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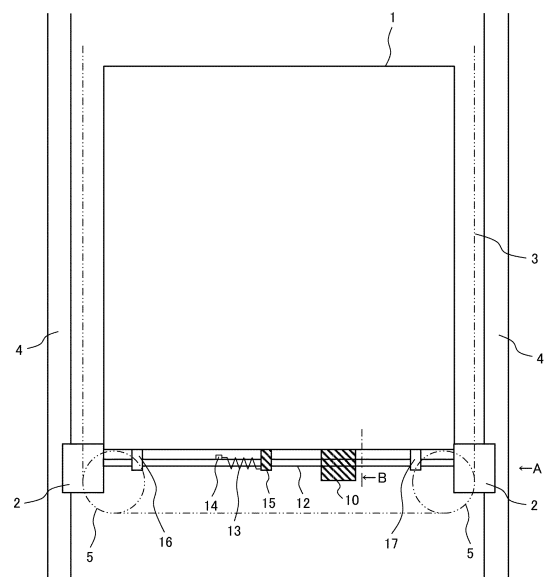
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(54) **ELEVATOR DEVICE**

(57) Disclosed herein is an elevator apparatus provided with an electric emergency stop device, and capable of reducing an occupied space and suitable for space saving. The elevator apparatus includes an elevator car (1), an emergency stop device (2) provided to the elevator car, a driving mechanism (12 to 17) provided to the elevator car and which causes the emergency stop device to operate, and an electric actuator (10) which actuates the driving mechanism. The driving mechanism includes a driving rod (12) connected to the emergency stop device and which causes the emergency stop device to operate. The driving rod includes a torsion spring part (13). When the electric actuator operates, the driving rod rotates by biasing force of the torsion spring part. The rotation of the driving rod causes the emergency stop device to operate.

[FIG. 1]



Description

Technical Field

[0001] The present invention relates to an elevator apparatus provided with an emergency stop device which is electrically actuated.

Background Art

[0002] An elevator apparatus is provided with a governor and an emergency stop device for the sake of emergency stop of an elevator car which gets into a given overspeed state, by constant monitoring of an ascending-and-descending speed of the elevator car. Generally, the elevator car and the governor are coupled to each other by a governor rope, and when an overspeed state is detected, the governor binds the governor rope to cause the emergency stop device at the elevator car side to operate, and thus the elevator car is stopped emergently.

[0003] In such an elevator apparatus, since the governor rope which is an elongated object is laid in a hoistway, space saving and cost reduction are difficult. Moreover, when the governor rope swings, interference between a structure and the governor rope inside the hoistway easily occurs.

[0004] In this respect, an emergency stop device which does not utilize a governor rope is proposed.

[0005] As a background art related to the emergency stop device which does not utilize the governor rope, a technology described in PTL 1 is known.

[0006] In this background art, a drive shaft which drives an emergency stop device, and an actuation mechanism which actuates the drive shaft are provided on top of an elevator car. The actuation mechanism includes a movable iron core mechanically connected to the drive shaft with a connection piece interposed therebetween, and an electromagnet which attracts the movable iron core. Although the drive shaft is biased by a drive spring, the electromagnet is energized and the movable iron core is attracted thereto in an ordinary time, and thus motion of the drive shaft is bound by the actuation mechanism.

[0007] In an emergency, the electromagnet is demagnetized and the binding of the drive shaft is cancelled, and thus the drive shaft is driven by biasing force of the drive spring. As a result, since a pulling-up rod of the emergency stop device is lifted, the emergency stop device operates and the elevator car stops emergently.

[0008] Moreover, when the emergency stop device is returned to the ordinary state, the electromagnet is shifted to approach the movable iron core which was shifted in the emergency. When the electromagnet contacts the movable iron core, the electromagnet is energized, and the movable iron core is attracted to the electromagnet. Furthermore, the electromagnet is driven in the state in which the movable iron core is attracted to the electromagnet, and thus the movable iron core and the electromagnet are returned to a waiting position for the ordinary

time. Note that a shifting mechanism of the electromagnet includes a feed screw shaft with which the electromagnet is screwed, and a motor which rotates the feed screw shaft.

Citation List

Patent Literature

[0009] PTL 1: WO2020/110437

Summary of Invention

Technical Problem

[0010] In the background art, the actuation mechanism is configured to lift the pulling-up rod of the emergency stop device, and thus flexibility in installation of the actuation mechanism is limited, and an installation space of the actuation mechanism becomes large.

[0011] In the background art, a space occupied by a driving mechanism including the drive shaft and the actuation mechanism is large. Therefore, flexibility of the elevator car in installation of the driving mechanism and the actuation mechanism is limited.

[0012] Therefore, the present invention provides an elevator apparatus provided with an electric emergency stop device, and capable of reducing an occupied space and suitable for space saving.

Solution to Problem

[0013] In order to solve the above problem, an elevator apparatus according to the present invention includes an elevator car, an emergency stop device provided to the elevator car, a driving mechanism provided to the elevator car and which causes the emergency stop device to operate, and an electric actuator which actuates the driving mechanism. The driving mechanism includes a driving rod connected to the emergency stop device and which causes the emergency stop device to operate. The driving rod includes a torsion spring part. When the electric actuator operates, the driving rod rotates by biasing force of the torsion spring part. The rotation of the driving rod causes the emergency stop device to operate.

Advantageous Effects of Invention

[0014] According to the present invention, a space occupied by the driving mechanism of the emergency stop device can be reduced.

[0015] A problem other than the above problem, a configuration, and an effect will be revealed by the following description of an embodiment.

Brief Description of Drawings

[0016]

[FIG. 1] FIG. 1 is a schematic configuration diagram of an elevator apparatus of one example.

[FIG. 2] FIG. 2 is a view seen from an arrow A in FIG. 1, and illustrates an emergency stop device in the example.

[FIG. 3] FIG. 3 is a configuration diagram showing a mechanical structure of an electric actuator 10 (FIG. 1) in a case in which the emergency stop device 2 is in a non-operating state.

[FIG. 4] FIG. 4 is a plan view showing the mechanical structure of the electric actuator illustrated in FIG. 3.

[FIG. 5] FIG. 5 is a configuration diagram showing a mechanical structure of the electric actuator 10 (FIG. 1) in a case in which the emergency stop device 2 is in an operating state.

[FIG. 6] FIG. 6 is a plan view showing the mechanical structure of the electric actuator illustrated in FIG. 5.

Description of Embodiments

[0017] Hereinafter, an elevator apparatus of one embodiment of the present invention is described by an example with reference to the drawings. Note that, in the drawings, ones with the same reference characters indicate the same components or components with similar functions.

[0018] FIG. 1 is a schematic configuration diagram of an elevator apparatus of one example of the invention.

[0019] As illustrated in FIG. 1, the elevator apparatus includes an elevator car 1, an emergency stop device 2, a driving mechanism (12 to 17) which causes the emergency stop device 2 to operate, and an electric actuator 10 which actuates the driving mechanism.

[0020] The elevator car 1 is hung, by a main rope 3, inside a hoistway provided to a building, by the main rope 3 wound onto a car-beneath pulley 5 which is provided to a beneath part of the elevator car 1. Moreover, the elevator car 1 is slidably engaged with a guide rail 4 with a guide device (not illustrated) interposed therebetween. When the main rope 3 is friction-driven by a driving device (hoisting machine: not illustrated), the elevator car 1 ascends or descends in the hoistway. Note that the elevator apparatus of this example is so called a machine-room-less elevator in which the driving device (hoisting machine: not illustrated) and an elevator controller (not illustrated) are installed inside the hoistway.

[0021] A speed detector (not illustrated) is provided to the elevator car 1, and an ascending-and-descending speed of the elevator car 1 inside the hoistway is constantly detected. Therefore, the speed detector can detect that the ascending or descending speed of the elevator car 1 exceeds a given overspeed.

[0022] In this example, the speed detector includes an image sensor, and detects a speed of the elevator car 1 based on image information on a surface condition of the guide rail 4, which is acquired by the image sensor. For example, the speed detector calculates the speed based on a shift distance of an image feature in a given time.

[0023] Note that the speed detector may calculate the speed of the elevator car based on an output signal of a rotary encoder which rotates together with the transfer of the elevator car.

5 **[0024]** The electric actuator 10 is an electromagnetic actuator in this example, and is positioned at the beneath part of the elevator car 1. Moreover, the driving mechanism (12 to 17) is also positioned at the beneath part of the elevator car 1.

10 **[0025]** When the electric actuator 10 operates, a driving rod 12 which drives the emergency stop device 2 rotates about a longitudinal-direction center axis by biasing force of a spring part 13. When the driving rod 12 rotates, a brake element (described later) of the emergency stop device 2 is pushed up. Therefore, the emergency stop device 2 operates.

15 **[0026]** As illustrated in FIG. 1, the driving rod 12 is disposed below the elevator car 1. The driving rod 12 is rotatably supported by a first support part 16 and a second support part 17 below of the elevator car 1.

20 **[0027]** In this example, the spring part 13 includes a torsion coil spring. The driving rod 12 is inserted into the spring part 13. One end of the spring part 13 (that is, the torsion coil spring) is fixed to a latch part 14 on a surface of the driving rod 12. Moreover, the other end of the spring part 13 (that is, the torsion coil spring) is fixed to a fixing part 15 located at the beneath part of the elevator car 1.

25 **[0028]** Therefore, when the electric actuator 10 operates and the driving rod 12 rotates as will be described later, the spring part 13 receives a torsional moment, and stores bending elastic energy about a center axis of the spring part 13. In this example, since the driving rod 12 is inserted into the spring part 13, the center axis of the spring part 13 substantially matches the rotational center axis of the driving rod 12. Therefore, when bending elastic energy of the spring part 13 is released, as described above, the driving rod 12 rotates by biasing force of the spring part 13.

30 **[0029]** Note that details of the configuration and operation of the electric actuator 10 will be described later.

35 **[0030]** The emergency stop device 2 is provided to each of left and right sides of the elevator car 1. A pair of brake elements provided to each emergency stop device 2 are movable between a braking position and a non-braking position, and sandwich the guide rail 4 therebetween at the braking position. Moreover, when the emergency stop device 2 ascends relatively to the elevator car 1 as a result of descent of the elevator car 1, friction force which acts between the brake element and the guide rail 4 generates braking force. Thereby, when the elevator car 1 gets into an overspeed state, the emergency stop device 2 is actuated to emergently stop the elevator car 1.

40 **[0031]** The elevator apparatus of this example is provided with so called a rope-less governor system which does not utilize a governor rope. When the ascending-and-descending speed of the elevator car 1 reaches a first overspeed exceeding a rated speed (for example, a

speed not exceeding 1.3 times the rated speed), power supply of the driving device (hoisting machine) and power supply of a control device which controls the driving device are interrupted. Moreover, when the descending speed of the elevator car 1 reaches a second overspeed (for example, a speed not exceeding 1.4 times the rated speed), the electric actuator 10 provided to the elevator car 1 actuates the emergency stop device 2 to emergently stop the elevator car 1.

[0032] In this example, the rope-less governor system includes the speed detector, and a safety control device which determines the overspeed state of the elevator car 1 based on an output signal of the speed detector. This safety control device measures the speed of the elevator car 1 based on the output signal of the speed detector, and when the safety control device determines that the measured speed reaches the first overspeed, the safety control device outputs a command signal to interrupt the power supply of the driving device (hoisting machine), and the power supply of the control device which controls the driving device. Moreover, when the safety control device determines that the measured speed reaches the second overspeed, the safety control device outputs a command signal to cause the electric actuator 10 to operate.

[0033] FIG. 2 is a view seen from an arrow A in FIG. 1, and illustrates the emergency stop device 2 in this example.

[0034] As illustrated in FIG. 2, a pair of brake elements 201 are placed on a base part 202. When a pushing-up rod 203 fixed to the base part 202 is driven upward in the drawing, the base part 202 pushes up the brake elements 201 to the braking position. Rotational force of the driving rod 12 is converted into the driving force to move the pushing-up rod 203 upward, by a first link part 101, a second link part 102, and a third link part which are mutually rotatably connected to each other.

[0035] An end part of the driving rod 12 is connected to a longitudinal-direction middle part of the first link part 101. Longitudinal-direction one end part of the first link part 101 and longitudinal-direction one end part of the second link part 102 are mutually rotatably connected to each other at a connection part 110. Longitudinal-direction the other end part of the second link part 102 and longitudinal-direction one end part of the third link part 103 are mutually rotatably connected to each other at a connection part 111. A longitudinal-direction middle part of the third link part 103 is rotatably supported by a fixing shaft 115. An end part of the driving rod 12 is connected. Longitudinal-direction the other end part of the third link part 103 and longitudinal-direction one end part of the pushing-up rod 203 are mutually rotatably connected to each other at a connection part 112.

[0036] By such first to third link parts (101, 102, 103), when the driving rod 12 rotates in a direction indicated by an arrow in the drawing, the pushing-up rod 203 is driven upward. Therefore, the brake elements 201 placed on the base fixed to the pushing-up rod 203 are pushed

up to the braking position.

[0037] Below the configuration and operation of the electric actuator 10 are described.

[0038] FIG. 3 is a configuration diagram showing a mechanical structure of the electric actuator 10 (FIG. 1) in a case in which the emergency stop device 2 is in a non-operating state. Moreover, FIG. 4 is a plan view showing the mechanical structure of the electric actuator illustrated in FIG. 3. Note that since the emergency stop device 2 is in the non-operating state, the electric actuator is in a non-actuating state (waiting state). That is, the elevator apparatus is in an ordinary operating state.

[0039] As illustrated in FIGS. 3 and 4, an electric actuation part includes an operation lever 11 connected to the driving rod 12, a movable member 34 which rotatably engaged with the operation lever 11, and an electromagnet part 35 which attracts the movable member 34 by electromagnetic force. The electromagnet part 35 includes two electromagnet core parts 35A whose pole faces are facing to the movable member 34, and an electromagnet support plate 35B to which the two electromagnet core parts 35A are fixed. Note that, in the movable member 34, at least a portion attracted to the electromagnet part 35 is made of magnetic material.

[0040] The electric actuation part includes a feed screw 36 (for example, a trapezoidal thread) which is rotatably supported by a first support member 41 and a second support member 42 fixed to a base part 50 provided to the beneath part of the elevator car 1, and a motor 37 which rotary drives the feed screw 36. The feed screw 36 is screwed with a feed nut 35C provided to the electromagnet part 35. When the motor 37 rotates the feed screw 36, the rotating feed screw 36 and the feed nut 35C provided to the electromagnet part 35 convert the rotation of the motor 37 into linear motion of the electromagnet part 35 along an axial direction of the feed screw 36.

[0041] The base part 50 is configured with a plate-like member being bent, and includes a fixed part fixed to the elevator car 1, and a convex part projecting downward of the elevator car 1. The feed screw 36, the movable member 34, the electromagnet part 35, and the motor 37 are located below the convex part of the base part 50. The driving rod 12 is located in a space between the beneath part of the elevator car 1 and the convex part of the base part 50. Longitudinal-direction one end part of the operation lever 11 is connected to the driving rod 12. The operation lever 11 passes an opening part 50C at the convex part of the base part 50. Longitudinal-direction the other end part of the operation lever 11 is connected to the movable member 34.

[0042] As illustrated in FIGS. 3 and 4, in the waiting state, the movable member 34 is attracted to the excited electromagnet part 35. The electromagnet part 35 is located at a given position for the waiting state. At this time, biasing force of the spring part 13 (FIG. 1) is acting on the driving rod 12 to be rotated in the direction indicated by the arrow in FIG. 3. Here, since the movable member

34 is attracted by the electromagnet part 35, the motion of the movable member 34 and the operation lever 11, and rotation of the driving rod 12 are bound, against the biasing force of the spring part 13.

[0043] FIG. 5 is a configuration diagram showing a mechanical structure of the electric actuator 10 (FIG. 1) in a case in which the emergency stop device 2 is in the operating state. Moreover, FIG. 6 is a plan view showing the mechanical structure of the electric actuator illustrated in FIG. 5. Note that since the emergency stop device 2 is in the operating state, the electric actuator is in an actuating state. That is, the elevator apparatus is in a stopped state.

[0044] In the waiting state described above, when excitation of the electromagnet part 35 is stopped in accordance with command from the safety control device (not illustrated), the attractive force acting on the movable member 34 is lost. Therefore, by the biasing force of the spring part 13 (FIG. 1), the driving rod 12 rotates in the direction indicated by the arrow in FIG. 3. At this time, since the operation lever 11 rotates together with the driving rod 12, the movable member 34 connected to the operation lever 11 shifts in a direction to separate from the electromagnet part 35 along the longitudinal direction of the feed screw 36. Note that the electromagnet part 35 stays at the given position for the waiting state.

[0045] When the driving rod 12 rotates, the pushing-up rod 203 (FIG. 2) of the emergency stop device 2 is driven upward. Therefore, the emergency stop device 2 operates.

[0046] Here, operation of the electric actuator in a case of returning from the actuating state illustrated in FIGS. 5 and 6, to the waiting state illustrated in FIGS. 3 and 4 is described.

[0047] In order to return the electric actuator to the waiting state, first, the motor 37 is driven to rotate the feed screw 36. The rotating feed screw 36, and the feed nut 35C provided to the electromagnet part 35 convert rotation of the motor 37 into linear motion of the electromagnet part 35 along the axial direction of the feed screw 36. Therefore, the electromagnet part 35 approaches and contacts the movable member 34 located at an operating position as illustrated in FIGS. 5 and 6.

[0048] When the contact between the electromagnet part 35 and the movable member 34 is detected by a switch or a sensor (not illustrated), or load current of the motor 37, the electromagnet part 35 is excited and also the motor 37 is stopped. The movable member 34 is attracted to the electromagnet part 35 by action of electromagnetic force. When the electromagnet part 35 attracts the movable member 34, while excitation of the electromagnet part 35 is continued, the feed screw 36 is counter-rotated by rotation of the motor 37 in a reverse direction. Therefore, the movable member 34 shifts, together with the electromagnet part 35, to a given position for the waiting state as illustrated in FIG. 3.

[0049] When a switch, a sensor, or the like (not illustrated) detects that the electromagnet part 35 or the mov-

able member 34 reaches the given position for the waiting state, the motor 37 is stopped. Excitation of the electromagnet part 35 continues.

[0050] While the movable member 34 shifts from the operating position (FIGS. 5 and 6) to the given position for the waiting state (FIGS. 5 and 6), the operation lever 11 rotates the driving rod 12 in a direction opposite from the direction indicated by the arrow in FIG. 3. Therefore, the spring part 13 (FIG. 1) including the torsion coil spring receives a torsional moment, and stores bending elastic energy about the center axis of the spring part 13. Therefore, the spring part 13 releases the elastic energy during operation of the electric actuator 10, and then, the spring part 13 stores the elastic energy when the electric actuator returns to the waiting state.

[0051] According to the example, a space occupied by the driving mechanism and the electric actuator 10 of the emergency stop device 2 can be reduced. Therefore, the driving mechanism and the electric actuator 10 can be installed within a narrow space such as the beneath part of the elevator car 1.

[0052] In this example, each of the longitudinal direction of the driving rod 12 of the driving mechanism, and the longitudinal direction of the feed screw 36 (that is, the longitudinal direction of the electric actuator) is arranged to be parallel to a lower surface of the elevator car 1 (for example, an elevator car floor surface). Therefore, the space occupied by the driving mechanism and the electric actuator 10 of the emergency stop device 2 can certainly be reduced.

[0053] Note that, alternative to the torsion coil spring, a torsion bar spring (torsion bar) may be used. In this case, for example, at least part of the driving rod 12 is configured with the torsion bar spring.

[0054] Note that the present invention is not limited to the embodiment, but includes various modifications. For example, the embodiment provides detailed description such that the description of the invention is easy to understand, and the invention is not limited to include all the described configurations. Moreover, in terms of a partial configuration of the example, addition of another configuration, deletion, and replacement are possible.

[0055] For example, in a case in which the emergency stop device is provided above the elevator car 1, the electric actuator 10 may be provided on top of the elevator car.

[0056] Furthermore, the elevator apparatus may be one with a machine room.

Reference Signs List

[0057]

- 1: elevator car
- 2: emergency stop device
- 3: main rope
- 4: guide rail
- 5: car-beneath pulley
- 10: electric actuator

11: operation lever
 12: driving rod
 13: spring part
 14: latch part
 15: fixing part
 16: first support part
 17: second support part
 34: movable member
 35: electromagnet part
 35A: electromagnet core part
 35B: electromagnet support plate
 35C: feed nut
 36: feed screw
 37: motor
 41: first support member
 42: second support member
 50: base part
 50C: opening part
 101: first link part
 102: second link part
 103: third link part
 110 :
 111: connection part
 112: connection part
 115: fixing shaft
 201: brake element
 202: base part
 203: pushing-up rod

Claims

1. An elevator apparatus, **characterized by** comprising:

an elevator car;
 an emergency stop device provided to the elevator car;
 a driving mechanism provided to the elevator car and configured to cause the emergency stop device to operate; and
 an electric actuator configured to actuate the driving mechanism, wherein
 the driving mechanism includes a driving rod connected to the emergency stop device and configured to cause the emergency stop device to operate,
 the driving rod includes a torsion spring part, when the electric actuator operates, the driving rod rotates by biasing force of the torsion spring part, and
 the rotation of the driving rod causes the emergency stop device to operate.

2. The elevator apparatus according to Claim 1, **characterized in that** the electric actuator includes:

a lever part connected to the driving rod;

a movable member rotatably connected to the lever part; and
 an electromagnet part configured to attract the movable member in a waiting state, and
 in the waiting state, when the electric actuator operates and excitation of the electromagnet part is stopped, the driving rod rotates by the biasing force of the torsion spring part.

3. The elevator apparatus according to Claim 2, **characterized in that** the electric actuator includes:

a feed screw configured to be screwed with the electromagnet part; and
 a motor configured to rotary drive the feed screw.

4. The elevator apparatus according to Claim 3, **characterized in that**, when the motor rotates the feed screw, the electromagnet part shifts along an axial direction of the feed screw.

5. The elevator apparatus according to Claim 4, **characterized in that** the movable member shifts together with the electromagnet part by being attracted to the electromagnet part.

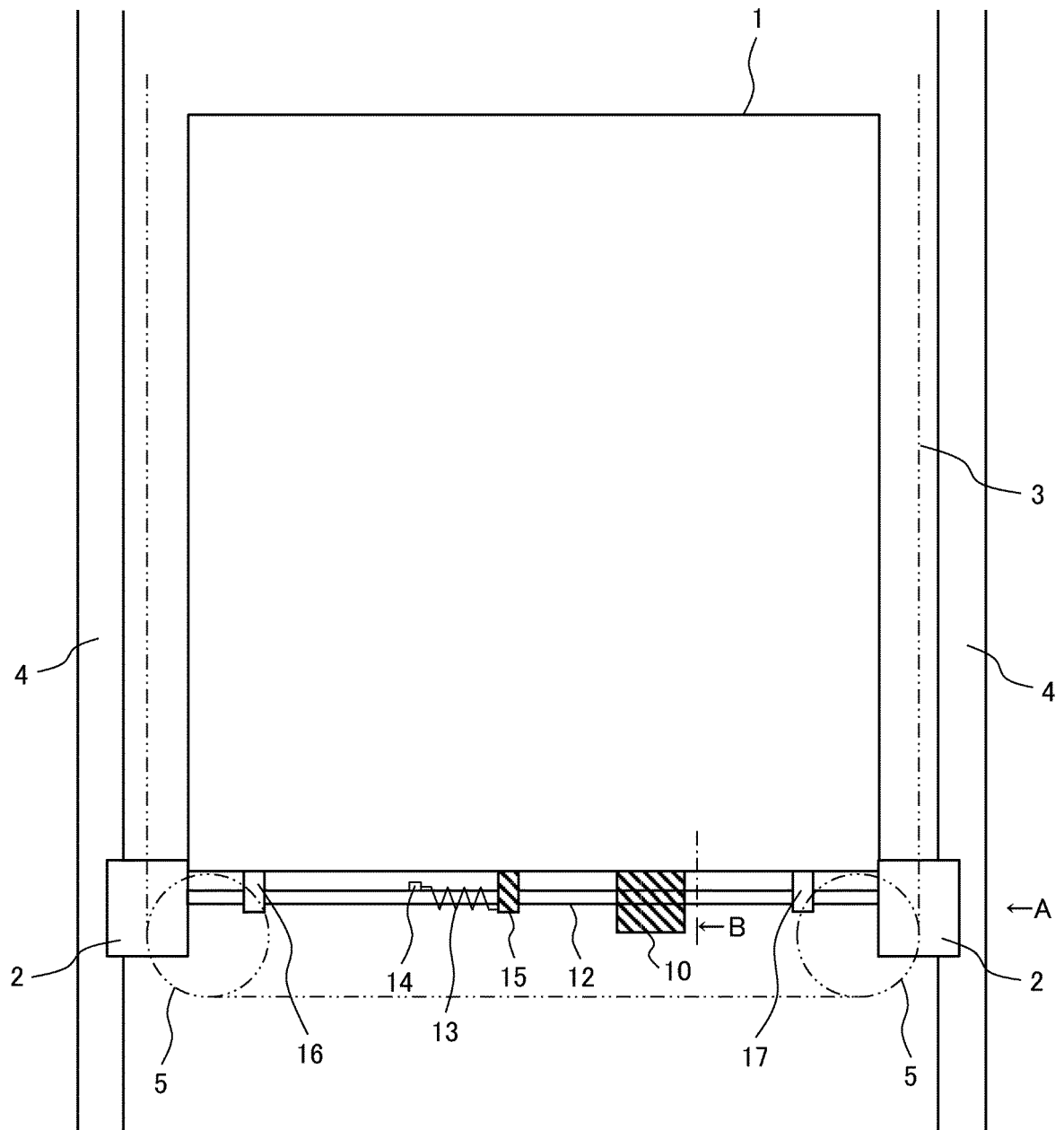
6. The elevator apparatus according to Claim 5, **characterized in that**, when the movable member attracted to the electromagnet part shifts together with the electromagnet part, a torsional moment is applied to the torsion spring part by the lever part.

7. The elevator apparatus according to Claim 1, **characterized in that** the torsion spring part includes a torsion coil spring.

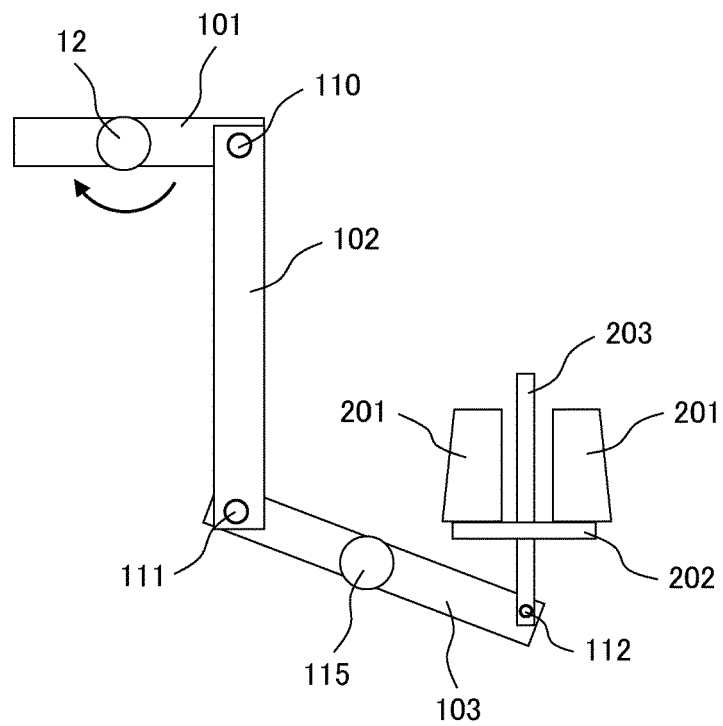
8. The elevator apparatus according to Claim 1, **characterized in that** the torsion spring part is a torsion bar spring included in the driving rod.

9. The elevator apparatus according to Claim 1, **characterized in that** the driving mechanism and the electric actuator are provided to a beneath part of the elevator car.

[FIG. 1]

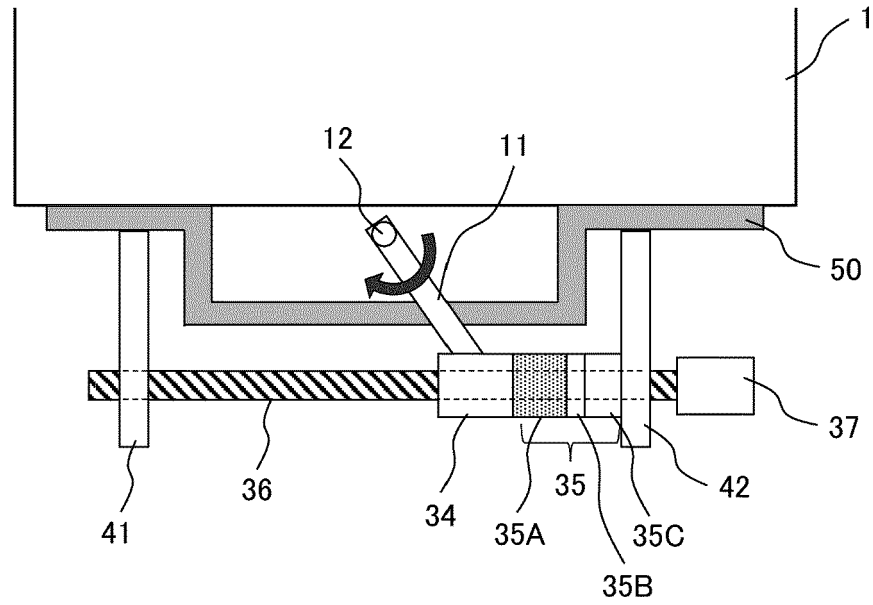


[FIG. 2]



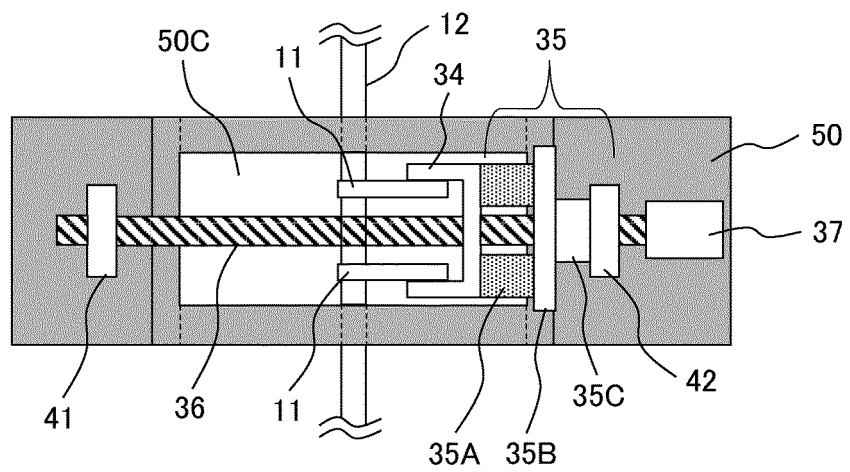
VIEW SEEN FROM ARROW A (FIG. 1)

[FIG. 3]

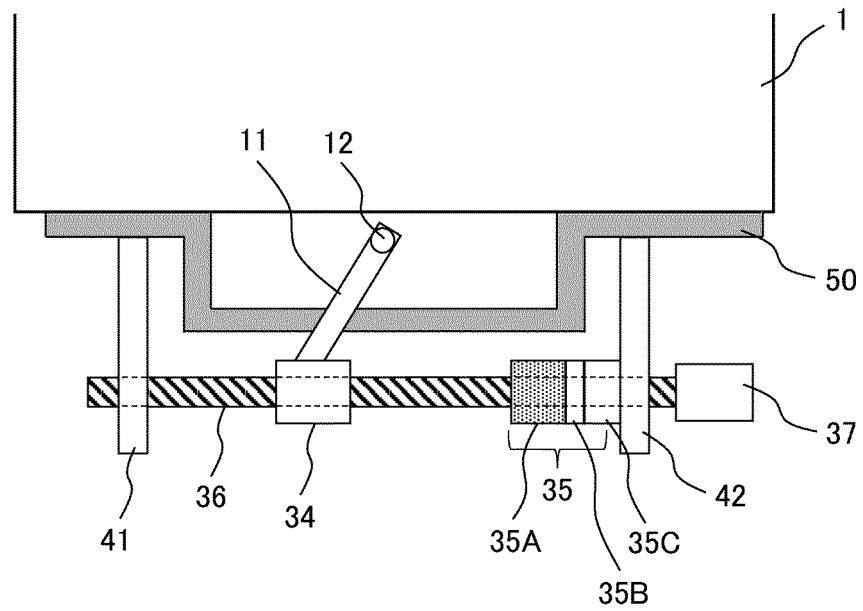


VIEW SEEN FROM ARROW B (FIG. 1)

[FIG. 4]

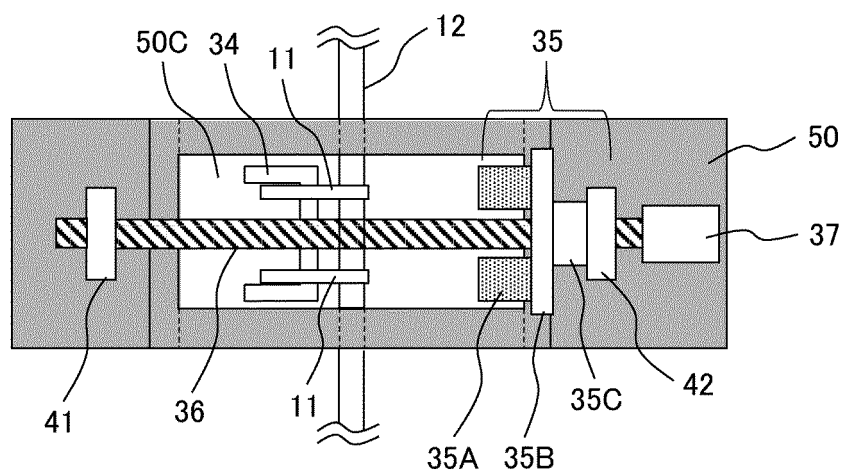


[FIG. 5]



VIEW SEEN FROM ARROW B (FIG. 1)

[FIG. 6]



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/035262

A. CLASSIFICATION OF SUBJECT MATTER <i>B66B 5/06</i> (2006.01)i; <i>B66B 5/16</i> (2006.01)i FI: B66B5/16 Z; B66B5/06 Z According to International Patent Classification (IPC) or to both national classification and IPC	B. FIELDS SEARCHED																		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT	<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>JP 2021-130550 A (HITACHI, LTD.) 09 September 2021 (2021-09-09) paragraphs [0013]-[0112], fig. 1-12</td> <td>1-9</td> </tr> <tr> <td>Y</td> <td>JP 2004-142914 A (MITSUBISHI ELECTRIC CORP.) 20 May 2004 (2004-05-20) paragraphs [0008]-[0015], fig. 1-2</td> <td>1-9</td> </tr> <tr> <td>Y</td> <td>WO 2019/220505 A1 (MITSUBISHI ELECTRIC CORP.) 21 November 2019 (2019-11-21) paragraphs [0014]-[0061], fig. 1-8</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>US 2014/0326544 A1 (INVENTIO AG) 06 November 2014 (2014-11-06)</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>JP 2012-520811 A (OTIS ELEVATOR CO.) 10 September 2012 (2012-09-10)</td> <td>1-9</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	JP 2021-130550 A (HITACHI, LTD.) 09 September 2021 (2021-09-09) paragraphs [0013]-[0112], fig. 1-12	1-9	Y	JP 2004-142914 A (MITSUBISHI ELECTRIC CORP.) 20 May 2004 (2004-05-20) paragraphs [0008]-[0015], fig. 1-2	1-9	Y	WO 2019/220505 A1 (MITSUBISHI ELECTRIC CORP.) 21 November 2019 (2019-11-21) paragraphs [0014]-[0061], fig. 1-8	1-9	A	US 2014/0326544 A1 (INVENTIO AG) 06 November 2014 (2014-11-06)	1-9	A	JP 2012-520811 A (OTIS ELEVATOR CO.) 10 September 2012 (2012-09-10)	1-9
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Date of the actual completion of the international search 25 November 2021	Date of mailing of the international search report 07 December 2021																		
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