram showing a configuration of a Braille display control device, Figure 7 is a flowchart showing processing in a touch pattern judgment means provided on the touch panel control device, Figure 8 is a flowchart showing processing in an operating mode control means provided on the touch panel control device, Figure 9 is a flowchart showing processing in an operating mode judgment means provided on the Braille display control device, and Figure 10 is a front view for explaining one example of motion in a screen information preparation means provided on the touch panel control device.

[0018] In Figure 1, reference sign 1 denotes a car that moves up and down in an elevator shaft (not shown) while loading users, baggage, and the like. In this car 1, an operating panel 2 for the user in the car 1 to perform call registration operation and door open/close operation is provided. The control relating to the whole of elevator operation, including the running motion of the car 1 in response to the operation on the operating panel 2, is carried out by an elevator control device 3. This elevator control device 3 is connected to the operating panel 2, and is installed in a machine room 4 provided in a top portion of the shaft.

[0019] The operating panel 2 is provided with a touch panel 5 and a Braille display 6. Figure 2 is a front view of this operating panel 2. As shown in Figure 2, the touch panel 5 is provided on the front of the operating panel 2, and the Braille display 6 is arranged on the lower side of the touch panel 5 on the front of the operating panel 2. This Braille display 6 is provided separately from the touch panel 5, and is arranged so as not to lap over the touch panel 5 as viewed from the front of the operating panel 2.

[0020] On the touch panel 5, an operation button indication area 5a and a message indication area 5b are formed. The operation button indication area 5a is an area in which there are displayed a plurality of floor buttons for designating a destination floor and registering the call, and a door open button and a door close button for instructing the destination floor registration device on the opening/closing of a door. The various buttons displayed in the operation button indication area 5a are the objects of touch operation onto the touch panel 5 performed by the user. Also, in the message indication area 5b, a message to the user, such as information on elevator maintenance, is displayed.

[0021] The Braille display 6 is divided into a plurality of areas. Figure 3 is a front view of the Braille display 6. These plurality of areas constitute a registered destination floor indication section 6a, a touch area information indication section 6b, an upper-side area information indication section 6c, a lower-side area information indication section 6d, a right-side area information indication section 6e, and a left-side area information indication section 6f.

[0022] The Braille display 6 has a function of indicating an arbitrary Braille character 7 by selectively changing projection parts, which constitute the Braille character 7, projected from the surface. Such a function can be realized by using the conventional art, for example, described in Patent Literature 1 or 3.

[0023] By using this function of indicating an arbitrary Braille character 7, in the registered destination floor indication section 6a of the Braille display 6, a list of destination floors, which have been call-registered by the operation of the operation button indication area 5a of the touch panel 5 on the operating panel 2, is indicated in Braille. In the touch area information indication section 6b, the information on the contents, which are displayed in the area in which the user is touching the touch panel 5 on the operating panel 2 at present, is indicated in Braille. In the upper-side area information indication section 6c, the information on the contents, which are displayed in the area in the upward direction (upper-side area) as viewed from the location in which the user is touching the touch panel 5 at present, is indicated in Braille. In the lower-side area information indication section 6d, the information on the contents, which are displayed in the area in the downward direction (lower-side area) as viewed from the location in which the user is touching the touch panel 5 at present, is indicated in Braille. In the right-side area information indication section 6e, the information on the contents, which are displayed in the area in the right direction (right-side area) as viewed from the location in which the user is touching the touch panel 5 at present, is indicated in Braille. In the left-side area information indication section 6f, the information on the contents, which are displayed in the area in the left direction (right-side area) as viewed from the location in which the user is touching the touch panel 5 at present, is indicated in Braille.

[0024] Also, the Braille display 6 has a function of detecting whether or not the user is touching a Braille indication section of the Braille display 6. This function can be realized by using a detection sensor for detecting, for example, vibrations at the touch time, infrared rays generated from a person, or a change in electrical resistance

or electrostatic capacity caused by a touch of a human body.

[0025] Concerning the arrangement of the indication sections 6a to 6f on the Braille display 6, in Figure 3, these indication sections are arranged in a row longitudinally; however, the arrangement of the indication sections 6a to 6f may be changed as appropriate. For example, the touch area information indication section 6b may be arranged in the center, and the indication sections 6c to 6f of upper and lower side and right and left side may be arranged on the upper, lower, right, and left sides of the touch area information indication section 6b, respectively.

[0026] As shown in Figure 4, the operating panel 2 includes a touch panel control device 8 for controlling the motion of the touch panel 5, and a Braille display control device 9 for controlling the motion of the Braille display 6. First, the configuration of the touch panel control device 8 is explained with reference to Figure 5.

[0027] First, the touch panel control device 8 has two operating modes. The two operating modes are an ordinary mode and a Braille mode. The ordinary mode is an operating mode that is selected when a nondisabled person, that is, a user who does not use the Braille display 6 operates the operating panel 2. On the other hand, the Braille mode is an operating mode that is selected when a visually disabled person, that is, a user who uses the Braille display 6 operates the operating panel 2. The operating mode of the touch panel control device 8 at the present time is stored in an operating mode information storage means 8a.

[0028] A touch detection means 8b detects, based on a signal delivered from the touch panel 5 by the touch operation onto the touch panel 5, whether or not the touch operation onto the touch panel 5 has been performed by the user. If it is detected that the touch operation onto the touch panel 5 has been performed, the touch detection means 8b detects the coordinates in which the touch operation onto the touch panel 5 has been performed (hereinafter, referred to as "touch coordinates"). The presence or absence of touch operation and the touch coordinates that have been detected by the touch detection means 8b is told to a touch pattern judgment means 8c.

[0029] Based on the presence or absence of touch operation and the touch coordinates that are told from the touch detection means 8b, the touch pattern judgment means 8c judges the touch pattern of the touch panel 5 following the flowchart of Figure 7, described later. The touch pattern judgment means 8c determines the start/end of Braille mode in accordance with the judged touch pattern, and tells it to an operating mode control means 8e. Also, the touch pattern judgment means 8c tells the touch coordinates to a destination floor registration means 8g and a screen information preparation means 8k.

[0030] The notification of the start/end of Braille mode is also sent from the Braille display control device 9 as described later. An operating mode reception means 8d of the touch panel control device 8 receives the notification of the start/end of Braille mode sent from the Braille display control device 9, and tells the received start/end of Braille mode to the operating mode control means 8e.

[0031] Based on the start/end of Braille mode told from the touch pattern judgment means 8c and the notification of the start/end of Braille mode sent from the operating mode reception means, the operating mode control means 8e changes over the operating mode of the touch panel control device 8 from Braille mode to ordinary mode and vice versa following the flowchart of Figure 8, described later. The latest operating mode changed over by the operating mode control means 8e is stored in the operating mode information storage means 8a.

[0032] A screen arrangement information storage means 8f stores the positions of the operation buttons in the operation button indication area 5a displayed on the touch panel 5 and the position of the message indication area 5b, the size of the area, and the indication contents. The destination floor registration means 8g judges, based on the touch coordinates obtained via the screen arrangement information storage means 8f and the touch pattern judgment means 8c, the destination floor caused to correspond to the floor button arranged at the touch coordinates. Also, the destination floor registration means 8g tells that destination floor to a destination floor registration transmission means 8h and a registered destination floor information storage means 8i. The destination floor registration transmission means 8h transmits the destination floor told from the destination floor registration means 8g to the elevator control device 3. On receipt of the destination floor transmitted from the destination floor registration transmission means 8h, the elevator control device 3 registers the call to that destination floor.

[0033] The registered destination floor information storage means 8i stores the destination floor told from the destination floor registration means 8g as a registered destination floor. Also, upon request from a registered destination floor list preparation means 8j, the registered destination floor information storage means 8i tells the registered destination floor having been stored to the registered destination floor list preparation means 8j. Based on the registered destination floor obtained from the registered destination floor information storage means 8i, the registered destination floor list preparation means 8j prepares a registered destination floor list, and tells the registered destination floor list having been prepared to a Braille indication transmission means 81.

[0034] When the operating mode is judged so as to be the Braille mode by referring to the storage contents of the operating mode information storage means 8a, the screen information preparation means 8k prepares Braille information about the Braille indication contents in the Braille display 6, and tells the prepared Braille information to the Braille indication transmission means 81. This Braille information is prepared based on the

touch coordinates told from the touch pattern judgment means 8c, the screen arrangement information stored in the storage means 8f, and the registered destination floor information stored in the storage means 8i. The prepared Braille information includes information on the indication contents at the touch coordinates, which information is indicated in Braille, and information on the indication contents in the areas in the upward, downward, right, and left directions with the touch coordinates being the center and on the distance from the touch coordinates to the indication contents, which information is indicated in Braille.

[0035] The Braille indication transmission means 81 transmits the Braille information told from the screen information preparation means 8k and the registered destination floor list told from the registered destination floor list preparation means 8j to the Braille display control device 9.

[0036] The operating mode information storage means 8a, the screen arrangement information storage means 8f, and the registered destination floor information storage means 8i, which are provided in the touch panel control device 8, are in common in that they have a function of storing/retaining information. Therefore, in place of the operating mode information storage means 8a, the screen arrangement information storage means 8f, and the registered destination floor information storage means 8i, one storage section provided in the touch panel control device 8 can be caused to perform this function.

[0037] Next, the configuration of the Braille display control device 9 is explained with reference to Figure 6. As described above, the Braille display 6 has a function of detecting whether or not the user is touching the Braille display 6. The Braille display 6 transmits the detection result as Braille display touch presence/absence information. A Braille display touch information reception means 9a receives the Braille display touch presence/absence information that is transmitted from the Braille display 6. The Braille display touch information reception means 9a tells the Braille display touch presence/absence information having been received to an operating mode judgment means 9b.

[0038] Based on the Braille display touch presence/absence information told from the Braille display touch information reception means 9a, the operating mode judgment means 9b judges the touch pattern of the Braille display 6 following the flowchart of Figure 9, described later. The operating mode judgment means 9b determines the start/end of Braille mode in accordance with the judged touch pattern, and tells it to an operating mode transmission means 9c. The operating mode transmission means 9c transmits the start/end of Braille mode told from the operating mode judgment means 9b to the touch panel control device 8. As described above, the notification of the start/end of Braille, mode, which is transmitted from the operating mode transmission means 9c, is received by the operating mode reception means 8d of the touch panel control device 8.

[0039] The above-described Braille information and registered destination floor list transmitted from the Braille indication transmission means 81 of the touch panel control device 8 are received by a Braille indication reception means 9d of the Braille display control device 9. The Braille indication reception means 9d tells the received Braille information and registered destination floor list to a Braille display drive means 9e.

[0040] The Braille display drive means 9e drives projection parts necessary for indicating, in Braille, the Braille information and registered destination floor list told from the Braille indication reception means 9d, and projects the projection parts from the surface of the Braille display 6, whereby in the indication sections 6a to 6f, the Braille information and registered destination floor list, which are told from the Braille indication reception means 9d, are indicated in Braille,

[0041] The flowchart of Figure 7 shows the processing in the touch pattern judgment means 8c of the touch panel control device 8.

When the presence/absence of touch operation onto the touch panel 5 and the touch coordinates, which are told from the touch detection means 8b, are received (Step S1), in Step S2, based on the received information, the touch pattern judgment means 8c checks whether or not the touch operation onto the touch panel 5 has been performed. If the touch operation onto the touch panel 5 has not been performed, the process proceeds to Step S3.

[0042] In Step S3, it is checked whether or not the state in which the touch operation onto the touch panel 5 is not performed has continued for a predetermined fixed time period or longer. If the state in which the touch operation onto the touch panel 5 is not performed has not continued for the predetermined fixed time period or longer, that is, if the continued time period for which the touch operation onto the touch panel 5 is not performed is shorter than the fixed time period, the process returns to Step S2. On the other hand, in Step S3, if the state in which the touch operation onto the touch panel 5 is not performed has continued for the predetermined fixed time period or longer, the process proceeds to Step S4. In Step S4, the touch pattern judgment means 8c tells the end of Braille mode to the operating mode control means 8e. By doing this, a series of processing is ended.

[0043] On the other hand, in Step S2, if the touch operation onto the touch panel 5 has been performed, the process proceeds to Step S5. In Step S5, it is checked whether or not the state in which the touch operation onto the touch panel 5 is performed has continued for a predetermined fixed time period or longer. If the state in which the touch operation onto the touch panel 5 is performed has continued for the predetermined fixed time period or longer, it is judged that the user who performs the touch operation is a visually disabled person, and the process proceeds to Step S6. This judgment is based on the fact that generally, the time period for which a non-disabled person performs touch operation is relatively short, whereas the touch time period of a visually disabled

person is longer than that of the nondisabled person because the visually disabled person searches for the position of operation button while touching the touch panel 5.

[0044] In Step S6, the touch pattern judgment means 8c tells the start of Braille mode to the operating mode control means 8e, and the process proceeds to Step S7. In Step S7, the touch pattern judgment means 8c tells the touch coordinates to the screen information preparation means 8k. On receipt of the notification of touch coordinates, as described above, the screen information preparation means 8k prepares Braille information indicated on the Braille display 6 when the present operating mode of the touch panel control device 8 is the Braille mode. In this stage, the touch coordinates are not yet told to the destination floor registration means 8g, and therefore, even if the destination floor button displayed on the touch panel 5 is touched, the call registration to the destination floor is not made.

[0045] In the successive Step S8, based on the presence/absence of touch operation onto the touch panel 5, which is told from the touch detection means 8b, it is checked whether or not the touch operation onto the touch panel 5 is absent. If the touch operation onto the touch panel 5 is not absent, and the touched state has continued, the process returns to Step S7. On the other hand, if the touch operation onto the touch panel 5 is absent, the process proceeds to Step S9.

[0046] In Step S9, it is checked whether or not the area, which is the same as the area on the touch panel 5 to which the touch operation has been last performed again within a predetermined fixed time period after the touch operation onto the touch panel 5 has become absent, is touched and then released. If the area, which is the same as the area on the touch panel 5 to which the touch operation has been last performed again within the predetermined fixed time period after the touch operation has become absent, is touched, the process proceeds to Step S10. In Step S10, the touch pattern judgment means 8c tells the touch coordinates to the destination floor registration means 8g. Therefore, when this stage is reached, the call to the destination floor is registered in accordance with the touch operation onto the touch panel 5. After Step S10, the process returns to Step S2.

[0047] Also, in Step S5, if the state in which the touch operation onto the touch panel 5 is performed has not continued for the predetermined fixed time period or longer, it is judged that the user who performs the touch operation is a nondisabled person, and the process transfers to Step S10 directly skipping Steps S6 to S9. In Step 10, the touch coordinates are told to the destination floor registration means 8g, and the call to the destination floor is registered.

[0048] On the other hand, in Step S9, if the area, which is the same as the area on the touch panel 5 to which the touch operation has been last performed again within the predetermined fixed time period after the touch operation has become absent, is touched, the process proceeds to Step S11. In Step S11, as in Step S3, it is checked whether or not the state in which the touch operation onto the touch panel 5 is not performed has continued for a predetermined fixed time period or longer. If the state in which the touch operation onto the touch panel 5 is not performed has not continued for the predetermined fixed time period or longer, that is, if the continued time period for which the touch operation onto the touch panel 5 is not performed is shorter than the fixed time period, the process returns to Step S7. On the other hand, in Step S11, if the state in which the touch operation onto the touch panel 5 is not performed has continued for the predetermined fixed time period or longer, the process proceeds to Step S12. In Step S12, the touch pattern judgment means 8c tells the end of Braille mode to the operating mode control means 8e. By doing this, the series of processing is ended.

[0049] The flowchart of Figure 8 shows the processing in the operating mode control means 8e of the touch panel control device 8.

The operating mode control means 8e uses two operating modes (operating mode (1) and operating mode (2)) internally to determine the start/end of Braille mode. The operating mode (1) corresponds to the state of Braille mode told from the touch pattern judgment means 8c. Also, the operating mode (2) corresponds to the state of Braille mode told from the operating mode reception means 8d (that is, the state of Braille mode judged in the operating mode judgment means 9b).

[0050] First, in Step S21, the operating mode control means 8e checks whether or not the start/end of Braille mode has been told from the touch pattern judgment means 8c. If the start/end of Braille mode has been told from the touch pattern judgment means 8c, the process proceeds to Step S22. In Step S22, it is checked whether or not the start/end of Braille mode having been told is the start of Braille mode. If the start/end of Braille mode having been told is the start of Braille mode, the process proceeds to Step S23.

[0051] In Step S23, a state in which the start of Braille mode has been told from the touch pattern judgment means 8c is established, and the operating mode control means 8e sets the operating mode (1) at "start". Then, in the successive Step S24, the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the Braille mode, whereby a series of processing is ended.

[0052] On the other hand, in Step S22, if the start/end of Braille mode having been told from the touch pattern judgment means 8c is not the start of Braille mode, the process proceeds to Step S25. In Step S25, a state in which the end of Braille mode has been told from the touch pattern judgment means 8c is established, and the operating mode control means 8e sets the operating mode (1) at "end". Then, in the successive Step S26, it is checked whether or not the operating mode (2) is in an "end" state.

[0053] In Step S26, if the operating mode (2) is in the

"end" state, the process proceeds to Step S27, where the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the ordinary mode, thereby ending the series of processing. On the other hand, in Step S26, if the operating mode (2) is not in the "end" state (if the operating mode (2) is in the "start" state), the process proceeds to Step S24, where the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the Braille mode, thereby ending the series of processing.

[0054] On the other hand, in Step S21, if the start/end of Braille mode has not been told from the touch pattern judgment means 8c, the process proceeds to Step S28. In Step S28, it is checked whether or not the start/end of Braille mode has been told from the operating mode reception means 8d. If the start/end of Braille mode has not been told from the operating mode reception means 8d as well, the processing is ended.

[0055] On the other hand, in Step S28, if the start/end of Braille mode has been told from the operating mode reception means 8d, the process proceeds to Step S29. In Step S29, it is checked whether or not the start/end of Braille mode having been told is the start of Braille mode. If the start/end of Braille mode having been told is the start of Braille, mode, the process proceeds to Step S30.

[0056] In Step S30, a state in which the start of Braille mode has been told from the operating mode reception means 8d is established, and the operating mode control means 8e sets the operating mode (2) at "start". Then, in the successive Step S31, the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the Braille mode, whereby the series of processing is ended.

[0057] On the other hand, in Step S29, if the start/end of Braille mode having been told from the operating mode reception means 8d is not the start of Braille mode, the process proceeds to Step S32. In Step S32, a state in which the end of Braille mode has been told from the operating mode reception means 8d is established, and the operating mode control means 8e sets the operating mode (2) at "end". Then, in the successive Step S33, it is checked whether or not the operating mode (1) is in an "end" state.

[0058] In Step S33, if the operating mode (1) is in the "end" state, the process proceeds to Step S34, where the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the ordinary mode, thereby ending the series of processing. On the other hand, in Step S33, if the operating mode (1) is not in the "end" state (if the operating mode (1) is in the "start" state), the process proceeds to Step S31, where the operating mode control means 8e turns the operating mode of the touch panel control device 8 to the Braille mode, thereby ending the series of processing.

[0059] The flowchart of Figure 9 shows the processing in the operating mode judgment means 9b of the Braille display control device 9.

First, when the Braille display touch presence/absence information is told from the Braille display touch information reception means 9a (Step S41), in Step S42, based on the Braille display touch presence/absence information having been told, the operating mode judgment means 9b checks whether or not the touch to the Braille display 6 has been given. If the touch to the Braille display 6 has been given, the process proceeds to Step S43.

[0060] In Step S43, it is checked whether or not the state in which the Braille display 6 is touched has continued for a predetermined fixed time period or longer. If the state in which the Braille display 6 is touched has continued for the predetermined fixed time period or longer, it is judged that a visually disabled person touches the Braille display 6, and the process proceeds to Step S44. In Step S44, the operating mode judgment means 9b tells the start of Braille mode to the operating mode transmission means 9c. Then, the process returns to Step S42.

[0061] On the other hand, in Step S42, if the touch to the Braille display 6 has not been given, the process proceeds to Step S45. In Step S45, it is checked whether or not the state in which the Braille display 6 is not touched has continued for a predetermined fixed time period or longer. If the state in which the Braille display 6 is not touched has not continued for the predetermined fixed time period or longer, that is, if the continued time period for which the Braille display 6 is not touched is shorter than the fixed time period, the process returns to Step S42.

[0062] On the other hand, in Step S45, if the state in which the Braille display 6 is not touched has continued for the predetermined fixed time period or longer, the process proceeds to Step S46. In Step S46, the operating mode judgment means 9b tells the end of Braille mode to the operating mode transmission means 9c. Then, the series of processing is ended.

[0063] In Step 43, if the state in which the Braille display 6 is touched has not continued for the predetermined fixed time period or longer, that is, if the continued time period for which the Braille display 6 is touched is shorter than the fixed time period as well, the process proceeds to Step S46, where the operating mode judgment means 9b tells the end of Braille mode to the operating mode transmission means 9c.

[0064] Thus, the start/end of Braille mode told from the operating mode judgment means 9b to the operating mode transmission means 9c is received by the operating mode reception means 8d of the touch panel control device 8 as described above, and is told to the operating mode control means 8e. The start/end of Braille mode is used for operating mode changeover judgment in the operating mode control means 8e.

[0065] As described above, the touch pattern judgment means 8c judges, based on the continued time period for which the touch panel 5 is touched, whether or not the start of Braille mode is told, and the operating mode judgment means 9b judges, based on the continued time period for which the Braille display is touched, whether

or not the start of Braille mode is told. If the state in which the start of Braille mode has been told from at least one of the touch pattern judgment means 8c and the operating mode judgment means 9b is established, the operating mode control means 8e turns the operating mode to the Braille mode.

[0066] In the Braille mode, the configuration is made such that various pieces of operation assisting information are indicated in Braille on the Braille display 6 in accordance with the touch place on the touch panel 5, and also when the same area is touched again after once leaving the touch panel 5, call registration is made. Thereby, when operation is performed by a visually disabled person, the operating mode is changed property to the Braille mode, whereby misoperation and misregistration can be prevented.

[0067] Next, a specific example of the motion of the destination floor registration device of an elevator, which is configured as described above, is explained with reference to Figure 10.

First, by the operation in the operation button indication area 5a of the touch panel 5 in the above description, the destination floor already having been call-registered has been stored in the registered destination floor information storage means 8i. The registered destination floor list preparation means 8j prepares a registered destination floor list based on the registered destination floor obtained from the registered destination floor information, storage means 8i, and the registered destination floor list thus prepared is told to the Braille display drive means 9e of the Braille display control device 9 through the Braille indication transmission means 81 and the Braille indication reception means 6d.

[0068] The Braille display drive means 9e projects the projection parts, which are necessary for indicating, in Braille, the registered destination floor list having been told, from the surface, and indicates, in Braille, the registered destination floor list having been told in the registered destination floor indication section 6a of the Braille display 6. For example, when 1F, 2F and 3F have already been registered as call destination floors, in the registered destination floor indication section 6a of the Braille display 6, the registered destination floors are indicated in Braille enumeratively, for example, as "registered, 1, 2, 3".

[0069] In this indication, a word expressing the indication content classification of that indication section, for example, "registered" is first indicated in Braille together with a numeral expressing the registered destination floor so that the user who is a visually disabled person can understand that the classification of contents indicated in the registered destination floor indication section 6a is a registered destination floor. The word expressing the indication content classification may be indicated in Braille in that indication section as explained above. Alternatively, if the indication content classification in that indication section does not change, a Braille block in which the indication contents are fixed may be provided near that indication section separately from that indication section, and the indication content classification may be indicated in Braille in this Braille block. In this case, a Braille block in which a phrase of, for example, "already registered floors are indicated below" is fixedly indicated in Braille is provided.

[0070] Thereby, when a visually disabled person is going to register a destination floor, he/she can know in advance whether the call to the target destination floor has already been registered. Therefore, if the call to the target destination floor has already been registered, the visually disabled person who is a user need not search for the part of the touch panel 5, so that unnecessary work can be saved.

[0071] Next, explanation is given of the motion of the Braille display 6 at the time when in the Braille mode, the visually disabled person who is a user performs touch operation onto the touch panel 5. For example, when the touch point touch-operated on the touch panel 5 is a first touch point 11a, which is a part of a 2F button 10b, the screen information preparation means 8k prepares information of items (1) to (5) described below from the touch coordinates sent from the touch pattern judgment means 8c, the screen arrangement information stored in the storage means 8f, and the registered destination floor information stored in the storage means 8i.

(1) Braille information on the indication contents of the area that the user is touching at present

[0072] The Braille information on the button name of the 2F button 10b that is the area in which the first touch point 11a is contained, and on the registration state of this 2F button 10b is prepared. As a specific example of the prepared Braille information, for example, "2F button registered" is cited.

(2) Braille information on the indication contents of the area lying in the upward direction as viewed from the location that the user is touching at present

[0073] The Braille information on the button name of a 4F button 10d in the area in the upward direction as viewed from the first touch point 11a, and on the distance from the first touch point 11a to the 4F button 10d is prepared. As a specific example of the prepared Braille information, for example, "upward direction 4 cm 4F button" is cited. At this time, in the case where a plurality of buttons or a message area lie in the upward direction as viewed from the first touch point 11a, the plurality of buttons and the like lying in the upward direction may be indicated. For example, in the case shown in Figure 10, the Braille information of, for example, "upward direction 4 cm 4F button, 8 cm message area" is indicated.

(3) Braille information on the indication contents of the area lying in the downward direction as viewed from the location that the user is touching at present

[0074] The Braille information on the button name of a door close button 10f in the area in the downward direction as viewed from the first touch point 11a, and on the distance from the first touch point 11a to the door close button 10f is prepared. As a specific example of the prepared Braille information, for example, "downward direction 3 cm close button" is cited. At this time, as in item (2), in the case where a plurality of operation buttons or a message area lie in the downward direction as viewed from the first touch point 11a, the plurality of buttons and the like lying in the downward direction may be indicated.

(4) Braille information on the indication contents of the area lying in the right direction as viewed from the location that the user is touching at present

[0075] The Braille information on the indication contents of the area in the right direction as viewed from the first touch point 11a, and on the distance from the first touch point 11a to the indication contents is prepared. In the case shown Figure 10, since nothing is indicated in the area in the right direction as viewed from the first touch point 11a, Braille information having the contents of, for example, "nothing in right direction" is prepared. As in items (2) and (3), the plurality of operation buttons and the like lying in the area on the right-hand side of the first touch point 11a may be indicated,

(5) Braille information on the indication contents of the area lying in the left direction as viewed from the location that the user is touching at present

[0076] The Braille information on the button name of a I F button 10a in the area in the left direction as viewed from the first touch point 11a, and on the distance from the first touch point 11a to the 1F button 10a is prepared. As a specific example of the prepared Braille information, for example, "left direction 5 cm 1F button" is cited. As in items (2) to (4), the plurality of operation buttons and the like lying in the area on the left-hand side of the first touch point 11a may be indicated.

[0077] In the example shown in Figure 10, in the case where the touch point touch-operated on the touch panel 5 is a second touch point 11b in the message indication area 5b, as the Braille information on the indication contents of the area that the user is touching at present of item (1), the Braille information on the indication contents of the message indication area 5b in which the touch point of the second touch point 11b is contained is prepared. As a specific example of the prepared Braille information, for example, "message maintenance today, ..." is cited.

[0078] The Braille information of items (1) to (5) prepared by the screen information preparation means 8k as described above is told to the Braille display drive means 9e of the Braille display control device 9 through the Braille indication transmission means 81 and the Braille indication reception means 9d. The Braille display drive means 9e projects projection parts necessary for indicating, in Braille, the told Braille information, whereby in the indication sections 6b to 6f of the Braille display 6, pieces of the told Braille information of items (1) to (5) are indicated in Braille, respectively.

[0079] Specifically, the "(1) Braille information on the indication contents of the area that the user is touching at present" is indicated in Braille in the touch area information indication section 6b of the Braille display 6. The "(2) Braille information on the indication contents of the area lying in the upward direction as viewed from the location that the user is touching at present" is indicated in Braille in the upper-side area information indication section 6c of the Braille display 6. The "(3) Braille information on the indication contents of the area lying in the downward direction as viewed from the location that the user is touching at present" is indicated in Braille in the lower-side area information indication section 6d of the Braille display 6. The "(4) Braille information on the indication contents of the area lying in the right direction as viewed from the location that the user is touching at present" is indicated in Braille in the right-side area information indication section 6e of the Braille display 6. The "(5) Braille information on the indication contents of the area lying in the left direction as viewed from the location that the user is touching at present" is indicated in Braille in the left-side area information indication section 6f of the Braille display 6.

[0080] As in the case of the registered destination floor indication section 6a, in the indication sections 6b to 6f as well, a word expressing the indication content classification of each indication section may first be indicated in Braille so that the user who is a visually disabled person can understand what is the content classification indicated in each indication section. As this word expressing the indication content classification, specifically, for example, in the case of the touch area information indication section 6b, "present position information" is used, in the case of the upper-side area information indication section 6c, "upward direction" is used, in the case of the lower-side area information indication section 6d, "downward direction" is used, in the case of the right-side area information indication section 6e, "right direction" is used, and in the case of the left-side area information indication section 6f, "left direction" is used. Further, a Braille block in which the word expressing the indication content classification is fixedly indicated in Braille may be provided.

[0081] In each of the indication sections 6a to 6f of the Braille display 6, in the case where the number of Braille characters of indication contents is large, and the Braille characters cannot be indicated in one indication section at a time, the Braille information to be indicated in that indication section may be divided into plural numbers, and the divided Braille information may be indicated so

as to be changed over every fixed time. For example, there is assumed the case where in the registered destination floor indication section 6a, the number of registered destination floors is large, and the contents to be indicated are "registered, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12", whereas only "registered, 1, 2, 3, 4, 5, 6, 7, 8" can be indicated at a time in the registered destination floor indication section 6a. In this case, as the contents indicated in Braille in the registered destination floor indication section 6a, the words of "registered, 1, 2, 3, 4, 5, 6, 7, 8" and "registered, 9, 10, 11, 12" are indicated by being changed over alternately every fixed time.

[0082] Thus, the Braille display 6 is provided at a position such that the Braille display 6 does not lap over the touch panel 5 on the operating panel 2 so as to be separate from the touch panel 5. When touch operation is performed on the touch panel 5, information for assisting the user in performing the touch operation in accordance with the touched position is indicated in Braille on the Braille display 6. At this time, the Braille information indicated on the Braille display 6 in accordance with the touched position is prepared mainly based on the screen arrangement information 8f. Therefore, when the arrangement of operation buttons and the like displayed on the touch panel 5 is changed, by merely updating the information stored in the screen arrangement information storage means 8f so as to match that arrangement change, the Braille information based on the updated screen arrangement can be indicated on the Braille display 6. Therefore, the arrangement of the Braille display 6 need not be changed for the arrangement change of elements displayed on the touch panel 5, and the arrangement change can be accommodated flexibly without impairing the degree of freedom of indication layout on the touch panel 5.

[0083] In the destination floor registration device of an elevator, which is configured as described above, when at least one of the touch panel and the Braille display is touched for the fixed time period or longer, the operating mode is changed over from ordinary mode to Braille mode. In the Braille mode, not only the information on the touch location but also the indication contents of touch panel in the upward, downward, right, and left directions with the touch location being the center are indicated in Braille, on the Braille display.

[0084] Therefore, when the user who is a visually disabled person is touching a place that is not the target operation button on the touch panel (including an area in which the operation buttons are not displayed), by offering the information on the periphery of the place, which is being touched at present, to the user, the user can be assisted in searching for the target operation button, and thereby the operability can be improved.

Industrial Applicability

[0085] The present invention can be applied to a destination floor registration device of an elevator, which is connected to an elevator control device and is provided with an operating panel having touch-panel operation buttons.

Description of Symbols

[0086]

1	car
2	operating panel
3	elevator control device
4	machine room
5	touch panel
5a	operation button indication area
5b	message indication area
6	Braille display
6a	registered destination floor indication section
6b	touch area information indication section
6c	upper-side area information indication section
6d	lower-side area information indication section
6e	right-side area information indication section
6f	left-side area information indication section
7	Braille character
8	touch panel control device
8a	operating mode information
8b	touch detection means
8c	touch pattern judgment means
8d	operating mode reception means
8e	operating mode control means
8f	screen arrangement information
8g	destination floor registration means
8h	destination floor registration transmission means
8i	registered destination floor information
8j	registered destination floor list preparation means
8k	screen information preparation means
81	Braille indication transmission means
9	Braille display control device
9a	Braille display touch information reception means
9b	operating mode judgment means
9c	operating mode transmission means
9d	Braille indication reception means
9e	Braille display drive means
10a	1F button
10b	2F button
10c	3F button
10d	4F button
10e	door open button
10f	door close button
11a	first touch point
11b	second touch point

Claims

1. A destination floor registration device of an elevator, which is connected to an elevator control device and is provided with an operating panel having touch-

panel operation buttons, comprising:

a touch panel provided on the front of the operating panel;
a Braille display capable of indicating arbitrary Braille characters, which is provided on the front of the operating panel separately from the touch panel, and is arranged so as not to lap over the touch panel as viewed from the front of the operating panel;
a storage section which stores in advance screen arrangement information on the arrangement of the operation buttons displayed on the screen of the touch panel;
a screen information preparation section which prepares, when touch operation is performed on the touch panel, based on touch coordinates through the touch operation onto the touch panel and the screen arrangement information stored in the storage section, information on the indication content of the screen of the touch panel at the touch coordinates, and information on the indication content of the screen of the touch panel in the upward, downward, right, and left directions as viewed from the touch coordinates and on the distance from the touch coordinates to the indication content on the screen of the touch panel; and
a Braille display control device which causes the information prepared by the screen information preparation section to be displayed in Braille on the Braille display.

2. The destination floor registration device of an elevator according to claim 1, further comprising:

a registered destination floor information retention section which retains information on the call destination floor having already been registered; wherein
in the case where the indication content of the screen of the touch panel at the touch coordinates is a destination floor button, based on the information retained in the registered destination floor information retention section, the screen information preparation section prepares information on the call registration state to the destination floor corresponding to the destination floor button.

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

a registered destination floor list preparation section which prepares, based on the information retained in the registered destination floor information retention section, information on a list of call destination floor having already been registered; wherein
the Braille display control device causes the information, prepared by the registered destination floor list preparation section to be displayed in Braille on the Braille display.

4. The destination floor registration device of an elevator according to any one of claims 1 to 3, wherein
on the screen of the touch panel, in addition to the operation buttons, a message indication section for displaying a predetermined message for the user is indicated;
the storage section stores in advance the screen arrangement information on the arrangement of the operation buttons and the message indication section, which are displayed on the screen of the touch panel; and
in the case where the indication content of the screen of the touch panel at the touch coordinates and/or in the upward, downward, right, and left directions as viewed from the touch coordinates is the message indication section, the screen information preparation section prepares information on the message displayed in the message indication section.

FIG. 1

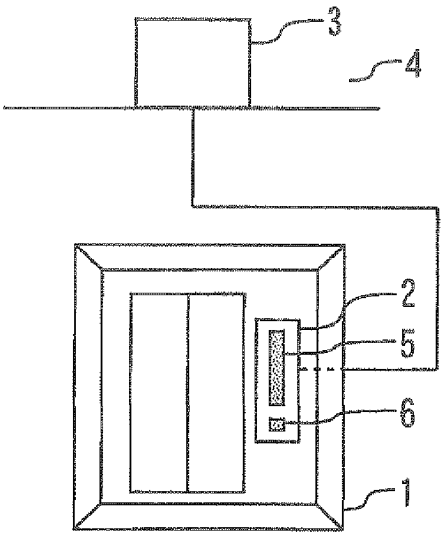

3
4
2
5
6
1

FIG. 2

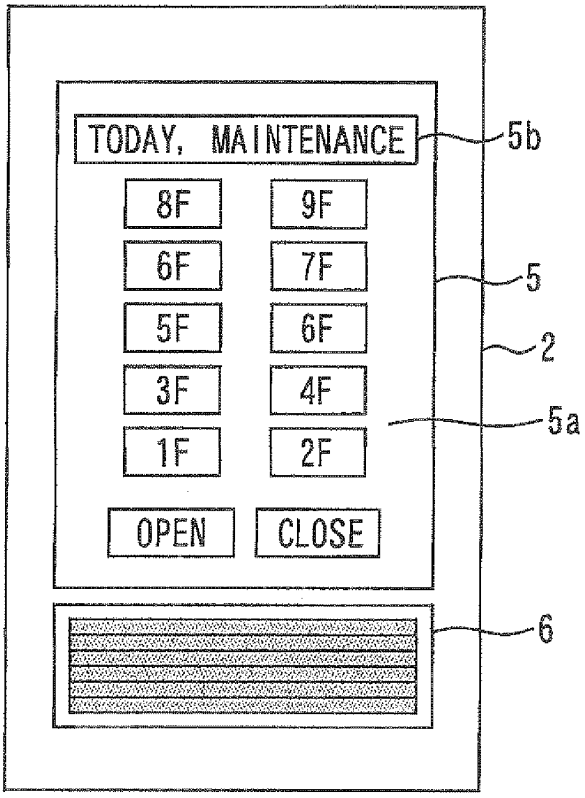

TODAY, MAINTENANCE
5b
8F
9F
6F
7F
5F
6F
3F
4F
1F
2F
5
2
5a
OPEN
CLOSE
6

FIG. 3

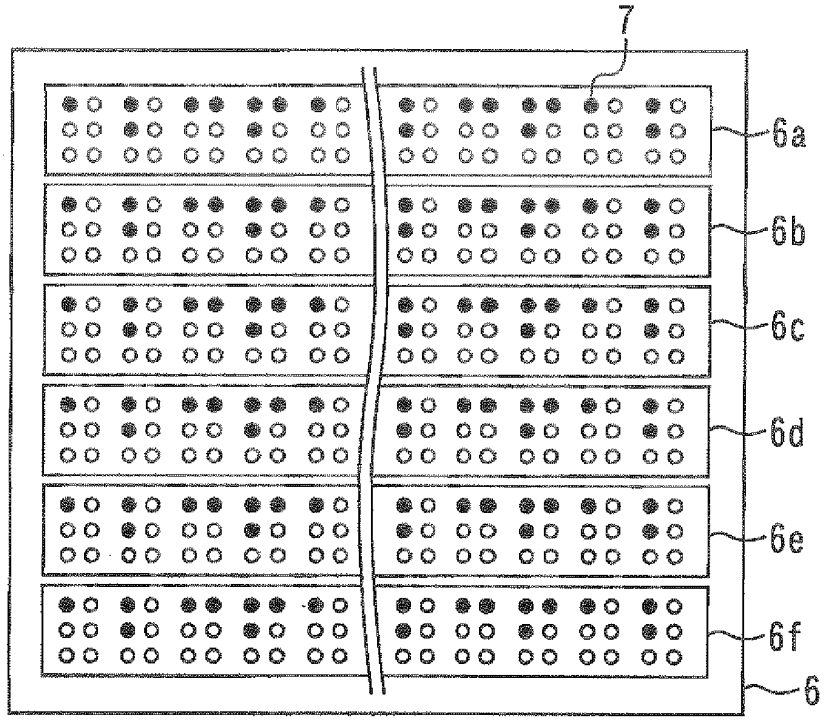

7
6a
6b
6c
6d
6e
6f
6

FIG. 4

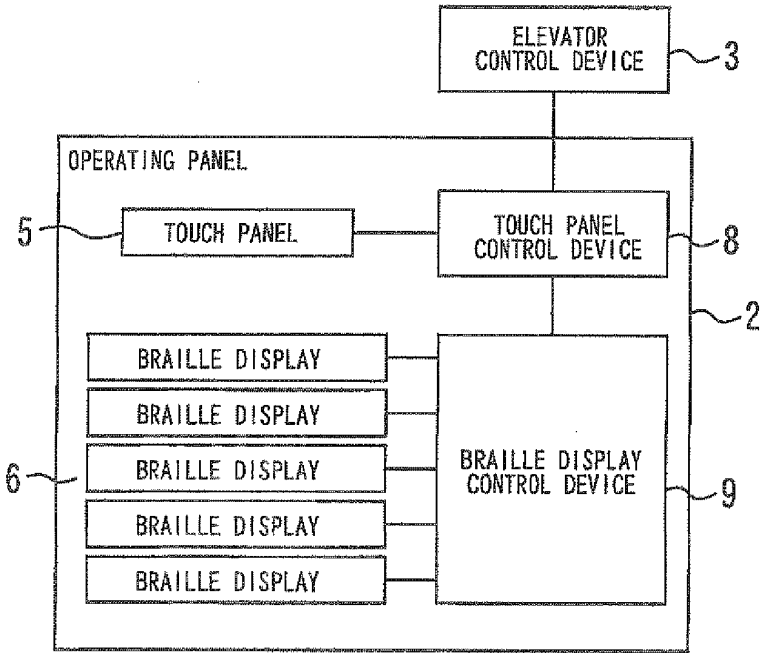
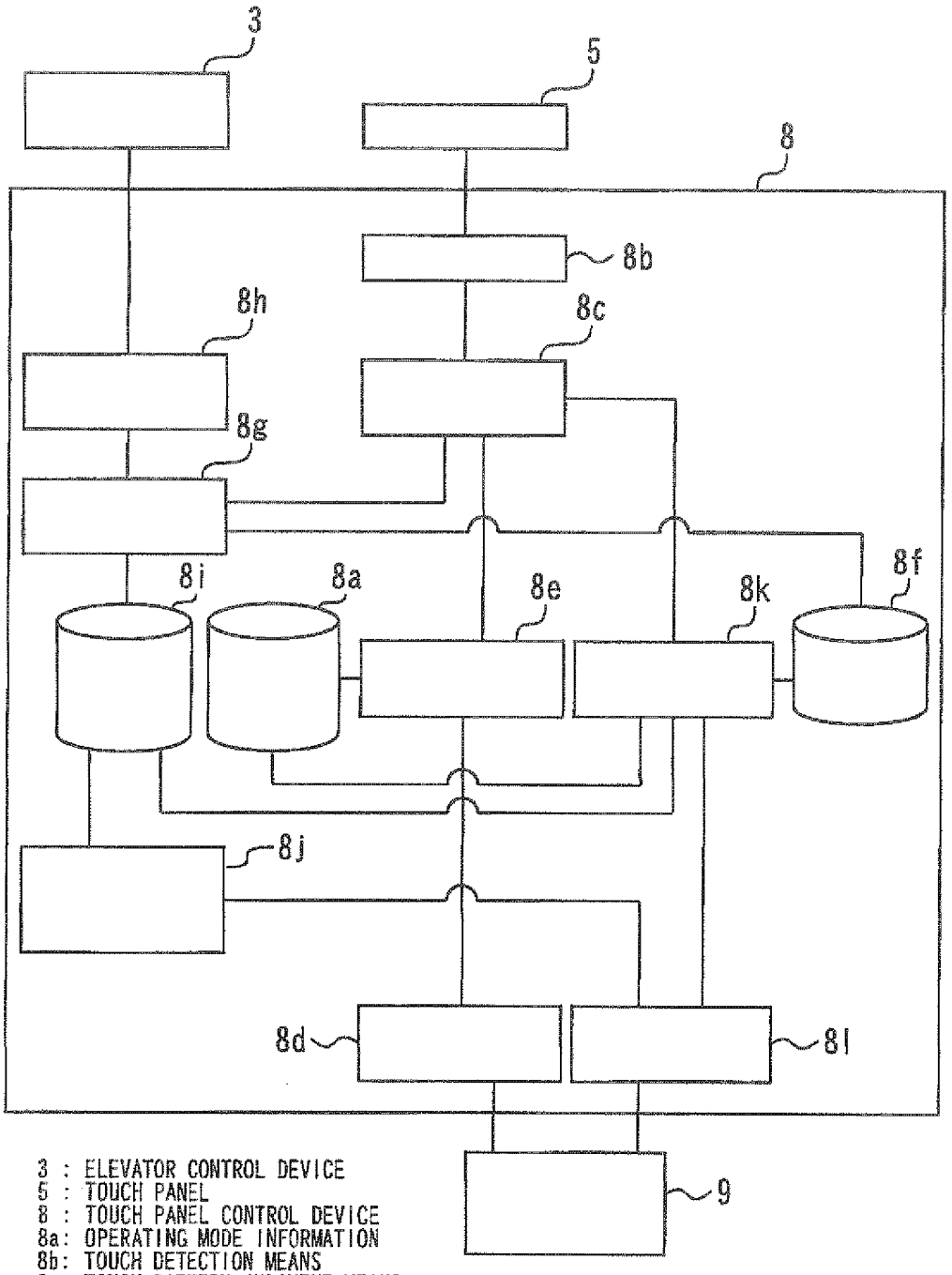
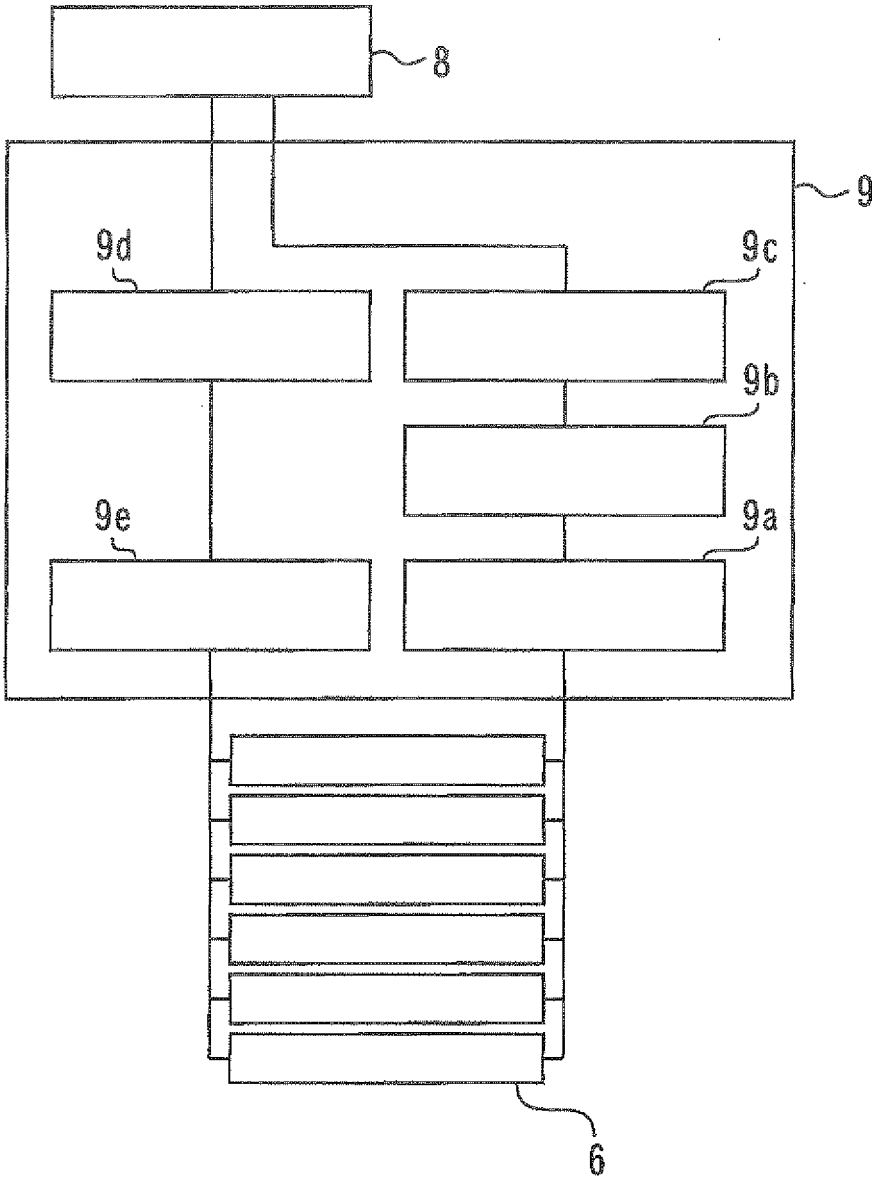

ELEVATOR CONTROL DEVICE
3
OPERATING PANEL
5
TOUCH PANEL
TOUCH PANEL CONTROL DEVICE
8
2
BRAILLE DISPLAY
BRAILLE DISPLAY
BRAILLE DISPLAY
BRAILLE DISPLAY
BRAILLE DISPLAY
6
BRAILLE DISPLAY CONTROL DEVICE
9

FIG. 5



3 : ELEVATOR CONTROL DEVICE
5 : TOUCH PANEL
8 : TOUCH PANEL CONTROL DEVICE
8a: OPERATING MODE INFORMATION
8b: TOUCH DETECTION MEANS
8c: TOUCH PATTERN JUDGMENT MEANS
8d: OPERATING MODE RECEPTION MEANS
8e: OPERATING MODE CONTROL MEANS
8f: SCREEN ARRANGEMENT INFORMATION
8g: DESTINATION FLOOR REGISTRATION MEANS
8h: DESTINATION FLOOR REGISTRATION TRANSMISSION MEANS
8i: REGISTERED DESTINATION FLOOR INFORMATION
8j: REGISTERED DESTINATION FLOOR LIST PREPARATION MEANS
8k: SCREEN INFORMATION PREPARATION MEANS
8l: BRAILLE INDICATION TRANSMISSION MEANS
9 : BRAILLE DISPLAY CONTROL DEVICE

FIG. 6



6 : BRAILLE DISPLAYS
8 : TOUCH PANEL CONTROL DEVICE
9 : BRAILLE DISPLAY CONTROL DEVICE
9a: BRAILLE DISPLAY TOUCH INFORMATION RECEPTION MEANS
9b: OPERATING MODE JUDGMENT MEANS
9c: OPERATING MODE TRANSMISSION MEANS
9d: BRAILLE INDICATION RECEPTION MEANS
9e: BRAILLE DISPLAY DRIVE MEANS

FIG. 7

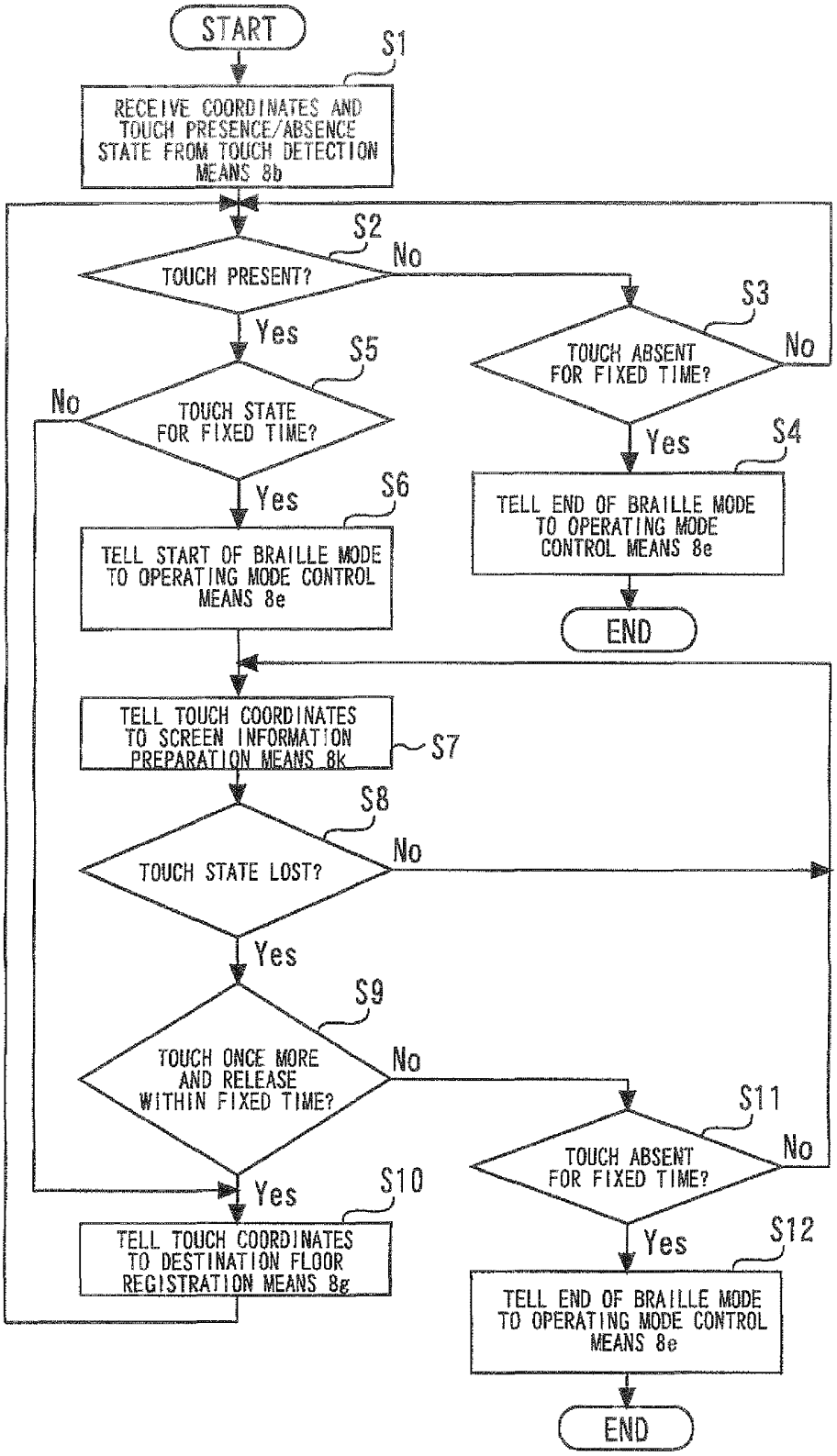

START
S1
RECEIVE COORDINATES AND TOUCH PRESENCE/ABSENCE STATE FROM TOUCH DETECTION MEANS 8b
S2
TOUCH PRESENT?
No
Yes
S3
TOUCH ABSENT FOR FIXED TIME?
No
Yes
S4
TELL END OF BRAILLE MODE TO OPERATING MODE CONTROL MEANS 8e
END
S5
TOUCH STATE FOR FIXED TIME?
No
Yes
S6
TELL START OF BRAILLE MODE TO OPERATING MODE CONTROL MEANS 8e
TELL TOUCH COORDINATES TO SCREEN INFORMATION PREPARATION MEANS 8k
S7
S8
TOUCH STATE LOST?
No
Yes
S9
TOUCH ONCE MORE AND RELEASE WITHIN FIXED TIME?
No
Yes
S10
TELL TOUCH COORDINATES TO DESTINATION FLOOR REGISTRATION MEANS 8g
S11
TOUCH ABSENT FOR FIXED TIME?
No
Yes
S12
TELL END OF BRAILLE MODE TO OPERATING MODE CONTROL MEANS 8e
END

FIG. 8

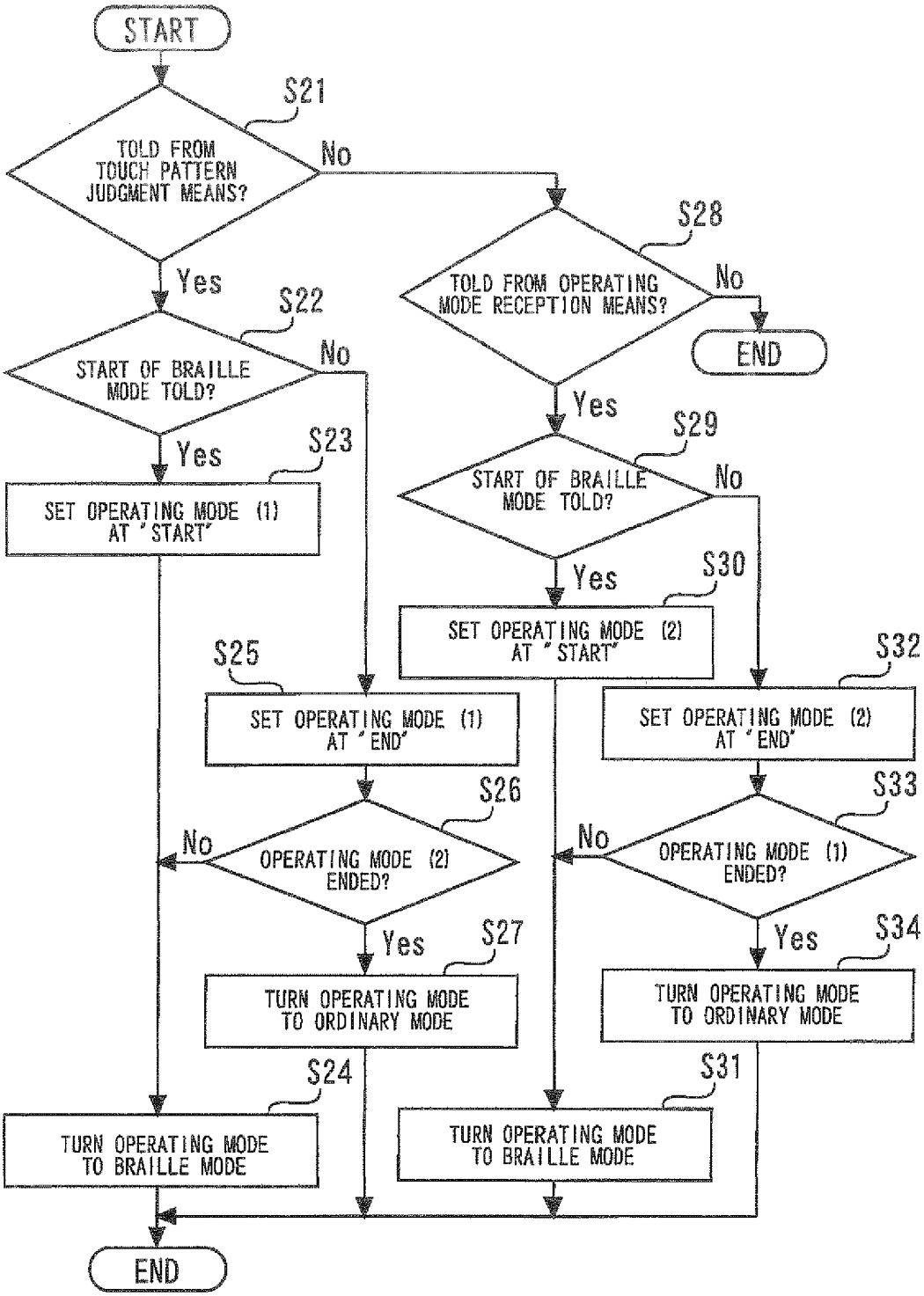

START
S21
TOLD FROM TOUCH PATTERN JUDGMENT MEANS?
No
Yes
S22
START OF BRAILLE MODE TOLD?
No
Yes
S23
SET OPERATING MODE (1) AT "START"
S28
TOLD FROM OPERATING MODE RECEPTION MEANS?
No
END
Yes
S29
START OF BRAILLE MODE TOLD?
No
Yes
S30
SET OPERATING MODE (2) AT "START"
S25
SET OPERATING MODE (1) AT "END"
S32
SET OPERATING MODE (2) AT "END"
S26
No
OPERATING MODE (2) ENDED?
S33
No
OPERATING MODE (1) ENDED?
Yes
S27
TURN OPERATING MODE TO ORDINARY MODE
Yes
S34
TURN OPERATING MODE TO ORDINARY MODE
S24
TURN OPERATING MODE TO BRAILLE MODE
S31
TURN OPERATING MODE TO BRAILLE MODE
END

FIG. 9

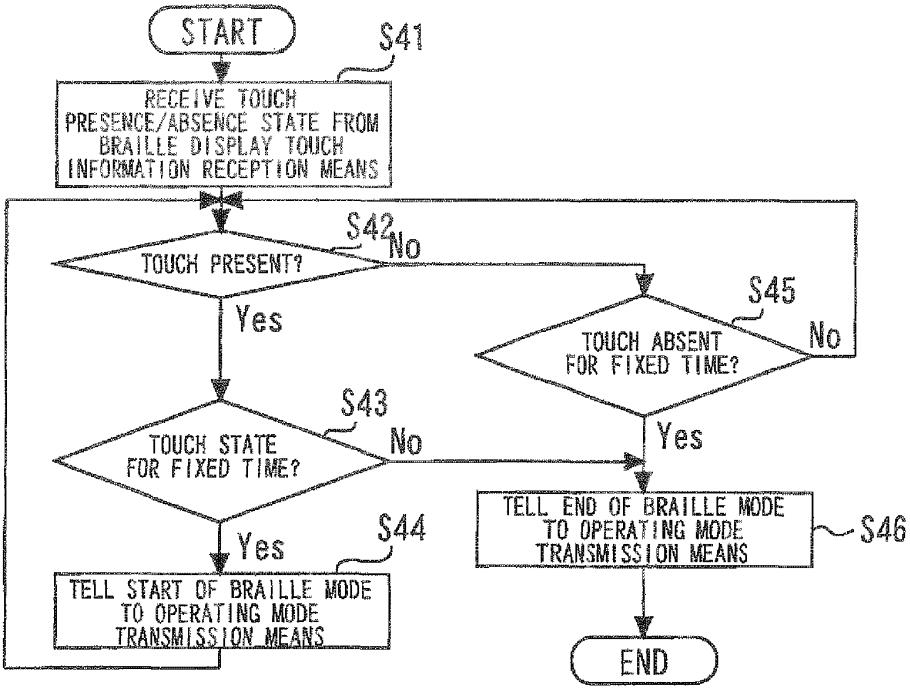
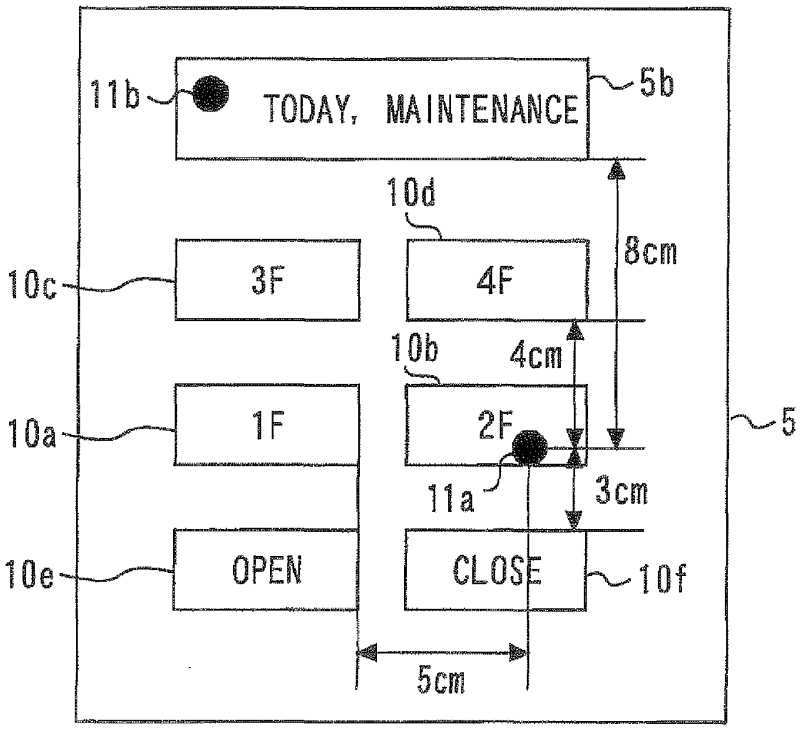

START
S41
RECEIVE TOUCH PRESENCE/ABSENCE STATE FROM BRAILLE DISPLAY TOUCH INFORMATION RECEPTION MEANS
S42
TOUCH PRESENT?
No
Yes
S45
TOUCH ABSENT FOR FIXED TIME?
No
Yes
S43
TOUCH STATE FOR FIXED TIME?
No
Yes
S44
TELL START OF BRAILLE MODE TO OPERATING MODE TRANSMISSION MEANS
TELL END OF BRAILLE MODE TO OPERATING MODE TRANSMISSION MEANS
S46
END

FIG. 10


11b
TODAY, MAINTENANCE
5b
10d
8cm
10c
3F
4F
10b
4cm
10a
1F
2F
5
11a
3cm
10e
OPEN
CLOSE
10f
5cm

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/051450

A. CLASSIFICATION OF SUBJECT MATTER
B66B3/00(2006.01)i, *B66B1/46*(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, B66B1/46

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.
A	JP 2007-314300 A (Mitsubishi Electric Corp.), 06 December 2007 (06.12.2007), entire text; fig. 1 to 10 (Family: none)	1-4
A	JP 2004-115151 A (Toshiba Elevator and Building Systems Corp.), 15 April 2004 (15.04.2004), entire text; fig. 1 to 12 (Family: none)	1-4
A	JP 57-57099 Y2 (Mitsubishi Electric Corp.), 08 December 1982 (08.12.1982), entire text; fig. 1 to 4 (Family: none)	1-4

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

* Special categories of cited documents:
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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
11 October, 2011 (11.10.11)	18 October, 2011 (18.10.11)
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/JP2011/051450

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2000-339515 A (NEC Yonezawa, Ltd.), 08 December 2000 (08.12.2000), entire text; fig. 1 to 4 (Family: none)	1-4

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2007314300 A **[0005]**
- JP 2004269196 A **[0005]**
- JP 5019680 A **[0005]**