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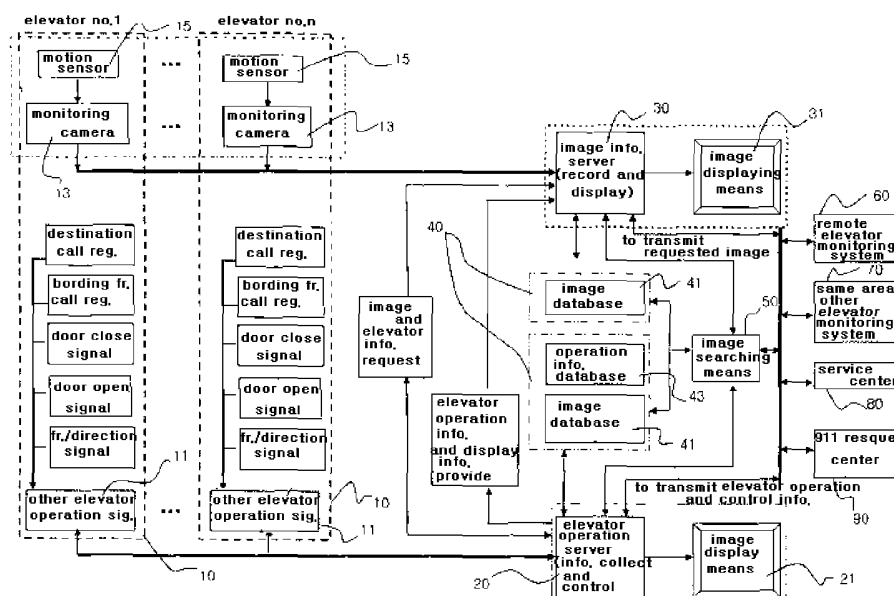
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(54) Title: A MONITORING SYSTEM FOR ELEVATOR OPERATION



(57) Abstract: A monitoring system for elevator operation is disclosed. The monitoring system for elevator operation comprises: an elevator operation server which collects elevators' operation/control information from any control panel corresponding to each elevator and manages control signals with respect to the elevators; an image information server which concurrently displays an elevator operation/control information with respect to each elevator transferred from the elevator operation server and inside images of each elevator and manages the image recording operation and image data with respect to the elevators; and a database which stores recorded inside images of the elevator corresponding to each item and image data belonging to each elevator operation/control information in relation with a specific item of the elevator operation/control information



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Description

A MONITORING SYSTEM FOR ELEVATOR OPERATION

Technical Field

- [1] The present invention relates to a monitoring system for an elevator operation, and in particular to a monitoring system for an elevator operation in which elevator image information and elevator operation information are concurrently displayed, and image information and operation information are searchable by searching each item of the operation information, and searching and controlling operations can be performed at a remote area, so that an elevator can be quickly and efficiently managed for emergency situations.

[2]

Background Art

- [3] The following patent lists are the prior arts adapted in the present invention. Korean patent laid-open No. 10-2004-0032191(laid-open date: April 17, 2004), Korean patent laid-open No. 10-1996-0004196(laid-open date: February 23, 1996), and Korean patent laid-open No. 10-1998-015244(laid-open date: May 25, 1998).
- [4] As life standard advances, and a huge size building such as a high rise building and an apartment increase, an elevator, which is designed to move up and down in a high rise building, became an important transportation means.
- [5] However, an elevator cage which is generally installed in a high rise building or an apartment building and moves up and down, is a closed space. Therefore when the above elevator has an operation failure during operation, the users of the corresponding elevator may have many problems in daily life. In worse case, if passengers' confinements occur, because it makes them feel great anxiety, urgent measurements are necessary.
- [6] Therefore, a CCTV system and an emergency call system are necessarily installed in an elevator of a big size building for the security and safety of passengers. Here, each system is connected with a monitor of a control room through a network, thereby allowing to monitor passengers' states in the elevator.
- [7] A control panel adapted to control an elevator operation is connected with an elevator monitoring panel of a control room, thereby, generating control signals for the elevator operation. The elevator monitoring panel is designed to monitor the elevator operations in accordance with signals received from the control panel. When the elevator has a certain failure, signals corresponding to the failure are detected by the elevator monitoring panel, so that a failure state of the elevator is displayed on a display means, and a certain alarm is generated to a manager.

- [8] However, the conventional elevator operation system has the following problems.
- [9] Since the operation of the elevator is controlled by the elevator monitoring panel, and the image monitoring is performed by the image monitoring panel such as CCTV, the manager is not able to directly check the inside states of the elevator. Since the elevator operation information and image information are independently provided, it is difficult to check and recognize the operation state and inside circumference of the elevator exactly.
- [10] In addition, since recording the images using a conventional elevator image monitoring panel is performed based on time series, when an elevator failure or a certain accident occurs, it is impossible to search the images except searching corresponding images by setting a certain time period. In this case, it takes long time for searching the images, and it is impossible to obtain reliable information with respect to an operation state of the elevator.
- [11] In addition, in the conventional elevator monitoring system, since the elevator image information and operation information can be obtained by an elevator monitoring panel and an image monitoring panel installed only at the same area, when a manager who is in charge of operating or managing for the area is absent from the area or when the monitoring device of the manager has any failure, it is impossible to quickly cope with the failure or accident of the elevator.

[12]

Disclosure of Invention

Technical Problem

- [13] Accordingly, it is an object of the present invention to provide an elevator operation system where it is possible to concurrently display elevator inside images and elevator operation information, and to efficiently search the elevator image information and operation information.
- [14] It is another object of the present invention to provide an elevator operation system where it is possible to perform reliable elevator monitoring operations irrespective of the structure or arrangement structure of the building.
- [15] It is the other object of the present invention to provide an elevator operation monitoring system where it is possible to monitor operation states of elevators even through the other elevator monitoring systems provided at the remote area or in the same area as well as the elevator monitoring panel belonging to the elevator, at the time of emergency.

[16]

Technical Solution

- [17] To achieve the above objects, there is provided a monitoring system for elevator

operation, comprising an elevator operation server which collects elevators' operation/control information from each control panel corresponding to each elevator and manages control signals with respect to the elevators; an image information server which concurrently displays elevator operation/control information with respect to each elevator transferred from the elevator operation server and inside images of each elevator and manages the image recording operation and image data with respect to the elevators; and a database which stores recorded inside images of the elevator corresponding to each item and image data belonging to each elevator operation/control information in relation with a specific item of the elevator operation/control information.

[18] The elevator operation server transmits information which designates the display state of each item of operation information or control signals together when transmits the elevator operation/control information to the image information server, and the elevator operation/control information is displayed correspondingly to the display states information, on a display means of the image information server.

[19] A searching means is provided at least at either side of said elevator operation server or said image information server, which providing image data stored in relation with control signals of a proper item and recorded inside images of the elevator concerned to the image data, when one item or a combination of at least two items belonging to each elevator operation/control information is selected.

[20] The elevator operation monitoring system comprises an image information requesting means which is provided at the elevator operation server and requests image information of the corresponding elevator to the image information server when a certain abnormal signal is detected in an operating elevator or a manager inputs a control signal; an image information transmission means which extracts and transmits images of the corresponding elevators having been monitored by the image information server to the elevator operation server, when the image information requesting means operates; and a display means which is provided at the elevator operation server and displays the images transmitted from the image information transmission means and the operation information of the elevator.

[21] The elevator operation server transmits elevator operation information, image data and images transmitted from the image information transmission means to the elevator operation monitoring system of a remote area, so that the elevator operation monitoring system of the remote area selectively controls the corresponding elevator.

[22] The elevator operation monitoring system of the remote area further comprises a remote searching means which provides image information and the other operation information stored in the database in relation with certain corresponding item when at one item or a combination of at least two items among items belonging to each

elevator operation information of the elevator in the elevator operation monitoring systems of the remote area is selectively inputted.

[23] The image information server further includes a means which closing up an image of the elevator wherein detected abnormal signals, from the plural elevators' images continuing to be displayed on the display means and to be monitored, and which generating an alarm.

[24] To achieve the above objects, there is provided a monitoring system for elevator operation, comprising an integrated management server which collects elevator operation/control information from each control panel corresponding to a plurality of elevators, respectively, manages control signals with respect to plurality of elevators, concurrently displays elevator operation/control information concerned to the elevators and inside images of each elevator to be corresponded to each other, and manages image recording operations and image data with respect to each elevator; and a database in which the integrated managing server stores each item consisting of each elevator operation/control information and recorded elevators' inside images to which each image data corresponding, to be related to a specific item of the elevator operation/control information.

[25] In the present invention, with the above constructions, it is possible to efficiently control the operation of the elevator, and to perform a quick search of the operation information. And therefore it is possible to quickly cope with situations like emergency states or manager's absences.

[26]

Advantageous Effects

[27] In the present invention, elevator inside images and elevator operation information are concurrently displayed, so that any abnormal state of an elevator can be quickly checked and measured through each of an image monitoring panel, an elevator monitoring panel, a remote elevator monitoring system, et al.

[28] In addition, in the present invention, since an elevator operation information can be checked through an image monitoring panel, and since an alarming operation is performed by the image monitoring panel, it is possible to monitor the elevator operations reliably irrespective of a structure and arrangement structure of a building.

[29] Since the item-based data search is possible in the present invention, with the items belonging to the elevator operation information, the accuracy and speed for searching image sources can be enhanced when a certain accident or robbery occurs in the elevator.

[30] Since the elevator monitoring panel controls display states of elevator operation information, image displayings can be easily performed without being dependent on an

image monitoring panel.

[31]

Brief Description of the Drawings

[32] Figure 1 is a view illustrating a control construction of an elevator operation monitoring system according to an embodiment of the present invention.

[33] Figure 2 is a flow chart of an image displaying process according to an embodiment of the present invention.

[34] Figure 3 is a flow chart of an image displaying process according to another embodiment of the present invention.

[35] Figure 4 is a front view illustrating an image displaying state of according to an embodiment of the present invention.

[36] Figure 5 is a front view illustrating a state that an image displaying means displays a close-up image of an elevator which has a failure according to an embodiment of the present invention.

[37] Figure 6 is a flow chart illustrating an image recording procedure by an image information server according to an embodiment of the present invention.

[38] Figure 7 is a view illustrating a construction of an elevator operation information database according to the present invention.

[39] Figure 8 is a view illustrating an image information database according to the present invention.

[40] Figure 9 is a view illustrating an image information searching means according to the present invention.

[41] *Description of the numbers at the main parts of the drawings*

[42] 10.....an elevator 11.....an control panel

[43] 15.....a motion sensor 13.....a monitoring camera

[44] 20.....an elevator operation server 21.....a displaying means

[45] 30.....an image information server 31.....a displaying means

[46] 40.....database 41a,41b..an image information database

[47] 43.....an operation information database 50.....a searching means

[48] 60.....an elevator operation monitoring system at the remote area

[49] 70.....an an elevator operation monitoring system at the same area

[50] 80.....a service center 90.....a 911 rescue center

Best Mode for Carrying Out the Invention

[51] The desirable embodiment of the elevator operation monitoring system according to the present invention will be described with reference to the accompanying drawings.

[52] Figure 1 is a view illustrating a control construction of an elevator operation monitoring system according to the present embodiment. Each of Figure 2 and 3 is a

flow chart of an image display process according to the present embodiment. Each of figure 4 and 5 is a front view illustrating an image displaying state according to the present embodiment. And, figure 6 is a flow chart illustrating an image recording procedure by an image information server according to the present embodiment. Each of figure 7 and 8 is a view illustrating a construction of an elevator operation information database according to the present embodiment. Figure 9 is a view illustrating an image information searching means according to the present embodiment.

- [53] The elevator operation monitoring system according to the present embodiment of Figure 1 is basically directed to monitoring the operation/control information and images and controlling elevator operation of plural elevators 10, and comprises an elevator operation server 20 which collects and manages the elevator operation/control information from plural elevator control panels 11, an image information server 30 which manages image recording operations and image data, and a database 40 which stores each item of the elevator operation/control information and image data.
- [54] The elevator operation server 20 according to the present embodiment generates and collects control signals and thereby controls operations and manages operation/control information with respect to the elevators 10. The elevator operation server 20 comprises a displaying means 21 appendantly, for displaying elevator operation/control information, so that a manager can monitor it. In the present embodiment, the elevator operation server 20 may include an elevator monitoring panel including a PC monitor.
- [55] At least one control panel 11 of the present embodiment is provided at each elevator 10 which has been being monitored by one elevator operation server 20. Here, the control panel 11 is connected with a motion sensor 15 provided inside of the elevator, a weight sensor, a door open and close sensor, an elevator up and down movement sensor, an elevator call sensor, a sensor sensing signals generated by the operation panel, an elevator stop sensor, and a driving motor, etc., respectively, and thereby controlling elevator operations.
- [56] The control panel 11 transmits a signal corresponding to a failure of the elevator operation to the elevator operation server 20. The elevator operation server 20 detects operation failures and passenger's confinements in accordance with signals from the control panel 11, so that an alarm is generated and provided to the manager.
- [57] In this present embodiment, the elevator operation server 20 displays the elevator operation/control information on its own displaying means(21), further more it transmits the elevator operation/control information to the image information server 30 and allows the elevator operation information and the inside images of the elevator to be displayed on the CCTV which is a displaying means 31 of the image information server 30.

- [58] As shown in Figure 2, the elevator operation/control information that the elevator operation server 20 of the present embodiment transmits to the image information server 10 comprises information concerning the format (position, state, color, font, shape, etc) in which each item of the information is displayed. As shown in Figures 4 and 5, the recording day and time of a corresponding image is displayed at a left lower side, and the open and close states of the door are displayed at a center lower portion of each elevator image, and the elevator operation mode is displayed at a right lower portion, and the elevator door is displayed on the screen in a rectangular shape.
- [59] The elevator operation/control information data is transmitted to the image information server 30 and is sprayed on the CCTV screen on which the elevators' inside images has been already being displayed in a certain format in accordance with display format information .
- [60] In another embodiment of the present invention of Figure 3, the format (position, state, color, font, shape, etc), in a way the elevator operation information is displayed, is previously set and stored in the image information server 30, and the elevator operation/control information received from the elevator operation server 20 is displayed in accordance with the corresponding format.
- [61] The image information server 30 of the present embodiment is connected with the monitoring camera 13 installed at each elevator 10, and the images filmed by the monitoring camera 13 is displayed on the displaying means 31, so that the manager can watch them and the images be recorded. In this present embodiment, as an image information server 30, both CCTV and DVR may be adopted.
- [62] In the image information server 30 of the present embodiment, the DVR, as one of the recording means, is designed to selectively start to record just for an specific event concerning certain operation state change or its developments of the elevators 10, such as a motion detection in the elevator 10, a button activation of the control panel and a boarding floor button activation, a failure signal of the elevator 10, an operation start and stop time of the elevator 10, etc.
- [63] For example, as shown in Figure 6, the recording operation may be started in accordance with a control signal 35 when the elevator door is fully opened or in accordance with a control signal 36 when the passenger gets on the elevator car and pushes a destination floor button. The recording operation may stop in accordance with a control signal 37 when the door starts closing or in accordance with a control signal 39 when the door is fully closed, after all the passengers get off the elevator car .
- [64] Therefore, with the image information server 30 according to the present embodiment, it is possible to achieve an accurate recording timing control, and to manage efficiently the memory needed for the recording. In the case that the motion sensor 15 is installed, since the information can be stored both in the image in-

formation server 30 and the elevator operation server 20, the reliability of the image information is enhanced.

- [65] In this present embodiment, to concurrently monitor the image and the elevator operation/control information, the image information server 30 is designed to receive the operation/control information of the elevator for displaying from the elevator operation server 20. Here, the elevator operation/control information received from the elevator operation server 20 is sprayed on the CCTV which as a displaying means 31, has been already displaying the inside images of the elevator 10 in accordance with the display format information included therein.
- [66] The recording means of the image information server 30 according to the present embodiment performs a recording operation with respect to the inside images of the elevator, and the image data concerning the recorded images is stored in the database 40 together with the elevator operation/control information.
- [67] The image information server 30 of the present embodiment stores the data concerning the recorded images into the database 40 which will be related with each item belonging to the elevator operation control information. Though the image recording is performed based on time series, since the image recorded files are classified, specified and stored in accordance with elevator operation/control signals, a random search operation for the inside image of the elevator can be performed based on the image data which includes control information with respect to the image recorded files.
- [68] The image data according to the present embodiment may comprise control signals which allows the image recording to be started, and control signals which allows the image recording operation to end, and a format information with respect to the displaying state of the operation/control information. In addition, since each item belonging to the elevator operation information is stored together in relation with the image data during the recording, it is possible to search an image data and recorded digital images based on a specific item of the elevator operation information.
- [69] In addition, when the recording is performed based on a specific operation control signal as a turning point, the image data with respect to the recorded image is stored into the database 40 in relation with the elevator operation/control information which shows the elevator operation states during the recording operation. In this present embodiment, only the inside images of the elevator filmed by the monitoring camera is recorded, and the elevator operation/control information displayed together with the images is stored separately in the database. while the recorded images have been being displayed, the elevator operation information may be sprayed on the displaying means in the same way as that of the recording time or only image is displayed based on the selection by the manager or the mode selection of a replaying apparatus.

- [70] In the other embodiment of the present invention, the image information server 300 records the images, so that they are recorded and displayed in the same way as that of when the filmed inside images of the elevator and the elevator operation/control information has been displayed together. Even though, in this case, the image data is stored in the database together with the elevator operation/control information. The storing and recording methods of the images and operation/control information may be modified based on the embodiments of the present invention, and the above embodiments of the present invention are not limited thereto.
- [71] In the above two modes, the image data is stored in relation with a specific item of the elevator operation/control information. Therefore when searching through one item or combination of two or more items among the items of the elevator operation/control information, we can obtain the specified image data stored in relation with such an item. And, automatically or manually searching process of the recorded images through the image data can be continued.
- [72] As shown in Figures 7 and 8, the database according to the present embodiment comprises an operation information database 43 to store elevator operation/control information, and an image information database 41 to store the image data with respect to the recorded image in relation with each item of the elevator operation/control information.
- [73] The operation information database 43 of Figure 7 according to the present embodiment is formed by the elevator operation server 20, and the data of the operation information database 43 is transferred to the image information server 30 and is displayed on the displaying means 31 together with the inside images of the elevator.
- [74] The image information database 41 of Figure 8 shows that the data concerning the images filmed by the monitoring camera is stored in relation with each item of the elevator operation/control information from the elevator operation server 20.
- [75] In this present embodiment, the image information database 41 is provided at both side of the image information server 30 and the elevator operation server 20, so that the image data can be accessed through either the image information server 30 or the elevator operation server 20.
- [76] That is to say, the elevator operation server 20 includes an image information requesting means, and when it requests the image information server 30 for image information displayed on the displaying means 31, the image information server 30 transfers the requested elevator image information to the elevator operation server 20, so that the elevator image information is stored in the image information database 41 provided at the side of the elevator operation server 20.
- [77] When the elevator operation server 20 selects certain image data on the table (for example, Figure 8) being displayed on the displaying means 21, the recorded inside

images of the elevator are streamed to the elevator operation server 20 and are displayed on the displaying means 21 of the elevator operation server 20. In this case, in accordance with a manager's selection, the operation/control information of a corresponding elevator may be sprayed in a certain format on the same screen which is already displaying the recorded images. At this time, it is determined whether the elevator operation/control information is displayed together with the elevator inside image or not based on the manager's selection.

[78] However, the image information database 41 may be provided at either side of the elevator operation server 20 or of the image information server 30. Namely, in the case that the image information database 41 is provided only at the side of the image information server 30, and an image information with respect to a specific item of the elevator operation information is requested by the elevator operation server 20, corresponding image and image data are extracted and streamed to the side of the elevator operation server 20.

[79] The image information server 30 may be designed to only record and display the images, and image data are transferred to the elevator operation server 20 and stored in the image information database 41 at the side of the elevator operation server 20. In this case, when the elevator operation server 20 selects certain image data and requests the corresponding image to the image information server 30, corresponding images are streamed to the elevator operation server 20 and displayed. The elevator operation/control information is sprayed in a certain format on the same screen which is already displaying the images.

[80] The image information requesting means according to the present invention may be designed to manually or automatically request image information to the image information server based on the set states. For example, the image information requesting means according to the present embodiment is set to request image information of a corresponding elevator 10 to the image information server 30 when the operating elevator 10 detects a certain abnormal signal. The image information transmission means of the image information server 30 extracts image information of a corresponding elevator when the image information requesting means is manually or automatically operated, and transmits the extracted image information to the elevator operation server 20.

[81] As soon as the image information transmission means according to the present embodiment transmits image signals of the elevator 10 which has an abnormal signal, to the elevator operation server 20, the elevator operation server 20 displays images and elevator operation information at the displaying means 21 provided at the elevator operation server 20 so that the image information can be monitored.

[82] At this time, since the received are something the same as each of the images, the

operation/control information, and the format information in which the operation/control information is displayed on the displaying means(31) of the image information server(30). And, therefore, the operation information is displayed on the displaying means 21 of the elevator operation server 20 at certain portions of the screen based on the same specified formats of the recording time.

[83] In the case of the elevator operation monitoring system according to the present embodiment, there is provided a searching means 50 which makes it possible to search the inside image information of the elevator, filmed at the time of the start and end of a certain event occurring or during the development of the event, using the information of a certain item belonging to the elevator operation information.

[84] As shown in Figure 8, the image information database 41 according to the present embodiment, data fields concerning a moving direction, a door state, an operation mode, a car call state, a boarding floor call state, a failure and the other information of the elevators belonging to a certain group, are recorded with respect to the time when the images are filmed. In addition, image data files forms an independent field which are related with each image recording time.

[85] In another embodiment of the present invention, the image data are stored in direct respond with the operation/control information signals according to a sequential generation of the elevator operation/control information signals consisting a point of start and end time of the image recording. For example, the image recording operation is performed in accordance with a signal corresponding to a state that there are passenger in the elevator based on the operation of the motion sensor and a signal corresponding to a states that there is no passenger in the elevator. The information with respect to the telerecorded image files is classified, specified and stored in relation with image data, according to a sequential operation of the motion sensor. At the same time, the other operation/control information of the elevator is classified and specified according to the operation of the motion sensor and stored to be related with the image data.

[86] Therefore, using information concerning a certain floor in which the elevator 10 has stopped and image data which is mapped together, we can obtain image information recorded in relation with.

[87] For example, certain image data, mapped together with the information of a certain floor, designates a name of the image file corresponding to such operation/control information(a certain floor), it is possible to obtain recorded inside image of the elevator just clicking the image data item from the displayed table or inputting manually a signal corresponding to the image data.

[88] For example, when robbery occurred in the interior of the elevator 10, and the passenger remembers the floor (for example, second floor) of the robbery, it is possible

to obtain an operation/control information (22/03/05. 10:10:16) with respect to the floor and an image data (xxx.dat) related with the time of robbery by searching the item of the corresponding floor. In addition, corresponding recorded images may be obtained using the operation/control information and image data of the robbery.

[89] In this embodiment of the present invention, it is possible to easily search a moving picture based on various circumference variables such as an up and down operation history of the elevator 10 between the floors, the image data of the troubled elevator, the number of the troubled elevator and combinations of each.

[90] In addition, the image search may be performed by the elevator operation server 20 or the image information server 30. And through the image information database(41) as a result of searching based on a certain item or a combination of two or more items of the operation/control information, we can extract the other operation/control information and image data of the elevators corresponding to a certain event occurring.

[91] As shown in Figure 9, the searching means 50 comprises an image searching means 51 and an elevator operation searching means 53, and the elevator operation and image searching means 51 and 53 may use the methods of the sequential search 100 or the conditional search 200 in accordance with a manager's selection. The sequential search 100 of the present embodiment means searching elevator's images or elevator operation/control information or both, in the forward direction or backward direction according to the recorded sequence.

[92] The conditional search 200 means obtaining image information or elevator operation/control information, or both, by inputting specific conditions by a manager.

[93] Here, the searching means 50 according to the present embodiment comprises a means for replaying the recorded images in the forward or backward direction for the sequential search 100, a means for inputting conditions for conditional search, means for displaying data corresponding to the inputted conditions, and, information providing means extracting and displaying corresponding images and operation information, for a manager to select and monitor concerned image information from the displayed data.

[94] The information providing means according to the present embodiment is designed to bring a file recorded on the image recording means such as DVR, when an image data file name is clicked from the displayed database in accordance with search conditions, to display corresponding images on the displaying means.

[95] In the case of the conditional search 200 according to the present embodiment, when an automatic search is selected based on the manager's selection, the image files satisfying a corresponding condition can be sequentially brought to be displayed automatically by inputting proper search conditions.

[96] As shown in Figures 4 and 5, when the elevator operation sever detects an abnormal

signal in the signals received from the control panels, the elevator operation monitoring system according to the present embodiment transmits concerned signals to the image information server 30 together with the operation/control information of the elevator.

[97] Here, as shown in Figure 5, the image information server according to the present embodiment includes a means for closing up the image of a concerned elevator 10 from the images of plural elevators (Figure 4) during the monitoring operation, when an abnormal signal detected in the elevator operation information of a specific elevator, so that a manager or others can easily recognize the elevator 10 having failure.

[98] The image information server 30 according to the present embodiment has an alarming means generating an alarm to inform that at the time when a image is closed up, the elevator has any failure .

[99] The elevator operation server 20 according to the present embodiment is designed to selectively transmit image information and elevator operation/control information received from the image information transmission means to the other elevator operation monitoring systems 60 and 70 provided at the remote area or in the same area in accordance with a request of the elevator operation monitoring system or a manager's selection .

[100] In this case, the image information and operation/control information of the elevators are transmitted to the other elevator operation monitoring systems 60 and 70 or a service center 80, which are provided at the remote area or in the same area, through various paths such as LAN, WAN, broadband internet network, or wireless communication network. When passengers' confinement in the elevator or a certain failure occurs, a corresponding information is transmitted to an emergency rescue center 90, so that a proper measurement can be quickly performed.

[101] At this time, the image data and elevator operation/control information are transmitted basically through the elevator operation server 20. However, the image data and elevator operation/control information may be directly transmitted from the image information server 30 to the other elevator operation systems 60 and 70 or the service center 80 of the remote area or the same area based on the set condition. Various modifications can be performed on the above construction.

[102] The other elevator operation monitoring systems 60 and 70 of the remote area or the same area, which receive the image information and elevator operation/control information, may include a means for closing up the image of the elevator 10 having a failure among the displayed moving pictures and generating a certain alarm in the same manner as the image information server 30 of the standard area.

[103] In addition, the other elevator operation monitoring systems 60 and 70 of the

remote area or the same area may include a remote searching means for quickly coping with a certain abnormal operation state of the elevators 10, such as an elevator failure or passengers' confinement inside of the elevator.

- [104] The remote searching means according to the present invention includes a means for selectively inputting at least one item or a combination of the items with respect to the operation information of the elevator which can be monitored in the other elevator operation monitoring systems. So, when a circumference variable of a specific item belonging to the operation information of the remote elevator is inputted, the image data and the other operation/control information related with a corresponding item stored in the elevator operation monitoring system of the elevator is provided to the remote searcher.
- [105] The remote searcher can request recorded images of the desired time range using the image data and the other operation/control information, and the filmed inside images of the elevator, automatically or by a request of the remote searcher, are to be streamed to the elevator operation monitoring system of the remote area and to be displayed on the display means.
- [106] In this case, since the elevator operation information and the format information for displaying are transmitted together, it is possible to monitor optionally the moving pictures and the elevator operation/control information concurrently from the remote area.
- [107] In another embodiment of the present invention, an integrated management server, wherein integrated the functions of the elevator operation server 20 and the image information server 30, is substituting the elevator operation server and image information server. In this embodiment of the present invention, the integrated management server collects the elevator operation/control information, manages the elevator control signals, and manages image displaying and image recording operations.
- [108] Namely, the integrated management server is connected with each monitoring camera and each control panel provided at a plurality of elevators, respectively, and comprises a displaying means and a recording means. For example, the integrated management server is connected with a plurality of CCTVs and a plurality of DVRs respectively, which are designed to display the inside images of the elevator and collects/generates/manages the elevator operation/control information from the elevator operation/control signals provided from the plurality of control panels. The elevator operation/control information is sprayed in a certain format at a specific portion of the CCTV screen, on which the inside images of the elevator has been being displayed. In addition, the image recording is performed in response to the elevator operation/control information signal, and the image data corresponding to the recorded image file is stored in the image information database in response to the operation/control in-

formation of the elevator at the time when the recording is performed.

[109] The integrated management server according to this present embodiment is connected with LAN, WAN, broadband internet network, wireless communication network, etc. and transmits and receives image data and elevator operation/control information from/to the other elevator operation systems, etc. either at the remote area or at the same area.

[110] It's possible to search images and operation/control information from the other elevator operation monitoring systems both in the remote area and in the same area based on the transmitted and received image data and elevator operation/control information. It displays the image and operation/control information obtained as a result of the search, thereby, makes it possible multilateral monitoring and efficient controlling with respect to the elevator operation. In addition, it is possible to quickly cope with an emergency situation such as an elevator failure or passengers' confinements in the interior of the elevator.

[111] The integrated management server closes up the images of the elevator having an abnormal signal among the inside images of the elevators monitored by the displaying means like CCTV and generates an alarm.

[112] With the above-described constructions, this present invention provide the inside images and the operation information of the elevator concurrently to the manager, makes it easy and convenient to search the recorded images easy and convenient, makes it possible to quickly cope with the operation failure of the elevators by a remote manager.

[113]

Industrial Applicability

[114] In the present invention, elevator image information and elevator operation information are concurrently displayed, and image information and operation information are searchable by searching each item of the operation information, and searching and controlling operations can be performed at a remote area, so that an elevator can be quickly and efficiently managed even for emergency situations.

[115] As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described examples are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced by the appended claims.

[116]

Sequence Listing

[117] elevator, failure, operation information, image information, camera

[118]

Claims

- [1] A monitoring system for elevator operation, comprising:
an elevator operation server which collects elevators' operation/control information from each control panel corresponding to each elevator and manages control signals with respect to the elevators;
an image information server which concurrently displays elevator operation/control information with respect to each elevator transferred from the elevator operation server and inside images of each elevator and manages the image recording operation and image data with respect to the elevators; and
a database which stores recorded inside images of the elevator corresponding to each item and image data belonging to each elevator operation/control information in relation with a specific item of the elevator operation/control information.
- [2] The system of claim 1, wherein said elevator operation server transmits information which designates the display state of each item of operation information or control signals together when transmits the elevator operation/control information to the image information server, and the elevator operation/control information is displayed correspondingly to the display states information, on a displaying means of the image information server.
- [3] The system of claim 2, wherein a searching means is provided at least at either side of said elevator operation server or said image information server, which providing image data stored in relation with control signals of a proper item and recorded inside images of the elevator concerned to the image data, when one item or a combination of at least two items belonging to each elevator operation/control information is selected.
- [4] The system of one claim among claims 1 through 3, wherein said elevator operation monitoring system comprises:
an image information requesting means which is provided at the elevator operation server and requests image information of the corresponding elevator to the image information server when a certain abnormal signal is detected in an operating elevator or a manager inputs a control signal;
an image information transmission means which extracts and transmits images of the corresponding elevators monitored by the image information server to the elevator operation server, when the image information requesting means operates;
and a display means which is provided at the elevator operation server and displays the images transmitted from the image information transmission means

and the operation information of the elevator.

- [5] The system of claim 4, wherein said elevator operation server transmits elevator operation information, image data and images transmitted from the image information transmission means to the elevator operation monitoring system of a remote area, so that the elevator operation monitoring system of the remote area selectively controls the corresponding elevator.
- [6] The system of claim 4, wherein said elevator operation monitoring system of the remote area further comprises a remote searching means which provides image information and the other operation information stored in the database relatedly with certain corresponding item when at one item or a combination of at least two items among items belonging to each elevator operation information of the elevator in the elevator operation monitoring systems of the remote area is selectively inputted.
- [7] The system of one claim among claims 1 through 3, wherein said image information server further includes a means which closing up an image of the elevator wherein detected abnormal signals, from the plural elevators' images continuing to be displayed on the display means and to be monitored, and which generating an alarm.
- [8] A monitoring system for elevator operation, comprising:
an integrated management server which collects elevator operation/control information from each control panel corresponding to a plurality of elevators, respectively, manages control signals with respect to plurality of elevators, concurrently displays elevator operation/control information concerned to the elevators and inside images of each elevator to be corresponded to each other, and manages image recording operations and image data with respect to each elevator; and
a database in which the integrated managing server stores, each item consisting of each elevator operation/control information and recorded elevators' inside images to which each image data corresponding, to be related to a specific item of the elevator operation/control information.

AMENDED CLAIMS**[received by the International Bureau on 15 September 2006 (15.09.2006)]**

1.

A monitoring system for elevator operation, comprising:

an elevator operation server which collects elevators' operation/control information from each control panel corresponding to each elevator and manages control signals with respect to the elevators;

an image information server which concurrently displays elevator operation/control information with respect to each elevator transferred from the elevator operation server and inside images of each elevator and manages the image recording operation and image data with respect to the elevators;

a database which stores recorded inside images of the elevator corresponding to each item and image data belonging to each elevator operation/control information in relation with a specific item of the elevator operation/control information; and

a searching means which is provided at least at either side of said elevator operation server or said image information server, which providing image data stored in relation with control signals of a proper item and recorded inside images of the elevator concerned to the image data, when one item or a combination of at least two items belonging to each elevator operation/control information is selected.

2.

The monitoring system for elevator operation of claim 1, wherein said elevator operation server transmits information which designates the display state of each item of operation information or control signals together when transmits the elevator operation/control information to the image information server, and the elevator operation/control information is displayed correspondingly to the display states information, on a displaying means of the image information server.

3.

The monitoring system for elevator operation according to either of claims 1 or

2, wherein said elevator operation monitoring system comprises:

an image information requesting means which is provided at the elevator operation server and requests image information of the corresponding elevator to the image information server when a certain abnormal signal is detected in an operating elevator or a manager inputs a control signal;

an image information transmission means which extracts and transmits images of the corresponding elevators monitored by the image information server to the elevator operation server, when the image information requesting means operates;

and a display means which is provided at the elevator operation server and displays the images transmitted from the image information transmission means and the operation information of the elevator.

4.

The monitoring system for elevator operation of claim 3, wherein said elevator operation server transmits elevator operation information, image data and images transmitted from the image information transmission means to the elevator operation monitoring system of a remote area, so that the elevator operation monitoring system of the remote area selectively controls the corresponding elevator.

5.

The monitoring system for elevator operation of claim 3, wherein said elevator operation monitoring system of the remote area further comprises a remote searching means which provides image information and the other operation information stored in the database relatedly with certain corresponding item when at one item or a combination of at least two items among items belonging to each elevator operation information of the elevator in the elevator operation monitoring systems of the remote area is selectively inputted.

6.

The monitoring system for elevator operation according to either of claims 1 or 2, wherein said image information server further includes a means which closing up an image of the elevator wherein detected abnormal signals, from the plural elevators' images continuing to be displayed on the display means and to be monitored, and which generating an alarm.

7.

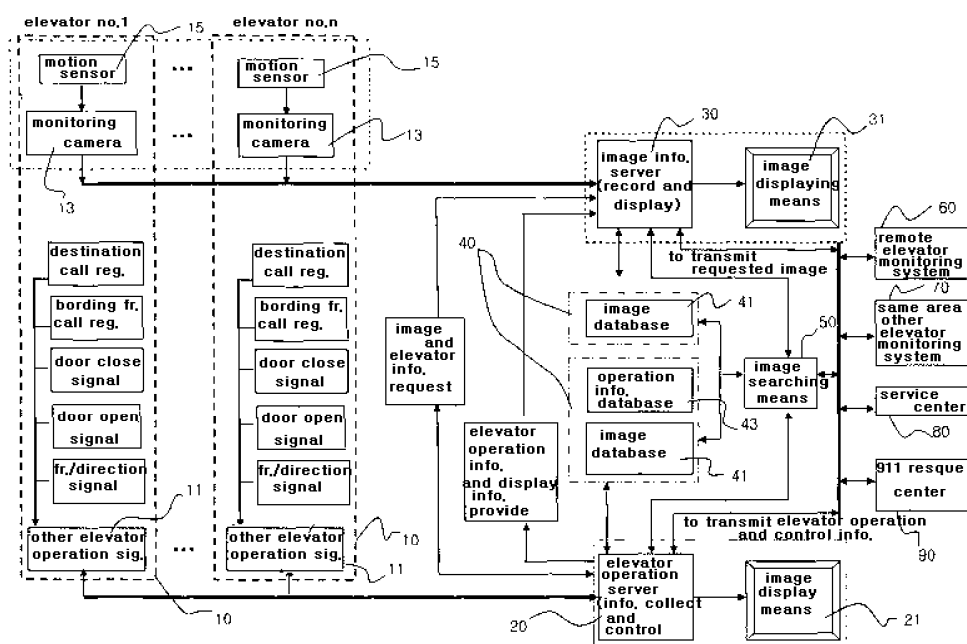
A monitoring system for elevator operation, comprising:

an integrated management server which collects elevator operation/control information from each control panel corresponding to a plurality of elevators, respectively, manages control signals with respect to plurality of elevators, concurrently displays elevator operation/control information concerned to the elevators and inside images of each elevator to be corresponded to each other, and manages image recording operations and image data with respect to each elevator;

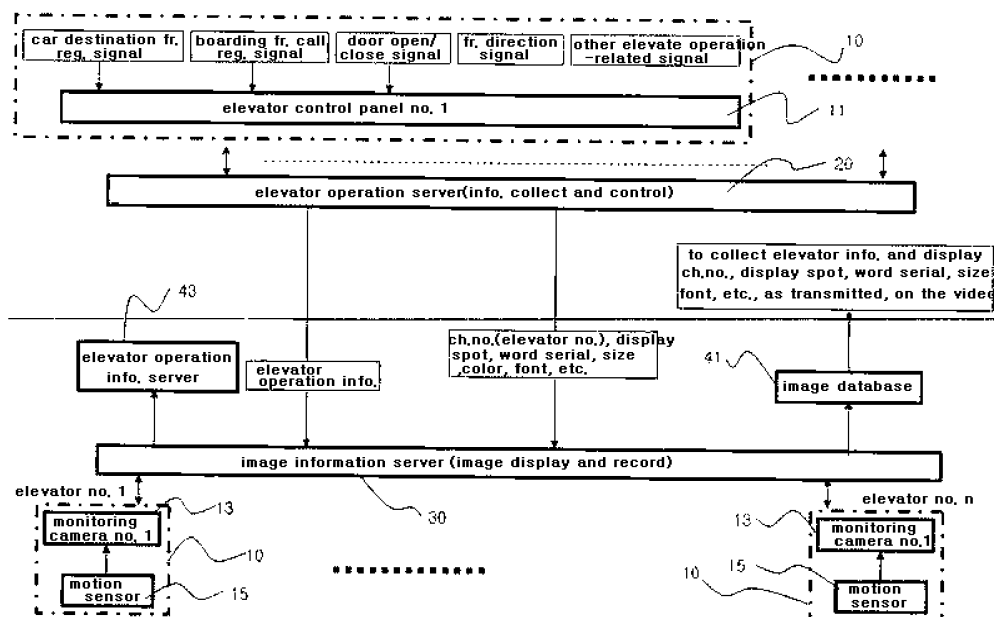
a database in which the integrated managing server stores, each item consisting of each elevator operation/control information and recorded elevators' inside images to which each image data corresponding, to be related to a specific item of the elevator operation/control information; and

a searching means which is provided at the integrated management server, which providing image data stored in relation with control signals of a proper item and recorded inside images of the elevator concerned to the image data, when one item or a combination of at least two items belonging to each elevator operation/control information is selected.

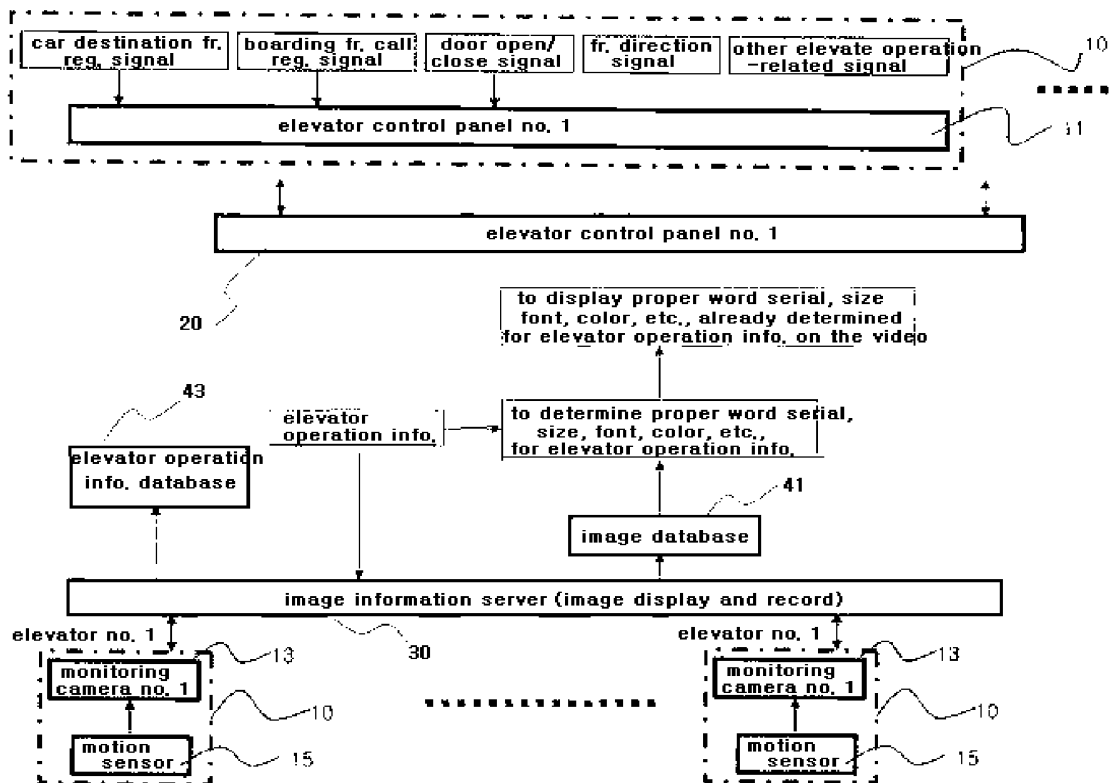
[Fig. 1]



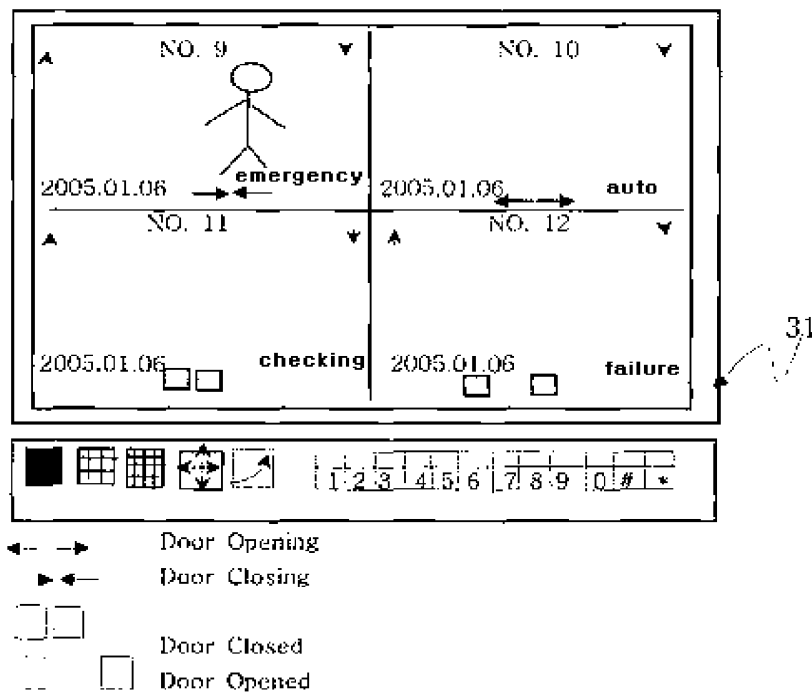
[Fig. 2]



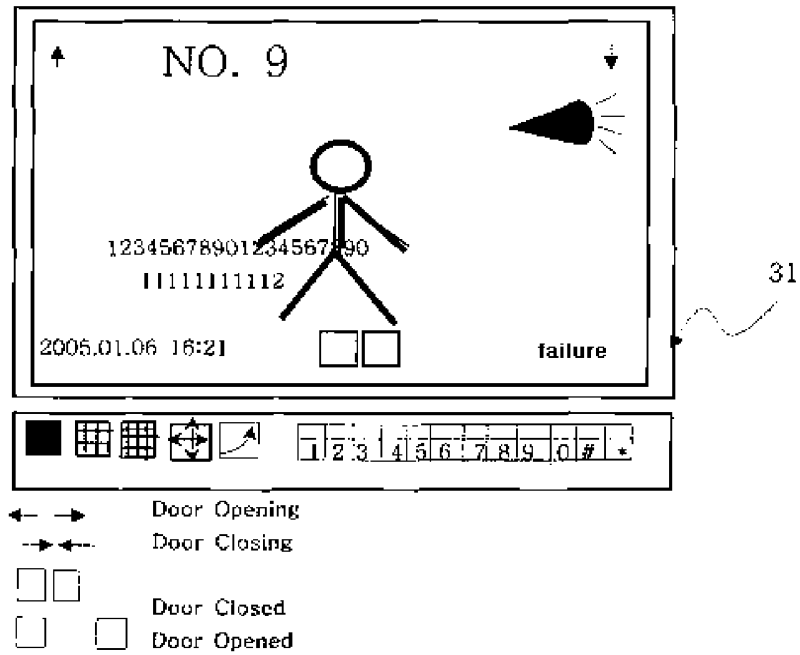
[Fig. 3]



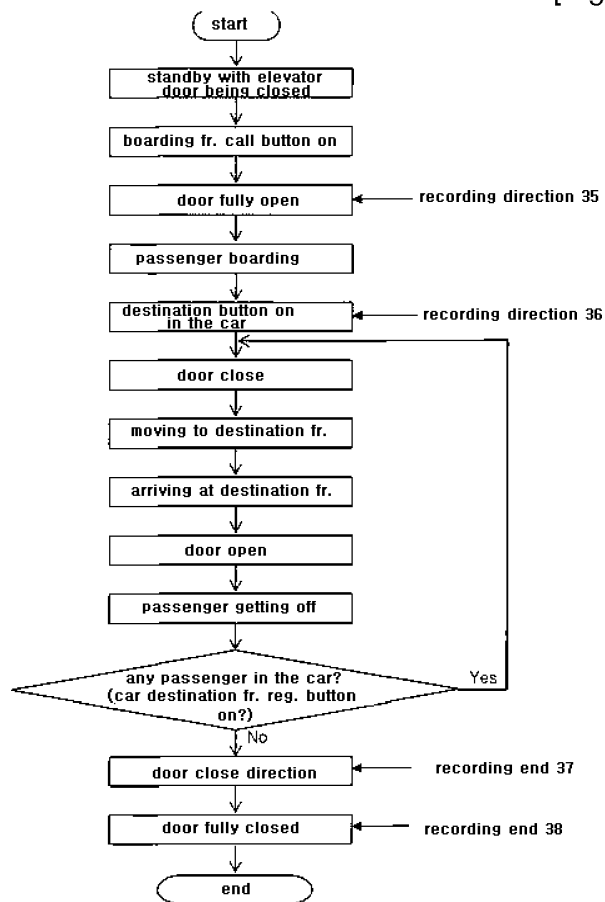
[Fig. 4]



[Fig. 5]



[Fig. 6]



[Fig. 7]

ch.1

operation time	Index	elevator operation history File	elevator info.						
			direction	floor	door state	operation state	car call state	boarding fr. call state	failure and other information
05.03.22. 10:10:15	1	xxx.dat	up	3	closed	stop	5th, 8th fr. reg.	11th, 13th fr. up	no failure/weight
05.03.22. 10:10:16	2	xxx.dat	up	4	closed	operating	5th, 8th fr. reg.	11th, 13th fr. up	no failure/weight
05.03.22. 10:10:20	3	xxx.dat	up	5	closed	stop	8th fr. reg.	11th, 13th fr. up	no failure/weight

⋮

⋮

Ch n

operation time	Index	elevator operation history File	elevator info.						
			direction	fr.	door state	operation state	car call state	boarding fr. call state	failure and other information
05.03.22. 10:10:15	1	xxx.dat	down	15	closed	stop	5th, 8th fr. reg.	11th, 13th fr. up	no failure/weight
05.03.22. 10:10:16	2	xxx.dat	down	14	closed	operating	5th, 8th fr. reg.	11th, 13th fr. up	no failure/weight
05.03.22. 10:10:20	3	xxx.dat	down	13	closed	stop	5th, 8th fr. reg.	11th fr. down	no failure/weight

[Fig. 8]

Ch1

filmed time	frame Index	image file	elevator information						
			direction	floor	door state	operation mode	car call state	boarding fr. call state	failure and other information
05.03.22. 10:10:15	1	xxx.dat	up	3	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight
05.03.22. 10:10:16	2	xxx.dat	up	4	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight
05.03.22. 10:10:17	3	xxx.dat	up	5	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight

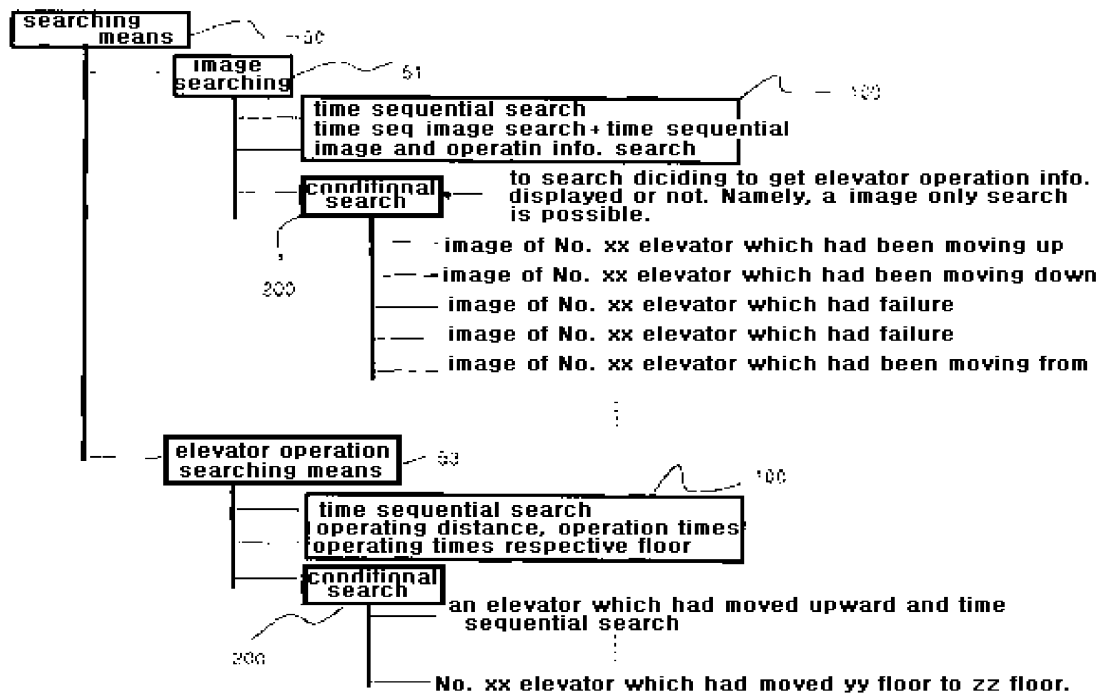
⋮

⋮

Ch n

filmed time	frame Index	image file	elevator information						
			direction	floor	door state	operation mode	car call state	boarding fr. call state	failure and other information
05.03.22. 10:10:15	1	xxx.dat	up	3	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight
05.03.22. 10:10:16	2	xxx.dat	up	4	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight
05.03.22. 10:10:17	3	xxx.dat	up	5	closed	auto	5, 8th fr. reg.	11, 13th fr. up	no failure/weight

[Fig. 9]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/001217**A. CLASSIFICATION OF SUBJECT MATTER*****B66B 1/18(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)

B66B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KIPO NPS system : "server", "monitor", "control"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

07 JULY 2006 (07.07.2006)

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Information on patent family members

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