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(72) Inventor: **NISHIDA, Takao,**

**Mitsubishi Denki Kabushiki Kaisha  
Chiyoda-ku, Tokyo 100-8310 (JP)**

(71) Applicant: **mitsubishi denki kabushiki  
kaisha**

**Tokyo 100-8310 (JP)**

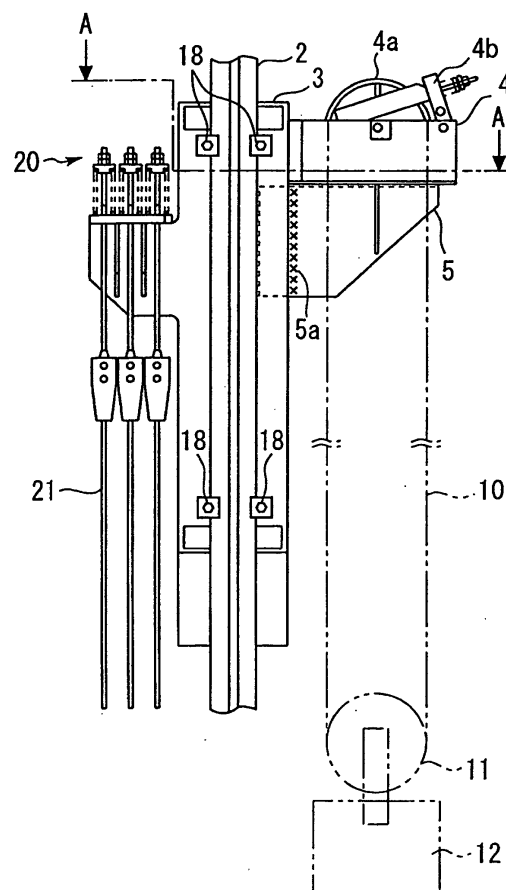
(74) Representative: **HOFFMANN - EITLE**

**Patent- und Rechtsanwälte  
Arabellastrasse 4  
81925 München (DE)**

(54) **GOVERNOR AND ELEVATOR**

(57) The invention is directed to a governor (4) which is to be installed in an elevator system having no machine room and provided integrally on a car-side cable anchor member (3) retained by a car guide rail (2). As a result, commonality of parts (18) to be used for installing the governor on the guide rail (2) can be achieved between the governor (4) and the car-side cable anchor member (3). Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

*Fig. 1*



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## Description

### Field of the Invention

**[0001]** The invention relates to a governor and an elevator system, and more particularly, to a governor and an elevator system which detect variations in the speed of a passenger car—which ascends or descends in a hoistway—or those in the speed of a counterweight.

### Background Art

**[0002]** There has hitherto been known an elevator system having no machine room, wherein, with a view toward space savings, a machine room having equipment—such as a hoisting machine or a governor—is not provided at the top of a building, and instead the equipment is installed in a hoistway through which a passenger car ascends or descends.

**[0003]** In particular, in such an elevator system, a governor for detecting variations in the ascending or descending speed of the passenger car is retained on car guide rails by way of a support plate (as described in, e. g., Japanese Patent Application Laid-Open No. 72353/2000).

**[0004]** The governor installed in a known elevator system having no machine room will be briefly described hereinbelow by reference to Fig. 5. Fig. 5 is a fragmentary enlarged view showing a retained state of the governor in the known elevator system.

**[0005]** As illustrated, a governor 4 is primarily constituted of a sheave 4a; a cable constraint section 4b; a governor cable 10; a tension pulley 11; and a weight 12. Here, the sheave 4a is rotatably supported by a support plate 35. Here, an endless governor cable 10 formed into a circumferential shape is passed around the sheave 4a. A weight 12 for imparting tension to the governor cable 10 is provided at the end of the governor cable 10 by way of the tension pulley 11.

**[0006]** The governor 4 is supported by the car guide rail 2 by way of the support plate 35. More specifically, two through holes formed at desired positions on one car guide rail 2 of the two car guide rails are registered with two through holes formed in the support plate 35. Then, the thus-registered through holes are fastened together with pin-shaped members 37. The support plate 35 is fastened to the car guide rail 2 with clipping members 38 provided at upper and lower positions relative to the pin-shaped members 37 such that the car guide rail 2 is clamped between the clipping members 38.

**[0007]** In the governor having the foregoing construction, a portion of the governor cable 10 is supported by an unillustrated passenger car which is to ascend or descend within a hoistway. As a result, variations in the speed of the passenger car are detected by the governor 4. More specifically, for example, in the event that variations have arisen in the ascending or descending speed of the passenger car as a result of breakage of a

portion of a pull cable suspending the passenger car and a counterweight, the cable constraint section 4b disposed in the vicinity of the sheave 4a is activated, thereby posing constraints on the governor cable 10. Subsequently, in association with the constraints imposed on the governor cable 10, an unillustrated emergency stop device for the passenger car is activated, thereby restricting ascending or descending action of the passenger car.

**[0008]** In the case of the governor installed in the known elevator system that has been described above, a plurality of custom-designed parts, such as clipping members or pin members, must be prepared for supporting the governor on the car guide rail. Consequently, there arises a problem of an increase in the number of assembly processes, as well as a problem of an increase in the number of parts and an associated cost hike.

**[0009]** The invention has been conceived to solve the problems set forth and aims at providing a governor and an elevator system which are compatible with an elevator system having no machine room, involve use of a smaller number of parts, are comparatively low cost, and involve a smaller number of assembly processes.

### Disclosure of the Invention

**[0010]** The invention is directed to a governor which is to be installed in an elevator system having no machine room and provided integrally on a car-side cable anchor member retained by a car guide rail. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

**[0011]** According to the invention, the improved governor is supported by way of a support plate joined to the car-side cable anchor member by means of welding. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

**[0012]** According to the invention, the improved governor is supported by way of a support plate fastened to the car-side cable anchor member with nuts and bolts. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

**[0013]** The invention is also directed to a governor which is to be installed in an elevator system having no machine room and provided integrally on a weight-side

cable anchor member retained by a weight guide rail. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

[0014] According to the invention, the improved governor is supported by way of a support plate joined to the weight-side cable anchor member by means of welding. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

[0015] According to the invention, the improved governor is supported by way of a support plate fastened to the weight-side cable anchor member with nuts and bolts. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

[0016] The invention is also directed to an elevator system equipped with the improved governor. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

### Brief Description of the Drawings

#### [0017]

Fig. 1 is a schematic view of a first preferable governor according to the invention;  
 Fig. 2 is a schematic cross-sectional view of the governor of Fig. 1 taken along line A-A;  
 Fig. 3 is a schematic view of a second preferable governor according to the invention;  
 Fig. 4 is a schematic cross-sectional view of the governor shown in Fig. 3 taken along line B-B; and  
 Fig. 5 is a fragmentary enlarged view showing a retained state of the governor in a known elevator system.

### Best Modes for Implementing the Invention

[0018] In order to describe the invention in more detail, the invention will be described by reference to the accompanying drawings. Here, throughout the drawings, like or corresponding elements are assigned like reference numerals, and their repeated explanations are simplified or omitted.

[0019] A governor according to a first embodiment of the invention will be described by reference to Figs. 1 and 2.

[0020] Fig. 1 is a schematic view of the governor of the first embodiment, showing a state in which the governor is retained on a car-side cable anchor. Fig. 2 is a schematic cross-sectional view of the governor of Fig. 1 taken along line A-A.

[0021] As shown in Figs. 1 and 2, reference numeral 1 designates an interior wall surface of a hoistway; 2 designates one of a plurality of car guide rails to be used for guiding ascending or descending action of a passenger car; 3 designates a car-side cable anchor member for supporting one end of a pull cable suspending the passenger car; 4 designates a governor; 4a designates a sheave of the governor 4; 4b designates a cable constraint section; 5 designates a support plate for supporting the governor 4; 5a designates a welded section of the support plate 5; 5b designates cable through holes formed in the support plate 5; 5c designates fastening screw sections provided on the support plate 5; 10 designates a governor cable of the governor 4; 11 designates a tension pulley of the governor 4; 12 designates a weight of the governor 4; 18 designates clipping members constituted of rail clips or bolts; 20 designates a pull cable retaining section for the car-side cable anchor section 3; and 21 designates a pull cable which suspends the passenger car and the counterweight.

[0022] As shown in Fig. 1, the car-side cable anchor 3 is held at a desired position on the car guide rail 2 with the clipping members 18; that is, two clipping members provided at higher positions and two clipping members provided at lower positions. Specifically, bolts are inserted into through holes formed in the car-side cable anchor member 3. The car guide rail 2 is clamped between rail clips screwed into the bolts. The car-side cable anchor member 3 is held on the car guide rail 2 by means of fastening the bolts.

[0023] The car-side cable anchor section 3 is equipped with a pull cable retaining section 20 for retaining one end of each of pull cables 21. An unillustrated passenger car, an unillustrated hoisting machine, and an unillustrated counterweight are sequentially provided at positions close to the other ends of the pull cables 21. The other ends of the pull cables 21 are retained by a weight-side cable anchor section provided closer to a counterweight.

[0024] The governor 4 is primarily constituted of a sheave 4a, a cable constraint section 4b, a governor cable 10, a tension pulley 11, and a weight 12. The sheave 4a is rotatably supported on the support plate 5. The governor cable 10, which is endless and formed into a circumferential shape, is passed around the sheave 4a. The weight 12 for imparting tension to the governor cable 10 is provided at a lower-end portion of the governor cable 10 by way of the tension pulley 11.

[0025] The governor 4 is supported on the cable-side cable anchor member 3 by way of the support plate 5.

More specifically, a partial surface area of the car-side cable anchor member 3 retained at a desired position on one car guide rail 2 is registered with a partial surface area of the support plate 5 (i.e., an area of a welding section 5a), and the areas are welded together by means of spot welding or the like.

**[0026]** The governor 4 is fastened to the support plate 5 welded to the car-side cable anchor member 3 by means of welding, with use of bolts by way of the fastening screw sections 5c shown in Fig. 2. The governor cable 10 passed around the sheave 4a is suspended by way of the cable through holes 5b formed in the support plate 5.

**[0027]** In the governor having the foregoing construction, a part of the governor cable 10 is supported on an unillustrated passenger car which ascends or descends within a hoistway, whereby variations in the speed of the passenger car are detected by the governor 4.

**[0028]** As has been described, according to the governor of the first embodiment, the governor 4 is provided integrally with the car-side cable anchor member 3. The car-side cable anchor member 3 is retained by the car guide rail 2, thereby obviating a necessity for parts specifically designed for retaining the governor 4 on the car guide rail 2. There can be provided a governor which is compatible with an elevator system having no machine room, is comparatively low cost, and involves a smaller number of assembly processes.

**[0029]** The governor 4 of the first embodiment is for detecting variations in the speed of the passenger car and is integrally supported on the car-side cable anchor member 3. In contrast, in a case where a governor detects variations in the speed of a counterweight, the governor may be provided integrally on a weight-side cable anchor member. Even in this case, there can be yielded the same advantage as that yielded in the first embodiment.

**[0030]** In the first embodiment, the support plate 5 of the governor 4 is provided on the car-side cable anchor member 3 by means of welding. In contrast, if the car-side cable anchor member 3 is formed so as to assume a shape which enables supporting of the governor 4, the governor 4 can be provided integrally on the car-side cable anchor member 3. Specifically, the car-side cable anchor member 3 supports the governor 4 and the traction cable retaining section 20 without involvement of use of other parts.

**[0031]** By reference to Figs. 3 and 4, a governor according to a second embodiment of the invention will be described.

**[0032]** Fig. 3 is a schematic view of a governor of the second embodiment, showing retention of the governor by a car-side cable anchor section. Fig. 4 is a schematic cross-sectional view of the governor of Fig. 3 taken along line B-B.

**[0033]** The governor of the second embodiment differs from the first embodiment in that the governor 4 is fastened to the car-side cable anchor section 3 with nuts

and bolts.

**[0034]** In Figs. 3 and 4, reference numeral 2 designates a car guide rail; 3 designates a car-side cable member; 4 designates a governor; 5 designates a support plate for supporting the governor 4; and 6 designates nuts and bolts to be used for fastening the support plate 5 on the car-side cable anchor member 3.

**[0035]** As shown in Fig. 3, as in the case of the first embodiment, the car-side cable anchor member 3 is retained at a desired position on the car guide rail 2 with the clipping members 18.

**[0036]** The governor 4 is supported by the car-side cable anchor member 3 by way of the support plate 5. More specifically, two through holes for bolts formed in the car-side cable anchor section 3 and two corresponding through holes formed in the support plate 5 are registered with each other. Bolts are fitted into the through holes, and nuts are screw-engaged with the bolts from the opposite sides of the through holes.

**[0037]** The governor 4 is fastened to the support plate 5 fixed to the car-side cable anchor member 3 with use of the general-purpose bolts and nuts 6, by way of the fastening screw holes 5c shown in Fig. 4.

**[0038]** In relation to the governor having the foregoing construction, as in the case of the first embodiment, a portion of the governor cable 10 is supported on a passenger car which ascends or descends within a hoistway. Variations in the speed of the passenger car are detected by use of the governor 4.

**[0039]** As has been described, even in the case of the governor of the second embodiment, the governor 4 is provided integrally on the car-side cable anchor member 3, as in the case of the first embodiment. The car-side cable anchor member 3 is retained by the car guide rail 2, thereby obviating a necessity for custom-designed parts to be used for retaining the governor 4 on the car guide rail 2. Hence, there can be provided a governor which is compatible with an elevator system having no machine room, is comparatively low cost, and involves a smaller number of assembly processes.

**[0040]** Under the method of supporting the governor 4 of the second embodiment, the support plate 5 can be removed from the car-side cable anchor member 3 by means of removing the bolts and the nuts 6. Hence, the method is superior to that of the first embodiment in terms of transportability. Specifically, the support plate 5 and the car-side cable anchor member 3 are separated from each other when shipped from the factory, and are transported to a building site where they are to be installed. Subsequently, they can be assembled together at the building site.

**[0041]** It is obvious that the invention is not limited to the above-described embodiments and is susceptible to modifications other than those suggested in the embodiments, as required, within the technical scope of the invention. The number, positions, and geometries of the constituent members are not limited to those mentioned in the embodiments. The preferred number, positions,

and geometries may be determined in carrying out the invention.

### Industrial Applicability

**[0042]** As has been described, a governor of the invention is installed integrally on a car-side cable anchor member to be held by a car guide rail. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side anchor member. Hence, the governor is useful as one capable of providing a comparatively low-cost system and of reducing the number of assembly processes related to installation.

**[0043]** According to the invention, the improved governor is supported by way of a support plate joined to the car-side cable anchor member by means of welding. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side cable anchor member. Hence, the governor is useful as one capable of providing a comparatively low-cost system and of reducing the number of assembly processes relating to installation.

**[0044]** According to the invention, the improved governor is supported by way of a support plate fastened to the car-side cable anchor member with nuts and bolts. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the car-side cable anchor member. Hence, the governor is useful as one capable of providing a comparatively low-cost system and of reducing the number of assembly processes relating to installation.

**[0045]** The invention is also directed to a governor which is to be installed in an elevator system having no machine room and provided integrally on a weight-side cable anchor member retained by a weight guide rail. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, the governor is useful as one capable of providing a comparatively low-cost system and of reducing the number of assembly processes relating to installation.

**[0046]** According to the invention, the improved governor is supported by way of a support plate joined to the weight-side cable anchor member by means of welding. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, a comparatively low-cost system can be provided, and the number of assembly processes relating to installation can be reduced.

**[0047]** According to the invention, the improved governor is supported by way of a support plate fastened to the weight-side cable anchor member with nuts and bolts. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the weight-side cable anchor member. Hence, the governor is useful as one capable

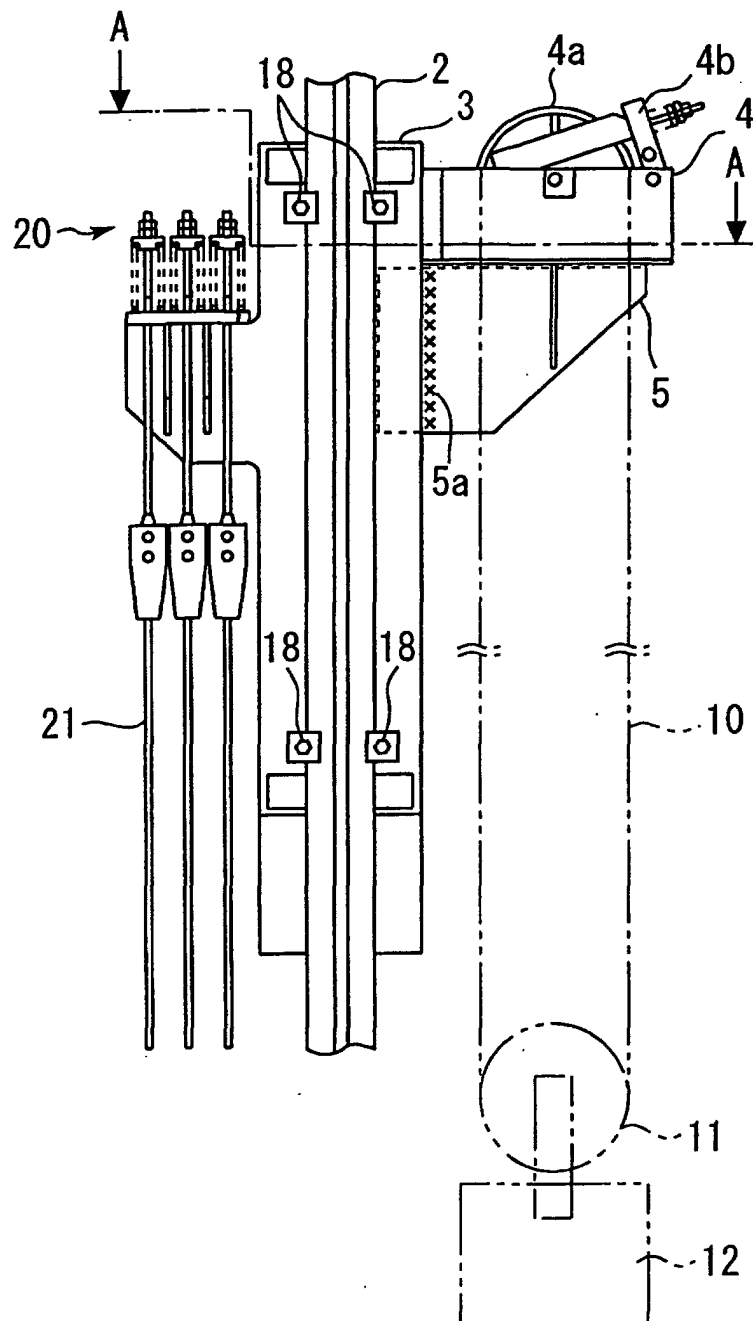
of providing a comparatively low-cost system and of reducing the number of assembly processes relating to installation.

**[0048]** The invention is also directed to an elevator system equipped with the improved governor. As a result, commonality of parts to be used for installing the governor on the guide rail can be achieved between the governor and the cable anchor member. Hence, the governor is useful as one capable of providing a comparatively low-cost system and of reducing the number of assembly processes relating to installation.

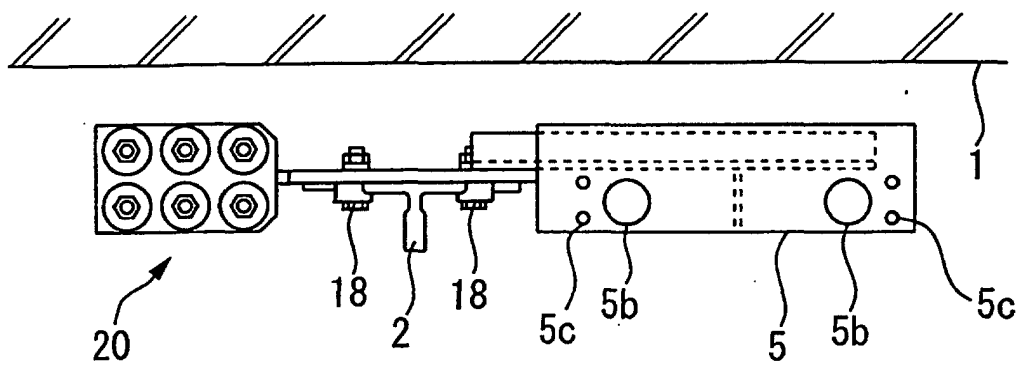
### Claims

1. A governor for detecting variations in the speed of a passenger car which ascends or descends within a hoistway while being guided by a plurality of car guide rails, wherein
  - one of the plurality of car guide rails retains a car-side cable anchor member which supports one end of a pull cable for suspending the passenger car, and the governor is provided integrally on the guide rail.
2. The governor according to claim 1, wherein the governor is supported by way of a support plate joined to the car-side cable anchor member by means of welding.
3. The governor according to claim 1, wherein the governor is supported by way of a support plate fastened to the car-side cable anchor member with nuts and bolts.
4. A governor for detecting variations in the speed of a counterweight which ascends or descends within a hoistway while being guided by a plurality of counterweight guide rails, wherein
  - one of the plurality of counterweight guide rails retains a weight-side cable anchor member which supports one end of a pull cable for suspending the passenger car, and the governor is provided integrally on the guide rail.
5. The governor according to claim 4, wherein the governor is supported by way of a support plate joined to the weight-side cable anchor member by means of welding.
6. The governor according to claim 4, wherein the governor is supported by way of a support plate fastened to the weight-side cable anchor member with nuts and bolts.
7. An elevator system comprising the governor according to any one of claims 1 through 6.

Fig. 1



*Fig. 2*



*Fig. 3*

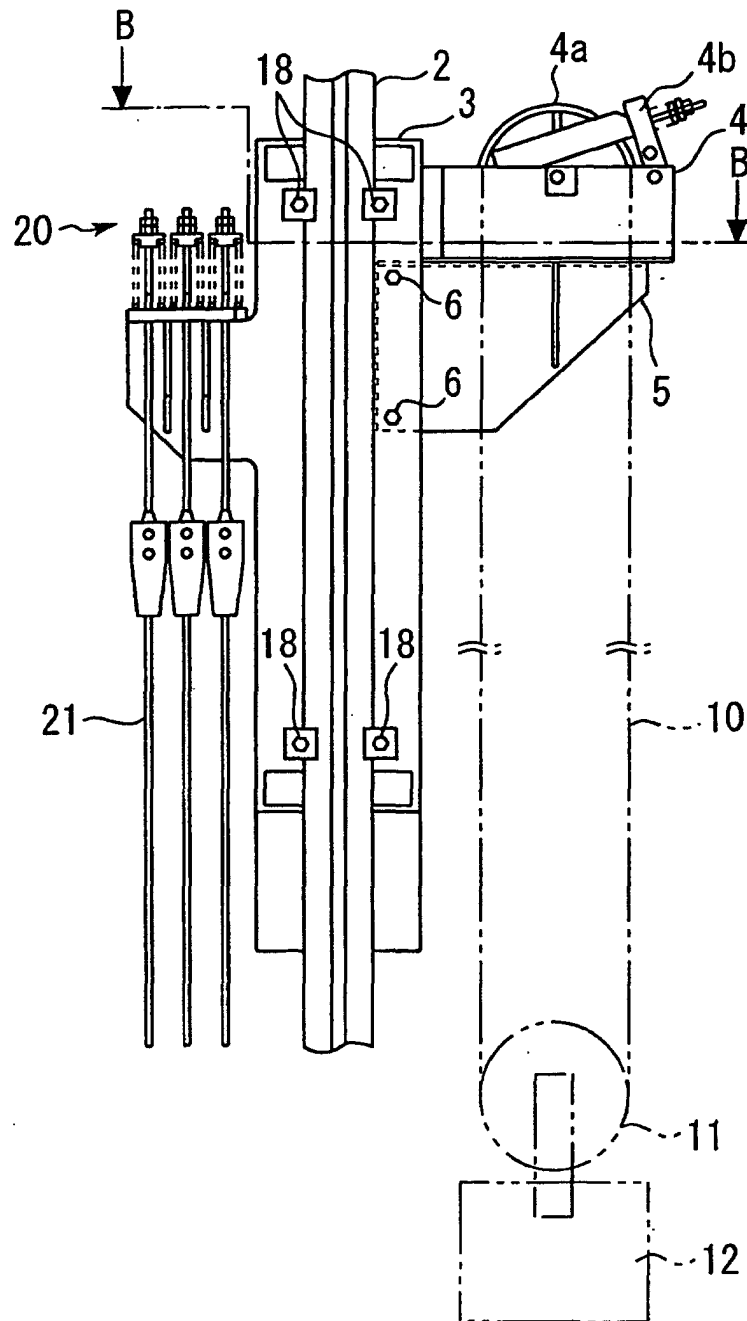




Fig. 4

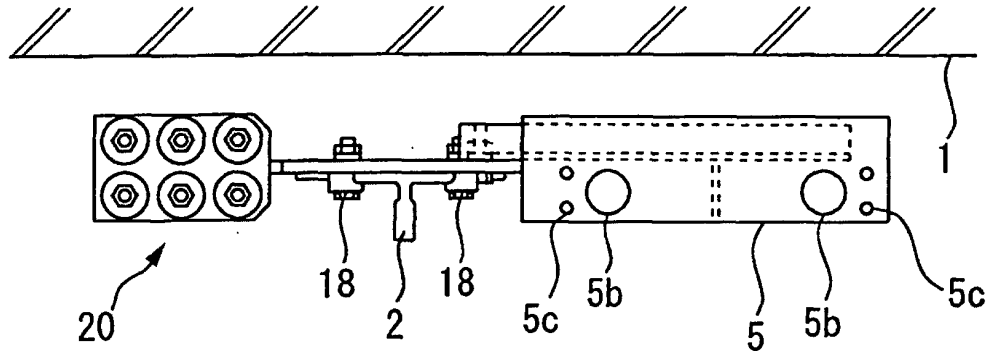
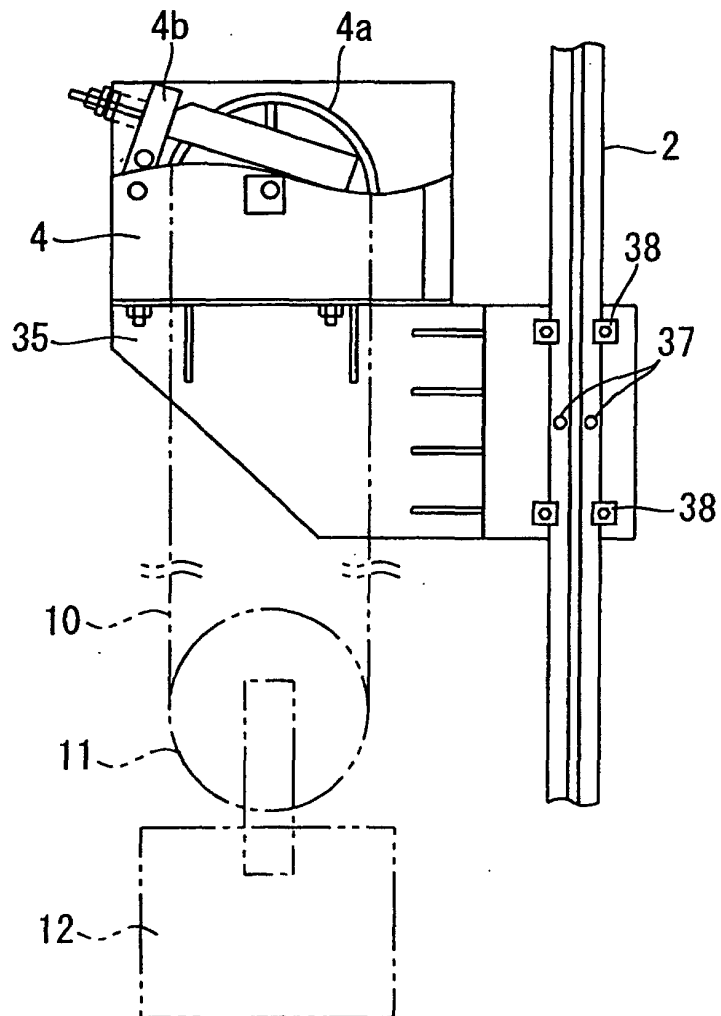


Fig. 5



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP01/07217

A. CLASSIFICATION OF SUBJECT MATTER  
Int.Cl<sup>7</sup> B66B5/04, B66B7/02

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)

Int.Cl<sup>7</sup> B66B5/00-B66B7/12

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 1996-2002  
Kokai Jitsuyo Shinan Koho 1971-2002 Toroku Jitsuyo Shinan Koho 1994-2002

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         | WO 99/48789 A1 (Mitsubishi Electric Corp.),<br>30 September, 1999 (30.09.99),<br>Description; page 3, line 21 to page 4, line 6;<br>page 9, lines 2 to 8; Figs. 1 to 3<br>& EP 0995712 A1 | 1-7                   |
| Y         | JP 2000-72353 A (Toshiba Corp.),<br>07 March, 2000 (07.03.00),<br>& EP 0990615 A2 & US 2001/0040071 A1                                                                                    | 1-7                   |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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Date of the actual completion of the international search  
15 May, 2002 (15.05.02)

Date of mailing of the international search report  
04 June, 2002 (04.06.02)

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