(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 728 754 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
06.12.2006 Bulletin 2006/49

(21) Application number: **04722679.0**

(22) Date of filing: **23.03.2004**

(51) Int Cl.:
B66B 13/16 *(2006.01)*

(86) International application number:
PCT/JP2004/003920

(87) International publication number:
WO 2005/090218 (29.09.2005 Gazette 2005/39)

(84) Designated Contracting States:
DE FR

(71) Applicant: **MITSUBISHI DENKI KABUSHIKI KAISHA**
Chiyoda-ku
Tokyo 100-8310 (JP)

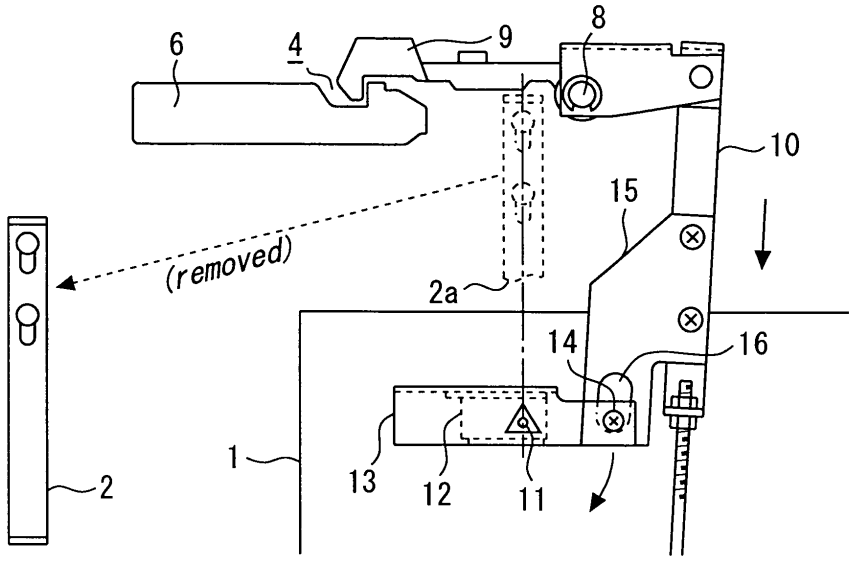
(72) Inventor: **SAKURAGI, Toshio,**
Mitsubishi Electric Eng.Co.Ltd.
Tokyo 102-0073 (JP)

(74) Representative: **HOFFMANN EITLE**
Arabellastrasse 4
81925 München (DE)

(54) **UNLOCKING DEVICE OF ELEVATOR LANDING DOOR AND METHOD OF MODIFYING THE DEVICE**

(57) Provided is an unlocking apparatus of elevator hall door, which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece 3 having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door 1, an unlocking lever 2 is pushed up by vertically operating the key removing rod, thereby to unlock a locking device 4 of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of the key removing rod. This unlocking apparatus includes a working piece 12 which is provided in the same place as the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole into which the key removing rod is inserted, and which has a keyhole mouthpiece 11 into which a triangular key is inserted, a working lever 13 which is fixed to this working piece and on the working end side of which a working pin 14 is provided, and a trigger 15 which is provided between the working pin of this working lever and a connecting member 10 of the lock device of the hall door and connects the two together. The unlocking lever 2 is not used.

Fig. 1



EP 1 728 754 A1

Description

Technical Field

[0001] The present invention relates to an unlocking apparatus of elevator hall door which unlocks an elevator hall door from the hall side and a method of modifying an unlocking apparatus.

Background Art

[0002] In some of conventional unlocking apparatus of elevator hall door, for example, as disclosed in the Japanese Patent Laid-Open No. 4-338092, there has been used a type which is constructed in such a manner that a key removing rod is inserted into a T-shaped keyhole mouthpiece provided on a back face of the upper part of a hall door and unlocking is performed by pushing up an unlocking lever by vertically operating this key removing rod. Furthermore, for example, as disclosed in the Japanese Utility Model Laid-Open No. 59-42261, there is also another type of construction in which unlocking is performed by turning a triangular key instead of the vertical operation of a key removing rod.

[0003] The former type of construction differs from the latter type of construction in the installation position of a keyhole mouthpiece provided on a back face of the upper part of a hall door. For example, as shown in Figure 6, in an unlocking apparatus in which a key removing rod (not shown) is vertically operated, the position of a T-shaped keyhole mouthpiece 3 is in the same position as the bottom end of an unlocking lever 2 in terms of plane and the bottom end of the unlocking lever 2 is pushed up by the key removing rod which has been inserted, thereby to unlock a locking device 4 provided above the top end portion of a hall door 1. In modification work of an elevator which involves modifying an unlocking apparatus of this construction into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of a key removing rod, for example, as shown in Fig. 7, it is necessary to change the installation position of a triangular keyhole mouthpiece 11 to the right in the figure by a distance d from the bottom end of the unlocking lever 2 and, therefore, it is necessary to change the position of the keyhole of the hall door 1 or to replace the hall door 1, posing the problem that cost increases when the unlocking apparatus is modified.

[0004] The present invention has been made to solve such a conventional problem and has as its object the provision of an unlocking apparatus of elevator hall door which permits a modification into an unlocking apparatus of such a construction that permits unlocking by turning a triangular key instead of the vertical operation of a key removing rod without changing the installation position of a keyhole mouthpiece, and a method of modifying an unlocking apparatus.

Disclosure of the Invention

[0005] The present invention provides an unlocking apparatus of elevator hall door, which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door, an unlocking lever is pushed up by vertically operating the key removing rod, thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of the key removing rod. This unlocking apparatus of elevator hall door is characterized in that the unlocking apparatus of elevator hall door comprises a working piece which is provided in the same place as the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole into which the key removing rod is inserted, and which has a keyhole mouthpiece into which a triangular key is inserted, a working lever which is fixed to this working piece and on the working end side of which a working pin is provided, and a trigger which is provided between the working pin of this working lever and a connecting member of the locking device of the hall door and connects the two together.

[0006] As a result of this, it is possible to make a modification into an unlocking apparatus of such a construction that permits unlocking by turning a triangular key instead of the vertical operation of a key removing rod without changing the installation position of a keyhole mouthpiece.

[0007] Also, in the present invention, in the unlocking condition during the ordinary opening and closing of the hall door, the working pin of the working lever is positioned in the middle of the elongated hole of the trigger even when the engaging condition of the locking device of the hall door is undone and the connecting member and the trigger move downward.

[0008] As a result of this, the working lever does not turn and can be kept at a standstill in a horizontal position.

Brief Description of the Drawings

[0009]

Figure 1 is an upper rear elevation which shows the locking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention;

Figure 2 is an upper rear elevation which shows the unlocking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention;

Figure 3 is a sectional view, as viewed from above, of the part of a working pin of an unlocking apparatus of elevator hall door in the first embodiment of the present invention;

Figure 4 is a sectional view, as viewed from side, of

the part of a working pin of an unlocking apparatus of elevator hall door in the first embodiment of the present invention;

Figure 5 is an upper rear elevation which shows the unlocking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention during ordinary opening and closing;

Figure 6 is an upper rear elevation which shows an example of a conventional unlocking apparatus of elevator hall door; and

Figure 7 is an upper rear elevation which shows another different example of a conventional unlocking apparatus of elevator hall door.

Best Mode for Carrying Out the Invention

[0010] The present invention will be described in further detail on the basis of the accompanying drawings.

First Embodiment:

[0011] Figure 1 is an upper rear elevation which shows the locking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention. Figure 2 is an upper rear elevation which shows the unlocking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention. Figure 3 is a sectional view, as viewed from above, of the part of a working pin of an unlocking apparatus of elevator hall door in the first embodiment of the present invention. Figure 4 is a sectional view, as viewed from side, of the part of a working pin of an unlocking apparatus of elevator hall door in the first embodiment of the present invention. Figure 5 is an upper rear elevation which shows the unlocking condition of an unlocking apparatus of elevator hall door in the first embodiment of the present invention during ordinary opening and closing. Figure 6 is an upper rear elevation which shows an example of a conventional unlocking apparatus of elevator hall door.

[0012] As shown in Figure 6, in a conventional unlocking apparatus of elevator hall door, an elevator hall door 1 which opens and closes an elevator entrance enclosed by a hall three-side frame is of such a construction that during the maintenance and inspection of an elevator, a key removing rod (not shown) is inserted from a keyhole in the front face of the hall door 1 into a T-shaped keyhole mouthpiece 3 provided in an upper rear face, and an unlocking lever 2 is pushed up by vertically operating this key removing rod, whereby a locking device 4 provided above the top end of the hall door 1 is unlocked. This locking device 4 is constituted by an engagement protruding member 6 fixed to a hanger case 5, and a lock member 9 which is mounted on a door hanger 7 fixed to the tope end portion of the hall door 1 so as to be able to swing vertically via a pivotal pin 8, and one leading end portion of which constantly engages with the above-described engagement protruding member 6 by its own weight. The other leading end portion of this lock member 9 on the opposite side is provided with a connecting member 10, with the pivotal pin 8 sandwiched. In elevator modification work in which an unlocking apparatus of this construction is modified into an unlocking apparatus of such a construction that unlocking is performed by turning a triangular key instead of the vertical operation of a key removing rod, a modification into an unlocking apparatus of elevator hall door in the first embodiment of the present invention as shown in Figure 1 to Figure 5 is carried out.

[0013] That is, in Figure 1 to Figure 4, first, because the unlocking lever 5 is not used any more, the bottom end portion of the unlocking lever 2, which becomes an obstacle, is cut off 2a or the unlocking lever 2 is completely demounted and removed (refer to Figure 1). Next, a working piece 12 having a keyhole mouthpiece 11 into which a triangular key is inserted is installed in a position on the back face side of a keyhole provided in the existing hall door 1. A working pin 14 is provided on the working end side of a working lever 13 fixed to this working piece 12. And between the connecting member 10 of the existing unlocking apparatus and the working pin 14 of the working lever 13, there is provided a trigger 15 to connect the two together. Also, an elongated hole 16 into which the working pin 14 is inserted is provided in the bottom end portion of this trigger 15. And because the working pin 14 is inserted and disposed near the bottom end portion of this elongated hole 16, as shown in Figure 5, the movement of the connecting member 10 and the trigger 15 during the ordinary opening and closing of the hall door 1 is within the range of upward runout (allowance) by the elongated hole 16 provided in the trigger 15 and does not interfere with the working pin 14. For this reason, the working lever 13 does not rotate and can be kept in a condition in which the working lever 13 is at a standstill in a horizontal position.

[0014] In an unlocking apparatus of elevator hall door thus modified, during the maintenance and inspection of an elevator, a triangular key is inserted from the front face of the hall door 1 into the triangular keyhole of the keyhole mouthpiece 11 and turned, whereby the working lever 13 is turned in the direction of an arrow of Figure 1 (the clockwise direction) and the trigger 15 fixed to the connecting member 10 via the working pin 14 at the leading end of the working lever 13 is lowered. This movement causes the connecting member 10 to make a stroke in the direction of an arrow of Figure 1(the downward direction) and an unlocking condition as shown in Figure 2 is obtained. Therefore, the unlocking lever 2 of the existing unlocking apparatus becomes not used any more and hence it is possible to modify an unlocking apparatus of such a construction that unlocking is performed by turning a triangular key without changing the installation position of the keyhole mouthpiece of the hall door 1.

[0015] Except during the operation of the key, the working lever 13 comes to a standstill owing to a moment due to the right and left mass imbalance of the axis of rotation thereof and owing to the limitation of the range

of rotation of the keyhole mouthpiece of the triangular key.

[0016] In the unlocking condition during the ordinary opening and closing of the hall door 1, even when as shown in Figure 5, the engaging condition of the key device 4 is undone and the lock member 9 is vertically swung via the pivotal pin 8, with the result that the connecting member 10 and the trigger 15 move downward, the working pin 14 is positioned substantially in the middle of the elongated hole 16 provided in the trigger 15 and the working pin 14 does not work. For this reason, the working lever 13 does not turn and can be kept at a standstill in a horizontal position.

[0017] And an additional mass to the working system of the unlocking apparatus is only a mass portion of the trigger 15. For this reason, it is possible to hold the effect of a modification on the magnitude of a force for causing the unlocking apparatus to work to a very small level.

Industrial Applicability

[0018] As described above, an unlocking apparatus of elevator hall door and a method of modifying an unlocking apparatus according to the present invention are suitable for modification work which involves modifying an unlocking apparatus of elevator hall door of such a construction that an unlocking lever is pushed up by vertically operating a key removing rod, thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of a key removing rod.

Claims

1. An unlocking apparatus of elevator hall door, which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door, an unlocking lever is pushed up by vertically operating the key removing rod, thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of the key removing rod, **characterized in that** the unlocking apparatus of elevator hall door comprises a working piece which is provided in the same place as the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole into which the key removing rod is inserted, and which has a keyhole mouthpiece into which a triangular key is inserted, a working lever which is fixed to this working piece and on the working end side of which a working pin is provided, and a trigger which is provided between the working pin of this working lever and a connecting member of the locking device of the hall door and connects the two together, the unlocking lever being not used.

2. An unlocking apparatus of elevator hall door, which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door, an unlocking lever is pushed up by vertically operating the key removing rod, thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of the key removing rod, **characterized in that** the unlocking apparatus of elevator hall door comprises a working piece which is provided in the same place as the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole into which the key removing rod is inserted, and which has a keyhole mouthpiece into which a triangular key is inserted, a working lever which is fixed to this working piece and on the working end side of which a working pin is provided, a trigger which is provided between the working pin of this working lever and a connecting member of the locking device of the hall door and connects the two together, and an elongated hole which is provided in a lower portion of this trigger and into which the working pin is inserted and disposed, the unlocking lever being not used.

3. The unlocking apparatus of elevator hall door according to claim 1 or 2, **characterized in that** when the triangular key is inserted into the keyhole mouthpiece and turned, the working lever works via the working piece and pushes down the trigger fixed to the connecting member via the working pin, whereby the locking device of the elevator hall door is unlocked.

4. The unlocking apparatus of elevator hall door according to claim 1 or 2, **characterized in that** in the unlocking condition during the ordinary opening and closing of the hall door, the working pin of the working lever is positioned in the middle of the elongated hole of the trigger even when the engaging condition of the locking device of the hall door is undone and the connecting member and the trigger move downward.

5. A method of modifying an elevator hall door which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door, an unlocking lever is pushed up by vertically operating the key removing rod thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key

instead of the vertical operation of the key removing rod, **characterized in that** the method comprises the step of cutting off a bottom end portion of the unlocking lever or completely remounting and removing the unlocking lever, the step of demounting the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole mouthpiece into which the key removing rod is inserted, the step of installing, in this same place where the keyhole mouthpiece has been demounted, a working piece having a keyhole mouthpiece into which a triangular key is inserted and of fixing, to this working piece, a working lever on the working end side of which a working pin is provided, and the step of providing, between the working pin of the working lever and the connecting member of the lock device of the hall door, a trigger which connects the two together.

6. A method of modifying an elevator hall door which is used in modifying an unlocking apparatus of elevator hall door of such a construction that, with an unlocking keyhole mouthpiece having a keyhole into which a key removing rod is inserted being fixed to a back side of the elevator hall door, an unlocking lever is pushed up by vertically operating the key removing rod thereby to unlock a locking device of the hall door into an unlocking apparatus in which unlocking is performed by turning a triangular key instead of the vertical operation of the key removing rod, **characterized in that** the method comprises the step of cutting off a bottom end portion of the unlocking lever or completely remounting and removing the unlocking lever, the step of demounting the unlocking keyhole mouthpiece on the back side of the hall door having a keyhole mouthpiece into which the key removing rod is inserted, the step of installing, in this same place where the keyhole mouthpiece has been demounted, a working piece having a keyhole mouthpiece into which a triangular key is inserted and of fixing, to this working piece, a working lever on the working end side of which a working pin is provided, the step of providing, between the working pin of the working lever and the connecting member of the lock device of the hall door, a trigger which connects the two together, and the step of inserting and disposing the working pin into an elongated hole provided in a lower portion of this trigger.

Fig. 1

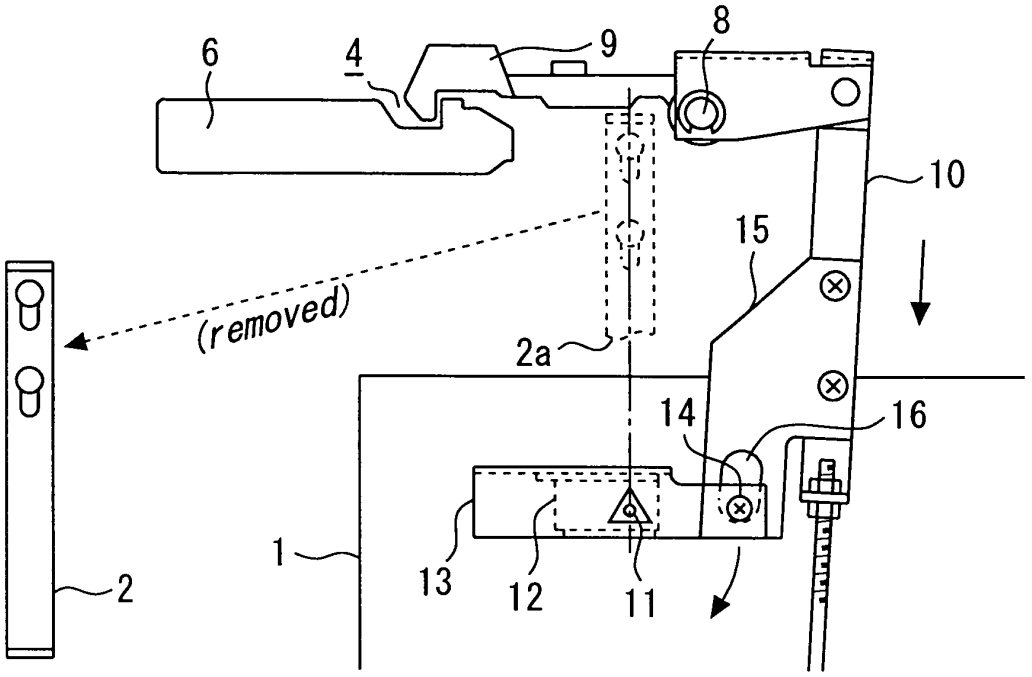


Fig. 2

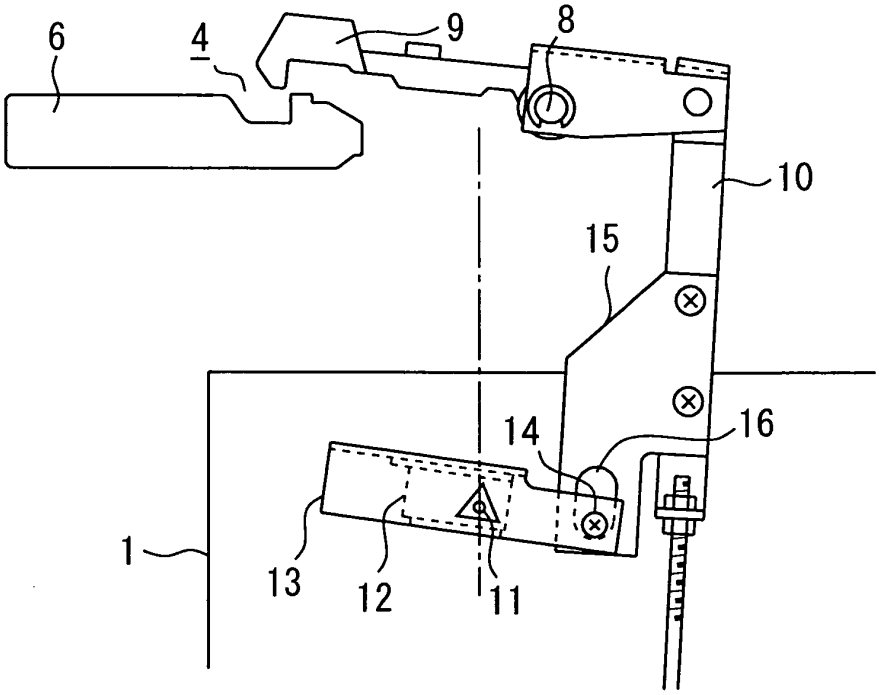


Fig. 3

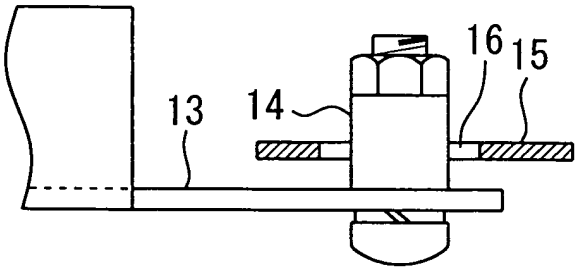


Fig. 4

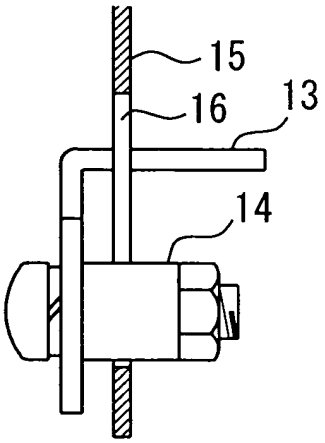


Fig. 5

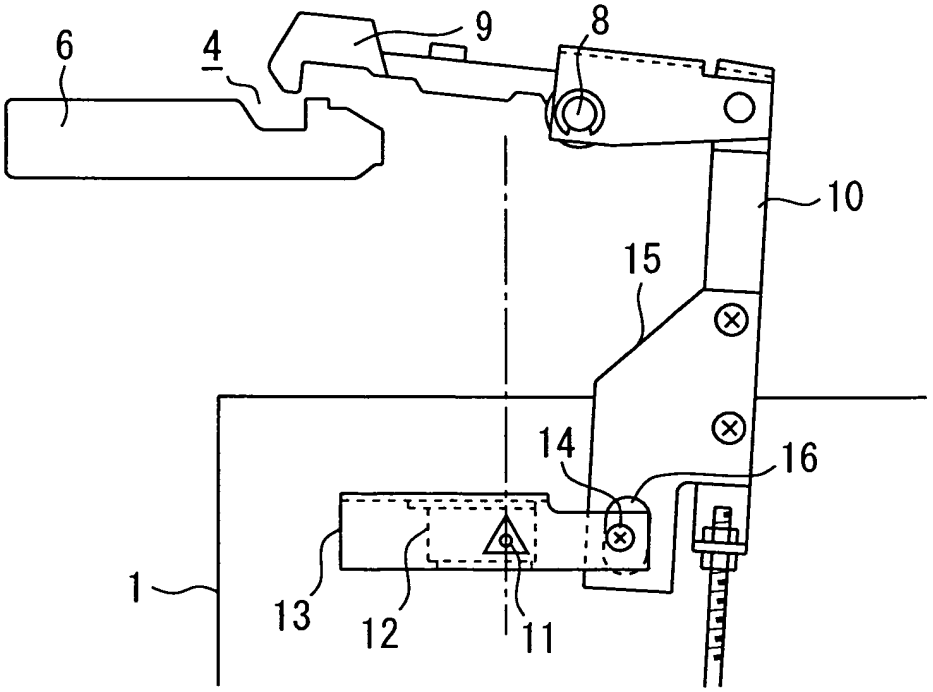


Fig. 6

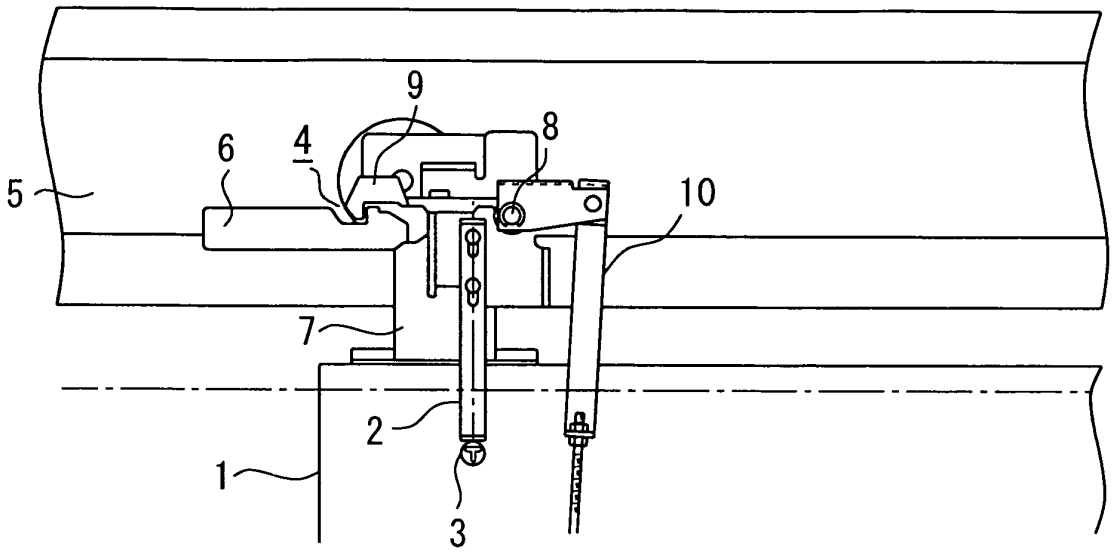
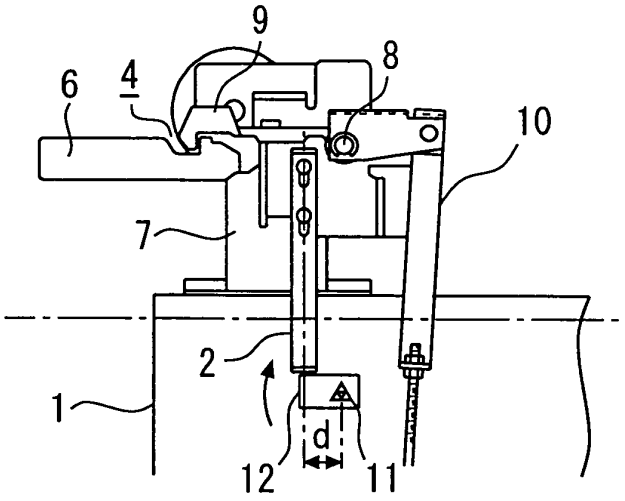


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/003920

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B66B13/16

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[7] B66B13/16

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	1996-2004
Kokai Jitsuyo Shinan Koho	1971-2004	Toroku Jitsuyo Shinan Koho	1994-2004

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 150767/1975(Laid-open No. 64467/1977) (Hitachi, Ltd.), 12 May, 1977 (12.05.77), Pay attention to description, page 2, line 12 to page 4, line 10; Fig. 4 (Family: none)	1-6

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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	Date of mailing of the international search report
10 December, 2004 (10.12.04)	28 December, 2004 (28.12.04)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/003920

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 139214/1982(Laid-open No. 42261/1984) (Mitsubishi Electric Corp.), 19 March, 1984 (19.03.84), Pay attention to description, page 4, line 14 to page 9, line 5; Figs. 1 to 9 (Family: none)	1-6

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 4338092 A **[0002]**
- JP 59042261 U **[0002]**