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(54) **HOISTWAY DOOR SEPARATION PREVENTING DEVICE FOR A LIFT**

(57) A hoistway door separation preventing device for a lift is provided, in which a separation prevention unit is installed in addition to an installation plate, connection plates, and a hanger plate. When the connection plate

is to be bent due to impact applied to the hoistway door, the separation prevention unit prevents the connection plate from being bent to prevent the separation of the hoistway door.

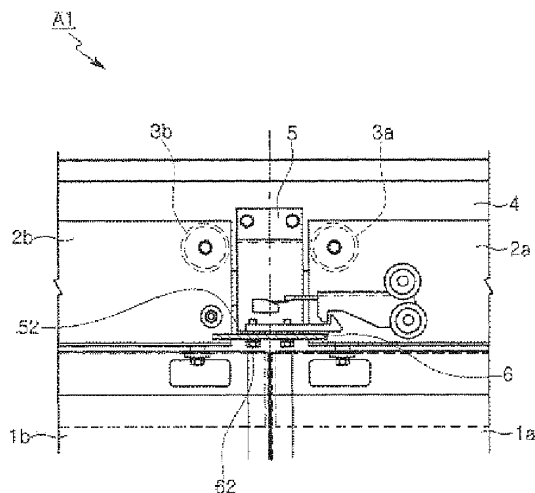


Fig. 6

Description

BACKGROUND OF THE INVENTION

Field of the invention

[0001] The present invention relates to a hoistway door separation preventing device for a lift, and more particularly to a hoistway door separation preventing device for a lift, which prevents opening of hoistway doors by an external force and accidents caused by such opening of the hoistway doors through reinforcement of a door closure force when the hoistway doors are in a closed state.

Description of the Prior Art

[0002] In general, elevator hoistway doors are installed in places where passengers can make direct contact with the doors rather than any other place of an elevator, and are exposed to passenger's mischief and accidents.

[0003] Among elevator accidents, the percentage of accidents which are caused by losing of user's footing into a shaft when strong impact is applied to the hoistway door is greatly increasing.

[0004] Although elevator manufactures take measures such as reinforcing of the strength of the hoistway door and the like, such measures are insufficient and cause a great burden of manufacturing costs.

[0005] FIG. 1 is a view illustrating a door structure of an elevator in the related art, and FIG. 2 is an enlarged view taking only a portion of the structure of FIG. 1. FIG. 3 is a side view illustrating a normal engagement state of the elevator door in the related art, and FIG. 4 is a side view illustrating an engagement state when the elevator door in the related art is separated.

[0006] Referring to FIGS. 1 to 3, an elevator generally includes two to four doors, and upper portions of the respective doors 1a and 1b are connected to connection plates 2a and 2b. The connection plates 2a and 2b are connected together through a wire or the like in the hoistway door device, and if one door is moved, the other door, which receives force transferred through the wire, is also moved, and thus the hoistway doors 1a and 1b can be opened or closed. Also, as the respective connection plates 2a and 2b are driven, the hoistway doors 1a and 1b can be opened or closed. In this case, between the connection plates 2a and 2b and a rail 24, pulleys 3a and 3b are provided.

[0007] As illustrated in FIG. 4, if strong impact is applied to the hoistway door 1a in this structure, the hoistway door may be bent and thus the connection plate 2a fixed to an upper end of the door may be broken. Accordingly, the pulley 3a fixed to the connection plate 2a may be separated from the rail 42, and thus the upper end of the hoistway door 1a may be also separated to cause the occurrence of fall accident.

SUMMARY OF THE INVENTION

[0008] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the related art while advantages achieved by the related art are maintained intact.

[0009] One subject to be achieved by the present invention is to provide a hoistway door separation preventing device for a lift, which has a great hoistway door separation preventing effect or originally blocks the separation of hoistway doors even at a low cost.

[0010] In one aspect of the present invention, there is provided a hoistway door separation preventing device for a lift, which includes a separation prevention means in addition to an installation plate, connection plates, and a hanger plate, wherein when the connection plate is to be bent due to impact applied to the hoistway door, the separation prevention means prevents the connection plate from being bent to prevent the separation of the hoistway door.

[0011] According to the present invention, unnecessary expenses for reinforcing the strength of the hoistway door in order to prevent the separation of the door due to an abnormal impact applied thereto is reduced, and a user or a resident is prevented from falling into a shaft due to the separation of the hoistway door that occurs frequently caused by an abnormal impact.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a view illustrating the door structure of an elevator in the related art;

FIG. 2 is an enlarged view taking only a portion of the door structure of FIG. 1;

FIG. 3 is a side view illustrating a normal engagement state of an elevator door in the related art;

FIG. 4 is a side view illustrating an engagement state when the elevator door in the related art is separated.

FIG. 5 is a perspective view illustrating a first embodiment of the present invention;

FIG. 6 is a front view illustrating a first embodiment of the present invention;

FIGS. 7 and 8 are side views illustrating a first embodiment of the present invention, in which FIG. 7 illustrates a normal state, and FIG. 8 illustrates an impact state;

FIG. 9 is a front view illustrating a second embodiment of the present invention;

FIGS. 10 and 11 are side views illustrating a second embodiment of the present invention, in which FIG. 10 illustrates a normal state, and FIG. 11 illustrates an impact state;

FIG. 12 is a front view illustrating a third embodiment

of the present invention; and
FIGS. 13 and 14 are side views illustrating a second embodiment of the present invention, in which FIG. 13 illustrates a normal state, and FIG. 14 illustrates an impact state.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[Embodiment 1]

[0014] FIG. 5 is a perspective view illustrating a first embodiment of the present invention, and FIG. 6 is a front view illustrating a first embodiment of the present invention. FIGS. 7 and 8 are side views illustrating a first embodiment of the present invention, in which FIG. 7 illustrates a normal state, and FIG. 8 illustrates an impact state.

[0015] Referring to FIGS. 5 to 7, a hoistway door separation preventing device for a lift according to a first embodiment A1 includes hoistway doors 1a and 1b installed on the left and right sides to divide a platform; left and right connection plates 2a and 2b provided with driving pulleys 3a and 3b and installed on an upper side of the hoistway doors 1a and 1b; a hanger plate 4 installed on an upper portion of a hoistway doorframe and provided with a rail 42 formed thereon to be engaged with the driving pulleys 3a and 3b; an installation plate 5 installed between the left and right connection plates 2a and 2b; a stepped portion 52 formed by bending a lower portion of the installation plate 5; and a fixing member 6 fixed to the stepped portion 52 and having both end portions installed to be in close contact with the connection plates 2a and 2b.

[0016] The stepped portion 52 is horizontally formed on the installation plate 5 with its lower portion bent to the outside.

[0017] The fixing member 6 is in the form of a metal bar having a predetermined length, is arranged on a bottom surface of the stepped portion 52, and is fixedly installed by a fastening bolt 62.

[0018] Both end portion of the fixing member 6 are installed to be in close contact with the front surfaces of the connection plates 2a and 2b.

[0019] Accordingly, as illustrated in FIG. 8, even if the hoistway doors 1a and 1b and the connection plates 2a and 2b are shifted to the left by an external impact, the movement of the connection plates 2a and 2b is impeded by the both end portions of the fixing member 6, and thus the separation of the hoistway doors 1a and 1b can be prevented.

[Embodiment 2]

[0020] FIG. 9 is a front view illustrating a second embodiment of the present invention, and FIGS. 10 and 11 are side views illustrating a second embodiment of the present invention. FIG. 10 illustrates a normal state, and FIG. 11 illustrates an impact state.

[0021] Referring to FIGS. 9 and 10, a hoistway door separation preventing device for a lift according to a second embodiment A2 includes hoistway doors 1a and 1b installed on the left and right sides to divide a platform; left and right connection plates 2a and 2b provided with driving pulleys 3a and 3b and installed on an upper side of the hoistway doors 1a and 1b; a hanger plate 4 installed on an upper portion of a hoistway doorframe and provided with a rail 42 formed thereon to be engaged with the driving pulleys 3a and 3b; an installation plate 5 installed between the left and right connection plates 2a and 2b; a hook member 8 formed by cutting portions of the connection plates 2a and 2b and backwardly bending the cut portions; and a catch 7 attached to a front surface of the hanger plate 4 to be engaged with the hook member 8.

[0022] The hook member 8 is formed by punching portions of the connection plates 2a and 2b in the form of a rectangle in a state where its lower portion is not punched, pushing and backwardly bending the punched portions, and then bending ends of the punched portions upwardly.

[0023] The catch 7 is formed by welding one end portion thereof with the hanger plate 4, horizontally bending the other end portion thereof, and then bending an end of the other end portion downwardly so that the end portion of the hook member 8 is caught by the catch 7.

[0024] Accordingly, in the second embodiment A2 of the present invention, as illustrated in FIG. 11, even if the hoistway door 1a is shifted to the left by an external impact, the movement of the hoistway door is impeded by the fixing force of the hook member 8 and the catch 7, and thus the separation of the hoistway doors 1a and 1b can be prevented.

[Embodiment 3]

[0025] FIG. 12 is a front view illustrating a third embodiment of the present invention, and FIGS. 13 and 14 are side views illustrating a second embodiment of the present invention. FIG. 13 illustrates a normal state, and FIG. 14 illustrates an impact state.

[0026] Referring to FIGS. 12 and 13, a hoistway door separation preventing device for a lift according to a third embodiment A3 includes hoistway doors 1a and 1b installed on the left and right sides to divide a platform; left and right connection plates 2a and 2b provided with driving pulleys 3a and 3b and installed on an upper side of the hoistway doors 1a and 1b; a hanger plate 4 installed on an upper portion of a hoistway doorframe and provided with a rail 42 formed thereon to be engaged with the driving pulleys 3a and 3b; an installation plate 5 installed between the left and right connection plates 2a and 2b;

and spacers 9 installed between rear surfaces of upper portions of the connection plates 2a and 2b and the hanger plate 4.

[0027] The spacer 9 has a "∩"-shaped cross section, and one side surface of the spacer 9 is attached to a rear surface of the connection plate 2a or 2b, and the other side surface of the spacer 9 is installed to be apart for a minute space from the hanger plate 4.

[0028] Accordingly, as illustrated in FIG. 13, even if the hoistway doors 1a and 1b are shifted to the left by an external impact, the spacers 9 installed on the upper portions of the connection plates 2a and 2b first collide with the hanger plate 4 to prevent a further movement of the connection plates 2a and 2b, and thus the separation of the hoistway doors 1a and 1b can be prevented.

[0029] Although preferred embodiments of the present invention have been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A hoistway door separation preventing device for a lift comprising:

hoistway doors installed on the left and right sides to divide a platform;
left and right connection plates provided with driving pulleys and installed on an upper side of the hoistway doors;
a hanger plate installed on an upper portion of a hoistway doorframe and provided with a rail formed thereon to be engaged with the driving pulleys;
an installation plate installed between the left and right connection plates;
a stepped portion formed by bending a lower portion of the installation plate; and
a fixing member fixed to the lower portion of the stepped portion and having both end portions installed to be in close contact with the connection plates.

2. The hoistway door separation preventing device for a lift according to claim 1, wherein the fixing member is in the form of a metal bar having a predetermined length, and is fixedly installed on a bottom surface of the stepped portion by a fastening bolt.

3. A hoistway door separation preventing device for a lift comprising: hoistway doors installed on the left and right sides to divide a platform;
left and right connection plates provided with driving pulleys and installed on an upper side of the hoistway doors;

a hanger plate installed on an upper portion of a hoistway doorframe and provided with a rail formed thereon to be engaged with the driving pulleys;
an installation plate installed between the left and right connection plates;
a hook member formed by cutting portions of the connection plates and backwardly bending the cut portions; and
a catch attached to a front surface of the hanger plate to be engaged with the hook member.

4. The hoistway door separation preventing device for a lift according to claim 3, wherein the hook member is formed by punching portions of the connection plates in the form of a rectangle in a state where its lower portion is not punched, pushing and backwardly bending the punched portions, and then bending ends of the punched portions upwardly.

5. The hoistway door separation preventing device for a lift according to claim 3, wherein the catch is formed by welding one end portion thereof with the hanger plate, horizontally bending the other end portion thereof, and then bending an end of the other end portion downwardly so that the end portion of the hook member is caught by the catch.

6. A hoistway door separation preventing device for a lift comprising:

hoistway doors installed on the left and right sides to divide a platform;
left and right connection plates provided with driving pulleys and installed on an upper side of the hoistway doors;
a hanger plate installed on an upper portion of a hoistway doorframe and provided with a rail formed thereon to be engaged with the driving pulleys;
an installation plate installed between the left and right connection plates; and
spacers installed between rear surfaces of upper portions of the connection plates and the hanger plate.

7. The hoistway door separation preventing device for a lift according to claim 6, wherein the spacer has a "∩"-shaped cross section, and one side surface of the spacer is attached to a rear surface of the connection plate, and the other side surface of the spacer is installed to be apart for a minute space from the hanger plate.

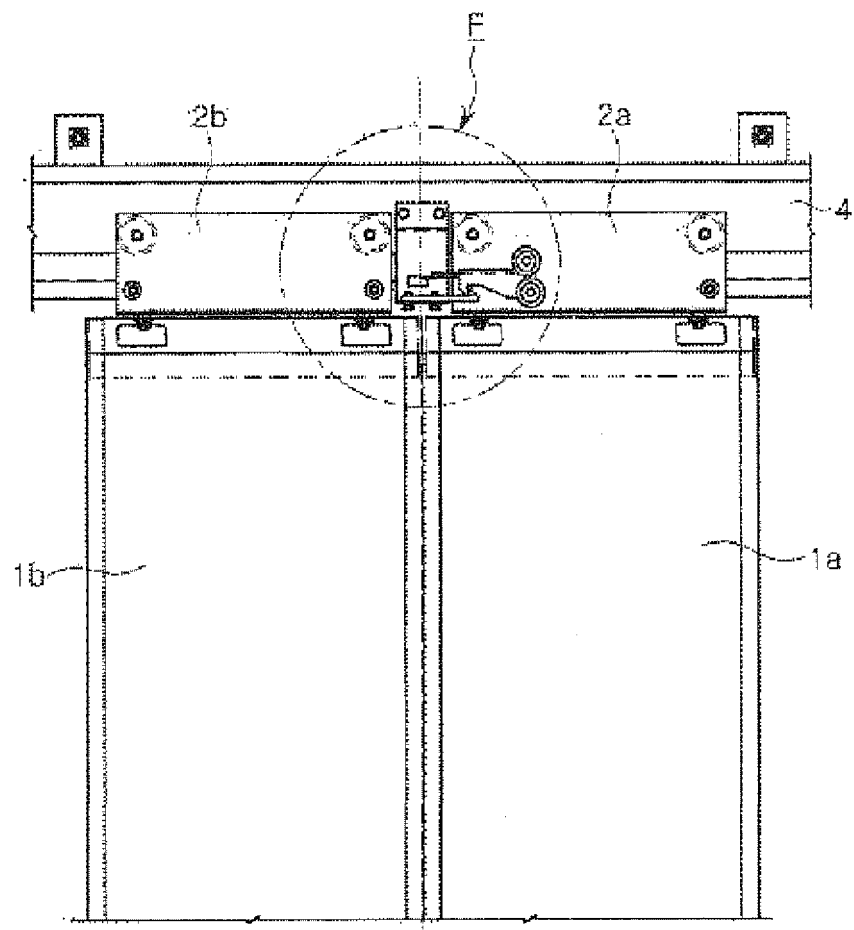


Fig.1

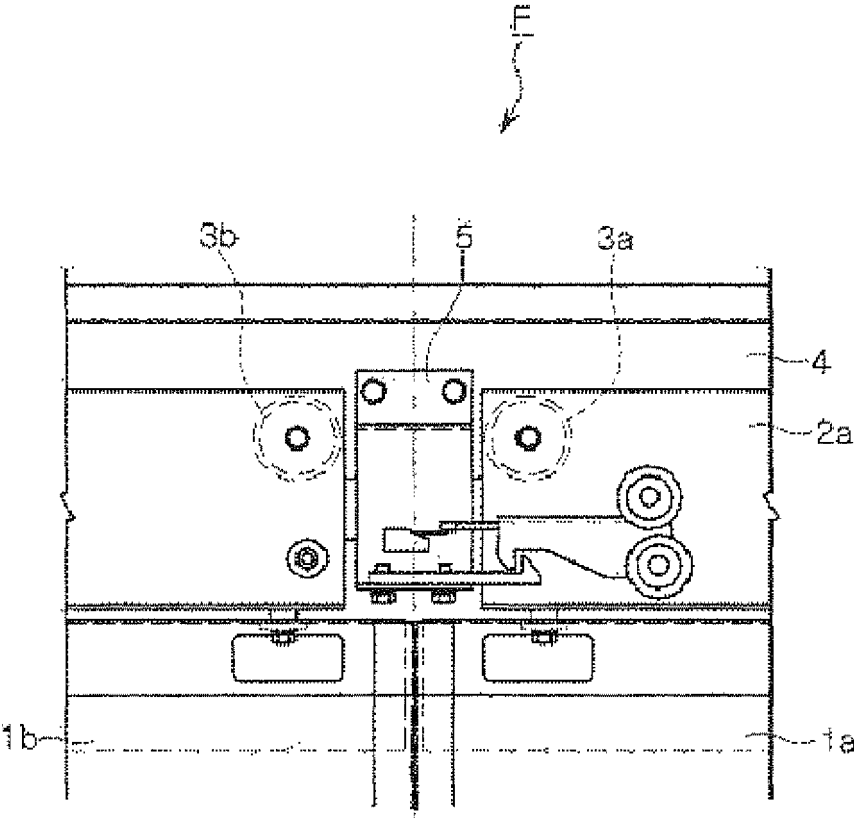


Fig.2

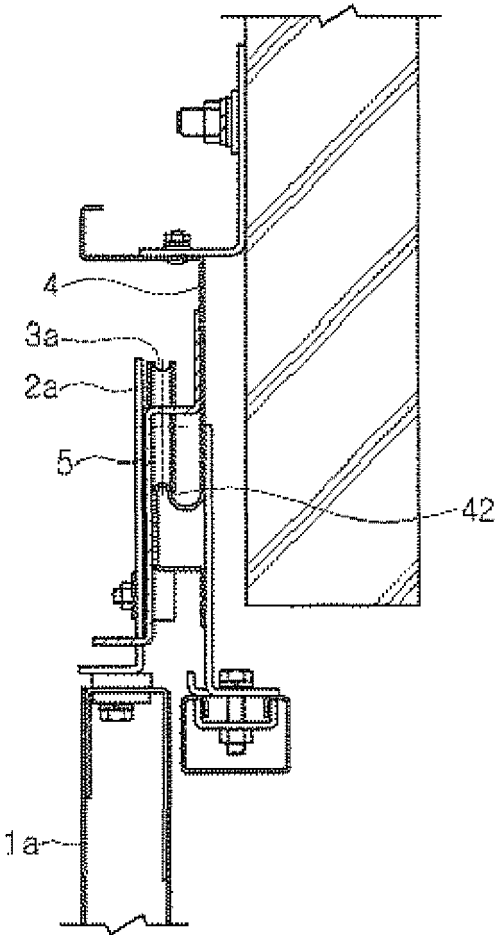


Fig.3

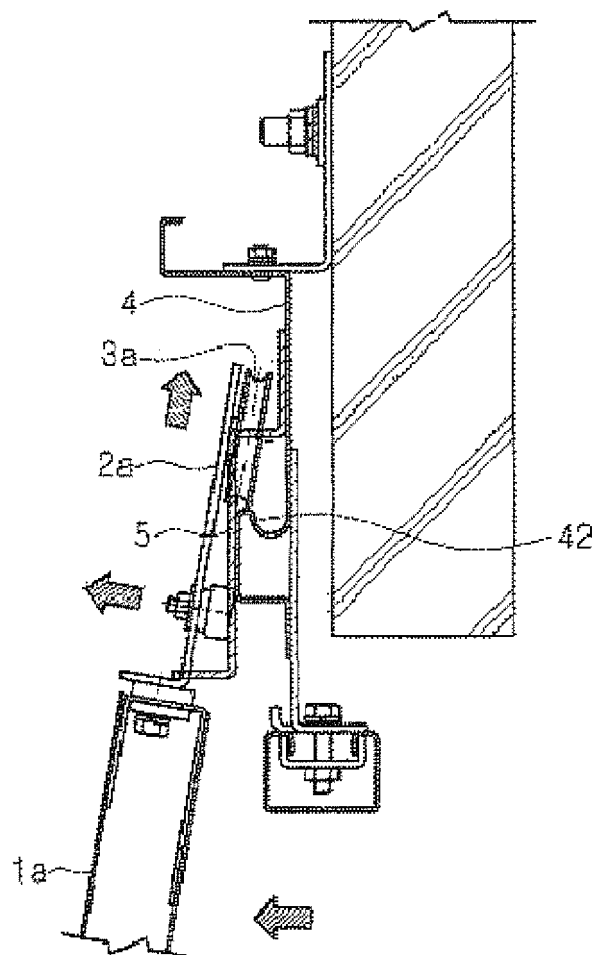


Fig.4

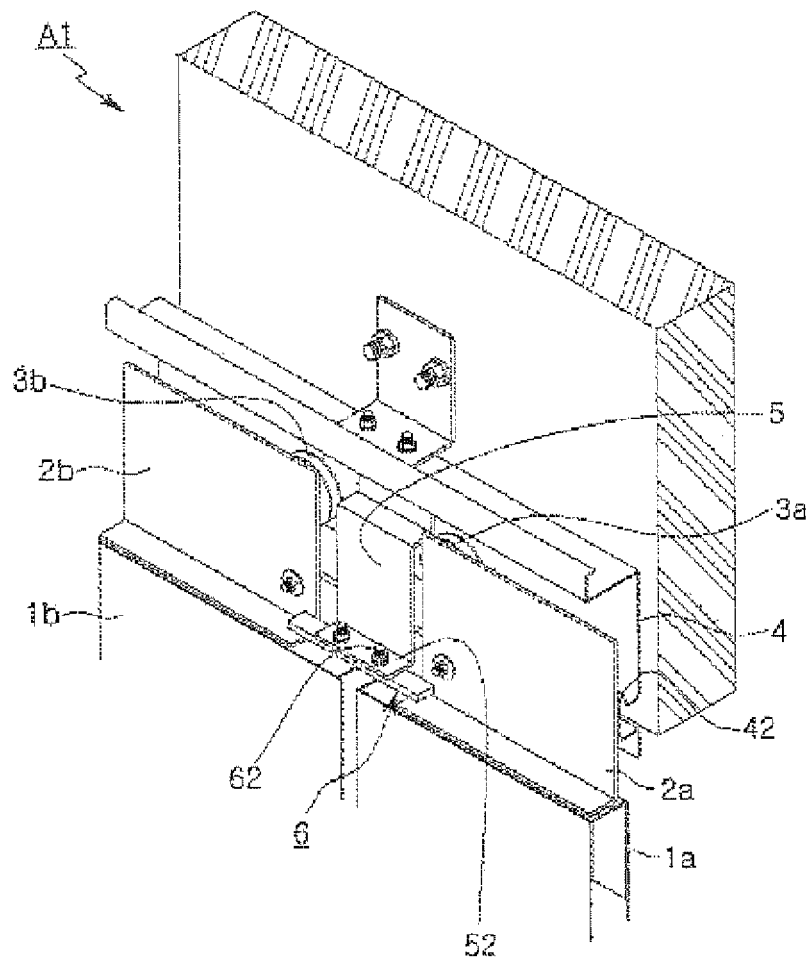


Fig.5

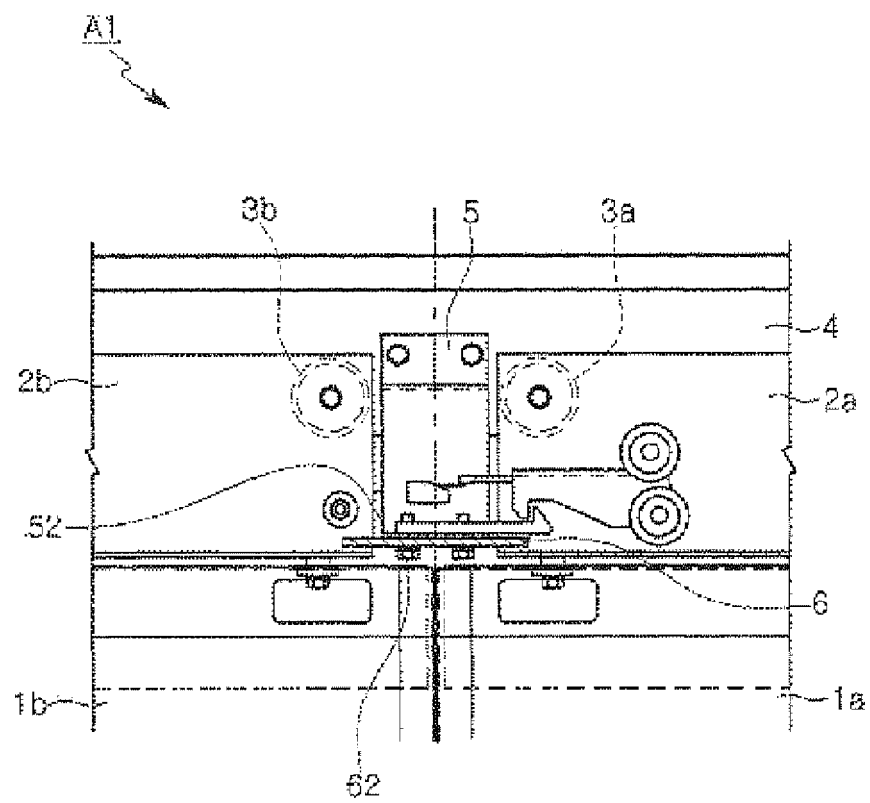


Fig. 6

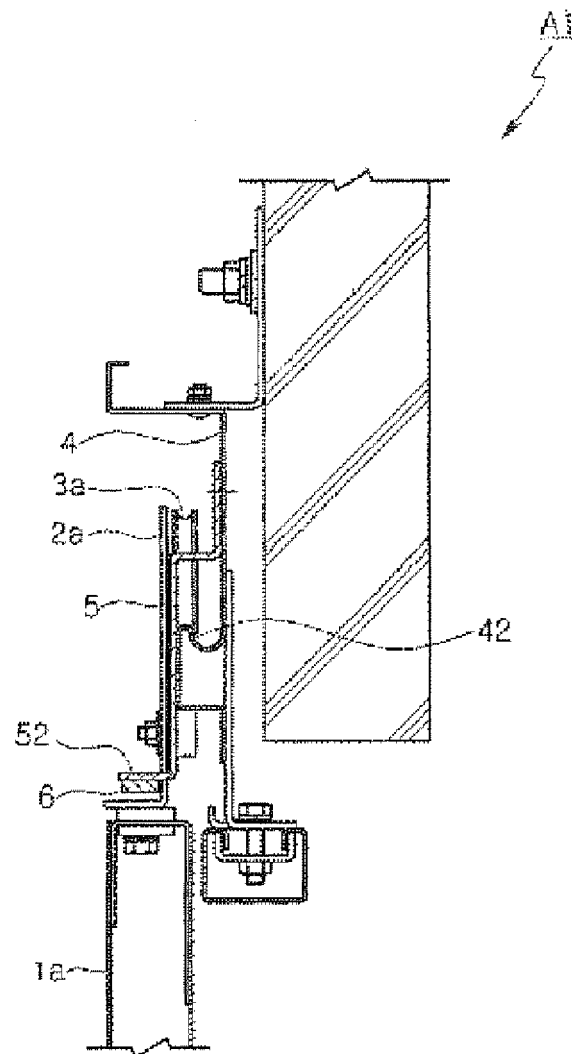


Fig.7

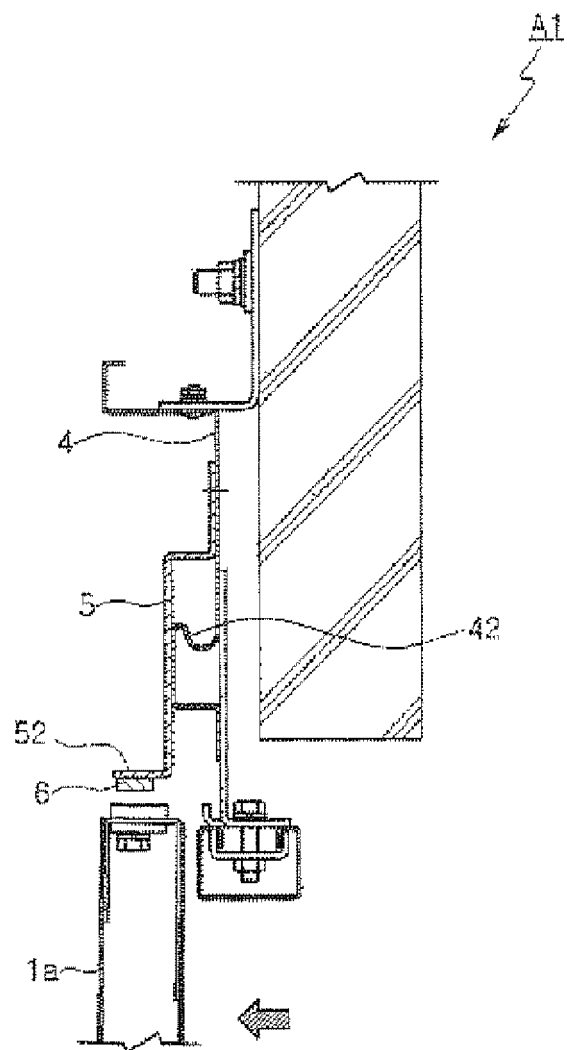


Fig.8

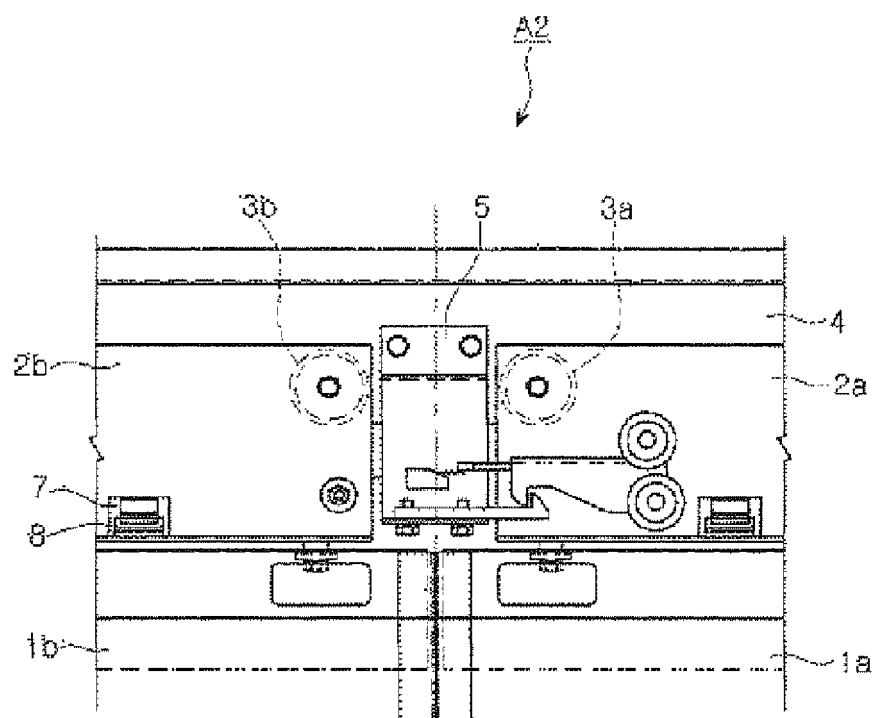


Fig.9

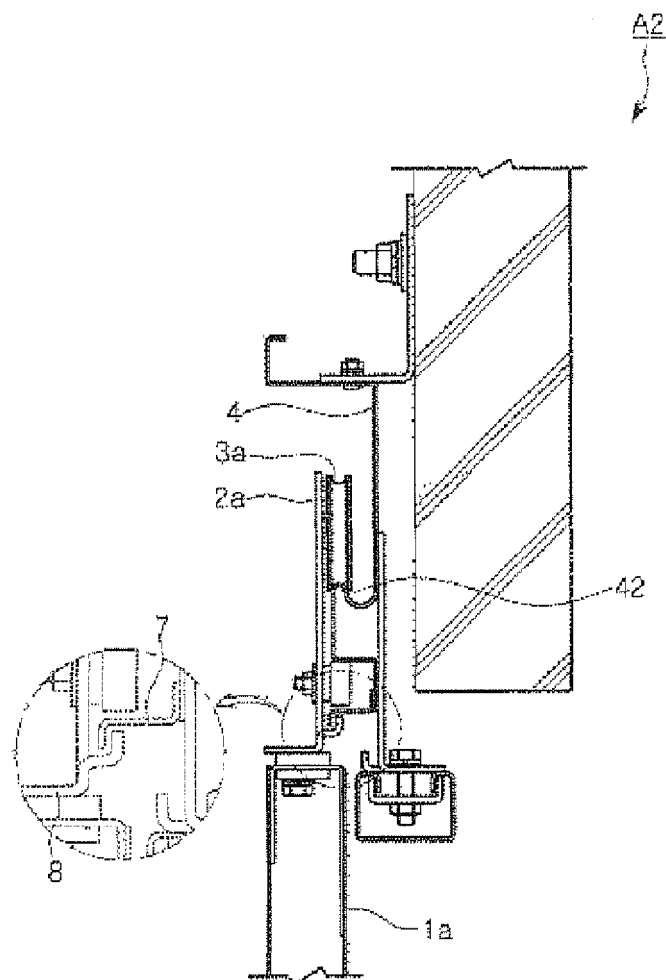


Fig.10

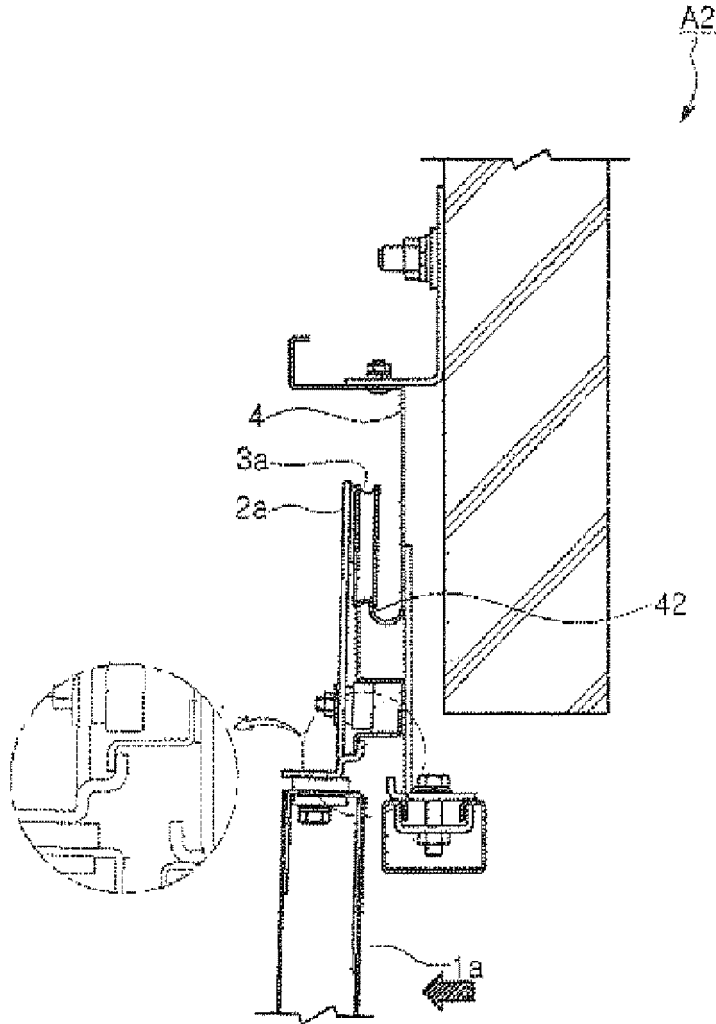


Fig.11

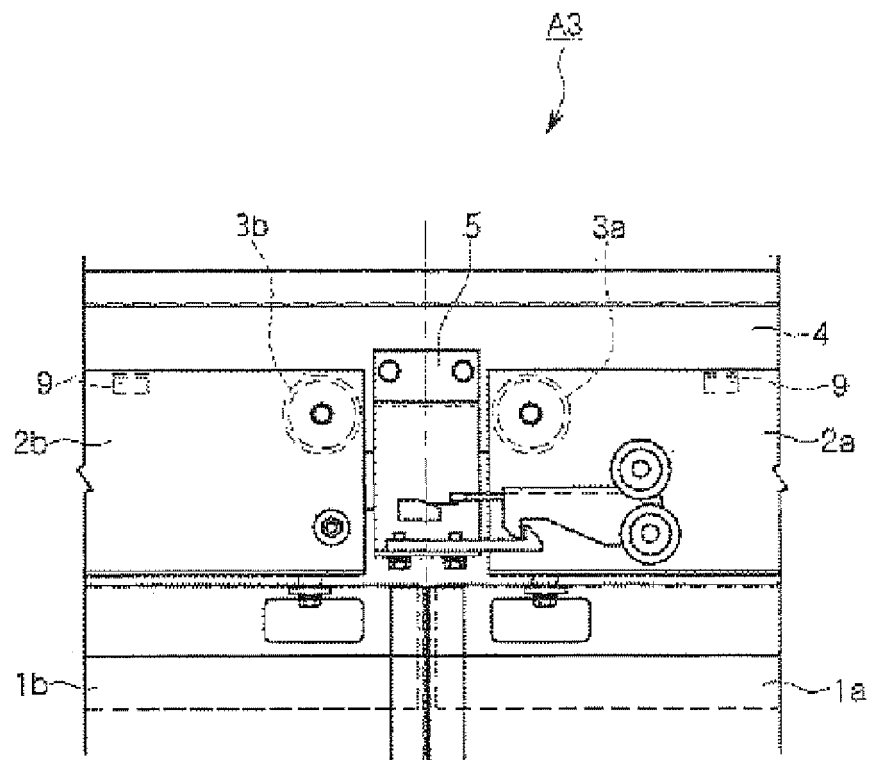


Fig.12

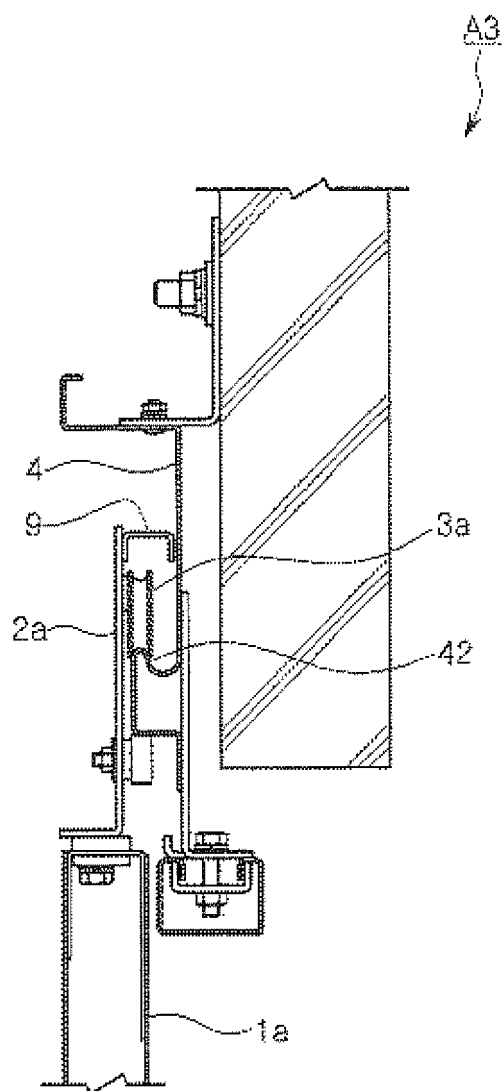


Fig.13

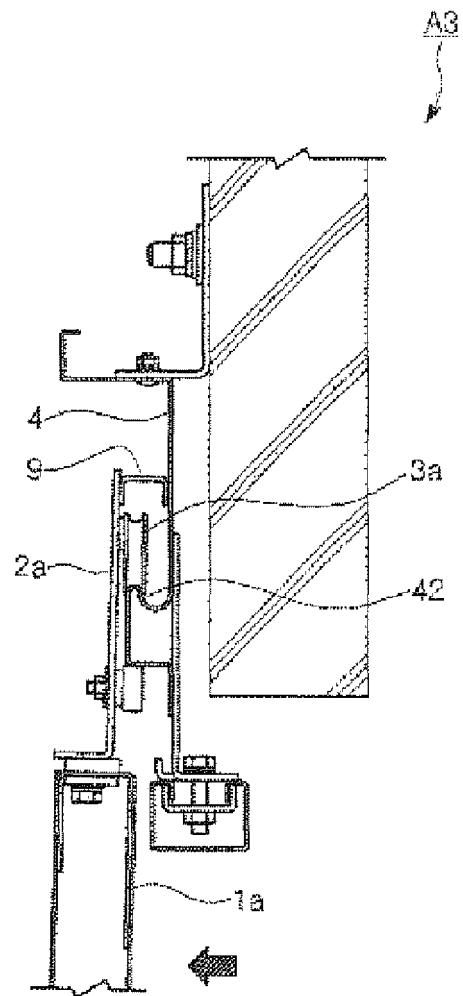


Fig.14