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(54) **DOOR DEVICE FOR ELEVATOR**

TÜRENVORRICHTUNG FÜR AUFZÜGE

DISPOSITIF DE PORTE POUR ASCENSEUR

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(73) Proprietor: **Mitsubishi Electric Corporation**

Tokyo 100-8310 (JP)

(72) Inventors:

- **IMAJO, Kensuke**
Tokyo 100-8310 (JP)

- **YAMAMORI, Kouichi**
Tokyo 102-0073 (JP)

(74) Representative: **Hoffmann Eitle**

Patent- und Rechtsanwälte PartmbB
Arabellastraße 30
81925 München (DE)

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Description

Technical Field

5 **[0001]** The present invention relates to a door operator installed in a hall or a car of an elevator.

Background Art

10 **[0002]** Patent Literature 1 below discloses a technique for preventing an elevator door from getting out of place when an excessive force is applied to the door. Specifically, for the door operator described in Patent Literature 1, a plate member is arranged on the side surface of a door rail so that the plate member and the door rail face to each other with a narrow gap G being provided therebetween to prevent a hanger roller from coming off the door rail.

Citation List

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Patent Literature

[0003] Patent Literature 1: Japanese Patent Laid-Open No. 54-75834

20 Summary of Invention

Technical Problem

25 **[0004]** For some elevators installed in high-rise buildings, the pressure in an elevator car is controlled to prevent ride comfort from being hindered by a change in atmospheric pressure. Also, in the case where an elevator hall is installed in a tunnel, when a vehicle moving at a high speed passes through it, the elevator door sometimes receives wind pressure.

[0005] When the door operator described in Patent Literature 1 is applied to such an elevator, the door is pushed by the pressure or the wind pressure, and there is a fear that the plate member may come into contact with the door rail. When the plate member comes into contact with the door rail, abnormal noise occurs when the door is opened or closed.
30 Further, the running resistance of the door increases, so that the opening/closing movement of the door may be hindered.

[0006] Figure 10 is a side view of a conventional door operator of an elevator, and Figure 11 is a view showing a state in which pressure is applied to a door in the door operator shown in Figure 10.

[0007] As shown in Figure 10, a door 1 of the elevator is hung on a door hanger 2. Reference sign 27 denotes a hanger case in which a door rail 28 is formed in a part thereof. On the door hanger 2, a hanger roller 6 is provided so as to be rotatable. The movement of the upper end portion of the door 1 is guided by the rolling of the hanger roller 6 on the upper face of the door rail 28.
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[0008] Also, reference sign 8 denotes a door shoe provided in the lower end portion of the door 1. The movement of the lower end portion of the door 1 is guided by the door shoe 8 arranged in a groove of a sill 4.

[0009] For the door operator configured as described above, when pressure is applied to the door 1, as shown in Figure 11, the door hanger 2 tilts, and the door 1 is deformed. This presents a problem that a gap between the door 1 and a side jamb 29 forming an entrance is widened, and thereby foreign matters are made liable to be brought in. Also, when a force acts in the direction opposite to the direction shown in Figure 11, the gap between the door 1 and the side jamb 29 is narrowed, or is eliminated. Therefore, when the door 1 is opened or closed, there is a fear that the design surface of the door 1 may be damaged or the opening/closing movement itself may be hindered.
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45 **[0010]** KR 100 257 351 B discloses a door operator of an elevator according to the preamble of claims 1, 2 and 3.

[0011] The present invention has been made to solve the above-described problems, and an object thereof is to provide a door operator of an elevator that can restrain the displacement of a door properly even when an external force is applied to the door on account of wind pressure or the like.

50 Solution to Problem

[0012] A door operator of an elevator according to the present invention is a door operator according to claim 1.

[0013] Also, a door operator of an elevator according to the present invention is a door operator which comprises a door rail provided above an elevator entrance, a door for opening and closing the entrance, a door hanger for hanging the door, a hanger roller which is provided rotatably on the door hanger to guide the opening/closing movement of the door by means of rolling on the upper face of the door rail, a support body for supporting the door rail, a part of which is arranged along the door rail, and a displacement restraining device which is provided on the door hanger to restrain the door from being displaced to the vertical direction and the axial direction of the hanger roller. The displacement
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restraining device comprises a stabilizing roller which rotates while being in contact with the lower face of the part of the support body along with the opening/closing movement of the door, a first guide roller which rotates while being in contact with one side surface of the part of the support body along with the opening/closing movement of the door, and a second guide roller which rotates while being in contact with the other side surface of the part of the support body along with the opening/closing movement of the door.

[0014] Also, a door operator of an elevator according to the present invention is a door operator according to claim 3.

Advantageous Effect of Invention

[0015] According to the door operator of an elevator in accordance with the present invention, the displacement of a door can be restrained properly even when an external force is applied to the door on account of wind pressure or the like.

Brief Description of Drawings

[0016]

Figure 1 is a front view showing a door operator of an elevator in a first embodiment according to the present invention.

Figure 2 is a perspective view showing an essential portion of the door operator of an elevator in the first embodiment according to the present invention.

Figure 3 is a side view showing the essential portion of the door operator of an elevator in the first embodiment according to the present invention.

Figure 4 is a perspective view showing an essential portion of a door operator of an elevator in a second embodiment not forming part of the present invention.

Figure 5 is a side view showing the essential portion of the door operator of an elevator in the second embodiment not forming part of the present invention.

Figure 6 is a perspective view showing an essential portion of a door operator of an elevator in a third embodiment according to the present invention.

Figure 7 is a side view showing the essential portion of the door operator of an elevator in the third embodiment according to the present invention.

Figure 8 is a perspective view showing an essential portion of a door operator of an elevator in a fourth embodiment according to the present invention.

Figure 9 is a side view showing the essential portion of the door operator of an elevator in the fourth embodiment according to the present invention.

Figure 10 is a side view of a conventional door operator of an elevator.

Figure 11 is a view showing a state in which pressure is applied to a door.

Description of Embodiments

[0017] The present invention will now be described in more detail with reference to the accompanying drawings. In the drawings, the same signs are applied to the same or equivalent elements, and duplicated explanation thereof is simplified or omitted as appropriate.

First Embodiment

[0018] Figure 1 is a front view showing a door operator of an elevator in a first embodiment according to the present invention, Figure 2 is a perspective view showing an essential portion of the door operator of an elevator in the first embodiment according to the present invention, and Figure 3 is a side view showing the essential portion of the door operator of an elevator in the first embodiment according to the present invention.

[0019] In Figures 1 to 3, reference sign 1 denotes a door for opening and closing an elevator entrance, and 2 denotes a door hanger provided above the upper end portion of the door 1. The door 1 is hung on the door hanger 2. The door 1 moves in the width direction thereof to open and close the entrance. Figure 1 shows an example of the door operator of a center-opening type in which the doors 1 move on both sides to open and close the entrance.

[0020] The opening/closing movement of the door 1 is guided by a door rail 3 and a sill 4.

[0021] The door rail 3 is supported on a support body 5 fixed to a predetermined fixing body. The support body 5 consists of a door support frame or a hanger case, and is fixed to, for example, a shaft wall or a shaft beam. The door rail 3 is arranged above the elevator entrance so as to be horizontal in the width direction of the entrance.

[0022] On the door hanger 2, a pair of hanger rollers 6 and a pair of stabilizing rollers 7 are provided so as to be rotatable in both directions.

[0023] Each of the hanger rollers 6 has a horizontal shaft in the direction perpendicular to the opening/closing direction of the door 1. That is, the shaft of the hanger roller 6 also intersects at right angles with the lengthwise direction of the door rail 3. The hanger roller 6 is placed on the door rail 3, and guides the opening/closing movement of the door 1 by means of the rolling on the upper face of the door rail 3.

[0024] The stabilizing rollers 7 are provided to restrain the vertical displacement of the door 1. Each of the stabilizing rollers 7 has a horizontal shaft parallel with the shaft of the hanger roller 6. The stabilizing roller 7 is arranged so that the upper end of the outer peripheral face thereof is in contact with the door rail 3 from the downside. Therefore, when the door 1 is opened or closed, the stabilizing roller 7 rotates while being in contact with the lower face of the door rail 3. That is, the stabilizing roller 7 and the hanger roller 6 hold the door rail 3 therebetween from the upside and the downside to prevent the occurrence of oscillation on the door 1.

[0025] The sill 4 is provided to guide the movement of the lower end portion of the door 1. The sill 4 is formed with a groove in the opening/closing direction of the door 1. The door 1 is provided with a door shoe 8 (not shown in Figures 1 to 3) projecting downward in the lower end portion thereof. The movement of the lower end portion of the door 1 is guided by (a part of) the door shoe 8 arranged in the groove of the sill 4. The door shoe 8 is provided in both side portions of the door 1.

[0026] Reference sign 9 denotes a displacement restraining device provided in one side portion and the other side portion of the door hanger 2. The displacement restraining device 9 is provided to restrain the door 1 from being displaced to the axial direction of the hanger roller 6. The displacement restraining device 9 is disposed in the lower portion of the door hanger 2, that is, at a position close to the door 1.

[0027] In the following, the details of the displacement restraining device 9 and the support body 5 relating to the displacement restraining device 9 are explained.

[0028] The support body 5 takes, for example, an L shape as viewed from the side, and on one side surface of one plate-shaped member 5a arranged vertically, the door rail 3 is provided. The plate-shaped member 5a is arranged parallel along the door rail 3. Therefore, the lower end portion of the plate-shaped member 5a is also arranged horizontally along the door rail 3.

[0029] The essential portion of the displacement restraining device 9 is configured by a support member 10 and a pair of guide rollers 11 and 12.

[0030] The support member 10 is formed of, for example, a plate member bent into an L shape. One side of the L shape of the support member 10 is arranged in the vertical direction, and is fixed to the side end face of the door hanger 2. The other side of the L shape of the support member 10 is arranged in the horizontal direction slightly under the lower end portion of the plate-shaped member 5a.

[0031] The guide rollers 11 and 12 are provided on the other side of the support member 10 so as to be rotatable in both directions. Each of the guide rollers 11 and 12 has a shaft in the vertical direction. One guide roller 11 is arranged so that the outer peripheral surface thereof is in line contact with one side surface of the plate-shaped member 5a. Therefore, when the door 1 is opened or closed, the guide roller 11 rotates while being in contact with one side surface of the plate-shaped member 5a. The other guide roller 12 is arranged so that the outer peripheral surface thereof is in line contact with the back surface of the one side surface of the plate-shaped member 5a. Therefore, when the door 1 is opened or closed, the guide roller 12 rotates while being in contact with the other side surface (the back surface) of the plate-shaped member 5a. That is, the guide rollers 11 and 12 hold the lower end portion of the plate-shaped member 5a therebetween from the front side and the rear side, and restrains the door 1 from being displaced to the direction in which users go into and out of an elevator car (corresponding to the axial direction of the hanger roller 6).

[0032] Any door operator having the above-described configuration can restrain the displacement of the door 1 properly even if a horizontal external force is applied to the side surface of the door 1 on account of wind pressure or the like.

[0033] That is, for the door operator of this embodiment, the paired guide rollers 11 and 12 each having a shaft in the vertical direction are provided so as to hold the lower end portion of the plate-shaped member 5a therebetween from the front side and the rear side. Therefore, even if a horizontal external force is applied to the side surface of the door 1, the external force can be received by the plate-shaped member 5a, and the door hanger 2 is not tilted. As a result, the door 1 is not deformed.

[0034] The guide rollers 11 and 12 are in contact with the lower end portion of the plate-shaped member 5a by a line (or by a surface having a minute width). Also, the displacement restraining device 9 having the guide rollers 11 and 12 is provided on both sides of the door hanger 2 and at the position close to the door 1. Therefore, even if an excessive external force is applied to the door 1, the door 1 is not curved unlike the conventional example shown in Figure 11.

[0035] Further, since the horizontal external force applied to the door 1 is received via the guide rollers 11 and 12, even when the external force is applied to the door 1, the opening/closing movement of the door 1 is not hindered. Also, since the external force can be received stably by the guide rollers 11 and 12, there is no fear that abnormal noise may occur when the door is opened or closed, or the running resistance of the door 1 may increase.

Second Embodiment

[0036] Figure 4 is a perspective view showing an essential portion of a door operator of an elevator in a second embodiment not forming part of the present invention, and Figure 5 is a side view showing the essential portion of the door operator of an elevator in the second embodiment not forming part of the present invention.

[0037] In Figures 4 and 5, reference sign 13 denotes a displacement restraining device provided in one side portion and the other side portion of the door hanger 2. The displacement restraining device 13 is provided to restrain the door 1 from being displaced to the axial direction of the hanger roller 6. In this embodiment, the displacement restraining device 13 restrains the displacement of the door 1 by utilizing the door rail 3, not utilizing the support body 5. For this purpose, the displacement restraining device 13 is arranged at a position close to the door rail 3.

[0038] The essential portion of the displacement restraining device 13 is configured by a support member 14 and a pair of guide rollers 15 and 16.

[0039] The support member 14 is formed of, for example, a plate member bent into an L shape. One side of the L shape of the support member 14 is arranged in the vertical direction, and is fixed to the side end face of the door hanger 2. The other side of the L shape of the support member 14 is arranged horizontally slightly under the door rail 3.

[0040] The guide rollers 15 and 16 are provided on the other side of the support member 14 so as to be rotatable in both directions. Each of the guide rollers 15 and 16 has a shaft in the vertical direction. One guide roller 15 is arranged so that the outer peripheral surface thereof is in line contact with one side surface of the door rail 3. Therefore, when the door 1 is opened or closed, the guide roller 15 rotates while being in contact with one side surface of the door rail 3. The other guide roller 16 is arranged so that the outer peripheral surface thereof is in line contact with the back surface of the one side surface of the door rail 3. Therefore, when the door 1 is opened or closed, the guide roller 16 rotates while being in contact with the other side surface (the back surface) of the door rail 3. That is, the guide rollers 15 and 16 hold the lower end portion of the door rail 3 therebetween from the front side and the rear side, and restrains the door 1 from being displaced to the direction in which users go into and out of the elevator car (corresponding to the axial direction of the hanger roller 6).

[0041] Other configurations are the same as those of the first embodiment.

[0042] The configuration shown in this embodiment can also achieve the same effect as that of the first embodiment. Also, in the above-described configuration, the displacement of the door 1 can be restrained properly by the displacement restraining device 13 without being affected by the arrangement and shape of the support body 5. In some cases, the positional relationship between the door rail 3 and the support body 5 deviates from the design value on account of an error occurring in manufacturing and installation. This configuration can surely prevent the guide rollers 15 and 16 from running idle on account of the above-described dimensional error, or can surely prevent the rolling resistance of the guide rollers 15 and 16 from increasing.

Third Embodiment

[0043] Figure 6 is a perspective view showing an essential portion of a door operator of an elevator in a third embodiment according to the present invention, and Figure 7 is a side view showing the essential portion of the door operator of an elevator in the third embodiment according to the present invention.

[0044] As shown in Figures 6 and 7, the door hanger 2 is provided with the pair of hanger rollers 6, but is not provided with the stabilizing roller 7. In this embodiment, the function of the stabilizing roller 7 is implemented by a displacement restraining device 17.

[0045] The displacement restraining device 17 is provided in one side portion and the other side portion of the door hanger 2. The displacement restraining device 17 has a function of restraining the door 1 from being displaced vertically in addition to the function of restraining the door 1 from being displaced to the axial direction of the hanger roller 6. In this embodiment, the displacement restraining device 17 restrains the displacement of the door 1 by utilizing the support body 5. For this purpose, the displacement restraining device 17 is arranged at a position close to the support body 5.

[0046] The essential portion of the displacement restraining device 17 is configured by a support member 18, a stabilizing roller 19, and a pair of guide rollers 20 and 21.

[0047] The support member 18 is formed of, for example, a block material having a U shape in plain view. One side surface of the support member 18 is fixed to the side end face of the door hanger 2. Also, the essential portion of the support member 18 is arranged under the plate-shaped member 5a.

[0048] The stabilizing roller 19 has a horizontal shaft parallel with the shaft of the hanger roller 6. The stabilizing roller 19 is arranged so that the upper end of the outer peripheral face thereof is in contact with the plate-shaped member 5a of the support body 5 from the downside. Therefore, when the door 1 is opened or closed, the stabilizing roller 19 rotates while being in contact with the lower end face of the plate-shaped member 5a. That is, the stabilizing roller 19 and the hanger roller 6 hold a unit consisting of the door rail 3 and the plate-shaped member 5a therebetween from the upside and the downside to prevent the occurrence of oscillation on the door 1.

[0049] The guide rollers 20 and 21 are provided on the upper surface of the support member 18 so as to be rotatable in both directions. Each of the guide rollers 20 and 21 has a shaft in the vertical direction. One guide roller 20 is arranged so that the outer peripheral surface thereof is in line contact with one side surface of the plate-shaped member 5a. Therefore, when the door 1 is opened or closed, the guide roller 20 rotates while being in contact with one side surface of the plate-shaped member 5a. The other guide roller 21 is arranged so that the outer peripheral surface thereof is in line contact with the back surface of the one side surface of the plate-shaped member 5a. Therefore, when the door 1 is opened or closed, the guide roller 21 rotates while being in contact with the other side surface (the back surface) of the plate-shaped member 5a. That is, the guide rollers 20 and 21 hold the lower end portion of the plate-shaped member 5a therebetween from the front side and the rear side, and restrains the door 1 from being displaced to the direction in which users go into and out of the elevator car (corresponding to the axial direction of the hanger roller 6).

[0050] Other configurations are the same as those of the first embodiment.

[0051] The configuration shown in this embodiment can also achieve the same effect as that of the first embodiment. Also, if being configured as described above, the present invention can also be applied to the door operator in which the stabilizing roller 7 is not provided on the door hanger 2. Further, since the stabilizing roller 19 is configured integrally in the displacement restraining device 17, the manufacturing cost can be reduced.

Fourth Embodiment

[0052] Figure 8 is a perspective view showing an essential portion of a door operator of an elevator in a fourth embodiment according to the present invention, and Figure 9 is a side view showing the essential portion of the door operator of an elevator in the fourth embodiment according to the present invention.

[0053] In Figures 8 and 9, reference sign 22 denotes a displacement restraining device provided in one side portion and the other side portion of the door hanger 2. In this embodiment as well, the stabilizing roller 7 is not provided on the door hanger 2. The function of the stabilizing roller 7 is implemented by the displacement restraining device 22. The displacement restraining device 22 is provided to restrain the door 1 from being displaced to the vertical direction and the axial direction of the hanger roller 6. The displacement restraining device 22 restrains the displacement of the door 1 by utilizing the door rail 3, not utilizing the support body 5. For this purpose, the displacement restraining device 22 is arranged at a position close to the door rail 3.

[0054] The essential portion of the displacement restraining device 22 is configured by a support member 23, a stabilizing roller 24, and a pair of guide rollers 25 and 26.

[0055] The support member 23 is formed of, for example, a block material having a U shape in plain view. One side surface of the support member 23 is fixed to the side end face of the door hanger 2. Also, the essential portion of the support member 23 is arranged under the door rail 3.

[0056] The stabilizing roller 24 has a horizontal shaft parallel with the shaft of the hanger roller 6. The stabilizing roller 24 is arranged so that the upper end of the outer peripheral face thereof is in contact with the door rail 3 from the downside. Therefore, when the door 1 is opened or closed, the stabilizing roller 24 rotates while being in contact with the lower face of the door rail 3. That is, the stabilizing roller 24 and the hanger roller 6 hold the door rail 3 therebetween from the upside and the downside to prevent the occurrence of oscillation on the door 1.

[0057] The guide rollers 25 and 26 are provided on the upper surface of the support member 23 so as to be rotatable in both directions. Each of the guide rollers 25 and 26 has a shaft in the vertical direction. One guide roller 25 is arranged so that the outer peripheral surface thereof is in line contact with one side surface of the door rail 3. Therefore, when the door 1 is opened or closed, the guide roller 25 rotates while being in contact with one side surface of the door rail 3. The other guide roller 26 is arranged so that the outer peripheral surface thereof is in line contact with the back surface of the one side surface of the door rail 3. Therefore, when the door 1 is opened or closed, the guide roller 26 rotates while being in contact with the other side surface (the back surface) of the door rail 3. That is, the guide rollers 25 and 26 hold the lower end portion of the door rail 3 therebetween from the front side and the rear side, and restrains the door 1 from being displaced to the direction in which users go into and out of the elevator car (corresponding to the axial direction of the hanger roller 6).

[0058] Other configurations are the same as those of the first embodiment.

[0059] The configuration shown in this embodiment can achieve the effects shown in the first to third embodiments.

Industrial Applicability

[0060] The door operator of an elevator according to the present invention is installed in a hall or a car of an elevator. This door operator is especially suitable for an elevator car in which the indoor pressure is controlled, an elevator hall installed in a tunnel, and the like.

Reference Signs List

[0061]

5	1	door
	2	door hanger
	3,28	door rail
	4	sill
	5	support body
10	5a	plate-shaped member
	6	hanger roller
	7, 19, 24	stabilizing roller
	8	door shoe
	9, 13, 17, 22	displacement restraining device
15	10, 14, 18, 23	support member
	11, 12, 15, 16, 20, 21, 25, 26	guide roller
	27	hanger case
	29	side jamb

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Claims

1. A door operator of an elevator comprising:

25 a door rail (3) provided above an elevator entrance;
a door (1) for opening and closing the entrance;
a door hanger (2) for hanging the door (1);
a hanger roller (6) which is provided rotatably on the door hanger (2) to guide the opening/closing movement
of the door (1) by means of rolling on the upper face of the door rail (3);
30 a stabilizing roller (7) which is provided on the door hanger (2) and rotates while being in contact with the lower
face of the door rail (3) along with the opening/closing movement of the door (1);
a support body (5) for supporting the door rail (3), a part of which is arranged along the door rail (3); and
a displacement restraining device (9) which is provided on the door hanger (2) to restrain the door from being
displaced to the axial direction of the hanger roller (6),
35 wherein
the displacement restraining device (9) comprises:

a first guide roller (11) which rotates while being in contact with one side surface of the part of the support
body (5) along with the opening/closing movement of the door (1); and
40 a second guide roller (12) which rotates while being in contact with the other side surface of the part of the
support body (5) along with the opening/closing movement of the door (1);
characterised in that the support body (5) has a plate-shaped member (5a) to the side surface of which
the door rail (3) is fixed; and
the displacement restraining device (9) restrains the displacement of the door (1) by means of the rollers
45 (11,12) brought into contact with the lower end portion of the plate-shaped member (5a) arranged along
the door rail (3).

2. A door operator of an elevator comprising:

50 a door rail (3) provided above an elevator entrance;
a door (1) for opening and closing the entrance;
a door hanger (2) for hanging the door;
a hanger roller (6) which is provided rotatably on the door hanger (2) to guide the opening/closing movement
of the door (1) by means of rolling on the upper face of the door rail (3);
55 a support body (5) for supporting the door rail (3), a part of which is arranged along the door rail (3); and
a displacement restraining device (17) which is provided on the door hanger (2) to restrain the door (1) from
being displaced to the vertical direction and the axial direction of the hanger roller (6),
characterised in that the displacement restraining device (17) comprises:

a stabilizing roller (19) which rotates while being in contact with the lower face of the part of the support body (5) along with the opening/closing movement of the door (1);
a first guide roller (20) which rotates while being in contact with one side surface of the part of the support body (5) along with the opening/closing movement of the door (1); and
a second guide roller (21) which rotates while being in contact with the other side surface of the part of the support body (5) along with the opening/closing movement of the door (1).

3. A door operator of an elevator comprising:

a door rail (3) provided above an elevator entrance;
a door (1) for opening and closing the entrance;
a door hanger (2) for hanging the door (1);
a hanger roller (6) which is provided rotatably on the door hanger (2) to guide the opening/closing movement of the door (1) by means of rolling on the upper face of the door rail (3); and
a displacement restraining device (22) which is provided on the door hanger (2) to restrain the door (1) from being displaced to the vertical direction and the axial direction of the hanger roller (6),
wherein
the displacement restraining device (22) comprises:

a stabilizing roller (24) which rotates while being in contact with the lower face of the door rail (3) along with the opening/closing movement of the door (1);
a first guide roller (25) which rotates while being in contact with one side surface of the door rail (3) along with the opening/closing movement of the door (1); and
a second guide roller (26) which rotates while being in contact with the other side surface of the door rail (3) along with the opening/closing movement of the door (1) **characterised in that** the displacement restraining device further comprises a support member (23) fixed to the door hanger (2), and the stabilizing roller (24), the first guide roller (25), and the second guide roller (26) each being provided rotatably on the support member (23)

4. The door operator of an elevator according to claim 2, wherein
the support body (5) has a plate-shaped member (5a) to the side surface of which the door rail (3) is fixed; and
the displacement restraining device (17) restrains the displacement of the door (1) by means of the rollers (20 and 21) brought into contact with the lower end portion of the plate-shaped member (5a) arranged along the door rail (3).

5. The door operator of an elevator according to any one of claims 1 to 3,
wherein the displacement restraining device (9, 17, 22) is provided in both side portions of the door hanger (2).

Patentansprüche

1. Türbetätiger eines Aufzugs, umfassend:

eine über einem Aufzugseingang vorgesehene Türschiene (3);
eine Tür (1) zum Öffnen und Schließen des Eingangs;
eine Türaufhängung (2) zum Aufhängen der Tür (1);
eine an der Türaufhängung (2) drehbar angeordnete Aufhängerrolle (6) zum Führen der Öffnungs-/Schließbewegung der Tür (1) durch Abrollen an der Oberseite der Türschiene (3);
eine Stabilisierungsrolle (7), die an der Türaufhängung (2) vorgesehen ist und sich in Kontakt mit der Unterseite der Türschiene (3) während der Öffnungs-/Schließbewegung der Tür (1) dreht;
einen Stützkörper (5) zum Stützen der Türschiene (3), von dem ein Teil entlang der Türschiene (3) angeordnet ist; und
eine an der Türaufhängung (2) vorgesehene Verschiebungsbegrenzungseinrichtung (9), um die Tür daran zu hindern, in axialer Richtung der Aufhängerrolle (6) verschoben zu werden,
wobei
die Verschiebungsbegrenzungseinrichtung (9) umfasst:

eine erste Führungsrolle (11), die sich in Kontakt mit einer Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht; und

eine zweite Führungsrolle (12), die sich in Kontakt mit der anderen Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht;

dadurch gekennzeichnet, dass

der Stützkörper (5) ein plattenförmiges Element (5a) aufweist, an dessen Seitenfläche die Türschiene (3) befestigt ist; und

die Verschiebungsbegrenzungseinrichtung (9) die Verschiebung der Tür (1) mittels der Rollen (11, 12) begrenzt, indem diese mit dem unteren Endabschnitt des plattenförmigen Elements (5a), das entlang der Türschiene (3) angeordnet ist, in Kontakt gebracht werden.

2. Türbetätiger eines Aufzugs, umfassend:

eine über einem Aufzugseingang vorgesehene Türschiene (3);

eine Tür (1) zum Öffnen und Schließen des Eingangs;

eine Türaufhängung (2) zum Aufhängen der Tür (1);

eine an der Türaufhängung (2) drehbar angeordnete Aufhängerrolle (6) zum Führen der Öffnungs-/Schließbewegung der Tür (1) durch Abrollen an der Oberseite der Türschiene (3);

einen Stützkörper (5) zum Stützen der Türschiene (3), von dem ein Teil entlang der Türschiene (3) angeordnet ist; und

eine an der Türaufhängung (2) vorgesehene Verschiebungsbegrenzungseinrichtung (17), um die Tür daran zu hindern, in vertikaler Richtung und axialer Richtung der Aufhängerrolle (6) verschoben zu werden,

dadurch gekennzeichnet, dass

die Verschiebungsbegrenzungseinrichtung (17) umfasst:

eine Stabilisierungsrolle (19), die sich in Kontakt mit der Unterseite des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht;

eine erste Führungsrolle (20), die sich in Kontakt mit einer Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht; und

eine zweite Führungsrolle (21), die sich in Kontakt mit der anderen Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht.

3. Türbetätiger eines Aufzugs, umfassend:

eine über einem Aufzugseingang vorgesehene Türschiene (3);

eine Tür (1) zum Öffnen und Schließen des Eingangs;

eine Türaufhängung (2) zum Aufhängen der Tür (1);

eine an der Türaufhängung (2) drehbar angeordnete Aufhängerrolle (6) zum Führen der Öffnungs-/Schließbewegung der Tür (1) durch Abrollen an der Oberseite der Türschiene (3);

eine an der Türaufhängung (2) vorgesehene Verschiebungsbegrenzungseinrichtung (22), um die Tür daran zu hindern, in vertikaler Richtung und axialer Richtung der Aufhängerrolle (6) verschoben zu werden,

wobei

die Verschiebungsbegrenzungseinrichtung (22) umfasst:

eine Stabilisierungsrolle (24), die sich in Kontakt mit der Unterseite der Türschiene (3) während der Öffnungs-/Schließbewegung der Tür (1) dreht;

eine erste Führungsrolle (25), die sich in Kontakt mit einer Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht; und

eine zweite Führungsrolle (26), die sich in Kontakt mit der anderen Seitenfläche des Teils des Stützkörpers (5) während der Öffnungs-/Schließbewegung der Tür (1) dreht,

dadurch gekennzeichnet, dass

die Verschiebungsbegrenzungseinrichtung ferner ein Stützelement (23) umfasst, dass an der Türaufhängung (2) angebracht ist, und die Stabilisierungsrolle (24), die erste Führungsrolle (25) und die zweite Führungsrolle (26) jeweils drehbar an dem Stützelement (23) vorgesehen sind.

4. Türbetätiger eines Aufzugs nach Anspruch 2, bei dem

der Stützkörper (5) ein plattenförmiges Element (5a) aufweist, an dessen Seitenfläche die Türschiene (3) befestigt ist; und

die Verschiebungsbegrenzungseinrichtung (17) die Verschiebung der Tür (1) mittels der Rollen (20 und 21), die mit dem unteren Endabschnitt des plattenförmigen Elements (5a), das entlang der Türschiene (3) angeordnet ist, in

Kontakt gebracht werden, begrenzt.

5. Türbetätiger eines Aufzugs nach einem der Ansprüche 1 bis 3, bei dem die Verschiebungsbegrenzungseinrichtung (9, 17, 22) in beiden Seitenabschnitten der Türaufhängung (2) vorgesehen ist.

Revendications

1. Actionneur de porte d'un ascenseur comprenant :

un rail de porte (3) agencé au-dessus d'une entrée d'ascenseur;
 une porte (1) pour ouvrir et fermer l'entrée ;
 un dispositif de suspension de porte (2) pour suspendre la porte (1) ;
 un galet de dispositif de suspension (6) qui est agencé de façon rotative sur le dispositif de suspension de porte (2) pour guider le mouvement d'ouverture/fermeture de la porte (1) par roulement sur la face supérieure du rail de porte (3) ;
 un galet de stabilisation (7) qui est agencé sur le dispositif de suspension de porte (2) et qui tourne lorsqu'il est en contact avec la face inférieure du rail de porte (3) lors du mouvement d'ouverture/fermeture de la porte (1) ;
 un corps de support (5) pour supporter le rail de porte (3), dont une partie est disposée le long du rail de porte (3) ; et
 un dispositif de retenue de déplacement (9) qui est agencé sur le dispositif de suspension de porte (2) pour empêcher la porte d'être déplacée dans la direction axiale du galet de dispositif de suspension (6), dans lequel le dispositif de retenue de déplacement (9) comprend :

un premier galet de guidage (11) qui tourne lorsqu'il est en contact avec une surface latérale de la partie du corps de support (5) lors du mouvement d'ouverture/fermeture de la porte (1) ; et
 un second galet de guidage (12) qui tourne lorsqu'il est en contact avec l'autre surface latérale de la partie du corps de support (5) lors du mouvement d'ouverture/fermeture de la porte (1) ;

caractérisé en ce que

le corps de support (5) comporte un élément en forme de plaque (5a) sur la surface latérale duquel le rail de porte (3) est fixé ; et
 le dispositif de retenue de déplacement (9) empêche le déplacement de la porte (1) grâce aux galets (11, 12) qui sont amenés en contact avec la portion d'extrémité inférieure de l'élément en forme de plaque (5a) disposée le long du rail de porte (3).

2. Actionneur de porte d'un ascenseur comprenant :

un rail de porte (3) agencé au-dessus d'une entrée d'ascenseur;
 une porte (1) pour ouvrir et fermer l'entrée ;
 un dispositif de suspension de porte (2) pour suspendre la porte ;
 un galet de dispositif de suspension (6) qui est agencé de façon rotative sur le dispositif de suspension de porte (2) pour guider le mouvement d'ouverture/fermeture de la porte (1) par roulement sur la face supérieure du rail de porte (3) ;
 un corps de support (5) pour supporter le rail de porte (3), dont une partie est disposée le long du rail de porte (3) ; et
 un dispositif de retenue de déplacement (17) qui est agencé sur le dispositif de suspension de porte (2) pour empêcher la porte (1) d'être déplacée dans la direction verticale et la direction axiale du galet de dispositif de suspension (6),

caractérisé en ce que

le dispositif de retenue de déplacement (17) comprend :

un galet de stabilisation (19) qui tourne lorsqu'il est en contact avec la face inférieure de la partie du corps de support (5) lors du mouvement d'ouverture/fermeture de la porte (1) ;
 un premier galet de guidage (20) qui tourne lorsqu'il est en contact avec une surface latérale de la partie du corps de support (5) lors du mouvement d'ouverture/fermeture de la porte (1) ; et
 un second galet de guidage (21) qui tourne lorsqu'il est en contact avec l'autre surface latérale de la partie du corps de support (5) lors du mouvement d'ouverture/fermeture de la porte (1).

3. Actionneur de porte d'un ascenseur comprenant :

un rail de porte (3) agencé au-dessus d'une entrée d'ascenseur;
 une porte (1) pour ouvrir et fermer l'entrée ;
 un dispositif de suspension de porte (2) pour suspendre la porte (1) ;
 un galet de dispositif de suspension (6) qui est agencé de façon rotative sur le dispositif de suspension de porte (2) pour guider le mouvement d'ouverture/fermeture de la porte (1) par roulement sur la face supérieure du rail de porte (3) ; et
 un dispositif de retenue de déplacement (22) qui est agencé sur le dispositif de suspension de porte (2) pour empêcher la porte (1) d'être déplacée dans la direction verticale et la direction axiale du galet de dispositif de suspension (6),
 dans lequel
 le dispositif de retenue de déplacement (22) comprend :

un galet de stabilisation (24) qui tourne lorsqu'il est en contact avec la face inférieure du rail de porte (3) lors du mouvement d'ouverture/fermeture de la porte (1) ;
 un premier galet de guidage (25) qui tourne lorsqu'il est en contact avec une surface latérale du rail de porte (3) lors du mouvement d'ouverture/fermeture de la porte (1) ; et
 un second galet de guidage (26) qui tourne lorsqu'il est en contact avec l'autre surface latérale du rail de porte (3) lors du mouvement d'ouverture/fermeture de la porte (1) ;
caractérisé en ce que le dispositif de retenue de déplacement comprend en outre un élément de support (23) fixé au dispositif de suspension de porte (2), et le galet de stabilisation (24), le premier galet de guidage (25) et le second galet de guidage (26) sont chacun agencés en rotation sur l'élément de support (23).

4. Actionneur de porte d'un ascenseur selon la revendication 2, dans lequel
 le corps de support (5) comporte un élément de forme de plaque (5a) sur la surface latérale duquel le rail de porte (3) est fixé ; et
 le dispositif de retenue de déplacement (17) empêche le déplacement de la porte (1) grâce aux galets (20 et 21) qui sont amenés en contact avec la portion d'extrémité inférieure de l'élément en forme de plaque (5a) agencé le long du rail de porte (3).
5. Actionneur de porte d'un ascenseur selon l'une des revendications 1 à 3, dans lequel le dispositif de retenue de déplacement (9, 17, 22) est agencé dans les deux portions latérales du dispositif de suspension de porte (2).

Fig. 1

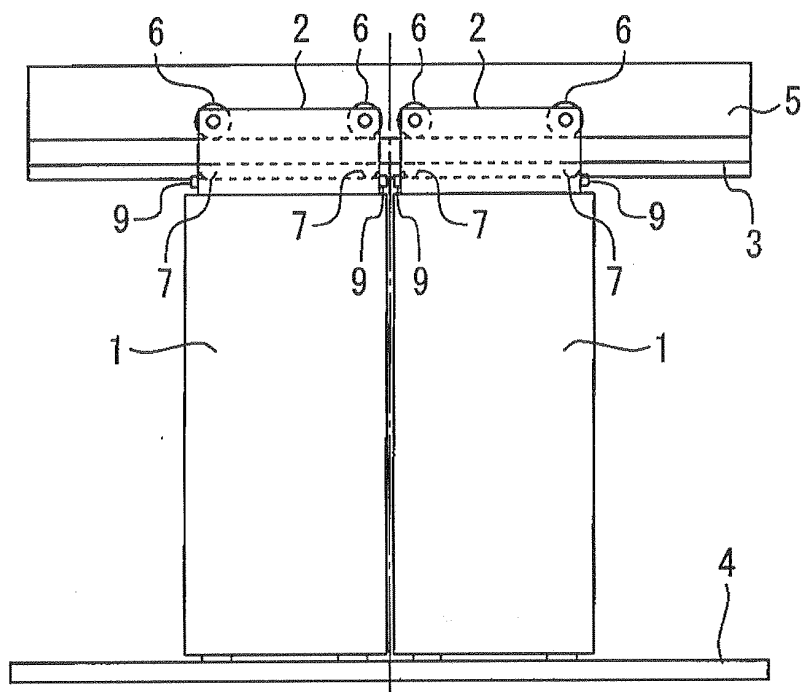


Fig. 2

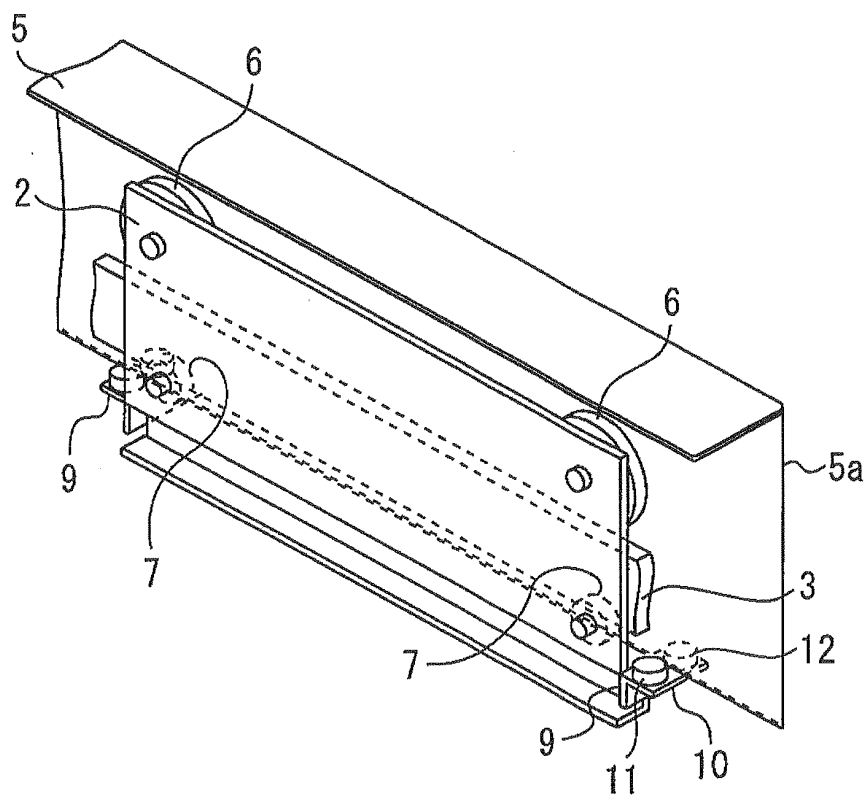


Fig. 3

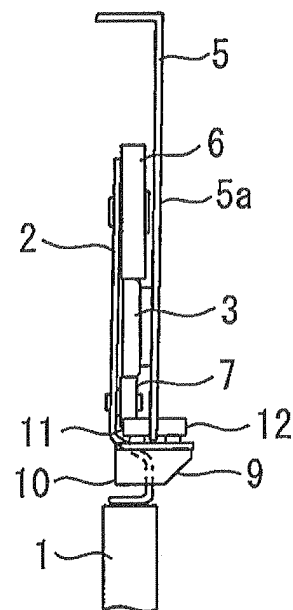


Fig. 4

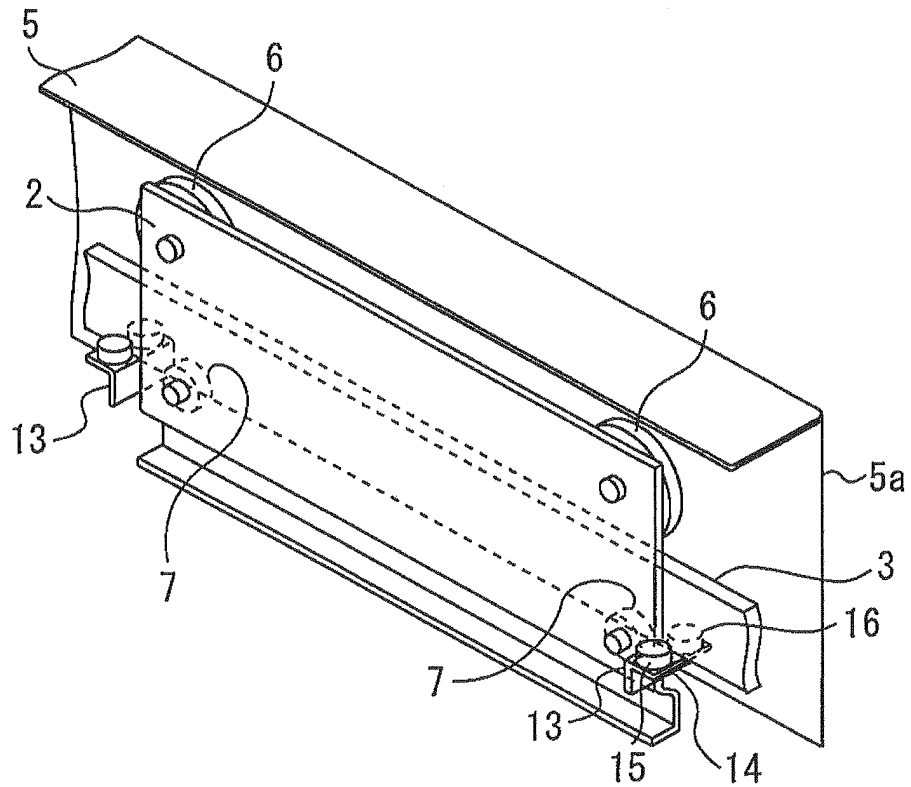


Fig. 5

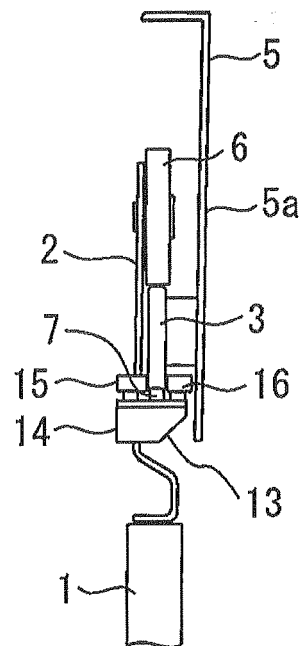


Fig. 6

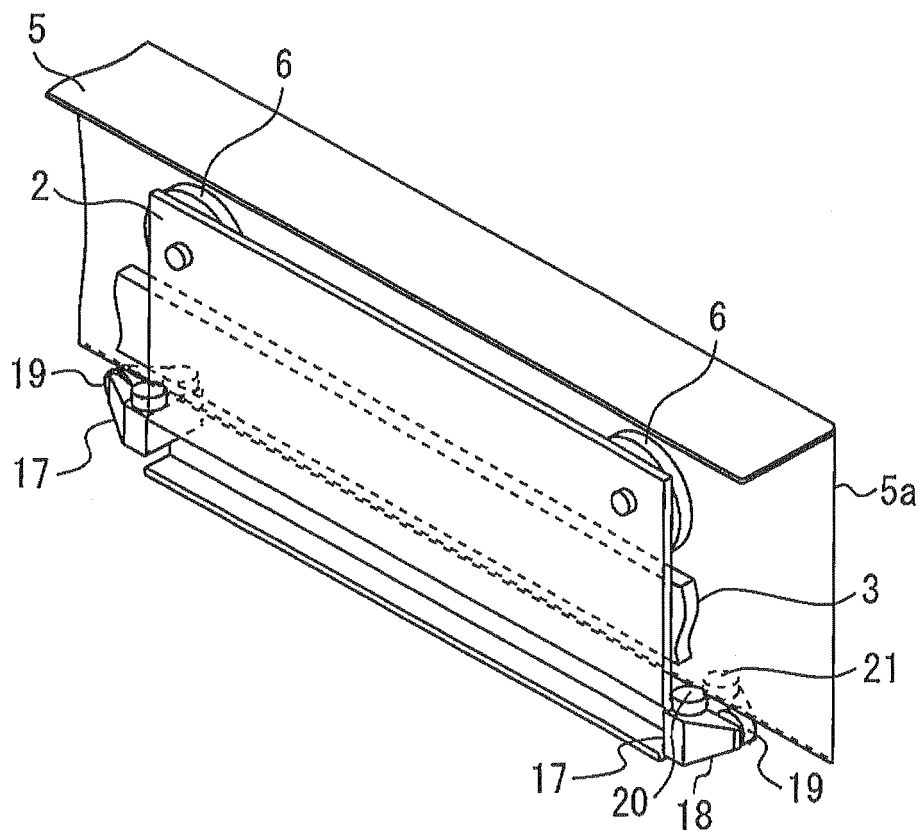


Fig. 7

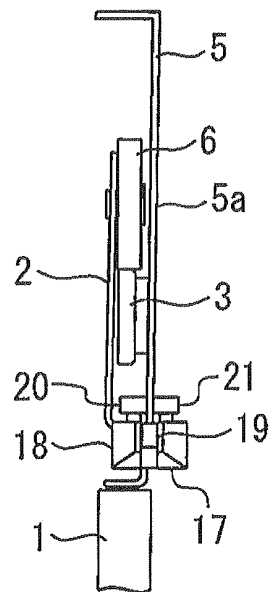


Fig. 8

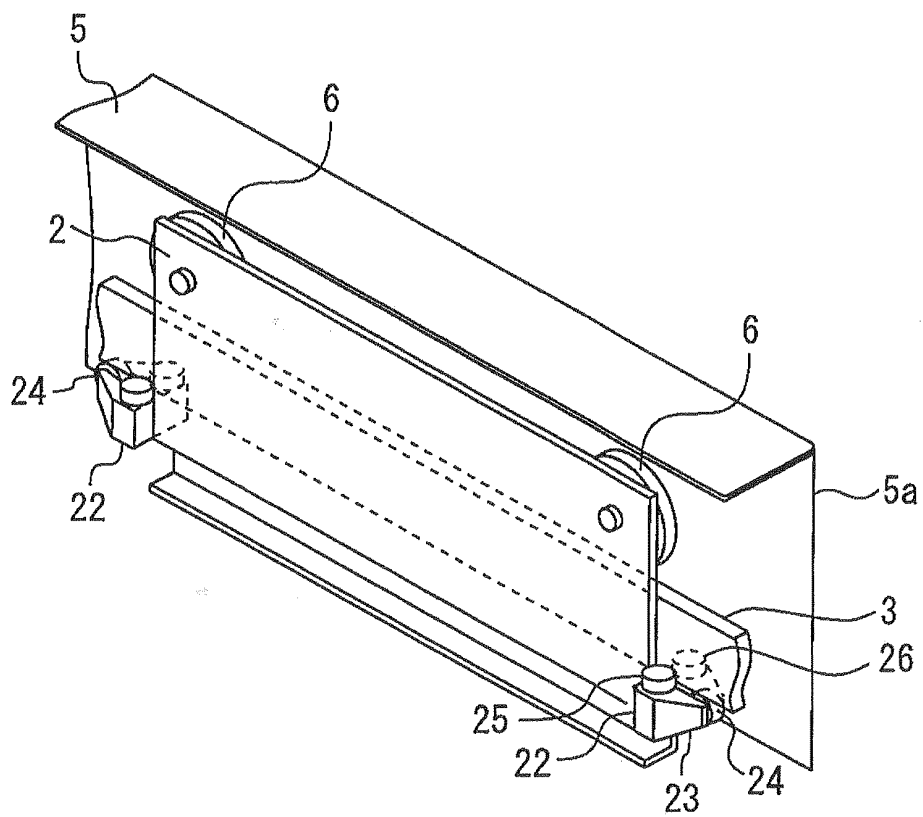


Fig. 9

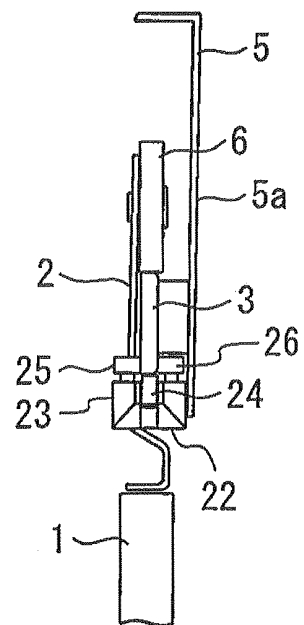


Fig. 10

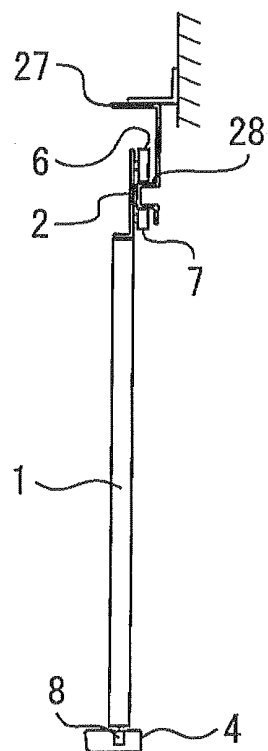
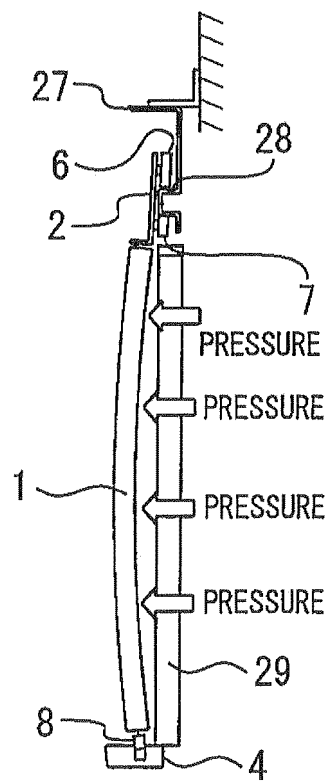


Fig. 11



REFERENCES CITED IN THE DESCRIPTION

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