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(54) **SPEED GOVERNOR OF ELEVATOR**

GESCHWINDIGKEITSREGLER FÜR AUFZUG

RÉGULATEUR DE VITESSE POUR ASCENSEUR

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Description

Technical Field

[0001] The present invention relates to an elevator speed governor for detecting an overspeed of a car or a counterweight and operating an emergency stop device.

Background Art

[0002] Conventionally, there is proposed an elevator speed governor having a pulley around which a speed governor rope is looped and a rope holding mechanism for holding a speed governor rope being supported by a stand. The rope holding mechanism is disposed below the pulley. A ratchet rotating coaxially with the pulley is also supported by the stand. The pulley is provided with a pawl that is engaged with the ratchet when the rotational speed of the pulley has reached a preset overspeed. The ratchet is rotated together with the pulley through engagement of the pawl with the ratchet.

[0003] A hook member is coupled to the rope holding mechanism. In a normal state, the hook member is engaged with an engaging projection fixed to the stand. A lateral surface of the ratchet is provided with a disengaging projection for disengaging the hook member from the engaging projection. The hook member is pressed by the disengaging projection, which is moved as the ratchet rotates, and then is disengaged from the engaging projection. The rope holding mechanism is actuated through disengagement of the hook member from the engaging projection. A plurality of protruding portions for mounting the pulley, the ratchet, the rope holding mechanism, and the engaging projection are formed on the stand.

[0004] Further, patent document 2 discloses an apparatus comprising a recovery lever which can be displaced within an ordinary position and a recovery position for engaging with a trip lever by rotating a pawl, the recovery lever being arranged so as to be displaced remotely from the elevator hall through a resetting wire.

[0005]

Patent Document 1: JP 08-119555 A
Patent Document 2: JP 2002-370879 A

Disclosure of the Invention

Problem to be solved by the Invention

[0006] In the conventional speed governor for the elevator as described above, however, the disengaging projection simply extends from the lateral surface of the ratchet. Therefore, the ratchet and the hook member may be elastically deformed when the hook member is disengaged from the engaging projection, in the case where the ratchet is slowly rotated during, for example, an actuation checking test of the speed governor. In this case, the hook member escapes from the engaging projection. As a result, there is caused a problem in that the speed governor does not operate reliably.

[0007] There is no mechanism for canceling actuation of the rope holding mechanism or disengaging the pawl from the ratchet after operation of the speed governor, so the return operation for the actuation of the speed governor becomes troublesome.

[0008] In addition, the stand assumes a complicated shape in order to support the pulley and the rope holding mechanism. In some cases, therefore, the stand is made of castings, section steel, or the like. As a result, the stand is increased in size to the extent of hindering the weight saving of the speed governor.

[0009] The present invention has been made to solve the problems as described above. It is an object of the present invention to obtain an elevator speed governor which can be actuated more reliably.

[0010] It is another object of the present invention to obtain an elevator speed governor which allows a return operation to be performed easily after the speed governor has been operated.

[0011] It is still another object of the present invention to obtain an elevator speed governor which can be made compact and lightweight.

Means for solving the Problem

[0012] An elevator speed governor according to the present invention includes the features of claim 1. The elevator speed governor may comprise a base installed within a hoistway; a pulley rotatably supported by the base and having a speed governor rope looped around the pulley, for rotating in accordance with a raising/lowering speed of a car; a ratchet provided with an engaging strip for actuation, and capable of rotating around a pulley shaft of the pulley; an engaging mechanism having a pawl, with which the pulley is provided turnably between an actuation position for being engaged with the ratchet and a release position for being disengaged from the ratchet, the pawl being turned from the release position to the actuation position, and rotating the ratchet in the same direction as the pulley when a rotational speed of the pulley has reached a set overspeed set in advance; an actuating lever which is brought into abutment on the engaging strip for actuation and displaced through movement of the engaging strip for actuation resulting from rotation of the ratchet; and a rope holding mechanism which is actuated through displacement of the actuating lever resulting from abutment on the engaging strip for actuation and brakes the speed governor rope, in which the base is provided with a groove portion into which a part of the engaging strip for actuation is inserted, the groove portion extending in a direction so that the engaging strip for actuation moves.

Brief Description of the Drawings

[0013]

Fig. 1 is a structural view showing an elevator according to Embodiment 1 of the present invention.
Fig. 2 is a perspective view showing the speed governor of the elevator of Fig. 1.
Fig. 3 is a perspective view showing the speed governor 10 as viewed from a direction different from that of Fig. 2.
Fig. 4 is a front view showing the speed governor of Fig. 2.
Fig. 5 is a lateral view showing the speed governor of Fig. 2.
Fig. 6 is a sectional view taken along a line VI-VI of Fig. 5.
Fig. 7 is a sectional view taken along a line VII-VII of Fig. 4.
Fig. 8 is an enlarged view showing the upper link of Fig. 4.
Fig. 9 is a sectional view taken along a line IX-IX of Fig. 6.
Fig. 10 is an illustrative view showing a normal state of the speed governor of Fig. 4.
Fig. 11 is an illustrative view showing an operating state of the speed governor of Fig. 10.
Fig. 12 is an illustrative view showing a state where the lower return lever of Fig. 11 has been turned radially outward.
Fig. 13 is an illustrative view showing a state where the lower link of Fig. 12 has been displaced upward.
Fig. 14 is an illustrative view showing a state where the upper return lever of Fig. 13 has been turned radially outward.
Fig. 15 is a longitudinal sectional view showing the speed governor of an elevator according to Embodiment 2 of the present invention.
Fig. 16 is a sectional view taken along a line XVI-XVI of Fig. 15.
Fig. 17 is a sectional view of an essential part of the speed governor according to Embodiment 3 of the present invention.

Best Modes for carrying out the Invention

[0014] Preferred embodiments of the present invention will be described hereinafter with reference to the drawings.

Embodiment 1

[0015] Fig. 1 is a structural view showing an elevator according to Embodiment 1 of the present invention. Referring to Fig. 1, a hoisting machine 4 for raising/lowering a car 2 and a counterweight 3 is installed in an upper portion of a hoistway 1. A deflector pulley 5 is provided in the vicinity of the hoisting machine 4. The hoisting machine 4 has a hoisting machine main body 6 including a motor, and a drive sheave 7 rotated by the hoisting machine main body 6. A main rope 8 for suspending the car 2 and the counterweight 3 is looped around the drive sheave 7 and the deflector pulley 5. By driving the hoisting machine 4, the car 2 and the counterweight 3 are raised/lowered within the hoistway 1.

[0016] A lower portion of the car 2 is mounted with a mechanical emergency stop device 9 for stopping the car 2 as an emergency measure through engagement with a guide rail (not shown). A speed governor 10 is provided in the upper portion of the hoistway 1. A tension pulley 11 is provided in a lower portion of the hoistway 1. A speed governor rope 12 is looped around the speed governor 10 and the tension pulley 11. Both ends of the speed governor rope 12 are connected to an actuating lever 9a of the emergency stop device 9.

[0017] Fig. 2 is a perspective view showing the speed governor 10 of the elevator of Fig. 1. Fig. 3 is a perspective view showing the speed governor 10 as viewed from a direction different from that of Fig. 2. In addition, Figs. 4 is a front view showing the speed governor 10 of Fig. 2, Fig. 5 is a lateral view showing the speed governor 10 of Fig. 2, Fig. 6 is a sectional view taken along a line VI-VI of Fig. 5, and Fig. 7 is a sectional view taken along a line VII-VI I of Fig. 4. Referring to the figures, the speed governor rope 12 is looped around a speed governor sheave 13 serving as a pulley. The speed governor sheave 13 is so supported by a base 14 fixed within the hoistway 1 as to be rotatable around a pulley shaft 15. Accordingly, the speed governor sheave 13 is rotated around the pulley shaft 15 in accordance with a raising/lowering speed of the car 2.

[0018] The base 14 has a pair of support plates 16, 17 facing each other. The support plates 16 and 17 are identical in shape to each other. The support plates 16, 17 are disposed on both sides in an axial direction of the speed governor sheave 13. Accordingly, while one end of the pulley shaft 15 is rotatably supported by the support plate 16, the other end of the pulley shaft 15 is rotatably supported by the support plate 17. The pulley shaft 15 is horizontally provided between the support plates 16, 17.

[0019] A pair of shafts 18 parallel to the pulley shaft 15 are fixed to a lateral surface of the speed governor sheave 13. One end of each of flyweights 19 is rotatably mounted on a corresponding one of the shafts 18. The flyweights 19 each are disposed symmetrically to each other with respect to the pulley shaft 15 (Fig. 6).

[0020] An actuating strip 20 protruding radially outwardly of the speed governor sheave 13 is fixed to the other end of one of the flyweights 19. The flyweights 19 are turned around the shafts 18, respectively, due to a centrifugal force resulting from rotation of the speed governor sheave 13. Thus, the actuating strip 20 is turned radially outwardly of the speed governor sheave 13. A balancing spring 21 acting against the centrifugal force is provided between one end of one of the one of the flyweights 19 and the speed governor sheave 13. A car stop switch 22 for operating a braking device (not shown) of the hoisting machine 4 is mounted on the base 14. The car stop switch 22 is disposed between the respective support plates 16, 17. The car stop switch 22 has a

switch lever 22a (Fig. 6) operated by the actuating strip 20.

[0021] The speed governor sheave 13 is provided with a pin 23 extending parallel to the shafts 18. One end of a trip lever 24 is turnably mounted to the pin 23. The other end of the trip lever 24 abuts on an outer lateral surface of the one of the flyweights 19. The trip lever 24 is turned around the pin 23 due to the turning of the flyweights 19. The pin 23 is provided with a torsion spring 25 for urging the other end of the trip lever 24 in such a direction as to come into abutment on the flyweight 19 (clockwise in Fig. 6).

[0022] The base 14 is provided with a ratchet 26 that is rotatable around the pulley shaft 15. The ratchet 26 is disposed between one of the support plates 16 and the speed governor sheave 13. A plurality of teeth are provided on an outer peripheral portion of the ratchet 26. An engaging strip 27 for actuation, which extends horizontally, is fixed to a lateral surface of the ratchet 26 (Fig. 6). A pawl 28 for selectively engaging one of the trip lever 24 and the ratchet 26 is supported by one of the shafts 18. In other words, the pawl 28 can turn around one of the shafts 18 between an actuation position for being engaged with the ratchet 26 after having been disengaged from the trip lever 24 and a release position for being engaged with the trip lever 24 after having been disengaged from the ratchet 26. The pawl 28 is urged in such a direction as to engage the ratchet 26, by means of an urging spring (not shown). The pawl 28 is usually spaced apart from the ratchet 26 by being engaged with the trip lever 24. When the pawl 28 is disengaged from the trip lever 24, the pawl 28 is turned by a spring force of the urging spring and then is engaged with the ratchet 26. When the pawl 28 is at the actuation position, the ratchet 26 is rotated in the same direction as the speed governor sheave 13.

[0023] An engaging mechanism 30 has the flyweights 19, the balancing spring 21, the trip lever 24, and the pawl 28.

[0024] A rope holding mechanism 31 for holding the speed governor rope 12 is provided below the speed governor sheave 13. The rope holding mechanism 31 is supported by the base 14. The rope holding mechanism 31 is provided between the support plates 16, 17.

[0025] The rope holding mechanism 31 has a fixed-side rope holding portion 32 which is a receiving portion fixed to the base 14, an expansion rod 34 which can expand and contract and one end of the expansion rod 34 is turnably mounted to a support shaft 33 supported by the base 14, a movable-side rope holding portion 35 which is a movable portion that is turnably mounted to the other end of the expansion rod 34 and is displaced in such a direction as to move into contact with or away from the fixed-side rope holding portion 32 due to the turning of the expansion rod 34, and a pressing spring 36 which is disposed between the movable-side rope holding portion 35 and the support shaft 33 (Fig. 6).

[0026] Owing to the turning of the expansion rod 34, the movable-side rope holding portion 35 is displaceable between a binding position for binding the speed governor rope 12 between the movable-side rope holding portion 35 and the fixed-side rope holding portion 32, and an open position which is located above the binding position for releasing the speed governor rope 12 from being bound. When the movable-side rope holding portion 35 is located at the binding position, the expansion rod 34 and the pressing spring 36 are contracted. Thus, the movable-side rope holding portion 35 is pressed in such a direction as to move into contact with the fixed-side rope holding portion 32, due to an elastic restoring force of the pressing spring 36.

[0027] A rod-like engaging member 37, which extends horizontally, is provided between the speed governor sheave 13 and the rope holding mechanism 31 (Fig. 6). The engaging member 37 is fixed between the support plates 16, 17. A lower end of an actuating lever 38 extending upward from the movable-side rope holding portion 35 is turnably coupled to the movable-side rope holding portion 35. The actuating lever 38 is provided with a recess portion 39 for engaging the actuating lever 38 with the engaging member 37, and a mounting pin 41 for the actuating lever. The mounting pin 41 is passed through a long hole 40 (Fig. 2) formed through the support plate 16. A pulling spring 42 for urging the actuating lever 38 in such a direction as to engage the actuating lever 38 with the engaging member 37 is provided between the mounting pin 41 for the actuating lever and the support plate 16 (Fig. 2). The movable-side rope holding portion 35 is held at the open position through engagement of the actuating lever 38 with the engaging member 37.

[0028] In a state where the actuating lever 38 is engaged with the engaging member 37, an upper end of the actuating lever 38 is inserted between the ratchet 26 and the support plate 16. In this state, the upper end of the actuating lever 38 is brought into abutment on the engaging strip 27 for actuation due to rotation of the ratchet 26. The actuating lever 38 is displaced in a rotational direction of the ratchet 26 against the urging of the pulling spring 42 due to abutment on the engaging strip 27 for actuation. The actuating lever 38 is disengaged from the engaging member 37 due to displacement of the upper end in the rotational direction of the ratchet 26. The movable-side rope holding portion 35 is displaced, because of its own weight, to the binding position located below, due to disengagement of the actuating lever 38 from the engaging member 37 (Fig. 6).

[0029] An upper return lever 43 and a lower return lever 44, which are a pair of return levers for displacing the pawl 28 from the actuation position to the release position, each are turnably supported by the support plate 16 (Figs. 2 and 6). The upper return lever 43 and the lower return lever 44 are curved plate-like members extending substantially in a circumferential direction of the ratchet 26. Further, the upper return lever 43 and the lower return lever 44 are disposed around the pulley shaft 15 and between the support plate 16 and the ratchet 26. In ad-

dition, the upper return lever 43 and the lower return lever 44 are disposed symmetrically to each other with respect to a horizontal plane including the pulley shaft 15. One end 43a of the upper return lever 43 and one end 44a of the lower return lever 44 each are turnably supported on the support plate 16.

[0030] A return projection 45 extending from the pawl 28 toward the support plate 16 side is provided on a lateral surface of the pawl 28. The pawl 28 is displaced from the actuation position to the release position when the upper return lever 43 and the lower return lever 44 are turned radially outward while abutting on the return projection 45. The upper return lever 43 and the lower return lever 44 are formed such that the pawl 28 is displaced to the release position regardless of whether the return projection 45 is brought into abutment on an outer peripheral portion of the upper return lever 43 or on an outer peripheral portion of the lower return lever 44.

[0031] A pin 46 for the upper return lever, which penetrates through the support plate 16, is provided at the other end 43b of the upper return lever 43. Further, a pin 47 for the lower return lever, which penetrates through the support plate 16, is provided at the other end 44b of the lower return lever 44 (Figs. 4 and 6).

[0032] The support plate 16 is provided with a long hole 48 for an upper lever for passing the pin 46 for the upper return lever therethrough, and a long hole 49 for a lower lever for passing the pin 47 for the lower return lever therethrough. The long hole 48 for the upper lever extends along a direction in which the pin 46 for the upper return lever moves due to the turning of the upper return lever 43. The long hole 49 for the lower lever extends along a direction in which the pin 47 for the lower return lever moves due to the turning of the lower return lever 44 (Figs. 2 to 4).

[0033] A link mechanism 50 for interlocking the actuating lever 38, the upper return lever 43, and the lower return lever 44 with one another is supported by the support plate 16 (Figs. 2, 4). The link mechanism 50 has an upper link 51 coupled to the pin 46 for the upper return lever and the pin 47 for the lower return lever, and a lower link 52 coupled to the pin 46 for the upper return lever and the mounting pin 41 for the actuating lever.

[0034] Fig. 8 is an enlarged view showing the upper link 51 of Fig. 4. As shown in the figure, the upper link 51 is provided with a long hole 53 through which the pin 46 for the upper return lever is slidably passed, and a through-hole 54 through which the pin 47 for the lower return lever is passed.

[0035] A pulling spring 55 for urging the upper link 51 in such a direction as to turn the lower return lever 44 radially inward is provided between the upper link 51 and the support plate 16. The upper link 51 is urged upward with respect to the support plate 16 by means of the pulling spring 55.

[0036] The lower link 52 is provided with a long hole 56 through which the pin 46 for the upper return lever is slidably passed, and a long hole 57 through which the mounting pin 41 for the actuating lever is slidably passed. Further, a sheath mounting member 59, to which a bendable sheath 58 is connected, is fixed to an intermediate portion of the lower link 52. A wire 60 for remote control operation is passed to extend inside the sheath 58. The wire 60 for remote control operation passes through the sheath mounting member 59. An end of the wire 60 for remote control operation is connected to the upper link 51.

[0037] In a normal state where the movable-side rope holding portion 35 is at the open position, the pin 46 for the upper return lever is located at a lower end of the long hole 53 of the upper link 51 and at an upper end of the long hole 56 of the lower link 52, and the mounting pin 41 for the actuating lever is located at an upper end of the long hole 57 of the lower link 52 (Figs. 2 and 4).

[0038] Fig. 9 is a sectional view taken along a line IX-IX of Fig. 6. Referring to Fig. 9, a groove portion 61, into which a tip (part) of the engaging strip 27 for actuation is inserted, is formed in the lateral surface of the support plate 16. The groove portion 61 extends along a direction in which the engaging strip 27 for actuation moves when the ratchet 26 is rotated.

[0039] Next, operation will be described. When the raising/lowering speed of the car 2 reaches a first overspeed, the actuating strip 20 comes into abutment on the switch lever 22a due to the turning of the flyweights 19 resulting from a centrifugal force, thereby turning the switch lever 22a. Thus, the car stop switch 22 is actuated and a power source for the hoisting machine 4 is turned off. As a result, the car 2 is stopped by the braking device of the hoisting machine 4.

[0040] Further, even when the hoisting machine 4 is stopped because of, for example, a rupture of the main rope 8, the car 2 is lowered without being stopped. Then, when the lowering speed of the car 2 reaches a second overspeed (set overspeed), the flyweights 19 further turn. In response to the turning of the flyweights 19, the turning amount of the trip lever 24 increases as well, so the trip lever 24 is disengaged from the pawl 28. Thus, the pawl 28 is turned from the release position to the actuation position by being urged by the urging spring and then engages the teeth of the ratchet 26. As a result, the ratchet 26 is slightly rotated counterclockwise in Fig. 6 together with the speed governor sheave 13.

[0041] When the ratchet 26 is rotated, the engaging strip 27 for actuation comes into abutment on the upper end of the actuating lever 38, thereby turning the actuating lever 38. Consequently, the actuating lever 38 is disengaged from the engaging member 37, and the movable-side rope holding portion 35 is displaced, because of its own weight, to the binding position located below. Owing to a drag of the fixed-side rope holding portion 32 which is applied to the movable-side rope holding portion 35 at this moment, the expansion rod 34 is contracted while being turned around the support shaft 33. The pressing spring 36 is thereby contracted, and the movable-side rope holding portion 35 is strongly pressed

against the fixed-side rope holding portion 32 through the speed governor rope 12. Thus, the rope holding mechanism 31 is actuated (performs trip operation), and the speed governor rope 12 is braked. When circulation of the speed governor rope 12 is stopped, the car 2 continues to be lowered. As a result, the actuating lever 9a is operated, and the emergency stop device 9 is actuated.

[0042] Fig. 10 is an illustrative view showing a normal state of the speed governor 10 of Fig. 4. In the normal state, as shown in the figure, the actuating lever 38 is engaged with the engaging member 37, and the movable-side rope holding portion 35 is disposed at the open position. The upper return lever 43 has been turned radially inward because of the weight of the other end 43b, and the lower return lever 44 has been turned radially inward by being urged by the pulling spring 55. In this state, the pin 46 for the upper return lever abuts on the lower end of the long hole 53, and the mounting pin 41 for the actuating lever abuts on the upper end of the long hole 57.

[0043] Fig. 11 is an illustrative view showing an operating state of the speed governor 10 of Fig. 10. When the rope holding mechanism 31 is actuated, the actuating lever 38 is disengaged from the engaging member 37, and the movable-side rope holding portion 32 is displaced from the open position to the binding position. At this moment, while the link mechanism 50, the upper return lever 43, and the lower return lever 44 are held in position, the mounting pin 41 for the actuating lever is slid from the upper end to the lower end of the long hole 57 of the lower link 52.

[0044] Next, a return operation performed after the trip operation of the speed governor 10 will be described. Figs. 12 to 14 are illustrative views for explaining the return operation of the speed governor 10 of Fig. 11. Fig. 12 is an illustrative view showing a state where the lower return lever 44 of Fig. 11 has been turned radially outward. Fig. 13 is an illustrative view showing a state where the lower link 52 of Fig. 12 has been displaced upward. Fig. 14 is an illustrative view showing a state where the upper return lever 43 of Fig. 13 has been turned radially outward.

[0045] When the wire 60 for remote control operation is pulled downward against the urging of the pulling spring 55 through operation performed at a location remote from the speed governor 10, for example, in a boarding area, the upper link 51 connected to the wire 60 for remote control operation is also pulled downward. At this moment, the upper link 51 is slid along the long hole 53 with respect to the pin 46 for the upper return lever. The pin 47 for the lower return lever is thereby displaced downward, and the lower return lever 44 is turned radially outward. After that, the lower return lever 44 is brought into abutment on the lower end of the long hole 49 for the lower lever (Fig. 4) formed through the support plate 16 (Fig. 12).

[0046] After that, when a pulling force is further applied downward to the wire 60 for remote control operation, a reaction force acting against the pulling force applied to the wire 60 for remote control operation downward acts on a portion of the sheath mounting member 59 which is in contact with the wire 60 for remote control operation. The reaction force acting on the sheath mounting member 59 includes an upward component. The lower link 52 is thereby pulled upward while being slid along the long hole 56 with respect to the upper return lever 43. After that, the pin 46 for the upper return lever is brought into abutment on the lower end of the long hole 56. At this moment, the movable-side rope holding portion 35 is also displaced upward together with the lower link 52 (Fig. 13).

[0047] After that, the lower link 52 is pulled further upward, so the pin 46 for the upper return lever is also displaced upward. As a result, the pin 46 for the upper return lever is brought into abutment on the upper end of the long hole 48 for the upper lever (Fig. 4) formed through the support plate 16. Thus, the upper return lever 43 is turned radially outward. At this moment, the pin 46 for the upper return lever is slid along the long hole 53 of the upper link 51. The movable-side rope holding portion 35 is also displaced to the open position, and the actuating lever 38 is engaged with the engaging member 37 due to the urging of the pulling spring 42 (Fig. 14).

[0048] When the return projection 45 (Figs. 2 and 6) is within a predetermined range, the upper return lever 43 and the lower return lever 44 are turned radially outward, so one of the upper return lever 43 and the lower return lever 44 is brought into abutment on the return projection 45. The pawl 28 is thereby turned against the urging of the urging spring, and is returned from the actuation position at which the pawl 28 is engaged with the teeth of the ratchet 26 to the release position at which the pawl 28 is engaged with the trip lever 24. In other words, the pawl 28 can be returned from the actuation position to the release position when the return projection 45 exists on a turning path of one of the upper return lever 43 and the lower return lever 44.

[0049] The return of the speed governor 10 is completed by displacing the pawl 28 to the release position and displacing the movable-side rope holding portion 35 to the open position in this manner.

[0050] In the speed governor 10 constructed as described above, the ratchet 26 is provided with the engaging strip 27 for actuation for actuating the rope holding mechanism 31 by displacing the actuating lever 38, and the support plate 16 is provided with the groove portion 61 into which a part of the engaging strip 27 for actuation is inserted. Therefore, the actuating lever 38 can be prevented from escaping from a gap between the engaging strip 27 for actuation and the support plate 16, due to elastic deformation of the ratchet 26 and the support plate 16 which is caused when the engaging strip 27 for actuation is brought into abutment on the actuating lever 38. As a result, the actuating lever 38 can be displaced more reliably. Accordingly, the speed governor 10 can be actuated more reliably.

[0051] One end 43a of the upper return lever 43 and

one end 44a of the lower return lever 44, which are disposed around the pulley shaft 15 and curved so as to surround the pulley shaft 15, are turnably provided on the support plate 16. The pawl 28 is pressed upward by one of the upper return lever 43 and the lower return lever 44 that are turned in such a direction as to move away from the pulley shaft 15 (radially outward), and then is turned from the actuation position to the release position. Therefore, the range in which the pawl 28 is pressed upward to the release position by the upper return lever 43 and the lower return lever 44 is widened. As a result, the reliability of the return operation of the pawl 28 can be enhanced.

[0052] The actuating lever 38 is interlocked with the upper return lever 43 and the lower return lever 44 by means of the link mechanism 50, and the wire 60 for remote control operation for displacing the link mechanism 50 is connected to the link mechanism 50. Therefore, the link mechanism 50 can be displaced, the pawl 28 can be displaced to the release position, and the movable-side rope holding portion 35 can be displaced to the open position simply by operating the wire 60 for remote control operation from, for example, a boarding area even if an operator does not enter the hoistway 1 to return the speed governor 10. Accordingly, the return operation following the trip operation of the speed governor 10 can be performed with ease.

[0053] The base 14 has the pair of the support plates 16, 17 facing each other, and the speed governor sheave 13, the engaging mechanism 30, the actuating lever 38, and the rope holding mechanism 31 are disposed between the support plates 16 and 17. Therefore, the width dimension of the speed governor 10 can be reduced. Consequently, the speed governor 10 can be made compact and lightweight. Since the support plates 16, 17 can be made identical in shape, a plurality of superimposed metal plates can be simultaneously worked at the time of manufacturing the support plates 16, 17. As a result, the base 14 can be manufactured with ease.

Embodiment 2

[0054] Fig. 15 is a longitudinal sectional view showing the speed governor 10 of an elevator according to Embodiment 2 of the present invention. Fig. 15 corresponds to Fig. 6 of Embodiment 1. Fig. 16 is a sectional view taken along a line XVI-XVI of Fig. 15. Referring to the figures, the engaging strip 27 for actuation is provided with an engaging strip-side inclined portion 71 that is inclined in such a direction as to guide the actuating lever 38 toward the ratchet 26 side through abutment on the actuating lever 38. That is, the engaging strip 27 for actuation is provided with the engaging strip-side inclined portion 71 such that a portion of the engaging strip-side inclined portion 71 which is close to the ratchet 26 is located farther from the actuating lever 38 than a portion of the engaging strip-side inclined portion 71 which is close to the support plate 16. A portion of the support plate 16 which faces the engaging trip 27 for actuation is formed as a flat surface. Embodiment 2 is identical to Embodiment 1 in other constructional and operational details.

[0055] In the speed governor 10 constructed as described above, the engaging strip 27 for actuation is provided with the engaging strip-side inclined portion 71 that is inclined in such a direction as to guide the actuating lever 38 toward the ratchet 26 side. Therefore, the actuating lever 38 can be prevented from escaping from a gap between the engaging strip 27 for actuation and the support plate 16 when the actuating lever 38 is brought into abutment on the engaging strip 27 for actuation. As a result, the trip operation of the speed governor 10 can be performed more reliably.

Embodiment 3

[0056] Fig. 17 is a sectional view of an essential part of the speed governor 10 according to Embodiment 3 of the present invention. Although only the engaging strip 27 for actuation is provided with the inclined portion in Embodiment 2, the actuating lever 38 may also be provided with an inclined portion. That is, while a portion of the engaging strip 27 for actuation which abuts on the actuating lever 38 is provided with the engaging strip-side inclined portion 71, a portion of the actuating lever 38 which abuts on the engaging strip 27 for actuation is provided with a lever-side inclined portion 72 that is substantially parallel to the engaging strip-side inclined portion 71. In other words, the lever-side inclined portion 72 is inclined in such a direction as to guide the actuating lever 38 toward the ratchet 26 side through abutment on the engaging strip 27 for actuation. Embodiment 3 is identical to Embodiment 2 in other constructional and operational details.

[0057] In the speed governor 10 constructed as described above, the portion of the actuating lever 38 which abuts on the engaging strip 27 for actuation is provided with the lever-side inclined portion 72 that is substantially parallel to the engaging strip-side inclined portion 71. Therefore, the trip operation of the speed governor 10 can be performed more reliably.

[0058] Although the portion of the support plate 16 which faces the engaging strip 27 for actuation is formed as a flat surface in Embodiments 2 and 3, a groove portion into which the engaging strip 27 for actuation is inserted may be formed in the support plate 16 as is the case with Embodiment 1. If this construction is adopted, the trip operation of the speed governor 10 can be performed more reliably.

Claims

1. An elevator speed governor, comprising:

a base (14) installed within a hoistway (1);

a pulley (13) rotatably supported by the base (14) and having a speed governor rope (12) looped around the pulley (13), for rotating in accordance with a raising/lowering speed of a car (2);
a ratchet (26) provided with an engaging strip (27) for actuation, and capable of rotating around a pulley shaft (15) of the pulley (13);
an engaging mechanism (30) having a pawl (28), with which the pulley (13) is provided turnably between an actuation position for being engaged with the ratchet (26) and a release position for being disengaged from the ratchet (26), the pawl (28) being turned from the release position to the actuation position, and rotating the ratchet (26) in the same direction as the pulley (13) when a rotational speed of the pulley (13) has reached a set overspeed set in advance;
an actuating lever (38) which is brought into abutment on the engaging strip (27) for actuation and displaced through movement of the engaging strip (27) for actuation resulting from rotation of the ratchet (26); and
a rope holding mechanism (31) which is actuated through displacement of the actuating lever (38) resulting from abutment on the engaging strip (27) for actuation and brakes the speed governor rope (12), wherein
the base (14) is turnably provided with an end of a return lever (43,44) that is disposed around the pulley shaft (15) and curved so that the return lever (43, 44) surrounds the pulley shaft (15) ; and
the pawl (28) is pressed upward by the return lever (43, 44), which is turned in a direction so that the return lever (43, 44) is moved away from the pulley shaft (15), and is turned from the actuation position to the release position.

2. An elevator speed governor according to Claim 1, further comprising:

a link mechanism (50) for interlocking the actuating lever (38) and the return lever (43,44) with each other; and
a wire (60) for remote control operation for displacing the link mechanism (50),
characterized in that the return lever (43, 44) is turned into a direction in which the pawl (28) is displaced from the actuation position to the release position, and the actuating lever (38) is displaced in a direction so that operation of the rope holding mechanism (31) is cancelled, due to displacement of the link mechanism (50) resulting from operation of the wire (60) for remote control operation.

Patentansprüche

1. Aufzugsgeschwindigkeitsregler mit:

einer Basis (14), die in einem Aufzugsschacht (1) installiert ist;
einer Rolle (13), die durch die Basis (14) drehbar getragen ist und ein Geschwindigkeitsreglerseil (12) aufweist, das um die Rolle (13) gewunden ist, und zum Rotieren gemäß einer Hebe-/Senkgeschwindigkeit einer Aufzugskabine (2);
einem Sperrrad (26), das mit einer Eingriffsleiste (27) zur Betätigung versehen ist und dazu eingerichtet ist, um einen Rollenschaft (15) der Rolle (13) zu rotieren;
einem Eingriffsmechanismus (30), der eine Sperre (28) aufweist, mit dem die Rolle (13) zwischen einer Betätigungsposition zum in Eingriff gelangen mit dem Sperrrad (26) und einer Entriegelungsposition zum aus dem Eingriff gelangen mit dem Sperrrad (26) drehbar eingerichtet ist, wobei die Sperre (28) von der Entriegelungsposition in die Betätigungsposition gedreht wird und das Sperrrad (26) in dieselbe Richtung wie die Rolle (13) rotiert, wenn eine Drehgeschwindigkeit der Rolle (13) eine im Voraus festgelegte Übergeschwindigkeit erreicht;
einem Betätigungshebel (38), der in einen Anstoßzustand an die Eingriffsleiste (27) zur Betätigung gebracht wird und durch eine Bewegung der Eingriffsleiste (27) zur Betätigung verschoben wird in Folge einer Drehung des Sperrrads (26); und
einem Seilhaltemechanismus (31), der durch eine Verschiebung des Betätigungshebels (38) betätigt wird, in Folge eines Anstoßens der Eingriffsleiste (27) zur Betätigung, und das Geschwindigkeitsreglerseil (27) abbremst, wobei
die Basis (14) mit einem Ende eines Rückstellhebels (43, 44) drehbar versehen ist, der um den Rollenschaft (15) angeordnet und gebogen ist, sodass der Rückführhebel (43, 44) die Rollenwelle (15) umgibt; und
das Sperrrad (28) durch den Rückführhebel (43, 44) nach oben gedrückt wird, der in eine Richtung gedreht wird, sodass der Rückführhebel (43, 44) von der Rollenwelle (15) wegbewegt wird, und von der Betätigungsposition in die Entriegelungsposition gedreht wird.

2. Aufzugsgeschwindigkeitsregler nach Anspruch 1, der ferner aufweist:

einen Verbindungsmechanismus (50) zum miteinander Verriegeln des Betätigungshebels (38) und des Rückführhebels (43, 44); und
einen Draht (60) für Fernsteuerungsbetrieb zum Verschieben des Verbindungsmechanismus

(50),
dadurch gekennzeichnet, dass der Rückführhebel (43, 44) in eine Richtung gedreht wird, in welcher das Sperrrad (28) von der Betätigungsposition in die Entriegelungsposition verschoben wird, und der Betätigungshebel (38) in einer Richtung verschoben wird, sodass eine Betätigung des Seilhaltemechanismus (31) abgebrochen wird, in Folge einer Verschiebung des Verbindungsmechanismus in Folge einer Betätigung des Drahts (60) für Fernsteuerungsbetrieb.

Revendications

1. Régulateur de vitesse d'ascenseur, comprenant :

une base (14) installée à l'intérieur d'une cage d'ascenseur (1) ;
une poulie (13) supportée en rotation par la base (14) et ayant un câble de régulateur de vitesse (12) enroulé autour de la poulie (13), pour tourner selon une vitesse de montée / descente d'une cabine (2) ;
un rochet (26) muni d'une section de mise en prise (27) pour mise en action, et susceptible de tourner autour d'un arbre de poulie (15) de la poulie (13) ;
un mécanisme de mise en prise (30) ayant un cliquet (28), avec lequel la poulie (13) est disposée de manière à pouvoir tourner entre une position de mise en action pour être en prise avec le rochet (26) et une position de libération pour être dégagée du rochet (26), le cliquet (28) étant tourné de la position de libération à la position de mise en action, et faisant tourner le rochet (26) dans le même sens que la poulie (13) quand une vitesse de rotation de la poulie (13) a atteint une limite de vitesse fixée à l'avance ;
un levier de mise en action (38) qui est amené en butée sur la section de mise en prise (27) pour mise en action et déplacé par le mouvement de la section de mise en prise (27) pour une mise en action résultant de la rotation du rochet (26) ; et
un mécanisme de maintien de câble (31) qui est actionné par le déplacement du levier de mise en action (38) résultant de la butée sur la section de mise en prise (27) pour mise en action et qui freine le câble de régulateur de vitesse (12), dans lequel
la base (14) est munie, de manière à pouvoir tourner, d'une extrémité d'un levier de retour (43, 44) qui est disposé autour de l'arbre de poulie (15) et incurvé de sorte que le levier de retour (43, 44) entoure l'arbre de poulie (15) ; et
le cliquet (28) est pressé vers le haut par le levier de retour (43, 44), qui est tourné dans un sens tel que le levier de retour (43, 44) est écarté de l'arbre de poulie (15), et est tourné de la position de mise en action à la position de libération.

2. Régulateur de vitesse d'ascenseur selon la revendication 1, comprenant en outre :

un mécanisme de liaison (50) pour verrouiller le levier de mise en action (38) et le levier de retour (43, 44) l'un à l'autre ; et
un fil (60) pour une opération de commande à distance pour déplacer le mécanisme de liaison (50),
caractérisé en ce que le levier de retour (43, 44) est tourné dans un sens dans lequel le cliquet (28) est déplacé de la position de mise en action à la position de libération, et le levier de mise en action (38) est déplacé dans un sens tel que la mise en oeuvre du mécanisme de maintien de câble (31) est annulée, à cause d'un déplacement du mécanisme de liaison (50) résultant de l'actionnement du fil (60) pour une opération de commande à distance.

FIG. 1

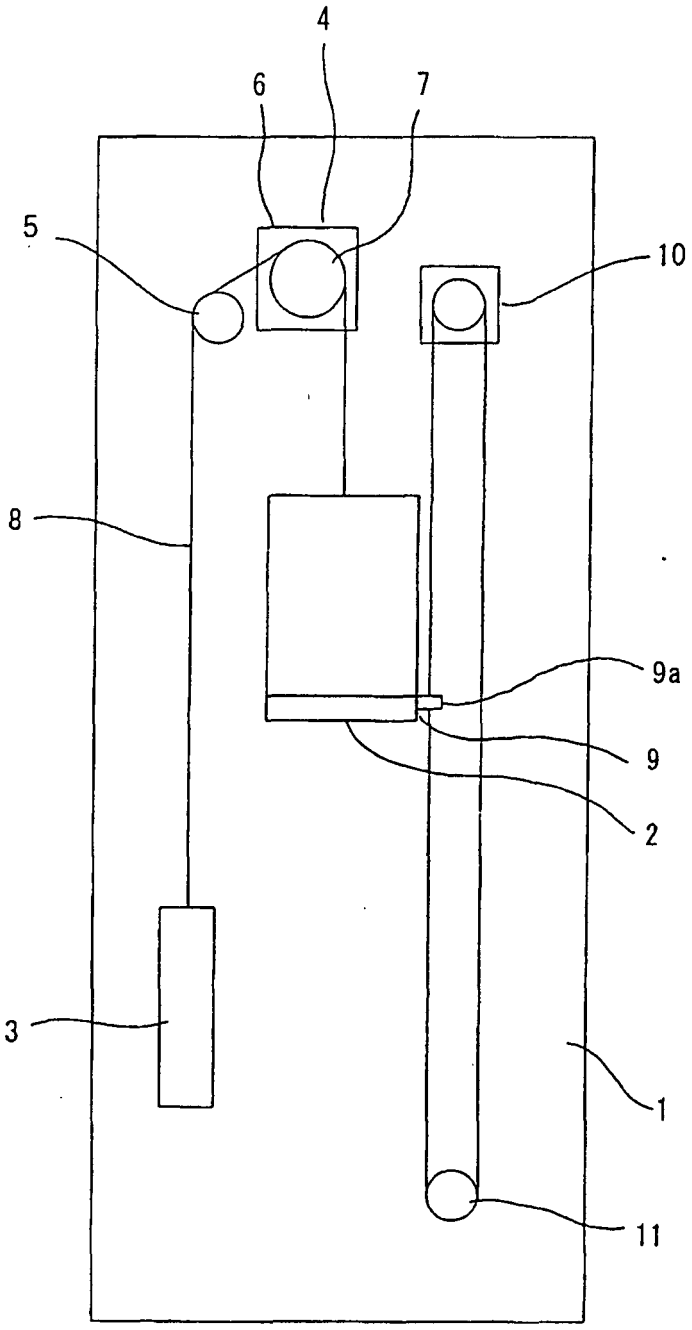


FIG. 2

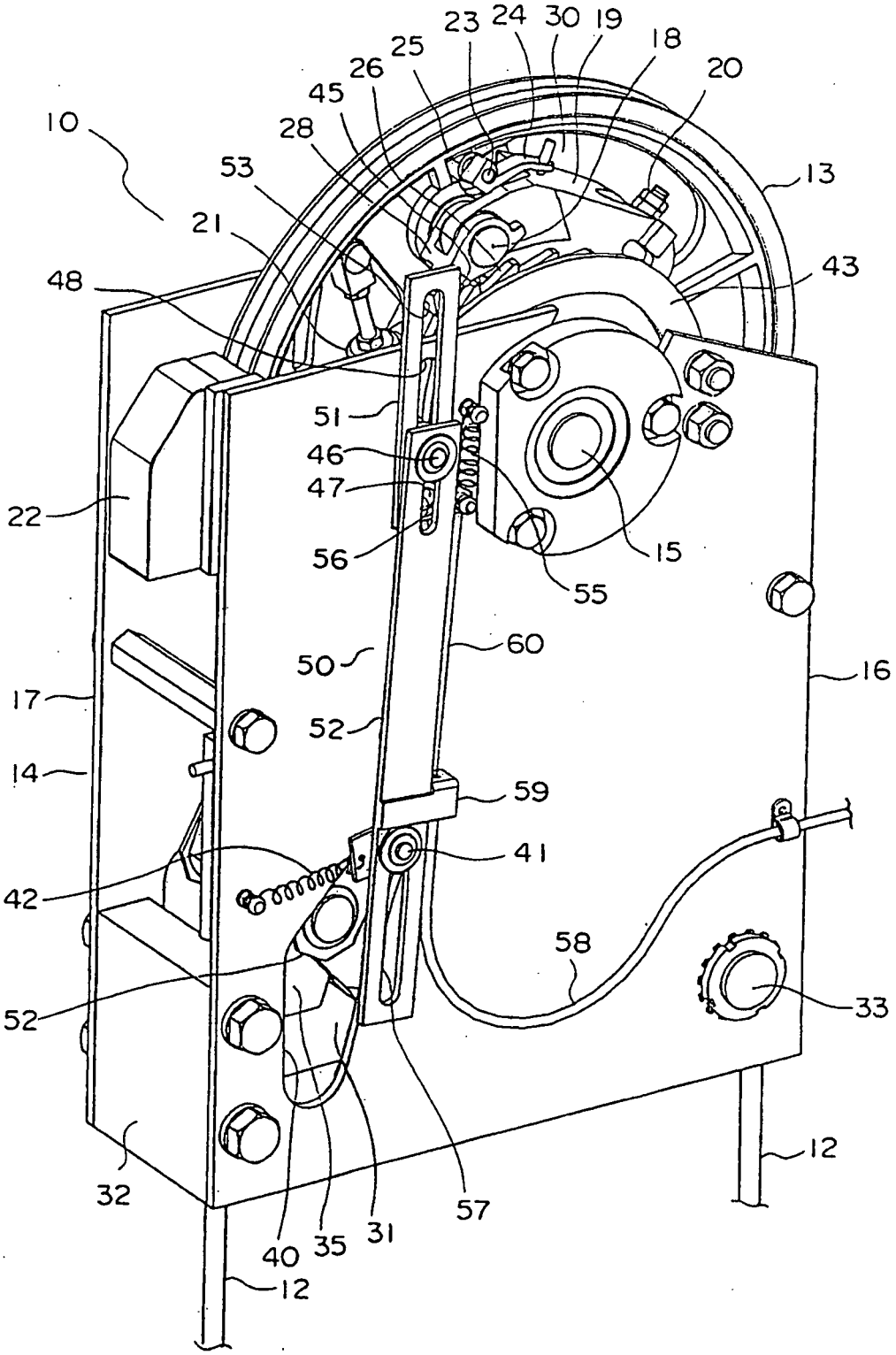

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FIG. 3

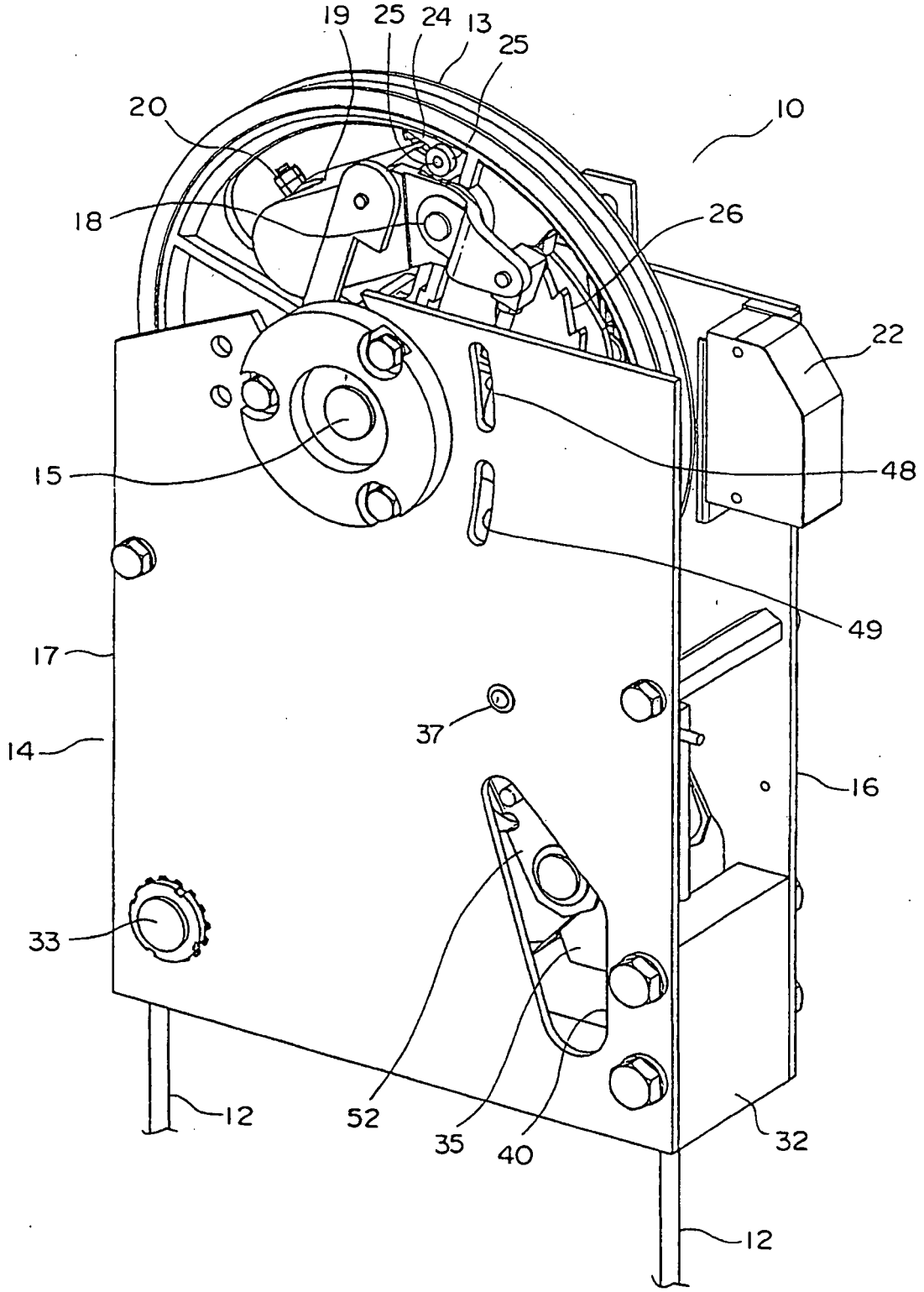


FIG. 4

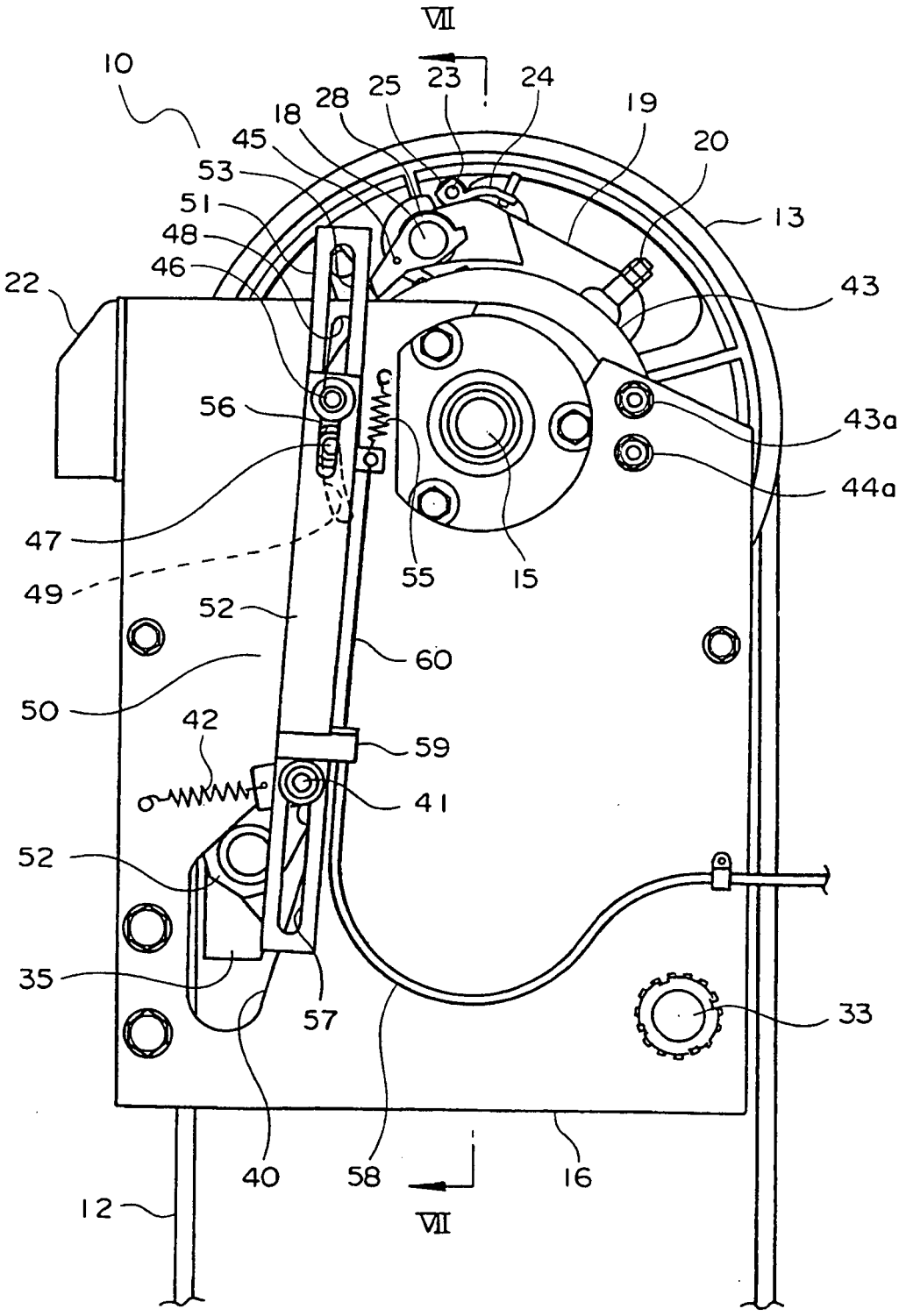

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FIG. 5

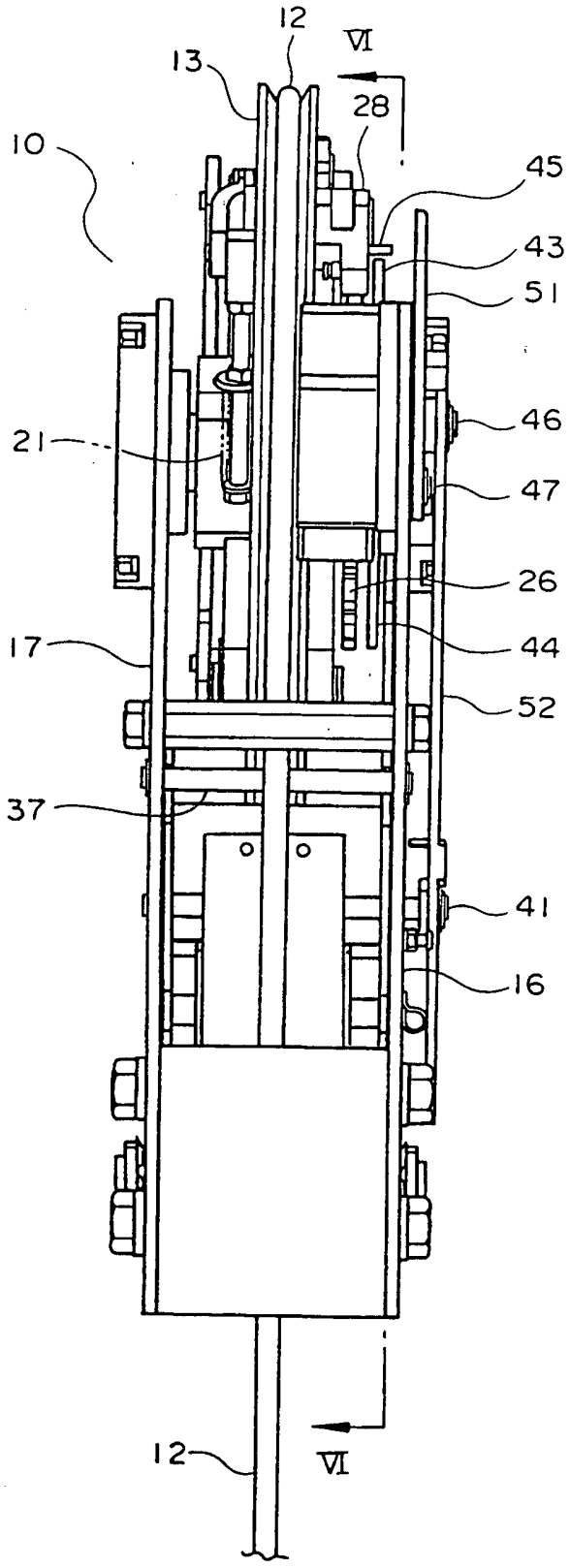


FIG. 6

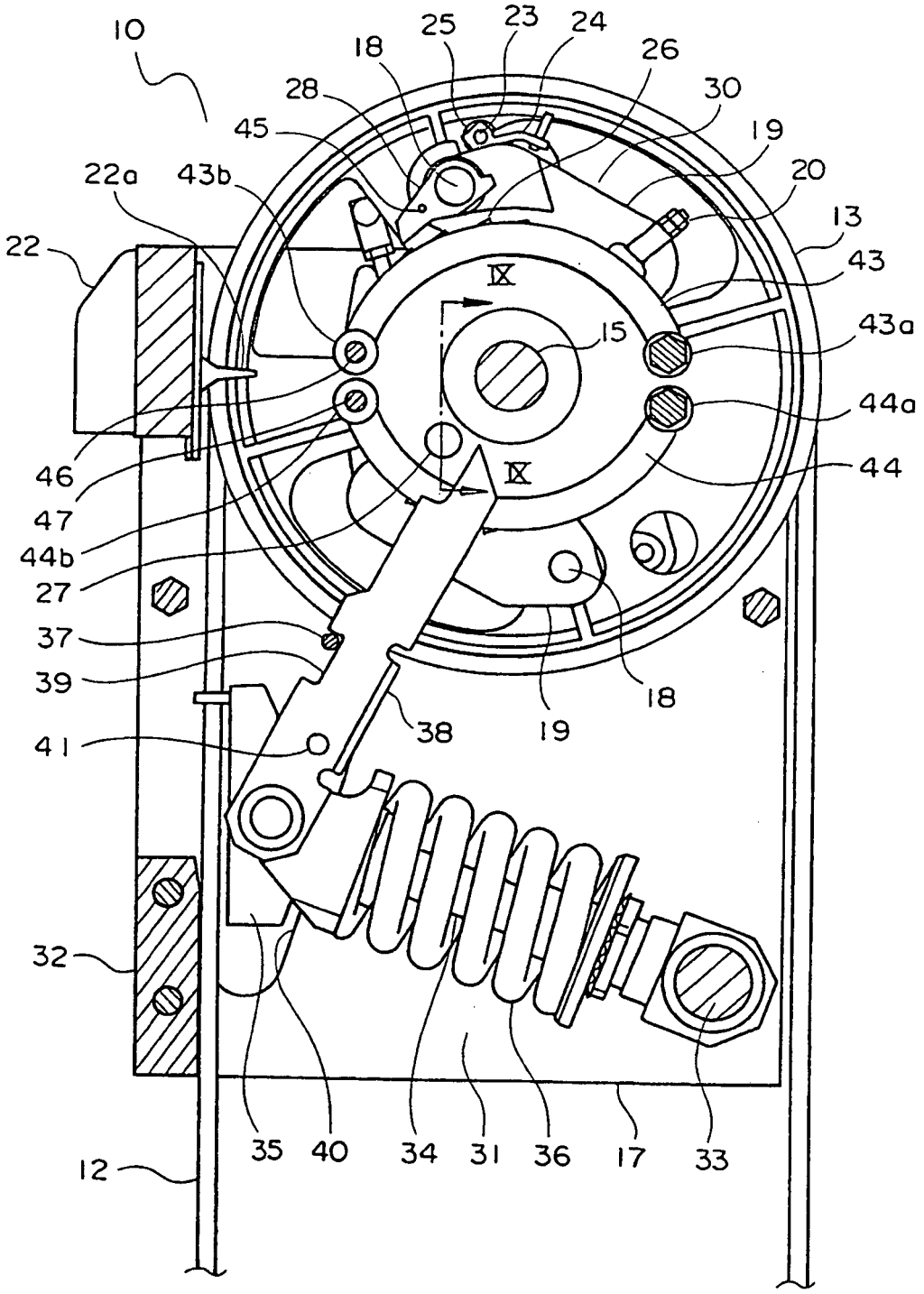

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FIG. 7

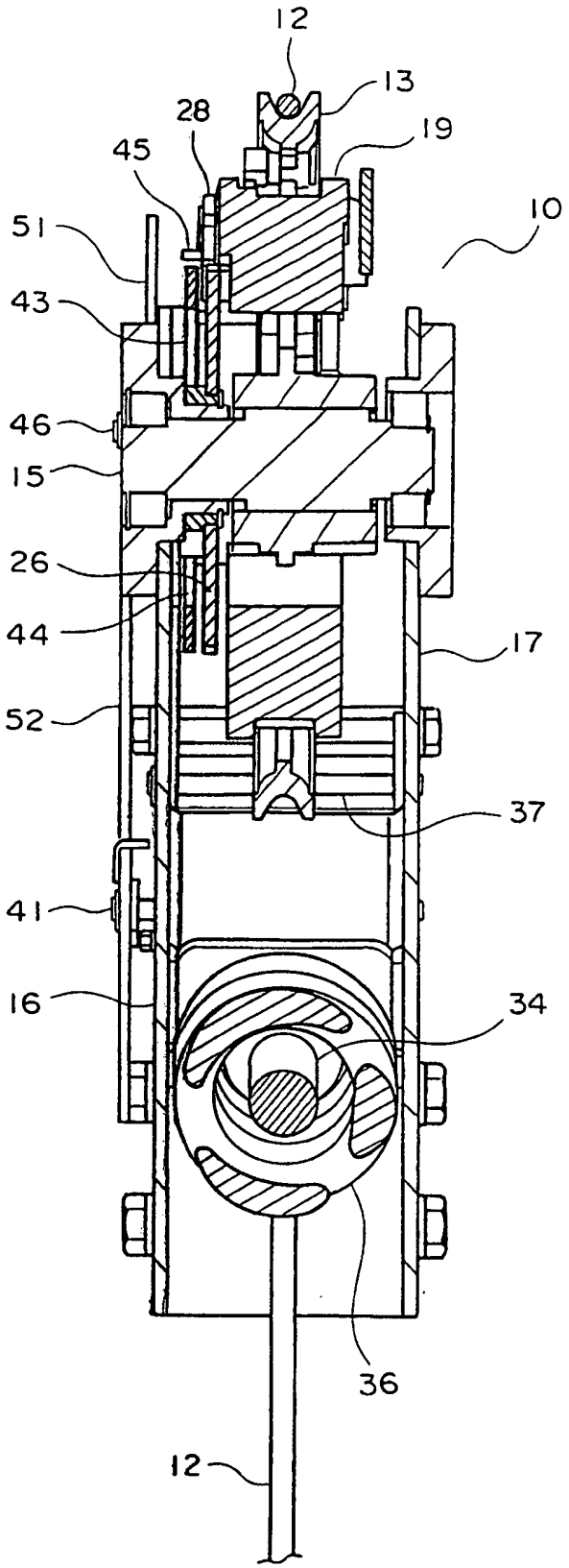


FIG. 8

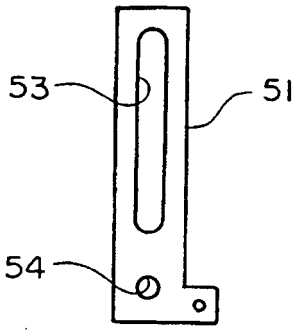


FIG. 9

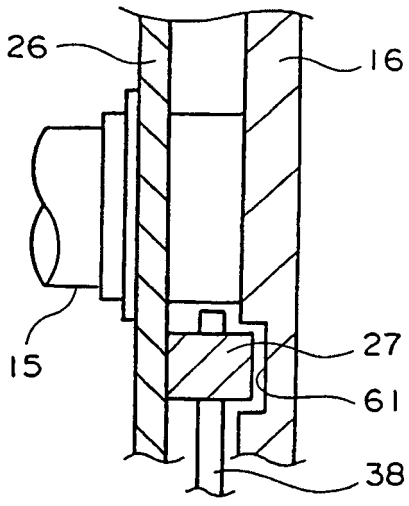


FIG.10

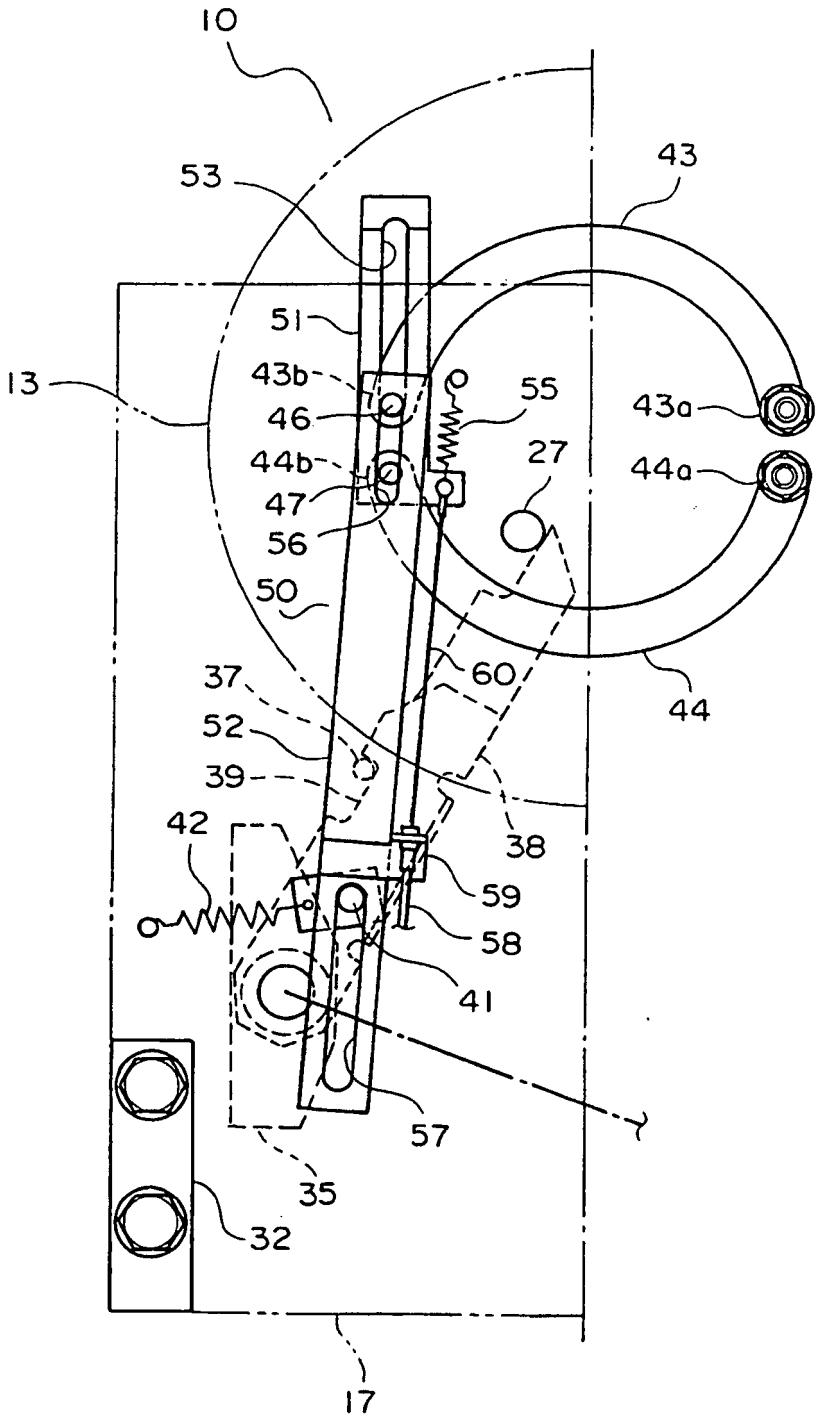

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FIG.11

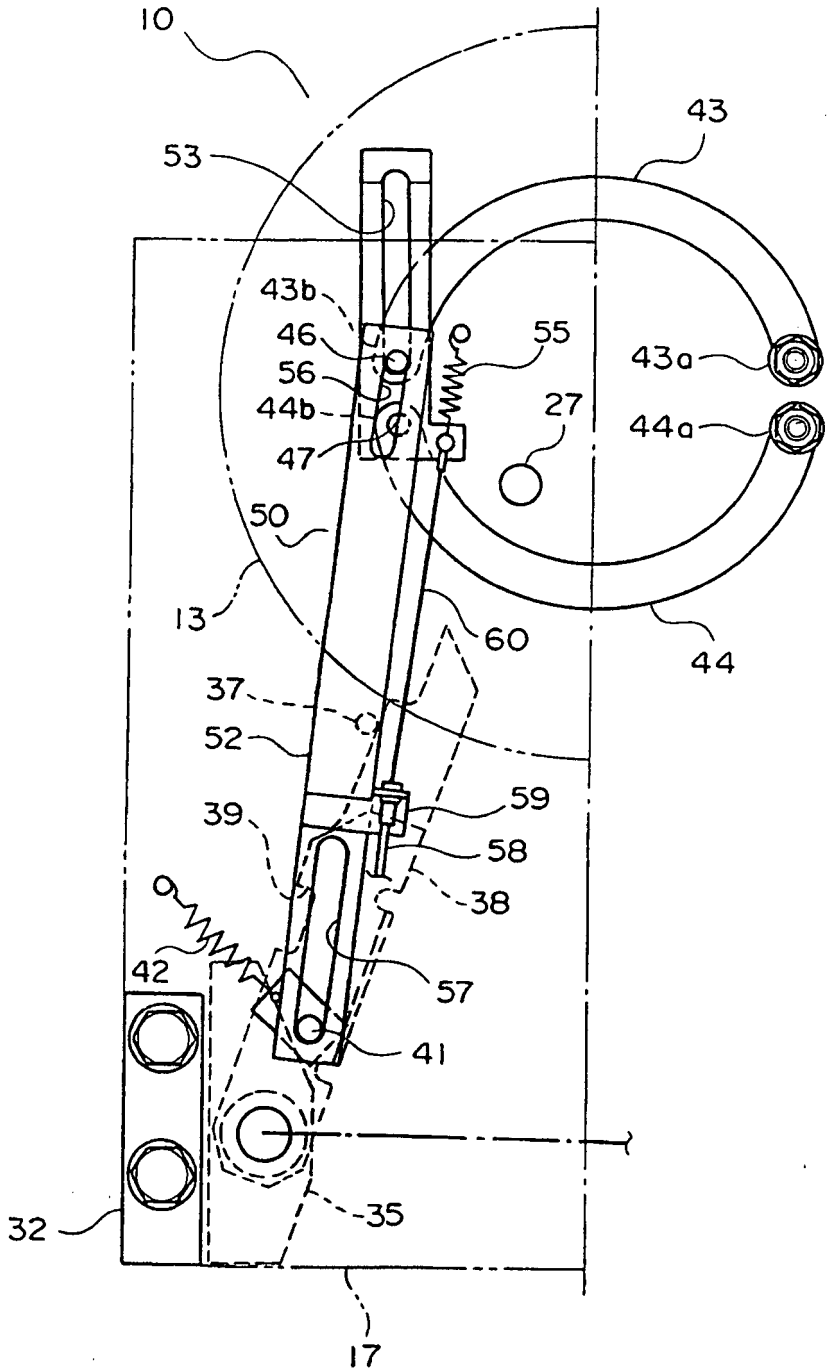

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FIG.12

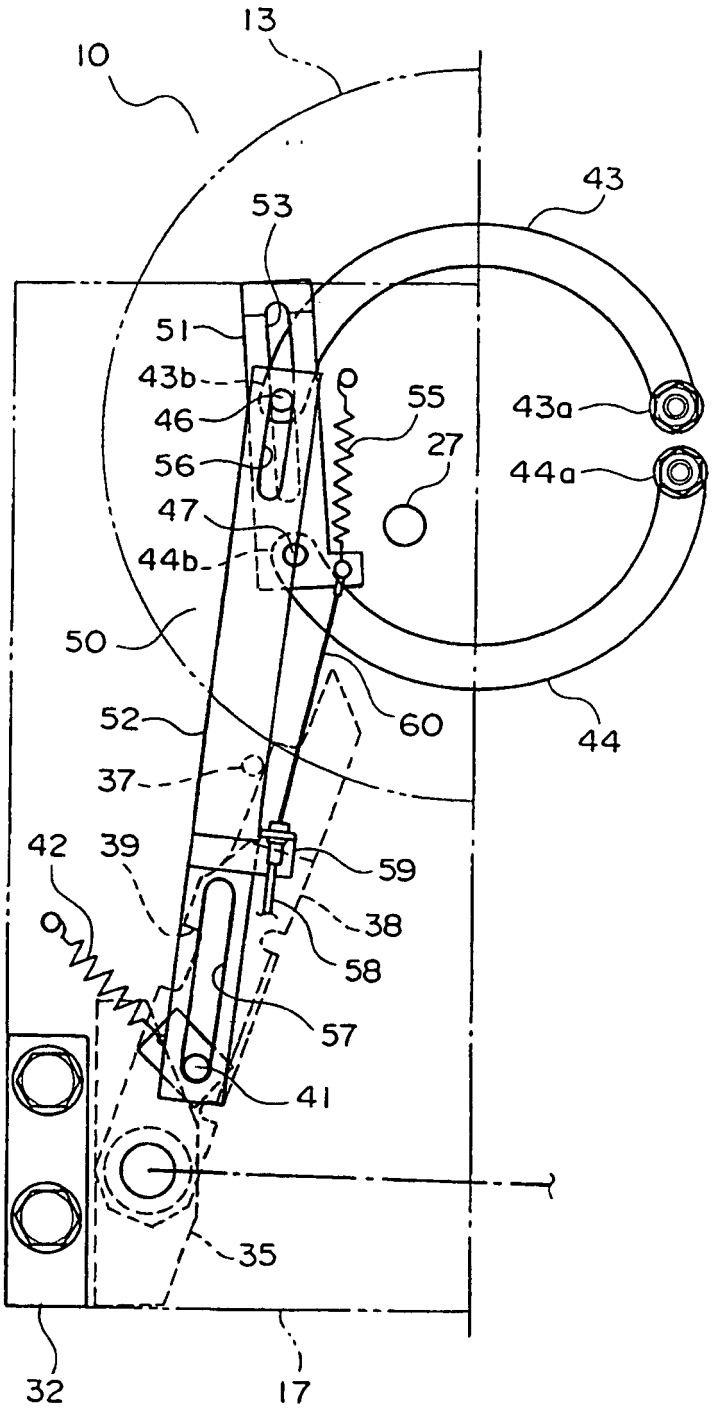

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FIG.13

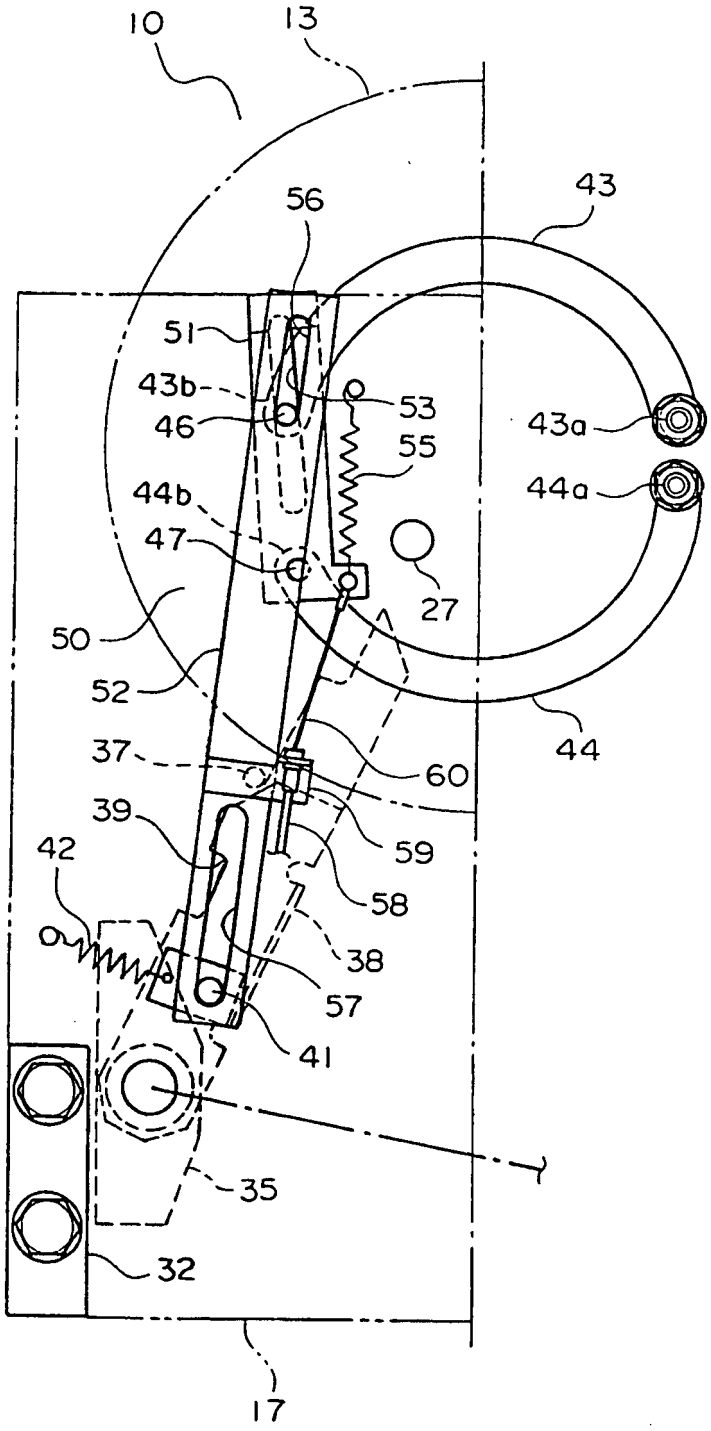

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FIG. 14

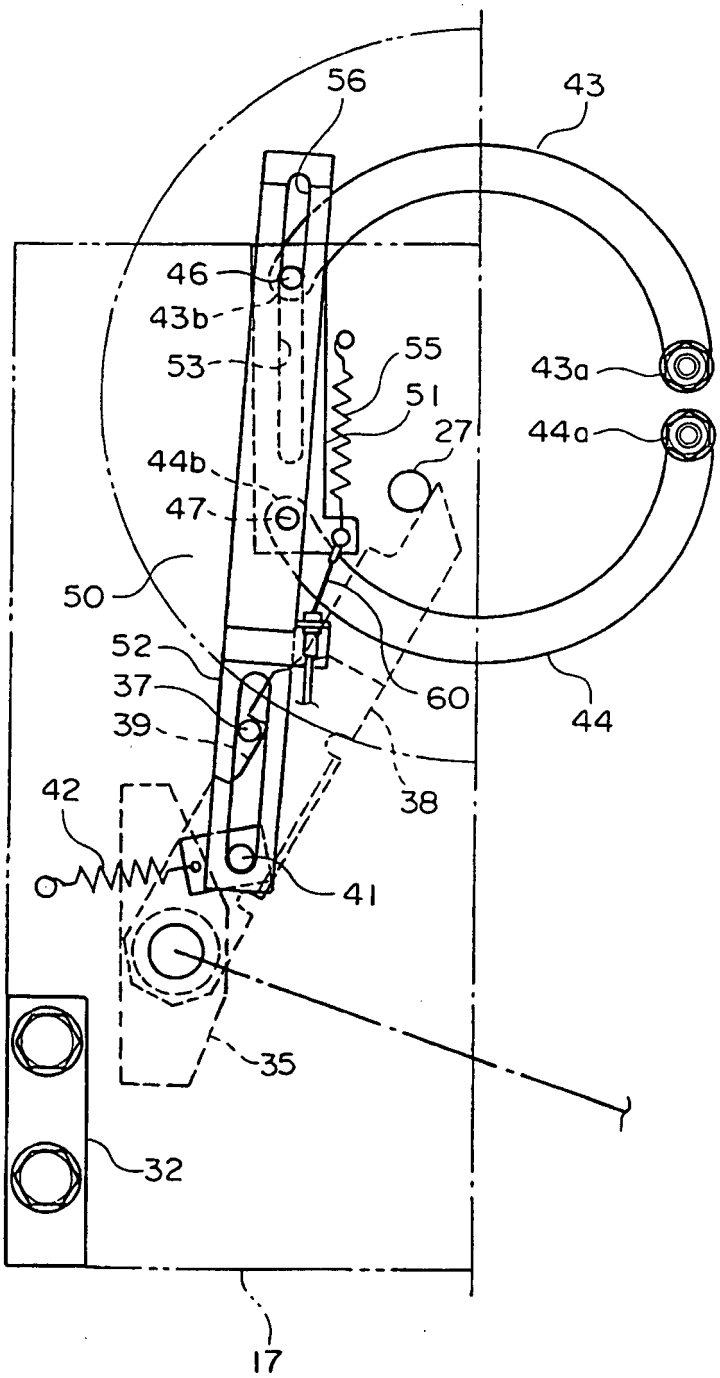

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FIG.15

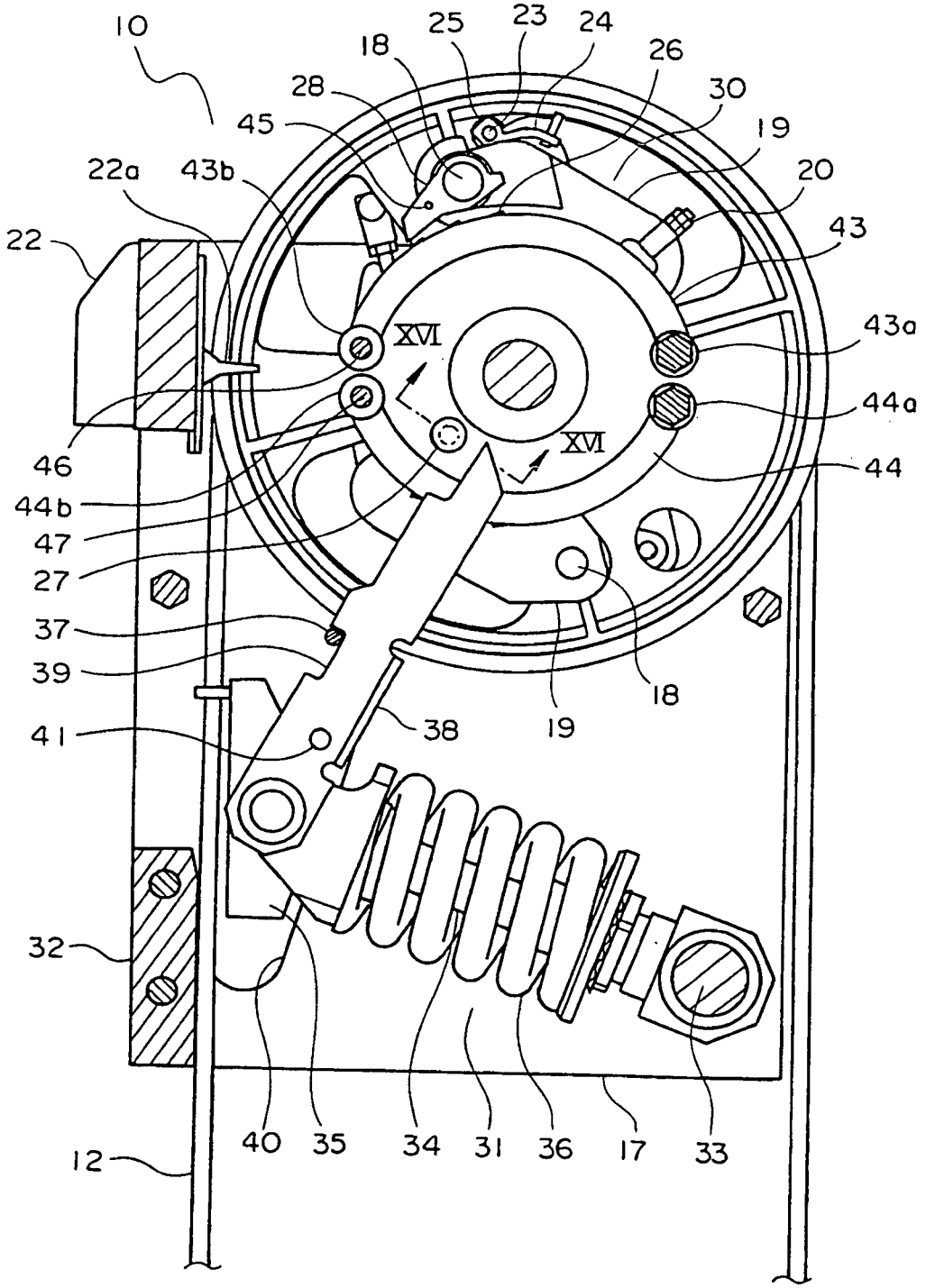

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FIG.16

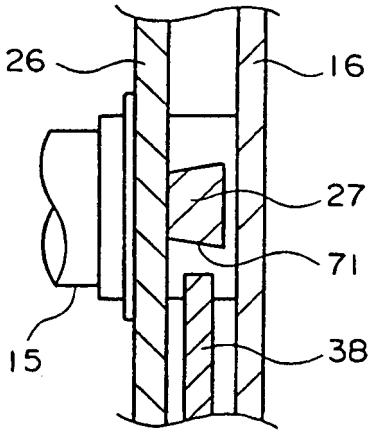
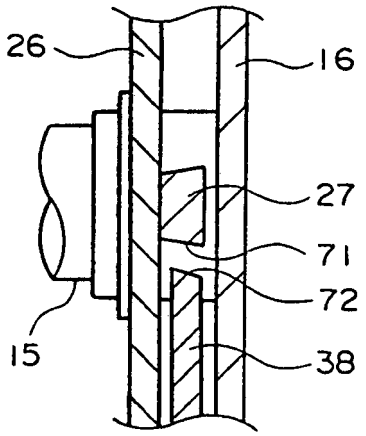


FIG.17



REFERENCES CITED IN THE DESCRIPTION

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- JP 2002370879 A **[0005]**