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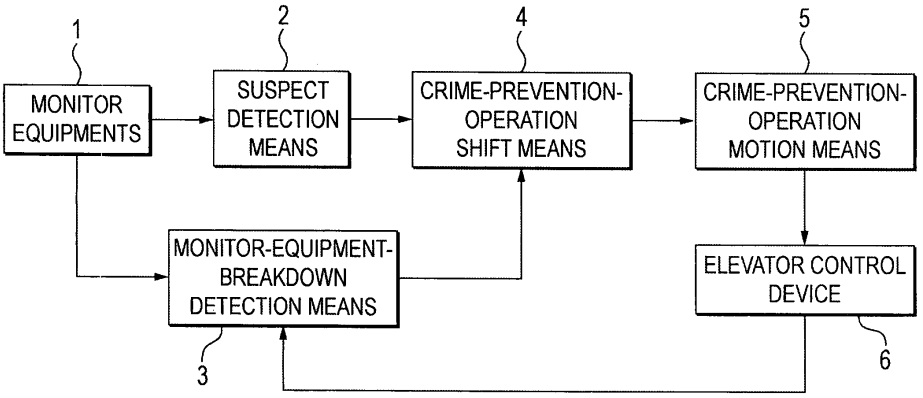
(54) CRIME PREVENTIVE OPERATION SYSTEM OF ELEVATOR

(57) [Problem] To obtain an elevator crime-prevention-operation apparatus which can shift an elevator to a crime prevention operation even at the breakdown of a monitor equipment that monitors the interior of an elevator cage.

[Means for Resolution] The interior of an elevator cage 7 is monitored by a monitor equipment 1 which is arranged so as to monitor the interior of the cage 7, any suspected person within the elevator cage 7 is detected on the basis of the output of the monitor equipment 1 by suspect detection means 2, while the breakdown of the monitor equipment 1 is detected by monitor-equipment-breakdown detection means 3, crime-prevention-operation shift means 4 outputs a crime-prevention-operation command in accordance with the output of either of the suspect detection means 2 and the monitor-equipment-breakdown detection means 3, and crime-prevention-operation motion means 5 brings the elevator into a crime prevention operation on the basis of the crime-prevention-operation command, whereby the elevator can be shifted to the crime prevention operation even at the breakdown of the monitor equipment 1.

FIG. 1



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Description

[Technical Field]

[0001] This invention relates to an elevator crime-prevention-operation apparatus which performs the crime prevention operation of an elevator when a suspected person within an elevator cage has been detected.

[Background Art]

[0002] In a prior-art, elevator crime-prevention-operation apparatus disclosed in, for example, JP-A-2004-149287, the crime-prevention-operation motion of stopping a cage at the nearest floor and opening a door is performed when a suspected person within the cage has been detected. As a monitor equipment which detects the suspected person within the cage, there is a vibration sensor which senses vibrations within the cage, a sound volume sensor which senses a sound volume within the cage, a monitor camera which monitors the interior of the cage, or the like.

[0003] Patent Document 1 : JP-A-2004-149287 (pages 3-9, Fig. 1)

Disclosure of the Invention

[Problems that the Invention is to Solve]

[0004] With the prior-art, elevator crime-prevention-operation apparatus, there has been the problem that, when a monitor equipment for discriminating a suspected person within a cage has broken down, an elevator cannot be shifted to a crime prevention operation. There has also been the problem that the apparatus cannot cope with a case where the suspected person has intentionally broken down the monitor equipment.

[0005] This invention has been made in order to solve the problems as stated above, and has for its object to obtain an elevator crime-prevention-operation apparatus which can shift the elevator to the crime prevention operation even at the breakdown of the monitor equipment for monitoring the interior of the elevator cage.

[Means for Solving the Problems]

[0006] An elevator crime-prevention-operation apparatus according to this invention comprising a monitor equipment which is arranged so as to monitor the interior of an elevator cage; suspect detection means for detecting any suspected person within the elevator cage, on the basis of an output of the monitor equipment; monitor-equipment-breakdown detection means for monitoring the output of the monitor equipment and detecting a breakdown of the monitor equipment; crime-prevention-operation shift means for outputting a crime-prevention-operation command which shifts an elevator to a crime prevention operation, in accordance with an output of either of the suspect detection means and the monitor-equipment-breakdown detection means; and crime-prevention-operation motion means for performing the crime prevention operation of the elevator on the basis of the crime-prevention-operation command from the crime-prevention-operation shift means.

[Advantages of the Invention]

[0007] As described above, this invention comprises a monitor equipment which is arranged so as to monitor the interior of an elevator cage; suspect detection means for detecting any suspected person within the elevator cage, on the basis of an output of the monitor equipment; monitor-equipment-breakdown detection means for monitoring the output of the monitor equipment and detecting a breakdown of the monitor equipment; crime-prevention-operation shift means for outputting a crime-prevention-operation command which shifts an elevator to a crime prevention operation, in accordance with an output of either of the suspect detection means and the monitor-equipment-breakdown detection means; and crime-prevention-operation motion means for performing the crime prevention operation of the elevator on the basis of the crime-prevention-operation command from the crime-prevention-operation shift means, so that the elevator can be shifted to the crime prevention operation even at the breakdown of the monitor equipment.

[Best Mode for Carrying Out the Invention]

Embodiment 1:

[0008] Fig. 1 is a block diagram showing the configuration of an elevator crime-prevention-operation apparatus according to Embodiment 1 of this invention.
Referring to Fig. 1, monitor equipments 1 are a vibration sensor, a sound volume sensor, etc. which are disposed in an elevator cage, and they monitor any suspected person within the elevator cage. Suspect detection means 2 detects the suspected person within the elevator cage in accordance with information from the monitor equipments 1. Monitor-equipment-breakdown detection means 3 monitors the outputs of the monitor equipments 1 so as to detect the breakdown of any of the monitor equipments 1.
Crime-prevention-operation shift means 4 outputs a crime-prevention-operation command for shifting an elevator to a crime prevention operation, in accordance with the detection result of either of the suspect detection means 2 and the monitor-equipment-breakdown detection means 3. Crime-prevention-operation motion means 5 causes an elevator control device 6 to perform predetermined crime-prevention-operation motions, such as stopping the elevator cage at the nearest floor and opening the door of the elevator cage, upon receiving the crime-prevention-operation command from the crime-prevention-operation shift means 4. The elevator control

device 6 performs the operation control of the elevator.

[0009] Fig. 2 is an explanatory diagram showing the monitor equipments within the elevator cage in the elevator crime-prevention-operation apparatus according to Embodiment 1 of this invention.

Referring to Fig. 2, the monitor equipments 1 which include a vibration sensor 1A, a sound volume sensor 1B and a monitor camera 1C are disposed in the elevator cage 7, and they monitor any suspected person within the cage 7.

Fig. 3 is a flow chart showing the operation of the crime-prevention-operation shift means in the elevator crime-prevention-operation apparatus according to Embodiment 1 of this invention.

[0010] Next, the operation will be described.

As a method of detecting any suspected person by the suspect detection means 2, the existence of the suspected person is judged in a case where the vibration sensor 1A has detected a vibration at or above a reference level, or in a case where the sound volume sensor 1B has detected a sound volume at or above a reference level. The image of the monitor camera 1C is recorded, and is transferred to a monitor center.

The monitor-equipment-breakdown detection means 3 includes means for detecting the breakdown of any of the monitor equipments 1, and this means detects the breakdown in a case where, notwithstanding that the elevator is operating, the change of an input level from any of the monitoring equipments 1 does not occur for a prescribed period.

Upon receiving the crime-prevention-operation command from the crime-prevention-operation shift means 4 as based on the output of either of the suspect detection means 2 and the monitor-equipment-breakdown detection means 3, the crime-prevention-operation motion means 5 stops the elevator cage 7 at the nearest floor and opens the door of the elevator cage 7 as the predetermined crime-prevention-operation motions.

[0011] Next, the operation of the crime-prevention-operation shift means 4 will be described with reference to Fig. 3.

First, at a step S1, if any of the monitor equipments 1 has broken down is detected on the basis of the output of the monitor-equipment-breakdown detection means 3. In a case where any of the monitor equipments 1 has not broken down, the judgement result of the step S1 becomes "No", and the process proceeds to a step S2. In a case where any of the monitor equipments 1 has broken down, the process proceeds to a step S3.

At the step S2, the existence or nonexistence of any suspected person within the elevator cage 7 is judged on the basis of the output of the suspect detection means 2. If the suspected person does not exist within the elevator cage 7, the judgement result of the step S2 becomes "No", and the process is ended. If the suspected person exists within the elevator cage 7, the process proceeds to the step S3.

At the step S3, the command of a crime prevention operation is given to the crime-prevention-operation motion means 5, whereby the elevator is shifted to the crime prevention operation.

[0012] Incidentally, the means for detecting a suspected person in the suspect detection means 2, the means for detecting any breakdown of the monitor equipments 1 in the monitor-equipment-breakdown detection means 3, and the elevator motions in the crime prevention operation of the prime-prevention-operation motion means 5 are not restricted to the above means.

[0013] According to Embodiment 1, the monitor-equipment-breakdown detection means and the crime-prevention-operation shift means for shifting the elevator to the crime prevention operation on the basis of the output of the monitor-equipment-breakdown detection means are disposed, and hence, the elevator is shifted to the crime prevention operation even at the breakdown of any monitor equipment, whereby the elevator crime-prevention-operation apparatus whose safety is higher in consideration of the breakdown of the monitor equipment can be obtained.

Embodiment 2:

[0014] Embodiment 2 will be described by quoting Figs. 1 and 2.

In this embodiment 2, a plurality of monitor-equipment-breakdown detection means 3 are arranged in correspondence with a plurality of monitor equipments 1, and the outputs of the plurality of monitor-equipment-breakdown detection means 3 are inputted to the crime-prevention-operation shift means 4. When the breakdowns of the monitor equipments 1 in or above a judgement criterion number (N), among the plurality of monitor equipments 1, are detected on the basis of the breakdown detection outputs of the monitor-eqipment-breakdown detection means 3 for detecting the breakdowns of the monitor equipments 1, the crime-prevention-operation shift means 4 shifts an elevator to a crime prevention operation.

Incidentally, the detections of the breakdowns of the individual monitor equipments 1 by the monitor-equipment-breakdown detection means 3 are made by detecting the breakdowns in cases where, as in Embodiment 1, notwithstanding that the elevator is operating, input levels from the monitor equipments do not change for a prescribed period.

[0015] Fig. 4 is a flow chart showing the operation of the crime-prevention-operation shift means in the elevator crime-prevention-operation apparatus according to Embodiment 2 of this invention.

Next, the operation of the crime-prevention-operation shift means in Embodiment 2 will be described with reference to Fig. 4.

First, at a step S11, it is judged whether the monitor equipments 1 have broken in or above a judgement criterion number (N), on the basis of the breakdown detection outputs of the plurality of monitor-equipment-breakdown de-

tection means 3. In a case where the monitor equipments have broken down below the judgement criterion number, the judgement result of the step S11 becomes "No", and the process proceeds to a step S12. In a case where the monitor equipments have broken down in or above the judgement criterion number, the process proceeds to a step S13.

At the step S12, the existence or nonexistence of any suspected person is judged on the basis of the output of the suspect detection means 2. If the suspected person does not exist, the judgement result of the step S12 becomes "No", and the process is ended. If the suspected person exists, the process proceeds to the step S13.

At the step S13, the command of a crime prevention operation is given to the crime-prevention-operation motion means 5, whereby the elevator is shifted to the crime prevention operation.

[0016] Incidentally, the judgement criterion number N which is used in the breakdown judgements of the crime-prevention-operation shift means 4 can be set in accordance with the total number of the monitor equipments 1. Besides, the operations of the suspect detection means 2 and the crime-prevention-operation motion means 5 are the same as stated in Embodiment 1.

[0017] According to Embodiment 2, when the monitor equipments in or above the judgement criterion number have broken down among the plurality of monitor equipments, the elevator is shifted to the crime prevention operation, whereby the elevator crime-prevention-operation apparatus whose safety is high according to the total number of the monitor equipments can be obtained.

[Brief Description of the Drawings]

[0018]

Fig. 1 is a block diagram showing the configuration of an elevator crime-prevention-operation apparatus according to Embodiment 1 and Embodiment 2 of this invention.

Fig. 2 is an explanatory diagram showing monitor equipments within an elevator cage in the elevator crime-prevention-operation apparatus according to Embodiment 1 and Embodiment 2 of this invention.

Fig. 3 is a flow chart showing the operation of a crime-prevention-operation shift means in the elevator crime-prevention-operation apparatus according to Embodiment 1 of this invention.

Fig. 4 is a flow chart showing the operation of a crime-prevention-operation shift means in the elevator crime-prevention-operation apparatus according to Embodiment 2 of this invention.

Claims

1. An elevator crime-prevention-operation apparatus comprising:

a monitor equipment which is arranged so as to monitor the interior of an elevator cage;

suspect detection means for detecting any suspected person within the elevator cage on the basis of an output of said monitor equipment;

monitor-equipment-breakdown detection means for monitoring the output of said monitor equipment and detecting a breakdown of said monitor equipment;

crime-prevention-operation shift means for outputting a crime-prevention-operation command which shifts the elevator to a crime prevention operation in accordance with an output of either of said suspect detection means and said monitor-equipment-breakdown detection means; and

crime-prevention-operation motion means for performing the crime prevention operation of the elevator on the basis of the crime-prevention-operation command from said crime-prevention-operation shift means.

2. An elevator crime-prevention-operation apparatus claimed in claim 1, wherein said monitor-equipment-breakdown detection means detects said monitor equipment as having broken down in a case where the elevator is operating and where an input level from said monitor equipment does not change for a prescribed period.

3. An elevator crime-prevention-operation apparatus claimed in claim 1, wherein the monitor equipments and the monitor-equipment-breakdown detection means for detecting the breakdowns of said monitor equipments are respectively arranged in a plurality of number, and said crime-prevention-operation shift means outputs the crime-prevention-operation command when the breakdowns of said monitor equipments in or above a preset criterion number have been detected on the basis of the outputs of said plurality of monitor-equipment-breakdown detection means.

FIG. 1

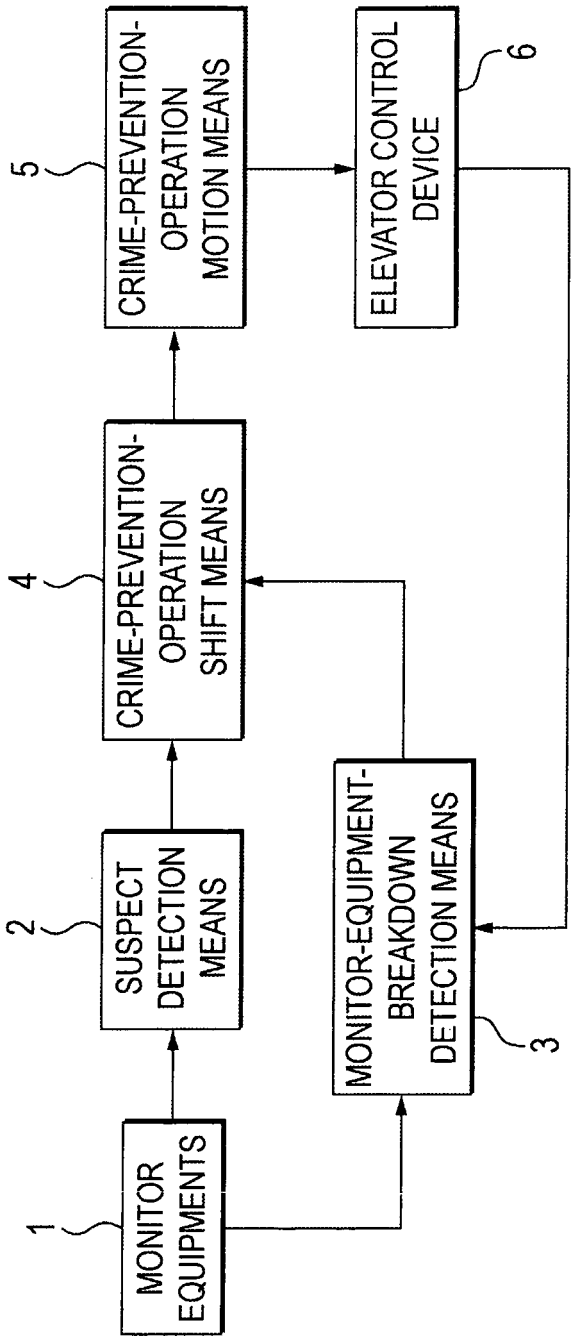

MONITOR EQUIPMENTS
1
SUSPECT DETECTION MEANS
2
MONITOR-EQUIPMENT-BREAKDOWN DETECTION MEANS
3
CRIME-PREVENTION-OPERATION SHIFT MEANS
4
CRIME-PREVENTION-OPERATION MOTION MEANS
5
ELEVATOR CONTROL DEVICE
6

FIG. 2

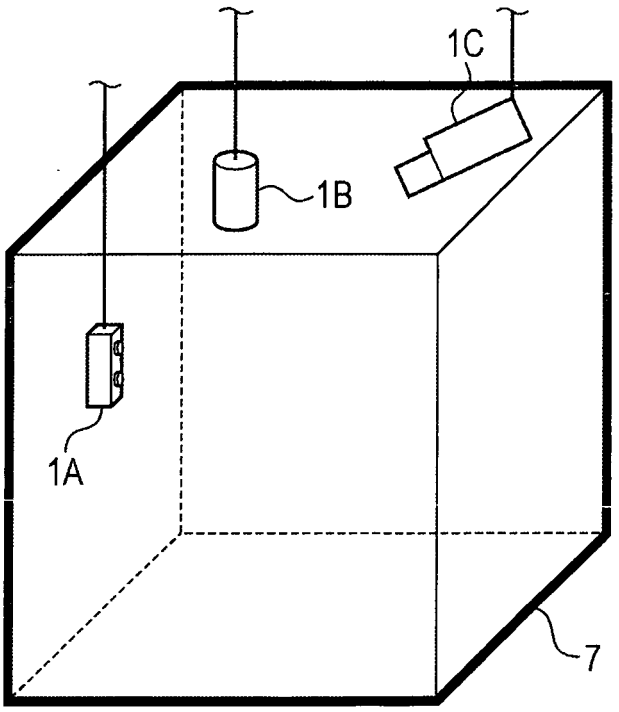


FIG. 3

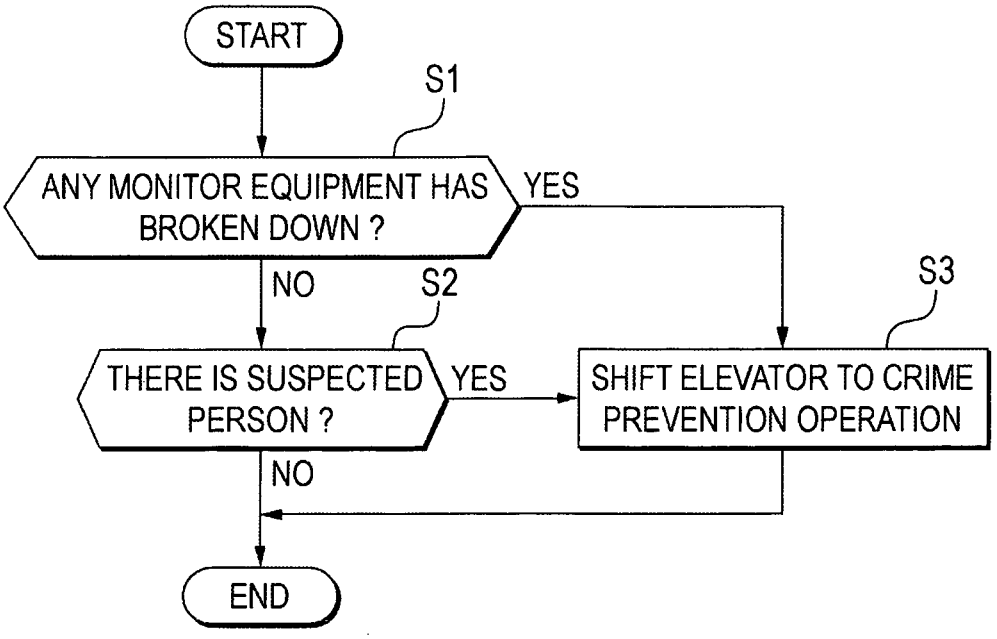
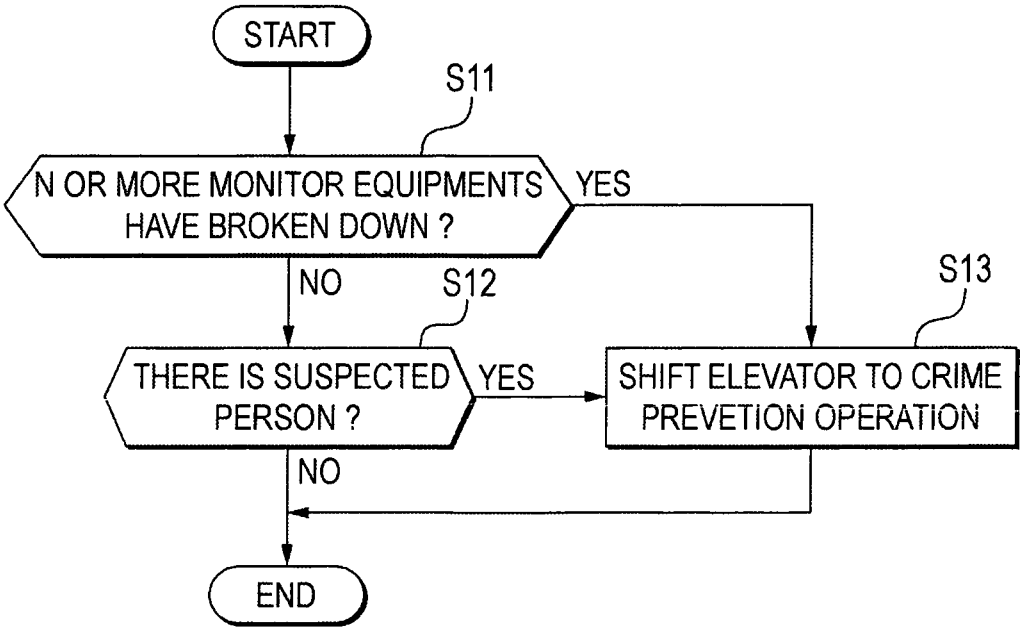

START
S1
ANY MONITOR EQUIPMENT HAS BROKEN DOWN ?
YES
NO
S2
S3
THERE IS SUSPECTED PERSON ?
YES
SHIFT ELEVATOR TO CRIME PREVENTION OPERATION
NO
END

FIG. 4


START
S11
N OR MORE MONITOR EQUIPMENTS HAVE BROKEN DOWN ?
YES
NO
S12
S13
THERE IS SUSPECTED PERSON ?
YES
SHIFT ELEVATOR TO CRIME PREVETION OPERATION
NO
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/305556

A. CLASSIFICATION OF SUBJECT MATTER
B66B5/00(2006.01), ***B66B3/00***(2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B66B3/00(2006.01)-***B66B5/28***(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2004-149287 A (Toshiba Elevator and Building Systems Corp.), 27 May, 2004 (27.05.04), Claims 1 to 10 (Family: none)	1-3
Y	JP 2001-080833 A (Hitachi, Ltd.), 27 March, 2001 (27.03.01), Claims 1 to 4, 8; Par. Nos. [0016] to [0019]; Fig. 1 (Family: none)	1-3
Y	JP 2004-059209 A (Hitachi Building Systems Co., Ltd.), 26 February, 2004 (26.02.04), Par. No. [0022] (Family: none)	2

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 July, 2006 (03.07.06)	11 July, 2006 (11.07.06)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/305556

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 151101/1976(Laid-open No. 070059/1978) (Hitachi, Ltd.), 12 June, 1978 (12.06.78), Claim 1 (Family: none)	3

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2004149287 A **[0002] [0003]**