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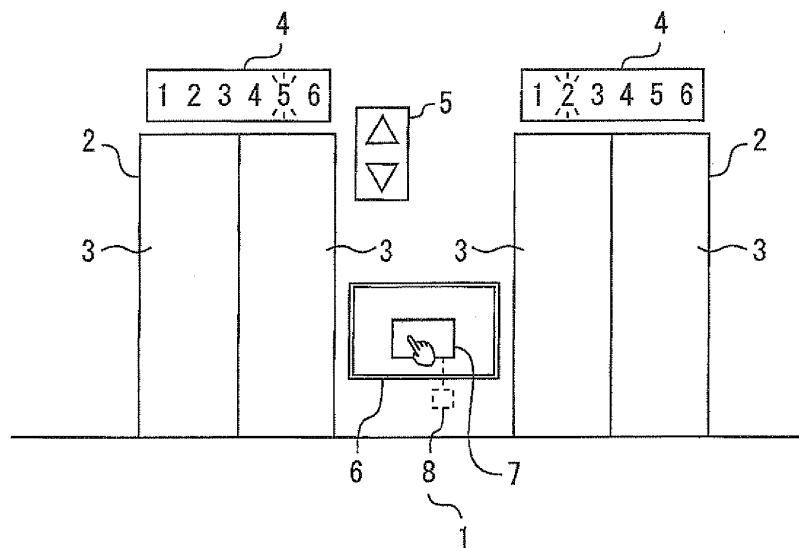
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(54) **ELEVATOR OPERATING PANEL**

(57) There is provided an elevator operating panel capable of saving the space, reducing the cost, and improving the design. For this purpose, the elevator operating panel is configured so as to include a touch panel provided in at least one of a hall and a car of an elevator and a display controller for causing an operation screen of the elevator to be displayed in a display part of the

touch panel. The touch panel has a scanner function and takes in a fingerprint of a user by means of the scanner function when a finger of the user touches the display part. The display controller identifies a fingerprint based on the user's fingerprint taken in by the touch panel and causes the operation screen of the elevator according to the user specified by the fingerprint identification to be displayed in the display part of the touch panel.

Fig. 1



Description

Technical Field

[0001] The present invention relates to an elevator operating panel.

Background Art

[0002] As an elevator to which security functions are added, there has been proposed an elevator in which an individual recognition device such as a fingerprint matching device or a card reader and a touch panel type operating panel are provided in elevator halls. According to such a device, a passenger is recognized by the individual recognition device, a destination floor candidate having a high possibility that the passenger goes to that floor when predetermined conditions are met is read based on the destination floor information for each passenger stored beforehand, and a plurality of destination floor buttons can be displayed on the touch panel (for example, refer to Patent Literature 1).

[0003] Also, there has been proposed an elevator in which not only in the hall but also in a car, the individual recognition device and a transom-wall operating panel are provided, or the individual recognition device is assembled in the side-wall operating panel itself to assure security (for example, refer to Patent Literature 2).

Citation List

Patent Literature

[0004]

Patent Literature 1: Japanese Patent Laid-Open No. 2005-231885

Patent Literature 2: Japanese Patent Laid-Open No. 2007-223733

Summary of Invention

Technical Problem

[0005] Unfortunately, for the elevators described in Patent Literatures 1 and 2, the individual recognition device must be installed aside from the operating panel. That is, there arises a problem that an installation space for the individual recognition device is separately needed. Also, since the installation distance between the operating panel and the individual recognition device, the wiring length, and the like must be considered, there arises a problem that an adverse influence is exerted on the cost and design.

[0006] The present invention has been made to solve the above-described problems, and accordingly an object thereof is to provide an elevator operating panel capable of saving the space, reducing the cost, and improv-

ing the design.

Means for Solving the Problems

5 **[0007]** An elevator operating panel of the present invention includes a touch panel provided in at least one of a hall and a car of an elevator and a display controller for causing an operation screen of the elevator to be displayed in a display part of the touch panel, wherein the touch panel has a scanner function and takes in a finger-
10 print of a user by means of the scanner function when a finger of the user touches the display part and wherein the display controller performs fingerprint identification based on the user's fingerprint taken in by the touch panel and causes the operation screen of the elevator accord-
15 ing to the user specified by the fingerprint identification to be displayed in the display part of the touch panel.

Advantageous Effects of Invention

20 **[0008]** According to the present invention, space sav-
ing, reduced cost, and improved design of an operating panel can be achieved.

25 Brief Description of the Drawings

[0009]

30 Figure 1 is a front view of an elevator hall in which an elevator operating panel in accordance with a first embodiment of the present invention is installed. Figure 2 is an identification screen of the elevator operating panel in accordance with the first embod-
im-
iment of the present invention.

35 Figure 3 shows a display screen at the time when the user is identified as a general passenger by finger-
print identification using the elevator operating panel in accordance with the first embodiment of the present invention.

40 Figure 4 shows a display screen at the time when the user is identified as maintenance personnel by finger-
print identification using the elevator operating panel in accordance with the first embodiment of the present invention.

45 Figure 5 is a flowchart for explaining the operation of the maintenance mode of the elevator operating panel in accordance with the first embodiment of the present invention.

50 Figure 6 shows a display screen at the time when the user is identified as management personnel by finger-
print identification using the elevator operating panel in accordance with the first embodiment of the present invention.

55 Figure 7 is a flowchart for explaining the operation of the secret mode of the elevator operating panel in accordance with the first embodiment of the present invention.

Figure 8 shows a display screen at the time when

the fingerprint is not identified by the elevator operating panel in accordance with the first embodiment of the present invention.

Figure 9 is a flowchart for explaining the operation of the elevator operating panel in accordance with the first embodiment of the present invention.

Figure 10 is a flowchart for explaining the operation of an elevator operating panel in accordance with a second embodiment of the present invention.

Figure 11 shows a destination floor registration screen of an elevator operating panel in accordance with a third embodiment of the present invention.

Figure 12 shows a display screen in the case where the fingerprint has not been identified on the elevator operating panel in accordance with the third embodiment of the present invention.

Figure 13 is a flowchart for explaining the operation of the elevator operating panel in accordance with the third embodiment of the present invention.

Figure 14 is a flowchart for explaining the operation of an elevator operating panel in accordance with a fourth embodiment of the present invention.

Figure 15 shows a display screen in the case where a destination floor is inputted by using an elevator operating panel in accordance with a fifth embodiment of the present invention.

Figure 16 is a flowchart for explaining the operation of the elevator operating panel in accordance with the fifth embodiment of the present invention.

Figure 17 shows a recognition screen of an elevator operating panel in accordance with a sixth embodiment of the present invention.

Figure 18 shows a first example of the destination floor registration screen of the elevator operating panel in accordance with the sixth embodiment of the present invention.

Figure 19 shows a second example of the destination floor registration screen of the elevator operating panel in accordance with the sixth embodiment of the present invention.

Figure 20 is a flowchart for explaining the operation of the elevator operating panel in accordance with the sixth embodiment of the present invention.

Figure 21 is a flowchart for explaining the operation of the elevator operating panel in accordance with a seventh embodiment of the present invention.

Figure 22 shows a display screen for explaining a method for changing over the mode on an elevator operating panel in accordance with an eighth embodiment of the present invention.

Figure 23 is a flowchart for explaining the operation of the elevator operating panel in accordance with the eighth embodiment of the present invention.

Description of Embodiments

[0010] Embodiments for carrying out the present invention will now be described with reference to the ac-

companying drawings. In the drawings, the same reference signs are applied to the same or equivalent elements, and the duplicated explanation thereof is simplified or omitted.

5

First embodiment

[0011] Figure 1 is a front view of an elevator hall in which an elevator operating panel in accordance with a 10 first embodiment of the present invention is installed.

In Figure 1, reference sign 1 denotes an elevator hall. This hall 1 is provided on every floor of a building in which the elevator is installed. In this embodiment, the building is 8-storied. The first to sixth stories are generally available stories, and on the other hand, the seventh and eighth stories are stories that can be used only by persons permitted especially such as maintenance personnel, management personnel, and the like of the building and elevator.

[0012] Reference sign 2 denotes a hall entrance. The hall entrances 2 are arranged side by side on the building wall. The hall entrance 2 leads to the entrance of a car having arrived at that hall 1. Reference sign 3 denotes a hall door. The hall doors 3 are provided at the hall entrance 2. The hall doors 3 have a function of opening/closing the hall entrance 2 simultaneously as a car door provided in the car having arrived at that hall 1 is opened and closed.

[0013] Reference sign 4 denotes an indicator. The indicators 4 are provided above the hall entrance 2 on the building wall. The indicators 4 have a function of displaying the position of the elevator car. Reference sign 5 denotes a directional lamp. The directional lamp 5 is provided between both of the hall entrances 2 on the building wall. The directional lamp 5 has a function of displaying the travel direction of elevator.

[0014] Reference sign 6 denotes a touch panel type operating panel. The touch panel type operating panel 6 is provided between both of the hall entrances 2 below the directional lamp 5 on the building wall. The touch panel type operating panel 6 includes a color liquid crystal panel 7 and a display controller 8.

[0015] The color liquid crystal panel 7 is configured so that a semi-transmissive display part is exposed to the hall 1 side. The color liquid crystal panel 7 is constructed by mounting an optical sensor (photodiode) and an amplifier on a glass substrate, and therefore has both of a touch panel function and an image scanner function. That is, the color liquid crystal panel 7 has a function of taking in the image of a substance that touches the display part. Specifically, the color liquid crystal panel 7 has a function of taking in a fingerprint of an elevator user by means of the scanner function when a finger of the elevator user touches the display part.

[0016] The display controller 8 has a function of performing fingerprint identification based on the user's fingerprint taken in by the color liquid crystal panel 7 and of causing an elevator operation screen corresponding

to the user specified by the fingerprint identification to be displayed in the display part of the color liquid crystal panel 7.

[0017] Next, a method for fingerprint identification using the touch panel type operating panel 6 is explained with reference to Figure 2.

Figure 2 is an identification screen of the elevator operating panel in accordance with the first embodiment of the present invention.

In Figure 2, reference sign 9 denotes the identification screen. This identification screen 9 is displayed in the display part of the color liquid crystal panel 7. On the upside of the identification screen 9, a guide of "Touch panel" is displayed. Below this guide display, a transversely long rectangular frame is displayed. Thereby, the user is prompted to touch the inside of the rectangular frame with his/her finger 10. When the user's finger 10 touches the display part of the color liquid crystal panel 7, the color liquid crystal panel 7 takes in the fingerprint from the user's finger 10.

[0018] The display controller 8 compares the fingerprint taken in by the color liquid crystal panel 7 with the fingerprint data for identification stored beforehand to perform fingerprint identification. The fingerprint data for identification is stored by distinguishing the general passengers, the maintenance personnel, and the management personnel from each other. The display controller 8 determines whether the identified user is the general passenger, the maintenance personnel, or the management personnel.

[0019] Next, the display part of the color liquid crystal panel 7 after fingerprint matching is explained with reference to Figures 3 to 8.

Figure 3 shows a display screen at the time when the user is identified as a general passenger by fingerprint identification using the elevator operating panel in accordance with the first embodiment of the present invention.

[0020] As shown in Figure 3, when the user is identified as a general passenger by fingerprint identification, a destination floor registration screen 11 is displayed. Specifically, as the destination floor buttons of the first to sixth stories, numerals "1" to "6" are displayed in such a manner that the numerals each are surrounded by a square frame and are arranged two-dimensionally. Thereby, the general passenger is informed of capability of call registration of the first to sixth floors.

[0021] Figure 4 shows a display screen at the time when the user is identified as maintenance personnel by fingerprint identification using the elevator operating panel in accordance with the first embodiment of the present invention. Figure 5 is a flowchart for explaining the operation of the maintenance mode of the elevator operating panel in accordance with the first embodiment of the present invention.

[0022] As shown in Figure 4, when the user is identified as maintenance personnel by fingerprint identification, a maintenance screen 12 is displayed. Specifically, on the

upside of the display part of the color liquid crystal panel 7, "Maintenance mode" is displayed. Also, on the downside of the display part of the color liquid crystal panel 7, "END" is displayed as a maintenance finish button.

[0023] Further, on the left-hand side in the center of the display part of the color liquid crystal panel 7, numerals "1" to "8" are displayed as the destination floor buttons of the first to eighth stories, and on the right-hand side in the center thereof, "UP", "DOWN", "RUN", "STOP", "ON", and "OFF" are displayed as various operation buttons. The maintenance personnel can perform various elevator operations by touching the destination floor buttons and the various operation buttons. That is, the elevator maintenance can be performed by the maintenance personnel without the installation of switches dedicated to door opening and maintenance in the operating panel.

[0024] At the elevator maintenance time, the general passengers do not use the elevator. Therefore, at the time of maintenance, the maintenance workability is regarded as of major importance as compared with the security. That is, until the maintenance personnel touches the maintenance finish button, the operation mode does not return to the normal mode.

[0025] Specifically, as shown in Figure 5, in step S1, the maintenance screen 12 shown in Figure 4 is displayed, and the control proceeds to step S2. In step S2, it is determined whether or not the finger 10 has touched any of the operation buttons. If the finger 10 has not touched any of the operation buttons, the control proceeds to step S3. In step S3, it is determined whether or not the finger 10 has touched the maintenance finish button. If the finger 10 has not touched the maintenance finish button, the control returns to step S2.

[0026] If the finger 10 has touched the maintenance finish button, the control proceeds to step S4. In step S4, the operation mode returns to the normal mode, and the operation is finished. On the other hand, if the finger 10 has touched any of the operation buttons in step S2, the control proceeds to step S5. In step S5, a predetermined elevator operation corresponding to the operation button touched by the finger 10 is registered, and the control returns to step S1.

[0027] Figure 6 shows a display screen at the time when the user is identified as management personnel by fingerprint identification using the elevator operating panel in accordance with the first embodiment of the present invention. Figure 7 is a flowchart for explaining the operation of the secret mode of the elevator operating panel in accordance with the first embodiment of the present invention.

[0028] As shown in Figure 6, when the user is identified as maintenance personnel by fingerprint identification, a secret floor registration screen 13 is displayed. Specifically, on the upside of the display part of the color liquid crystal panel 7, "Secret floor registration mode" is displayed. In this case, in addition to the numerals "1" to "6", numerals "7" and "8" are displayed as the destination floor buttons of the seventh and eighth stories in such a

manner that each of the numerals is surrounded by a double square frame. Due to the display of the destination floor buttons, the management personnel can make call registration of not only the first to sixth floors but also the seventh and eighth floors. That is, the management personnel can go to the seventh and eighth stories which the general passengers are not permitted to use.

[0029] Specifically, as shown in Figure 7, in step S11, the secret floor registration mode screen 13 shown in Figure 6 is displayed, and the control proceeds to step S12. In step S12, it is determined whether or not the finger 10 has touched the destination floor button before a fixed time has elapsed. If the finger 10 has touched the destination floor button before a fixed time has elapsed, the control proceeds to step S13, and the destination floor corresponding to the destination floor button touched by the finger 10 is registered. Thereafter, the control proceeds to step S14, and the operation mode turns to the normal mode, and the operation is finished. On the other hand, if the finger 10 has not touched the destination floor button before a fixed time has elapsed in step S12, to keep the security, the operation is finished without passing through steps S13 and S14.

[0030] Figure 8 shows a display screen at the time when the fingerprint is not identified by the elevator operating panel in accordance with the first embodiment of the present invention.

As shown in Figure 8, when the user is not any of the general passenger, the maintenance personnel, and the management personnel, and the fingerprint is not identified, an error message screen 14 is displayed.

[0031] Specifically, on the upside of the display part of the color liquid crystal panel 7, "Identification NG" is displayed in such a manner as to be surrounded by a transversely long rectangular frame. Also, in the center of the display part of the color liquid crystal panel 7, "Elevator cannot be operated" is displayed. Thereby, the user is informed of incapability of the use of elevator.

[0032] Next, a series of operations of the touch panel type operating panel is explained with reference to Figure 9.

Figure 9 is a flowchart for explaining the operation of the elevator operating panel in accordance with the first embodiment of the present invention.

[0033] First, in step S21, the identification screen 9 shown in Figure 2 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S22. In step S22, when the user's finger 10 touches the display part of the color liquid crystal panel 7, that finger 10 is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 10, and the control proceeds to step S23. In step S23, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S24. In step S24, it is determined whether or not the user whose fingerprint has been identified is a general passenger.

[0034] If the user whose fingerprint has been identified is a general passenger, the control proceeds to step S25. In step S25, the destination floor registration screen 11 shown in Figure 3 is displayed, and the control proceeds to step S26. In step S26, it is determined whether or not the finger 10 has touched a destination floor button before a fixed time has elapsed. If the finger 10 has not touched a destination floor button before a fixed time has elapsed, the control returns to step S21 to prevent a person whose fingerprint has not been identified from performing the operation of a destination floor button and thereby to keep the security. On the other hand, if the finger 10 has touched a destination floor button before a fixed time has elapsed, the control proceeds to step S27. In step S27, the destination floor corresponding to the destination floor button touched by the finger 10 is registered, and the operation is finished.

[0035] Also, if the user whose fingerprint has been identified is not a general passenger in step S24, the control proceeds to step S28. In step S28, it is determined whether or not the user whose fingerprint has been identified is maintenance personnel. If the user whose fingerprint has been identified is maintenance personnel, the control proceeds to step S29. In step S29, the operation mode turns to the maintenance mode explained with reference to Figures 4 and 5, and the operation is finished.

[0036] On the other hand, if the user whose fingerprint has been identified is not maintenance personnel in step S28, the control proceeds to step S30. In step S30, it is determined whether or not the user whose fingerprint has been identified is management personnel. If the user whose fingerprint has been identified is management personnel, the control proceeds to step S31. In step S31, the operation mode turns to the secret mode explained with reference to Figures 6 and 7, and the operation is finished.

[0037] On the other hand, if the user whose fingerprint has been identified is not management personnel in step S30, the control proceeds to step S32. In step S32, the operation mode turns to any other mode, and the operation is finished. The other modes are set to comply with various customer's request. For example, in the case where the user's fingerprint is identified as a physically handicapped person having been registered beforehand, an elevator operation screen suitable for a physically handicapped person using a wheelchair is displayed in the display part of the color liquid crystal panel 7.

[0038] If the fingerprint has not been identified in step S23, the control proceeds to step S33. In step S33, the error message screen 14 shown in Figure 8 is displayed in the display part of the color liquid crystal panel 7. The control returns to step S21, and the above-described operation is repeated.

[0039] According to the first embodiment explained above, the display controller 8 performs fingerprint identification based on the user's fingerprint taken in by the color liquid crystal panel 7, and causes the elevator operation screen corresponding to the user specified by the

fingerprint identification to be displayed in the display part of the color liquid crystal panel 7. Therefore, individual recognition can be made without separately providing a device for specifying the individual, such as a fingerprint matching device, a card reader, or a keypad, so that the thinned shape, saved space, reduced cost, and improved design of the touch panel type operating panel 6 can be achieved.

[0040] Also, using one display screen, the elevator operation screens suitable for various users can be displayed. Further, if the touch panel type operating panel 6 of this embodiment is applied to an apartment building, the security can be improved.

[0041] In the first embodiment, the case where the touch panel type operating panel 6 is provided in the hall 1 has been explained. However, the touch panel type operating panel 6 may be provided in the car. In this case, as a screen for management personnel, the operation screen of an air conditioner for air-conditioning the interior of the car and a lighting device for lighting the interior of the car may be displayed. Also, the configuration may be made such that the user's fingerprint is taken in at an arbitrary position of the display part of the color liquid crystal panel 7. In this case, there can be provided the touch panel type operating panel 6 of universal design which can be used easily for the fingerprint identification work by everybody, such as a tall user, a short user, and a user on a wheelchair.

Second embodiment

[0042] Figure 10 is a flowchart for explaining the operation of an elevator operating panel in accordance with a second embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment, and the duplicated explanation thereof is omitted.

[0043] In the first embodiment, as shown in step S26 in Figure 9, if the finger 10 has not touched any of the destination floor buttons within a fixed time, the control returns to step S21, and the display part of the color liquid crystal panel 7 returns to the identification screen 9. However, there is also a possibility that the user inadvertently touches a position deviating from the destination floor button and fails to register the destination floor. Accordingly, in the second embodiment, the configuration is made such that if the user's finger 10 touches the display part of the color liquid crystal panel 7 within a fixed time, the display of the destination floor buttons is maintained, and the display part of the color liquid crystal panel 7 does not return to the identification screen 9. Hereunder, points that are different from the first embodiment are explained.

[0044] As shown in Figure 10, in step S34 after step S25, it is determined whether or not the finger 10 has been detected by the color liquid crystal panel 7 before a fixed time has elapsed. If the finger 10 has been detected before a fixed time has elapsed, the control pro-

ceeds to step S35. In step S35, it is determined whether or not the finger 10 has touched any of the destination floor buttons. If the finger 10 has touched any of the destination floor buttons, the control proceeds to step S27, and the destination floor corresponding to the destination floor button touched by the finger 10 is registered. On the other hand, if the finger 10 has not touched any of the destination floor buttons, the control returns again to step S34 and the display part of the color liquid crystal panel 7 returns to the identification screen 9 in step S21 only when the finger 10 has not been detected before a fixed time has elapsed.

[0045] According to the second embodiment explained above, when the user's finger 10 has been detected at a position other than the display position of the destination floor buttons of the display part of the color liquid crystal panel 7 within a fixed time, the display controller 8 causes the color liquid crystal panel 7 to keep the display of the destination floor buttons. Therefore, the operability of the touch panel type operating panel 6 can be improved further.

Third embodiment

[0046] Figure 11 shows a destination floor registration screen of an elevator operating panel in accordance with a third embodiment of the present invention. Figure 12 shows a display screen in the case where the fingerprint has not been identified on the elevator operating panel in accordance with the third embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment, and the duplicated explanation thereof is omitted.

[0047] In the first embodiment, as shown in Figure 2, the identification screen 9 dedicated to fingerprint identification is displayed in the initial state. On the other hand, in the third embodiment, as shown in Figure 11, a destination floor registration screen 15 equivalent to the destination floor registration screen 11 of the first embodiment shown in Figure 3 is displayed. In the third embodiment when the user's finger 16 touches a destination floor button, the fingerprint is identified, and at the same time, the destination floor is registered. In Figure 11, when the user's finger 16 touches a destination floor button 17 indicated by numeral "6", the fingerprint is identified, and also the sixth floor is registered as a destination floor. At this time, the destination floor button 17 indicated by numeral "6" lights up. Thereby, the user is informed of the registration of the sixth floor as a destination floor.

[0048] In the third embodiment, as shown in Figure 12, even if a finger 18 of a user whose fingerprint has not been identified touches a destination floor button, the destination floor is not registered. That is, in Figure 12, even if the finger 18 of the user whose fingerprint has not been identified touches the destination floor button 17 indicated by numeral "6", the sixth floor is not registered as a destination floor. At this time, on the downside of

the display part of the color liquid crystal panel 7, "guidance to 6th floor cannot be given" is displayed as an error message 19.

[0049] Next, the operation of the touch panel type operating panel 6 in accordance with the third embodiment is explained with reference to Figure 13.

Figure 13 is a flowchart for explaining the operation of the elevator operating panel in accordance with the third embodiment of the present invention.

First, in step S41, the destination floor registration screen 15 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S42. In step S42, when the user's finger 16, 18 touches the display part of the color liquid crystal panel 7, that finger is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 16, 18, and the control proceeds to step S43. In step S43, it is determined whether or not the finger 16, 18 has touched any of the destination floor buttons.

[0050] If the finger 16, 18 has not touched any of the destination floor buttons, the control returns to step S41. On the other hand, if the finger 16, 18 has touched any of the destination floor buttons, the control proceeds to step S44. In step S44, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S45, and as shown in Figure 11, the destination floor corresponding to the destination floor button touched by the finger 16 is registered, thereby finishing the operation. On the other hand, if the user's fingerprint has not been identified, the control proceeds to step S46, and as shown in Figure 12, the error message 19 is displayed, the control returning to step S41.

[0051] The buttons displayed as the initial state are not subject to any special restriction if they are elevator operation buttons. That is, the configuration has only to be such that the fingerprint matching and the elevator operation registration can be accomplished at the same time.

[0052] According to the third embodiment explained above, when the elevator operation buttons are displayed beforehand in the display part of the color liquid crystal panel 7, and the user's finger 16, 18 touches the operation button, the display controller 8 performs fingerprint matching, and if the fingerprint is identified by the fingerprint matching, the display controller 8 registers the elevator operation corresponding to the operation button: Therefore, by one operation of the user, the fingerprint matching and the destination floor registration can be accomplished at the same time, so that the operability is improved. Also, thereby, the operation efficiency of elevator can be improved.

Fourth embodiment

[0053] Figure 14 is a flowchart for explaining the operation of an elevator operating panel in accordance with a fourth embodiment of the present invention. The same reference signs are applied to elements that are the same

as or equivalent to those in the third embodiment and the like, and the duplicated explanation thereof is omitted.

[0054] In the third embodiment, fingerprint identification is needed for the registration of all of the floors. On the other hand, in the fourth embodiment, fingerprint identification is needed for the registration of a specified floor only. Specifically, in the fourth embodiment, the elevator stops at six floors, and although fingerprint identification is not needed for the registration of the first to fifth floors, and the general passengers can be guided to these floors, only the specified persons whose fingerprints have been identified are guided to the sixth floor. Hereunder, the operation of the touch panel type operating panel in accordance with the fourth embodiment is explained with reference to Figure 14.

[0055] First, in step S41, the destination floor registration screen 15 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S42. In step S42, when the user's finger 16, 18 touches the display part of the color liquid crystal panel 7, that finger 16, 18 is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 16, 18, and the control proceeds to step S47. In step S47, it is determined whether or not the finger 16, 18 has touched the destination floor button corresponding to the sixth floor.

[0056] If the finger 16, 18 has touched the destination floor button corresponding to the sixth floor, the control proceeds to step S48. In step S48, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S49. In step S49, the sixth floor is registered as a destination floor. On the other hand, if the fingerprint matching is not performed, the control proceeds to step S50. In step S50, the error message 19 is displayed, and the control returns to step S41.

[0057] On the other hand, if the finger 16, 18 has not touched the destination floor button corresponding to the sixth floor in step S47, the control proceeds to step S51. In step S51, it is determined whether or not the finger 16, 18 has touched a destination floor button corresponding to a floor other than the sixth floor. If the finger 16, 18 has touched a destination floor button corresponding to a floor other than the sixth floor, the control proceeds to step S49, and the destination floor corresponding to the destination floor button touched by the finger 16, 18 is registered, thereby finishing the operation. On the other hand, if the finger 16, 18 has not touched a destination floor button corresponding to a floor other than the sixth floor, the control returns to step S41.

[0058] According to the fourth embodiment explained above, when the user's finger 16, 18 touches a specified destination floor button of the plurality of destination floor buttons, fingerprint identification is performed, and the destination floor corresponding to the specified destination floor button is registered. On the other hand, when the user's finger 16, 18 touches a destination floor button other than the specified destination floor button, finger-

print identification is not performed, and the destination floor corresponding to the destination floor button other than the specified destination floor button is registered. Therefore, the operation efficiency of elevator can be improved further.

Fifth embodiment

[0059] Figure 15 shows a display screen in the case where a destination floor is inputted by using an elevator operating panel in accordance with a fifth embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment and the like, and the duplicated explanation thereof is omitted.

[0060] In the first embodiment, the destination floor is registered by touching the destination floor button displayed in the display part of the color liquid crystal panel 7. On the other hand, in the fifth embodiment, the destination floor is registered by drawing a numeral by handwriting operation with a finger on a handwriting registration screen 20 of the color liquid crystal panel 7. At this time, fingerprint identification is also performed at the same time.

[0061] Specifically, as shown in Figure 15, on the upside of the handwriting registration screen 20 in the initial state, "Trace destination floor with finger" is displayed. Thereby, the user is prompted to trace the destination floor on the handwriting registration screen 20. In Figure 15, the user is tracing numeral "3" with his/her finger 21 on the handwriting registration screen 20. The color liquid crystal panel 7 takes in the movement locus of the finger 21 by using the scanner function. The display controller 8 determines whether or not the locus of the finger 21 taken in by the color liquid crystal panel 7 agrees with the character "3" registered beforehand, and makes character recognition.

[0062] Next, the operation of the touch panel type operating panel 6 in accordance with the fifth embodiment is explained with reference to Figure 16.

Figure 16 is a flowchart for explaining the operation of the elevator operating panel in accordance with the fifth embodiment of the present invention.

First, in step S61, the handwriting registration screen 20 shown in Figure 15 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S62. In step S62, when the user's finger 21 touches the display part of the color liquid crystal panel 7, that finger 21 is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 21, and the control proceeds to step S63.

[0063] In step S63, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S64. In step S64, the character is recognized and determined, and the control proceeds to step S65. In step S65, it is determined whether or not the handwritten character agrees with the

character pattern. If the handwritten character agrees with the character pattern, the control proceeds to step S66. In step S66, the destination floor corresponding to the numeral having agreed with the character pattern is registered.

On the other hand, if the fingerprint has not been identified by the fingerprint matching in step S63, or if the handwritten character does not agree with the character pattern in step S65, the control proceeds to step S67. In step S67, the error message screen 14 that is the same as that shown in Figure 8 of the first embodiment is displayed, and the control returns to step S61.

[0064] The character to be recognized is not limited to the numeral corresponding to the destination floor. That is, the configuration has only to be made such that if various elevator operations are caused to have one to one correspondence to various characters, various elevator operations can be registered by tracing various characters on the display part of the color liquid crystal panel 7.

[0065] According to the fifth embodiment explained above, the display controller 8 makes character recognition based on the movement locus of the finger 21 on the display part of the color liquid crystal panel 7, and registers the elevator operation corresponding to the character recognized by character recognition. Therefore, the display part of the color liquid crystal panel 7 can be made such as to have a simple design. Thereby, the design and visibility of the color liquid crystal panel 7 can be improved.

[0066] Especially in the case of a multi-stop elevator, the number of service floors increases, and therefore the number of destination floor buttons also increases on the ordinary operating panel. In contrast, on the touch panel type operating panel 6 of the fifth embodiment, the display of destination floor buttons is unnecessary, so that a remarkable effect can be achieved. Also, even a visually impaired person who cannot see the arrangement of destination floor buttons can easily register the destination floor.

Sixth embodiment

[0067] Figure 17 shows a recognition screen of an elevator operating panel in accordance with a sixth embodiment of the present invention. Figure 18 shows a first example of the destination floor registration screen of the elevator operating panel in accordance with the sixth embodiment of the present invention. Figure 19 shows a second example of the destination floor registration screen of the elevator operating panel in accordance with the sixth embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment and the like, and the duplicated explanation thereof is omitted.

[0068] In the first embodiment, the display position of the destination floor buttons does not change. On the other hand, in the sixth embodiment, the display control-

ler 8 changes the position of the elevator operation screen displayed in the display part of the color liquid crystal panel 7 so as to correspond to the position of the display part of the color liquid crystal panel 7 which the user's finger touches. Hereunder, the touch panel type operating panel 6 of the sixth embodiment is explained.

[0069] In Figure 17, reference sign 22 denotes an upper recognition zone, 23 denotes a central recognition zone, and 24 denotes a lower recognition zone. In Figure 17, a finger 25 of the user is touching the central recognition zone 23. In this case, as in the first embodiment, the destination floor buttons are displayed in the central portion of the display part of the color liquid crystal panel 7.

[0070] When the user's finger 25 touches the upper recognition zone 22, the destination floor buttons are displayed in the upper portion of the display part of the color liquid crystal panel 7 as shown in Figure 18. On the other hand, when the user's finger 25 touches the lower recognition zone 24, the destination floor buttons are displayed in the lower portion of the display part of the color liquid crystal panel 7 as shown in Figure 19.

[0071] Next, the operation of the touch panel type operating panel 6 of the sixth embodiment is explained with reference to Figure 20.

Figure 20 is a flowchart for explaining the operation of the elevator operating panel in accordance with the sixth embodiment of the present invention.

[0072] First, in step S71, the identification screen 9 shown in Figure 2 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S72. In step S72, when the user's finger 25 touches the display part of the color liquid crystal panel 7, that finger 25 is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 25, and the control proceeds to step S73. In step S73, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S74.

[0073] In step S74, it is determined whether or not the finger 25 has touched the upper portion of the display part of the color liquid crystal panel 7. If the finger 25 has touched the upper portion of the display part of the color liquid crystal panel 7, the control proceeds to step S75. In step S75, the destination floor registration screen shown in Figure 18 is displayed in the upper portion of the display part of the color liquid crystal panel 7, and the control proceeds to step S76. In step S76, it is determined whether or not the finger 25 has touched any of the destination floor buttons before a fixed time has elapsed. If the finger 25 has touched any of the destination floor buttons, the control proceeds to step S77. In step S77, the destination floor corresponding to the destination floor button touched by the finger 25 is registered, and the operation is finished. On the other hand, if the finger 25 has not touched any of the destination floor buttons, the control returns to step S71.

[0074] On the other hand, if the finger 25 has not touched the upper portion of the display part of the color liquid crystal panel 7 in step S74, the control proceeds to step S78. In step 78, it is determined whether or not the finger 25 has touched the central portion of the display part of the color liquid crystal panel 7. If the finger 25 has touched the central portion of the display part of the color liquid crystal panel 7, the control proceeds to step S79.

In step S79, as in the first embodiment, the destination floor registration screen shown in Figure 3 is displayed in the central portion of the color liquid crystal panel 7, and the operation is finished after passing through steps S76 and S77.

[0075] On the other hand, if the finger 25 has not touched the central portion of the display part of the color liquid crystal panel 7 in step S78, the control proceeds to step S80. In step S80, it is determined whether or not the finger 25 has touched the lower portion of the display part of the color liquid crystal panel 7. If the finger 25 has

touched the lower portion of the color liquid crystal panel 7, the destination floor registration screen shown in Figure 19 is displayed in the lower portion of the color liquid crystal panel 7, and the operation is finished after passing through steps S76 and S77.

[0076] If the fingerprint has not been identified in step S73, the control proceeds to step S81. In step S81, as in the first embodiment, the error message screen 14 shown in Figure 8 is displayed in the display part of the color liquid crystal panel 7, and the control returns to step S71.

[0077] According to the sixth embodiment explained above, the display controller 8 changes the position of the elevator operation screen displayed in the display part of the color liquid crystal panel 7 so as to correspond to the position of the display part of the color liquid crystal panel 7 which the user's finger 25 touches. Therefore, the display position of the destination floor buttons can be made at a proper height according to the user such as a tall user, a short user, and a user on a wheelchair. That is, there can be provided the touch panel type operating panel 6 of universal design that can be used easily by everybody.

Seventh embodiment

[0078] Figure 21 is a flowchart for explaining the operation of the elevator operating panel in accordance with a seventh embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment and the like, and the duplicated explanation thereof is omitted.

[0079] In the sixth embodiment, each time the fingerprint is identified, the touch position of the finger 25 on the color liquid crystal panel 7 is determined. On the other hand, in the seventh embodiment, each time the user's finger 25 touches the display part of the color liquid crystal panel 7, the position of the display part of the color liquid

crystal panel 7 which the user's finger 25 touches is recorded on a storage medium for each user as the finger-print identification position, and the position of the elevator operation screen changes for each user based on the recorded fingerprint identification position. Hereunder, the operation of the touch panel type operating panel 6 of the seventh embodiment is explained specifically.

[0080] First, in step S91, the identification screen 9 shown in Figure 2 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S92. In step S92, when the user's finger 25 touches the display part of the color liquid crystal panel 7, that finger 25 is detected by the color liquid crystal panel 7. Then, the color liquid crystal panel 7 takes in the fingerprint from that finger 25, and the control proceeds to step S93. In step S93, fingerprint matching is performed. If the fingerprint has been identified by the fingerprint matching, the control proceeds to step S94.

[0081] In step S94, the fingerprint and the fingerprint identification position are recorded on a storage medium, and the control proceeds to step S95. In step S95, the destination floor registration display position is determined based on the fingerprint identification position at this time recorded on the storage medium and the fingerprint identification position in the past of the identical fingerprint, and the control proceeds to step 96. In step S96, based on the above-described determination, the destination floor registration screen is displayed as shown in Figure 3, Figure 18, Figure 19, and the like, and the control proceeds to step S97.

[0082] In step S97, it is determined whether or not the finger 25 has touched any of the destination floor buttons before a fixed time has elapsed. If the finger 25 has touched any of the destination floor buttons, the control proceeds to step S98. In step S98, the destination floor corresponding to the destination floor button touched by the finger 25 is registered, and the operation is finished. On the other hand, if the finger 25 has not touched any of the destination floor buttons, the control returns to step S91.

[0083] If the fingerprint has not been identified in step S93, the control proceeds to step S99. In step S99, the error message 19 is displayed in the display part of the color liquid crystal panel 7, and the control returns to step S91.

[0084] According to the seventh embodiment explained above, the position of the elevator operation screen changes for each user based on the recorded touch position of the display part of the color liquid crystal panel 7. Therefore, the data processing time is short, so that the operation efficiency of elevator can be improved.

Eighth embodiment

[0085] Figure 22 shows a display screen for explaining a method for changing over the mode on an elevator operating panel in accordance with an eighth embodiment of the present invention. The same reference signs are applied to elements that are the same as or equivalent to those in the first embodiment and the like, and the duplicated explanation thereof is omitted.

[0086] For the semi-transmissive color liquid crystal panel 7 used in the first to seventh embodiments, the user's finger can be detected at the same time at a plurality of locations of the display part. Therefore, the eighth embodiment is configured so that if a special operation, in which two destination floor buttons are touched continuously for a fixed time or longer at the same time, is performed, the operation mode can be changed over to the secret floor registration mode, the maintenance mode, or the like. The reason of the condition that two destination floor buttons are touched continuously for a fixed time or longer at the same time is that even if two destination floor buttons are touched at the same time inadvertently, the changeover of mode to the secret floor registration mode, the maintenance mode, or the like can be presented.

[0087] Specifically, as shown in Figure 22, if fingers 26 and 27 touch the destination floor buttons indicated by numerals "1" and "5" at the same time for five seconds or longer, the operation mode is changed over to the secret floor registration mode. Also, if the fingers 26 and 27 touch the destination floor buttons indicated by numerals "2" and "6" at the same time for five seconds or longer, the operation mode is changed over to the maintenance mode.

[0088] Next, the operation of the touch panel type operating panel 6 of the eighth embodiment is explained with reference to Figure 23.

Figure 23 is a flowchart for explaining the operation of the elevator operating panel in accordance with the eighth embodiment of the present invention.

[0089] First, in step S101, the destination floor registration screen 11 that is equivalent to that shown in Figure 3 is displayed in the display part of the color liquid crystal panel 7 as the initial state, and the control proceeds to step S102. In step S102, when the user's fingers 26 and 27 touch the display part of the color liquid crystal panel 7, those fingers 26 and 27 are detected by the color liquid crystal panel 7, and the control proceeds to step S103. In step S103, it is determined whether or not the fingers 26 and 27 have touched a plurality of destination buttons at the same time.

[0090] If the fingers 26 and 27 have not touched a plurality of destination buttons at the same time, the control proceeds to step S104. In step S104, if the fingers 26 and 27 have touched one destination floor button, the control proceeds to step S105. In step S105, the destination floor of one floor corresponding to the destination floor button touched by the fingers 26 and 27 is registered. On the other hand, if the fingers 26 and 27 have not touched the destination floor button at all, the control returns to step S101.

[0091] On the other hand, if the fingers 26 and 27 have touched the plurality of destination buttons at the same

time in step S103, the control proceeds to step S106. In step S106, it is determined whether or not the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "1" and "5". If the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "1" and "5", the control proceeds to step S107. In step S107, it is determined whether or not the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "1" and "5" is five seconds or longer.

[0092] If the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "1" and "5" is five seconds or longer, the control proceeds to step S108. In step S108, the operation mode is changed over to the secret floor registration mode explained with reference to Figures 6 and 7, and the operation is finished. On the other hand, if the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "1" and "5" is shorter than five seconds, the control proceeds to step S109. In step S109, the first floor and the fifth floor are registered as the destination floors at the same time.

[0093] Also, if the fingers 26 and 27 have not touched the destination floor buttons indicated by numerals "1" and "5" in step S106, the control proceeds to step S110. In step S110, it is determined whether or not the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "2" and "6". If the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "2" and "6", the control proceeds to step S111. In step S111, it is determined whether or not the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "2" and "6" is five seconds or longer.

[0094] If the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "2" and "6" is five seconds or longer, the control proceeds to step S112. In step S112, the operation mode is changed over to the maintenance mode, and the operation is finished. On the other hand, if the time during which the fingers 26 and 27 have touched the destination floor buttons indicated by numerals "2" and "6" is shorter than five seconds, the control proceeds to step S113. In step S113, the second floor and the sixth floor are registered as the destination floors at the same time.

[0095] Also, if the fingers 26 and 27 have not touched the destination floor buttons indicated by numerals "2" and "6" in step S110, the control proceeds to step S114. In step S114, the destination floors corresponding to the two destination floor buttons touched by the fingers 26 and 27 are registered at the same time. If the fingers 26 and 27 have not touched the destination floor button at all, the control returns to step S101.

[0096] According to the eighth embodiment explained above, when the plurality of fingers 26, 27 are being detected by the color liquid crystal panel 7 for a preset and fixed time or longer, an operation screen of secret floor registration mode, maintenance mode, or the like, which

is the specified function of elevator, is displayed in the display part of the color liquid crystal panel 7. Therefore, the fingerprint identification time is not needed, and only the specified user can operate the elevator specially.

[0097] Besides the first to eighth embodiments, various embodiments are conceivable. For example, the plurality of elevator operation buttons may be displayed at arbitrary positions in the display part of the color liquid crystal panel 7. In this case, destination floor buttons, door opening/closing buttons, UP/DOWN call buttons, ten-key buttons, buttons for operating other optional functions, and the like can be arranged in a free layout.

Industrial Applicability

[0098] As described above, the elevator operating panel in accordance with the present invention can be applied to an elevator having an operating panel capable of saving the space, reducing the cost, and improving the design.

Description of symbols

[0099]

1 elevator hall, 2 hall entrance, 3 hall door, 4 indicator,
 5 directional lamp, 6 touch panel type operating panel,
 7 color liquid crystal panel, 8 display controller, 9 identification screen,
 10 finger, 11 destination floor registration screen,
 12 maintenance screen, 13 secret floor registration screen,
 14 error message screen, 15 destination floor registration screen,
 16 finger, 17 destination floor button, 18 finger, 19 error message,
 20 handwriting registration screen, 21 finger, 22 upper recognition zone,
 23 central recognition zone, 24 lower recognition zone, 25-27 finger.

45 **Claims**

1. An elevator operating panel comprising:

50 a touch panel provided in at least one of a hall and a car of an elevator; and
 a display controller for causing an operation screen of the elevator to be displayed in a display part of the touch panel,
 wherein the touch panel has a scanner function and takes in a fingerprint of a user by means of the scanner function when a finger of the user touches the display part and
 wherein the display controller performs finger-

print identification based on the user's finger-
print taken in by the touch panel and causes the
operation screen of the elevator according to the
user specified by the fingerprint identification to
be displayed in the display part of the touch pan-
el. 5

2. The elevator operating panel according to claim 1,
wherein the touch panel takes in the fingerprint of
the user at an arbitrary position of the display part. 10

3. The elevator operating panel according to claim 1,
wherein the display controller causes a destination
floor button for registering a destination floor of the
elevator to be displayed in the display part as the
operation screen of the elevator and causes the dis-
play of the destination floor button to be kept on the
touch panel when the user's finger is detected at a
position other than the display position of the desti-
nation floor button of the display part within a fixed
time. 15

4. The elevator operating panel according to claim 1,
wherein the display controller causes an operation
button of the elevator to be displayed beforehand in
the display part and performs fingerprint matching
when the user's finger touches the operation button
and registers the operation of the elevator corre-
sponding to the operation button when the fingerprint
is identified by the fingerprint matching. 20

5. The elevator operating panel according to claim 4,
wherein the display controller displays a plurality of
destination floor buttons for registering each of the
destination floors of the elevator as the operation
button, identifies the fingerprint and registers a des-
tination floor corresponding to a specified destination
floor button when the user's finger touches the spec-
ified destination floor button of the plurality of desti-
nation floor buttons and does not perform the finger-
print matching and registers the destination floor cor-
responding to the destination floor button other than
the specified destination floor button when the user's
finger touches a destination floor button other than
the specified destination floor button. 25

6. The elevator operating panel according to claim 1,
wherein the display controller registers the operation
of the elevator corresponding to a character recog-
nized on the basis of the movement locus of the us-
er's finger in the display part. 30

7. The elevator operating panel according to claim 2,
wherein the display controller changes the position
of the operation screen of the elevator displayed in
the display part so as to correspond to the position
of the display part touched by the user's finger. 35

8. The elevator operating panel according to claim 7,
wherein the display controller records the position of
the display part touched by the user's finger for each
user each time the user's finger touches the display
part and changes the position of the operation screen
of the elevator for each user based on the recorded
touch position of the user in the display part. 40

9. The elevator operating panel according to claim 1,
wherein the touch panel detects a plurality of fingers
at the same time in a plurality of locations of the dis-
play part and
wherein the display controller does not perform the
fingerprint identification and causes the operation
screen of the specified function of the elevator to be
displayed in the display part when the touch panel
detects the plurality of fingers continuously for a pre-
set and fixed time or longer at the same time. 45

10. The elevator operating panel according to claim 1,
wherein the display controller causes a plurality of
operation buttons of the elevator to be displayed at
an arbitrary position in the display part of the touch
panel. 50

55

Fig. 1

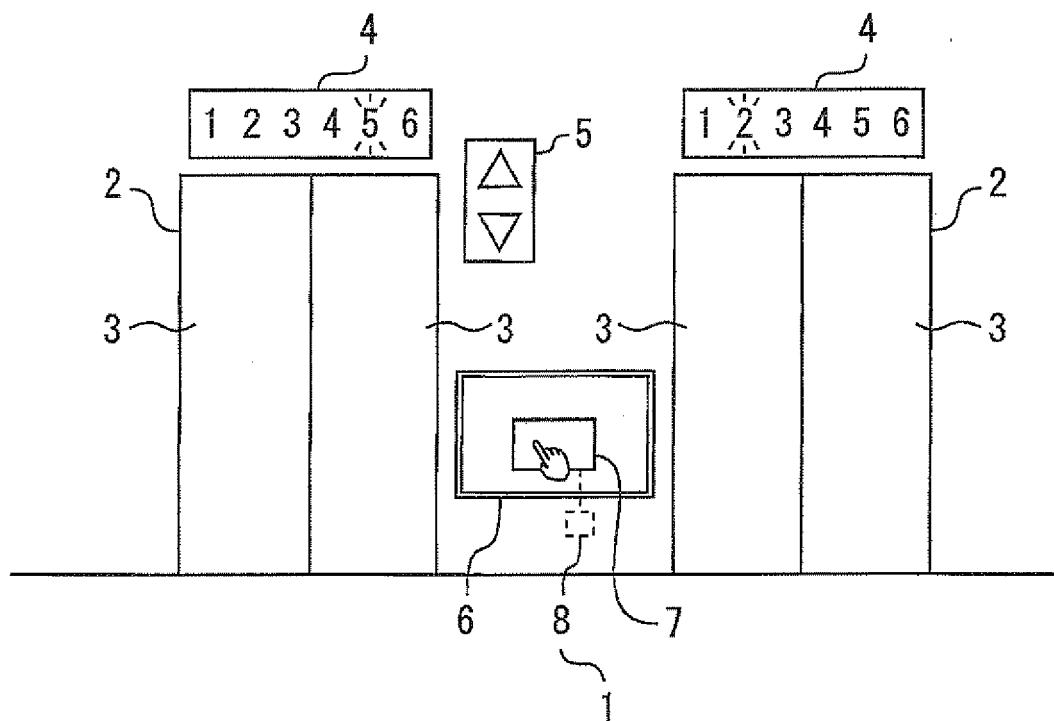


Fig. 2

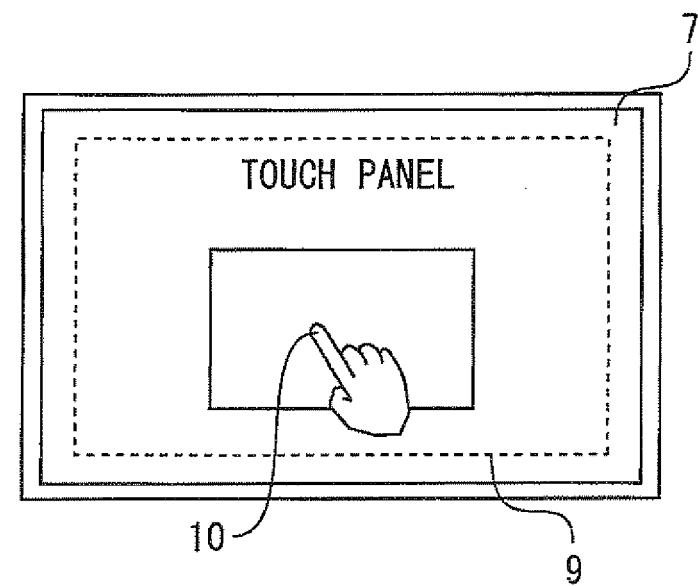


Fig. 3

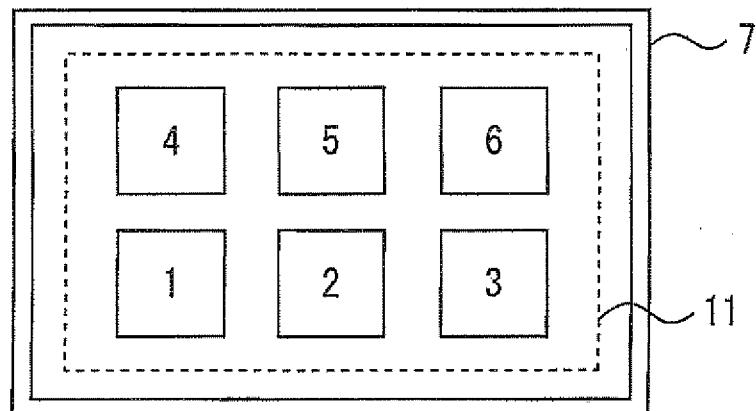


Fig. 4

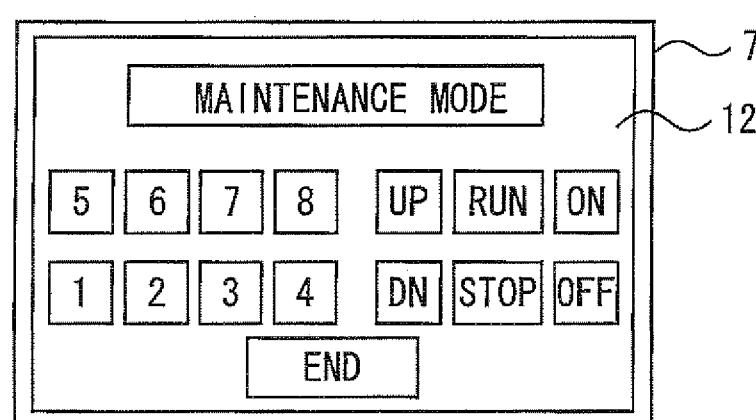


Fig. 5

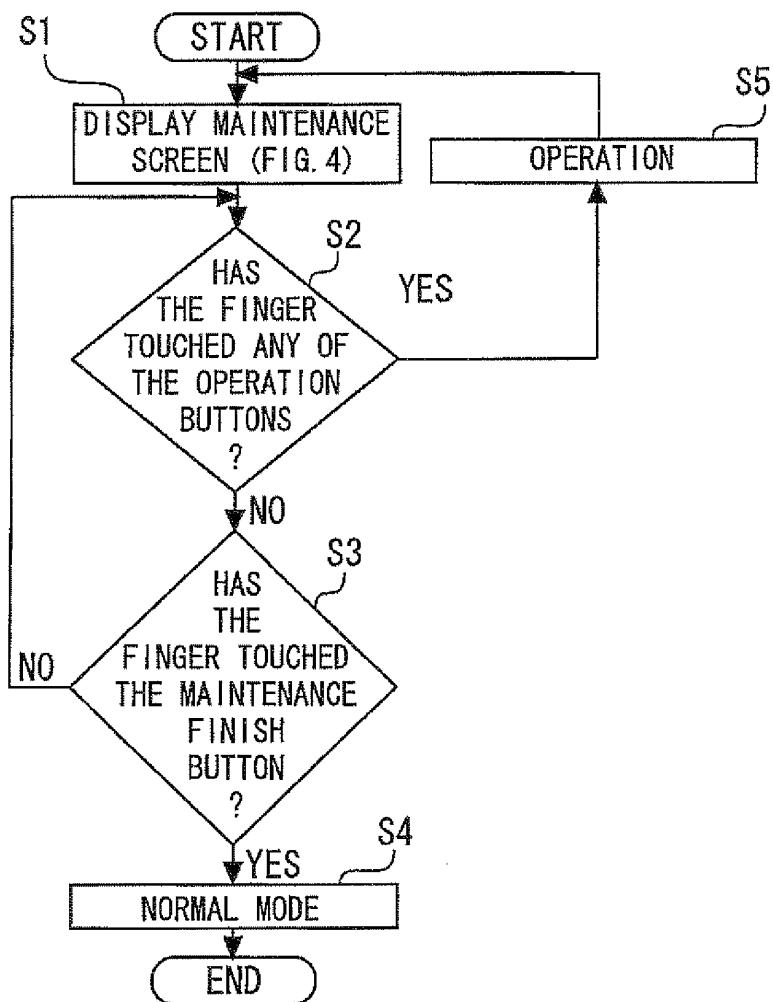


Fig. 6

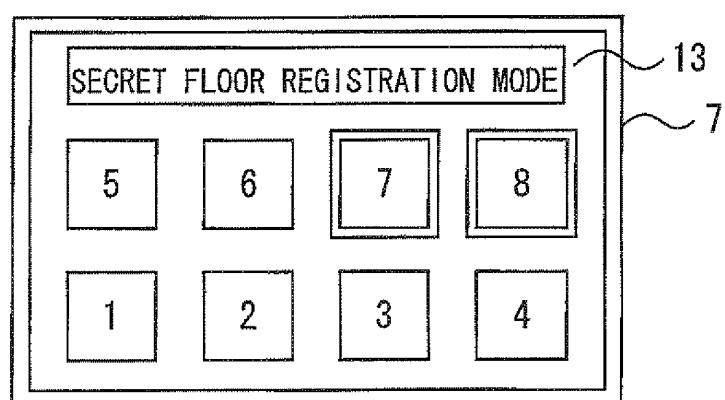


Fig. 7

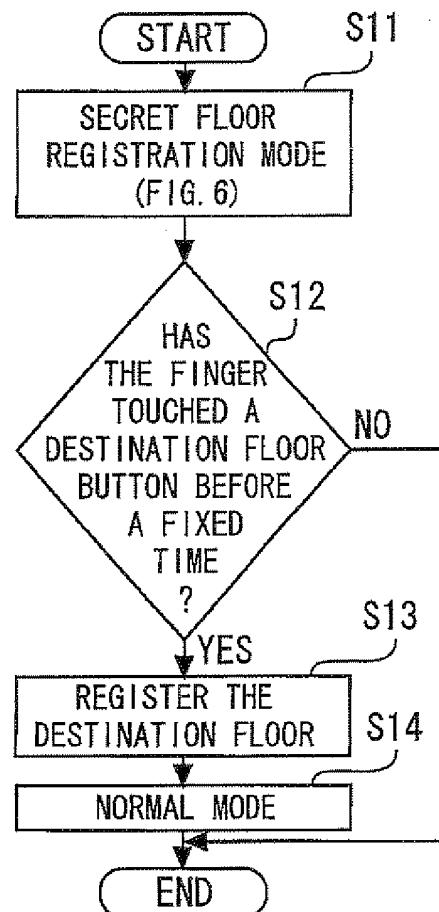


Fig. 8

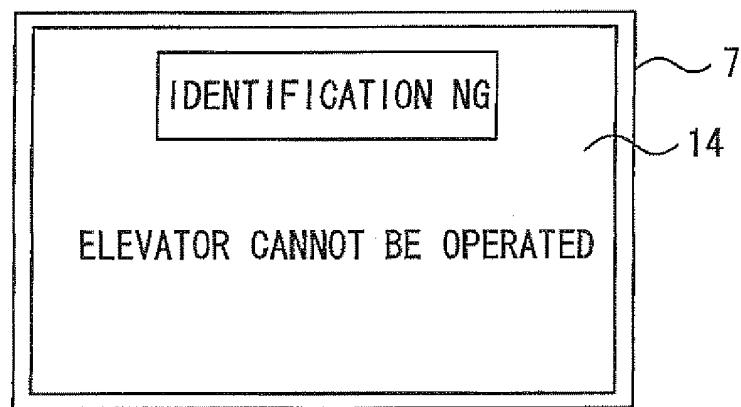


Fig. 9

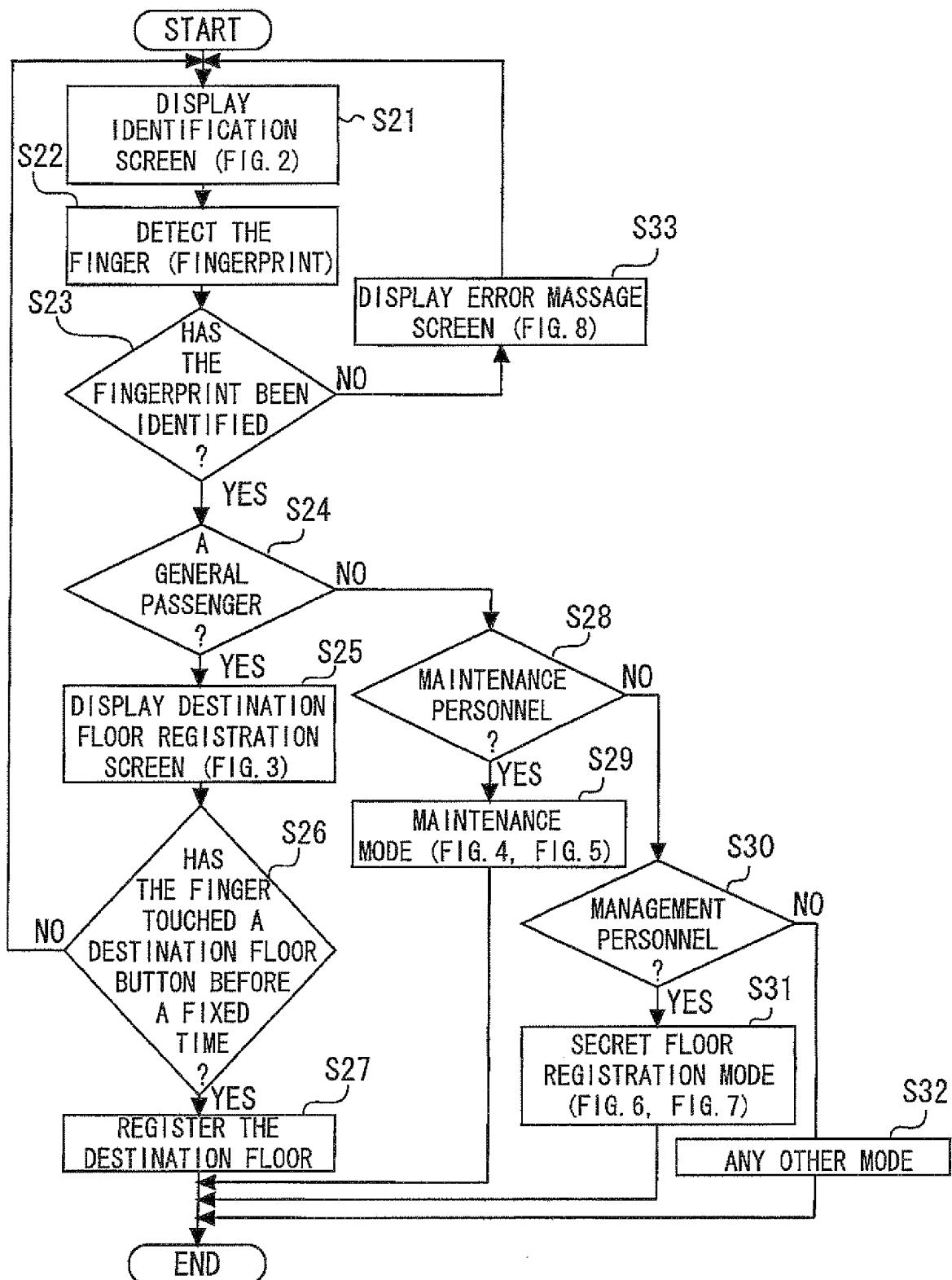


Fig. 10

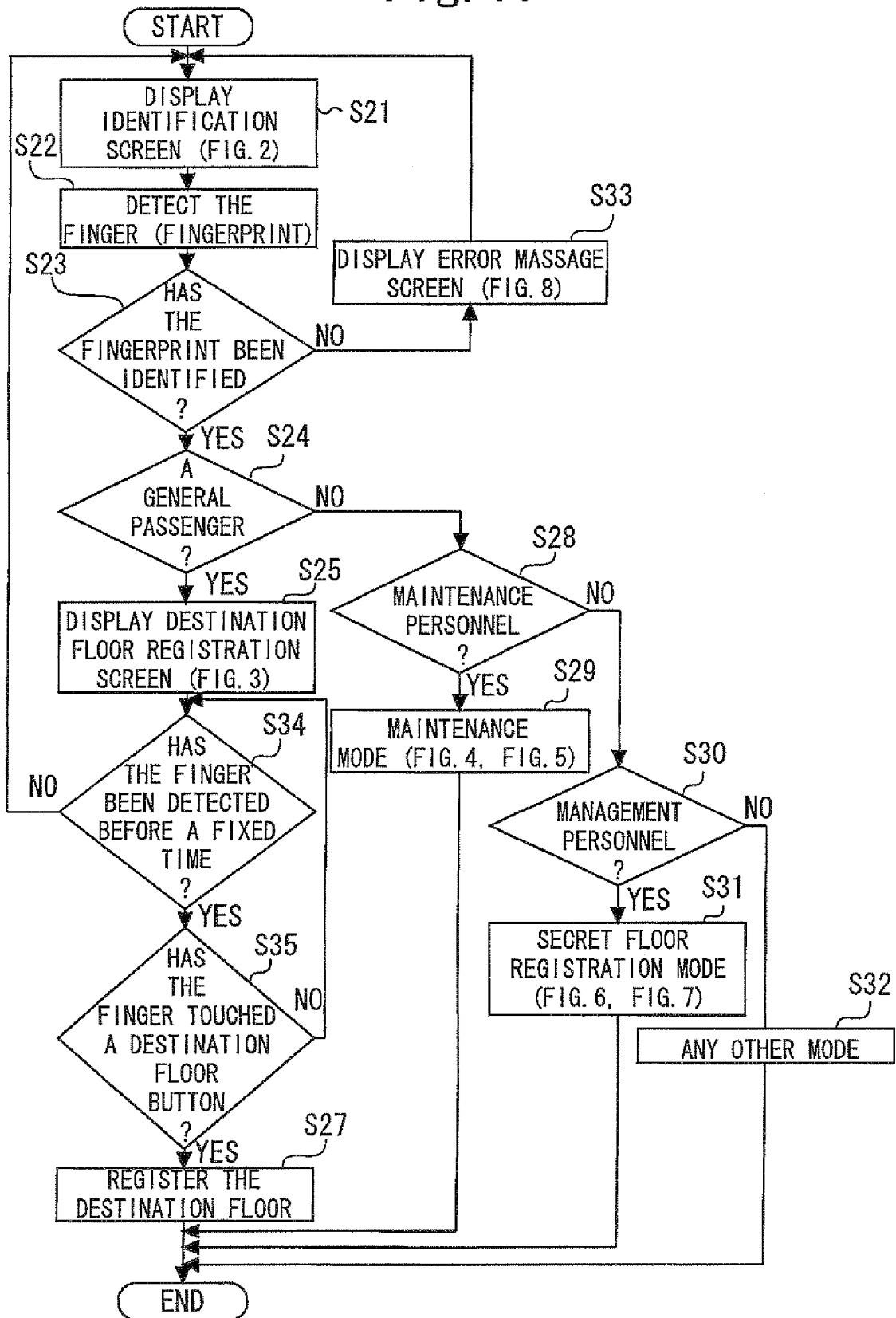


Fig. 11

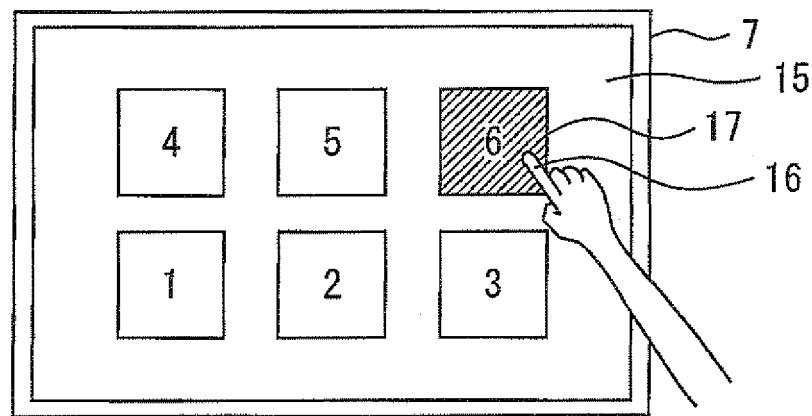


Fig. 12

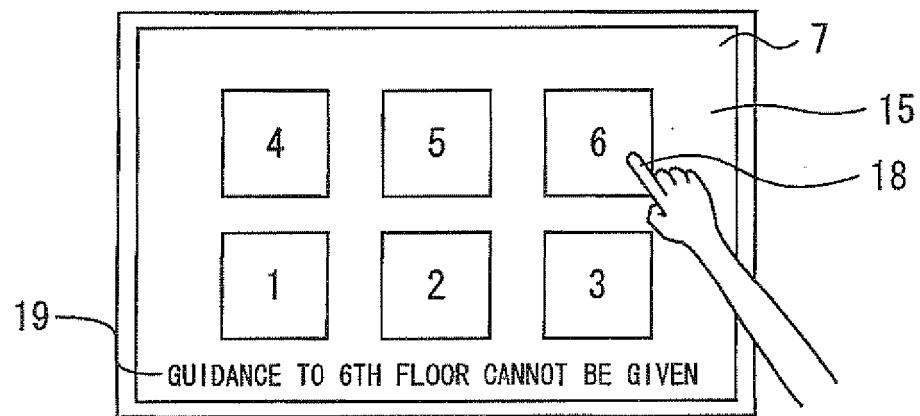


Fig. 13

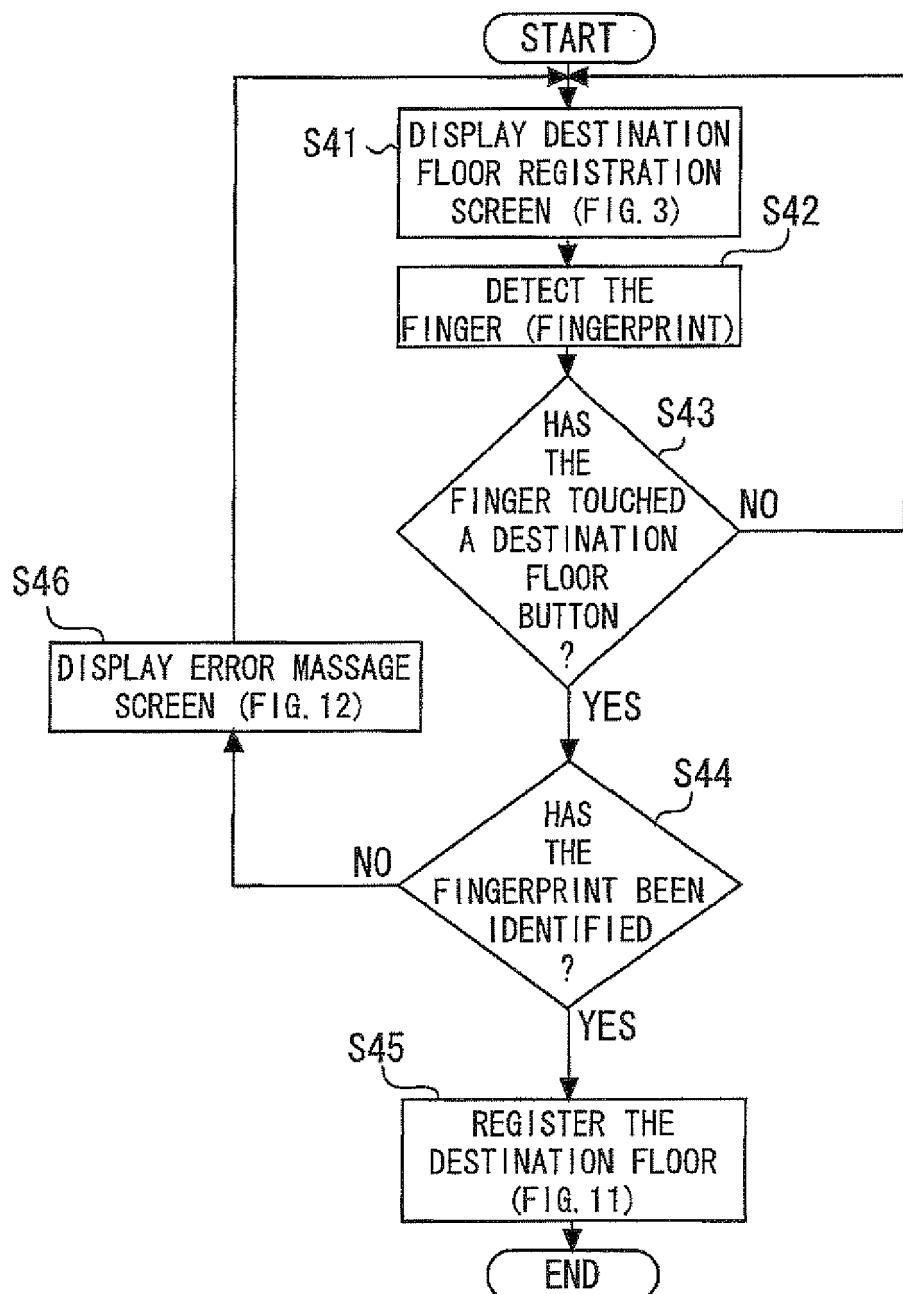


Fig. 14

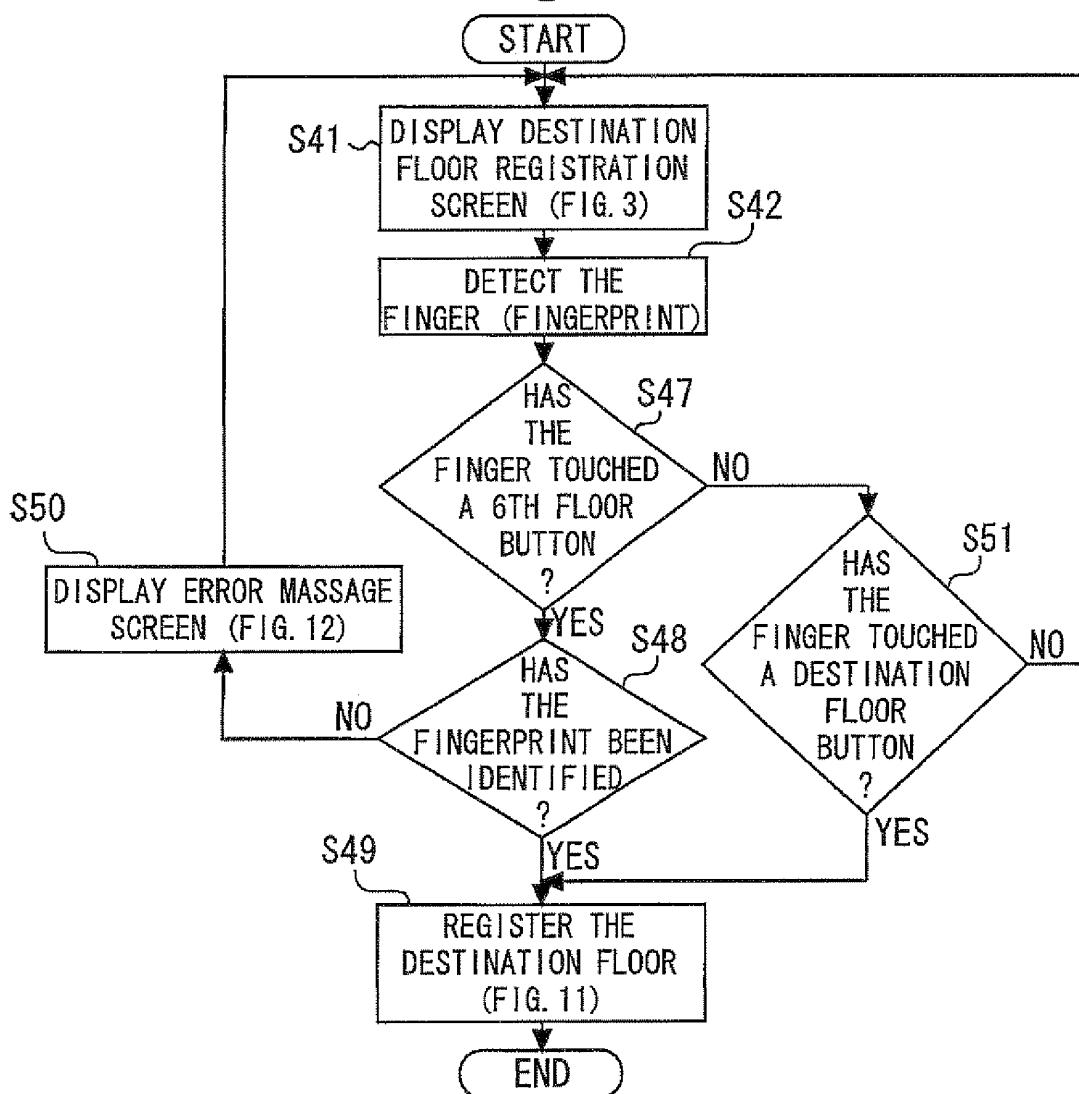


Fig. 15

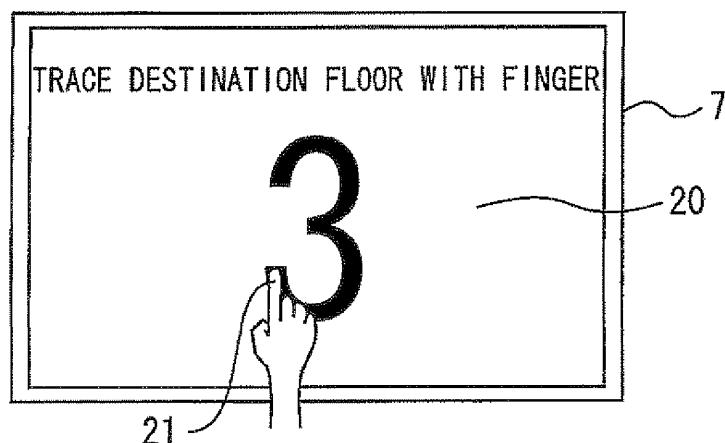


Fig. 16

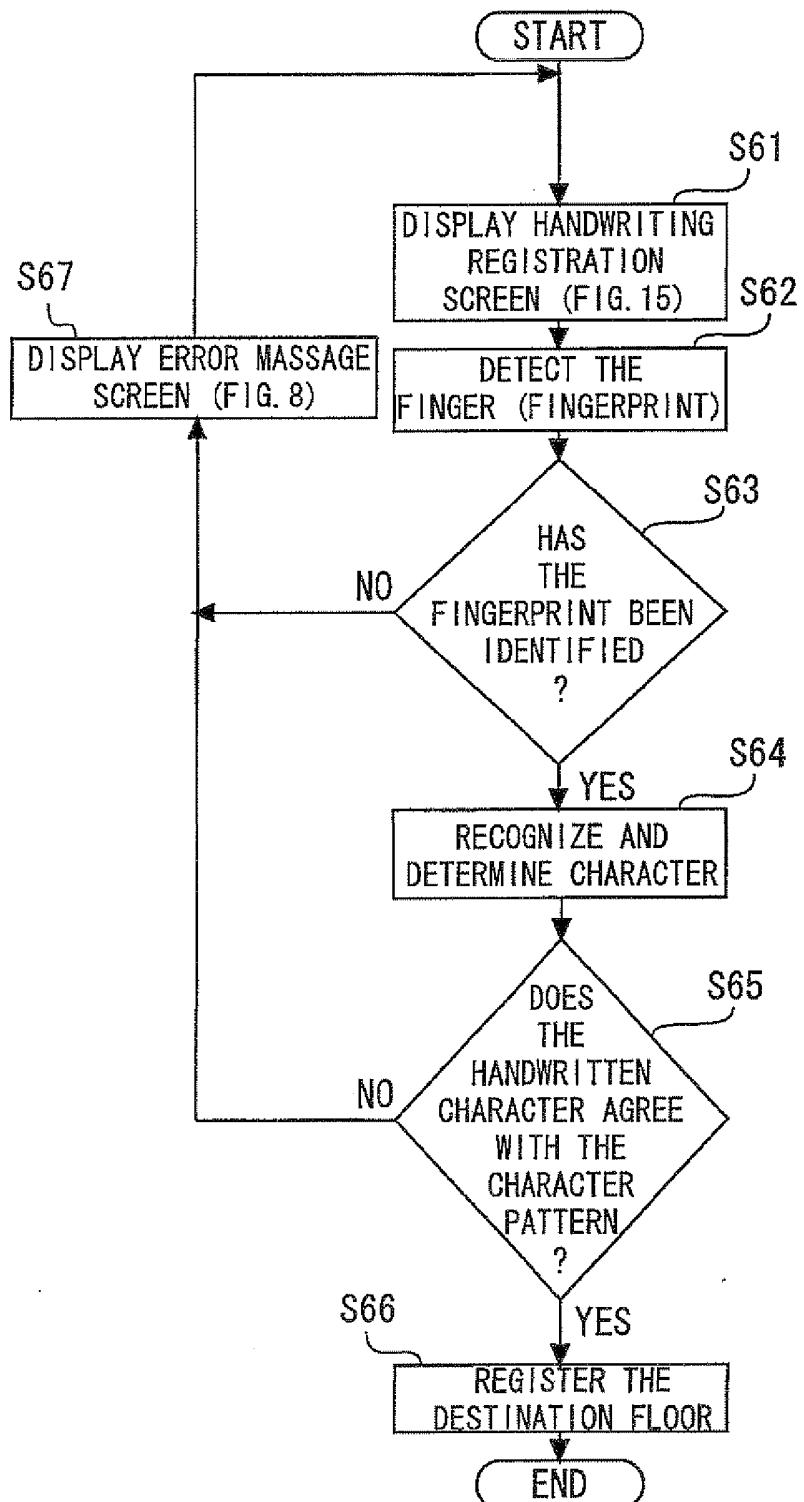


Fig. 17

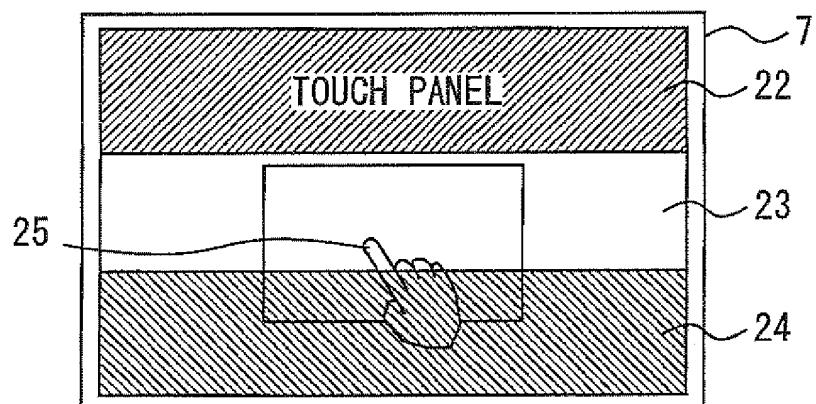


Fig. 18

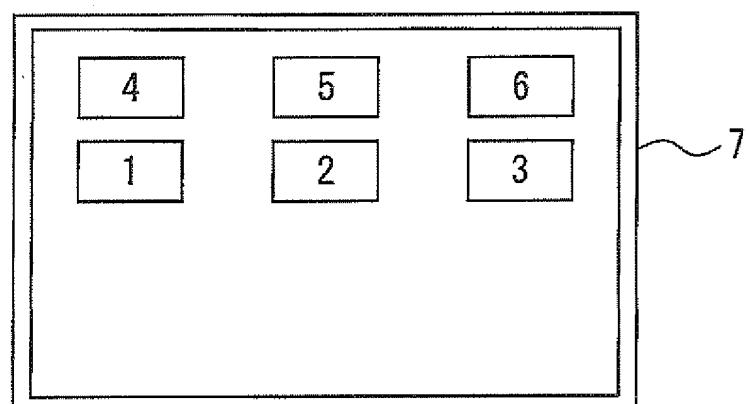


Fig. 19

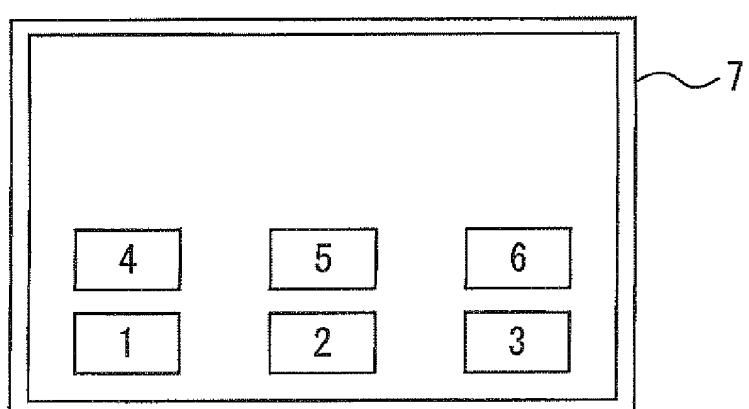


Fig. 20

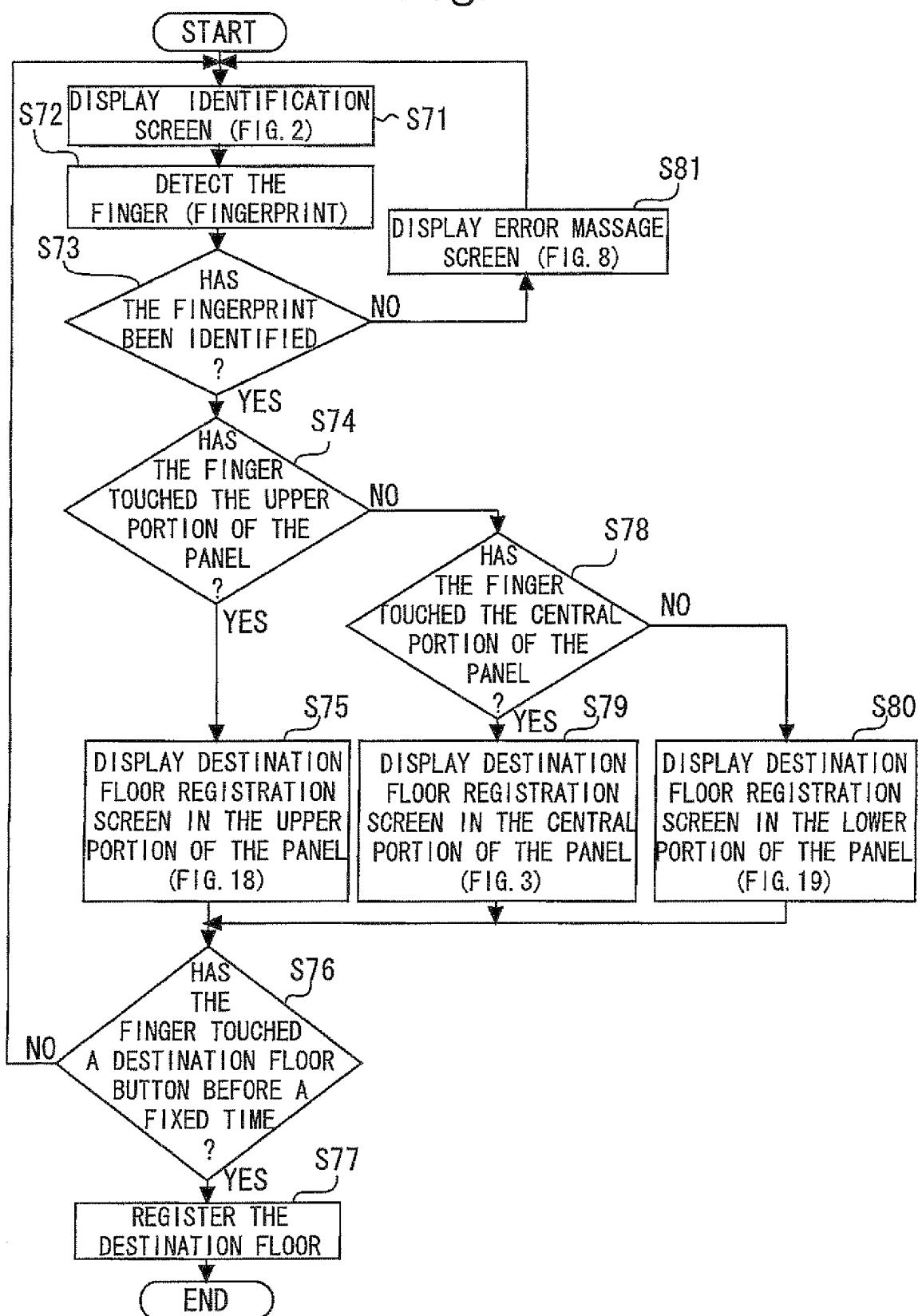


Fig. 21

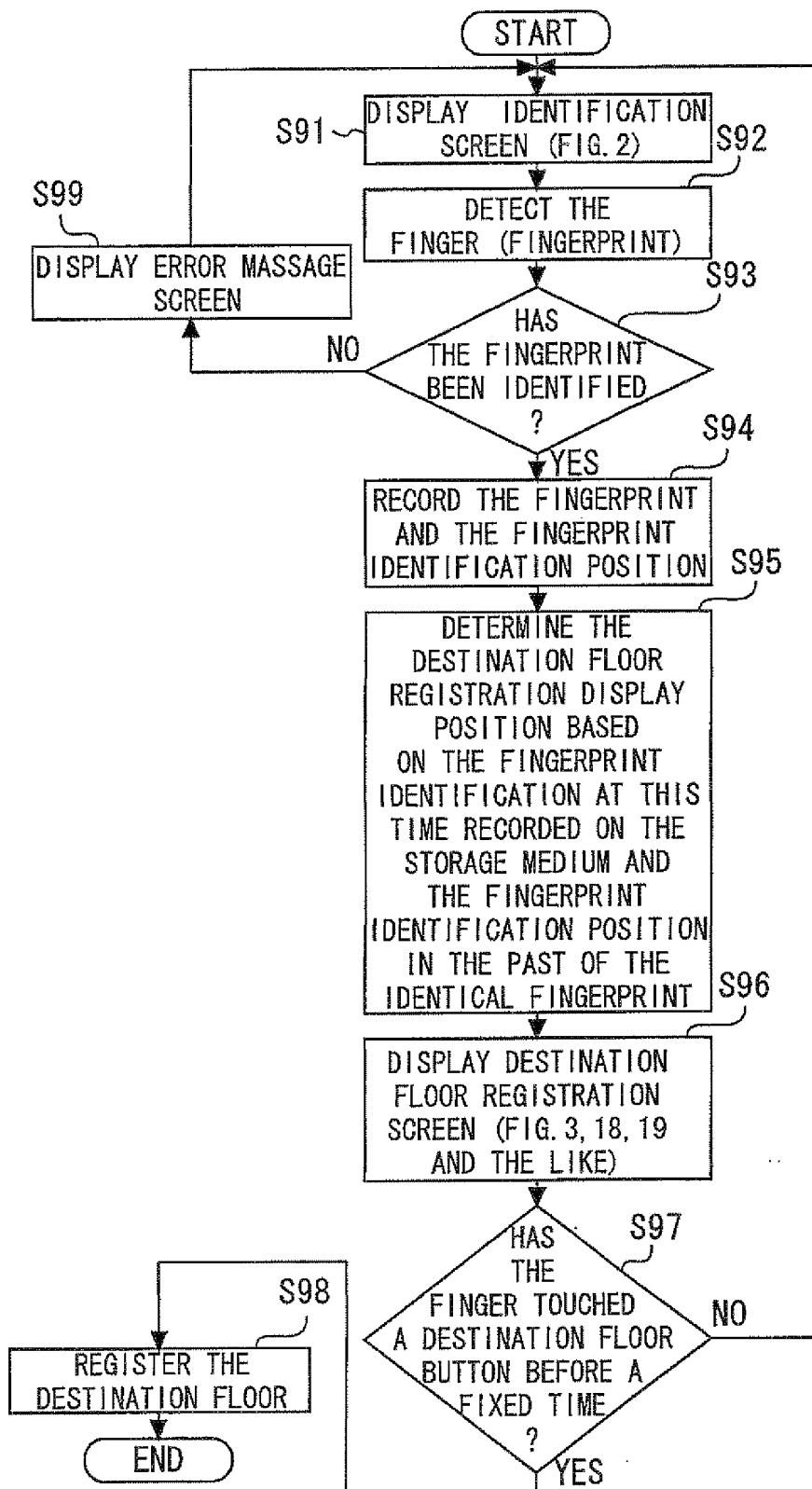


Fig. 22

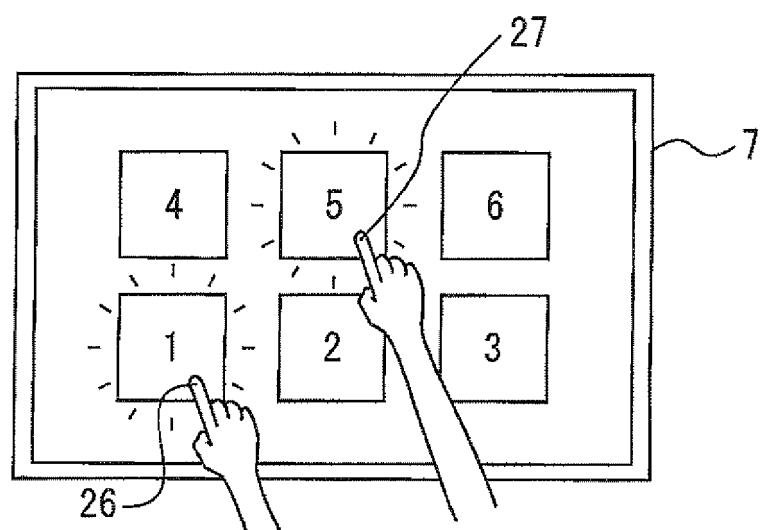
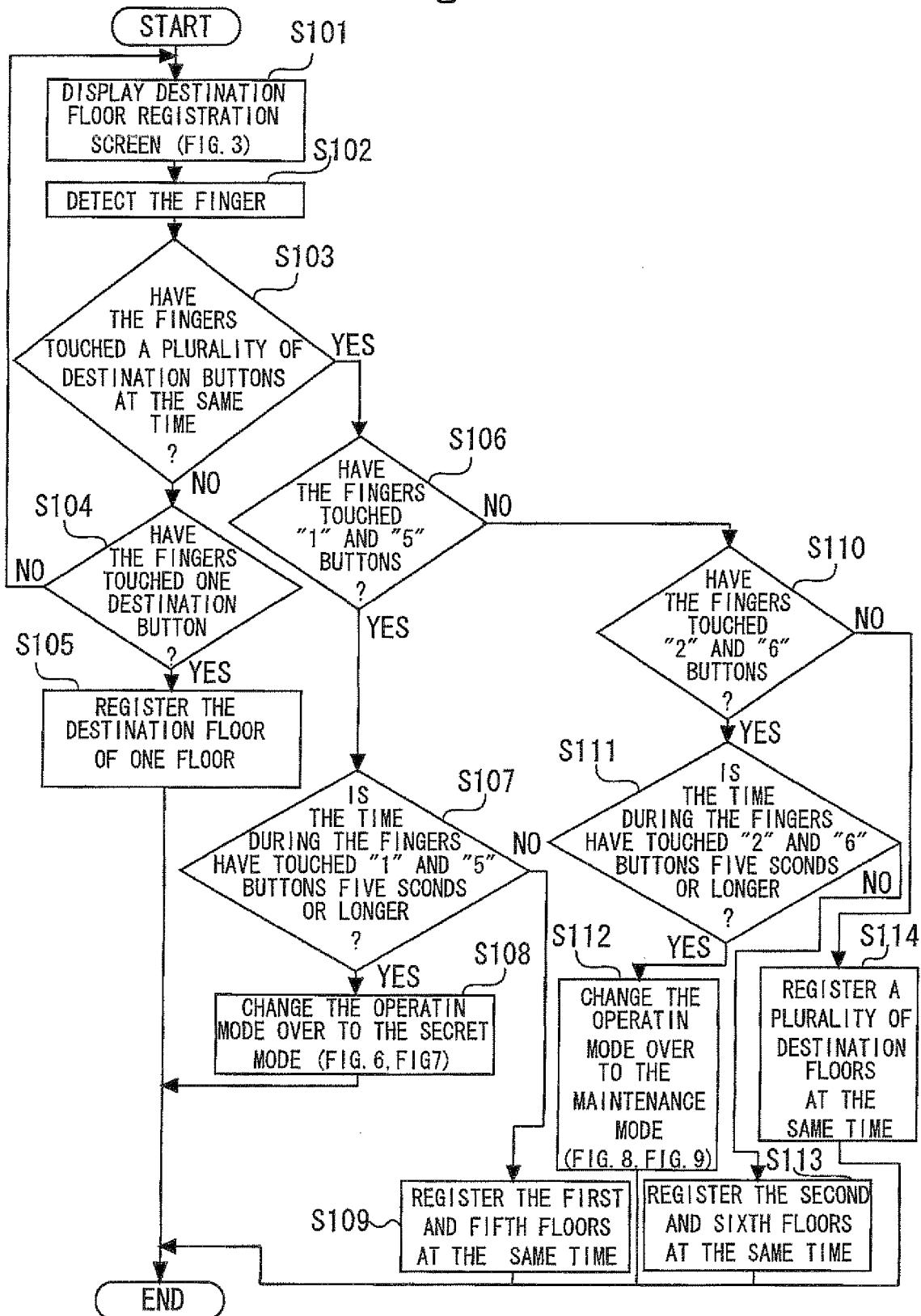


Fig. 23



INTERNATIONAL SEARCH REPORT		International application No. PCT/JP2009/065068												
A. CLASSIFICATION OF SUBJECT MATTER <i>B66B3/00 (2006.01) i, B66B1/14 (2006.01) i</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) <i>B66B3/00, B66B1/14</i>														
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <i>Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009 Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009</i>														
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)														
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Category*</th> <th style="text-align: left; padding: 2px;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="text-align: left; padding: 2px;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">JP 2007-238232 A (Mitsubishi Electric Corp.), 20 September 2007 (20.09.2007), paragraphs [0011] to [0025]; fig. 1 to 2 (Family: none)</td> <td style="text-align: center; padding: 2px;">1-2, 4-8, 10 3, 9</td> </tr> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">JP 2008-123032 A (Toyota Motor Corp.), 29 May 2008 (29.05.2008), paragraphs [0020] to [0104]; all drawings (Family: none)</td> <td style="text-align: center; padding: 2px;">1-2, 4-8, 10</td> </tr> <tr> <td style="text-align: center; padding: 2px;">Y</td> <td style="padding: 2px;">JP 2008-193258 A (Canon Inc.), 21 August 2008 (21.08.2008), paragraphs [0025] to [0055]; all drawings (Family: none)</td> <td style="text-align: center; padding: 2px;">1-2, 4-8, 10</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	JP 2007-238232 A (Mitsubishi Electric Corp.), 20 September 2007 (20.09.2007), paragraphs [0011] to [0025]; fig. 1 to 2 (Family: none)	1-2, 4-8, 10 3, 9	Y	JP 2008-123032 A (Toyota Motor Corp.), 29 May 2008 (29.05.2008), paragraphs [0020] to [0104]; all drawings (Family: none)	1-2, 4-8, 10	Y	JP 2008-193258 A (Canon Inc.), 21 August 2008 (21.08.2008), paragraphs [0025] to [0055]; all drawings (Family: none)	1-2, 4-8, 10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
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Date of the actual completion of the international search 09 November, 2009 (09.11.09)		Date of mailing of the international search report 17 November, 2009 (17.11.09)												
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REFERENCES CITED IN THE DESCRIPTION

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