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(54) **Elevator apparatus**

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Ascenseur

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(56) References cited:

EP-A- 0 676 357	**EP-A- 0 878 430**
EP-A- 0 949 743	**WO-A-95/00432**
DE-C- 19 739 001	**US-A- 1 171 964**
US-A- 4 739 969	**US-A- 5 018 603**

- **Zeitschrift ''Lift Report'' (1998), Heft 1 (Januar/ Februar 1998), Seite 6 bis 13**
- **Zeitschrift ''Lift Report'' (1998), Heft 3 (Mai/Juni 1998), Seiten 46 bis 60.**
- **Skriptum ''Heilbronner Aufzugstage 10. und 11. März 1998, Vortrag von Dr. Ralf Gfrörer ,, Antriebsvariante ohne Getriebe und ohne Triebwerksraum'' gemäss D2 Lift Report Seite 47/48 und 56.**

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a small-size hoisting machine for an elevator apparatus.

[0002] Hitherto, elevator apparatus provided with hoisting machines which are required to be small-sized have been constructed as disclosed in JP-A-63-277190, J-B2-7-45315 and JP-A-9-506237, for example.

[0003] None of these prior art documents takes disassembling and assembling of the hoisting machine into consideration, and they all have the problem that a lot of labor and time is needed for disassembling and assembling.

[0004] US-A-5,018,603 discloses an elevator hoisting machine with the features included in the first part of claim 1. Similar machines are described in WO-A-95/00432 and in EP-A-0 949 743, which is an Article 54(3) EPC document.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is to provide an elevator hoisting machine which is easy to disassemble and assemble.

[0006] This object is achieved by the elevator hoisting machine defined in claim 1.

[0007] With the structure of the invention, the motor and the sheave can be assembled and disassembled as separate parts, so that the operation can be simple and exchange of the sheave or the like can be individually effected.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1 is a partially sectional view of a hoisting machine of an elevator apparatus of an embodiment of the present invention;

Fig. 2 is a front view of the hoisting machine shown in Fig. 1;

Fig. 3 is a perspective view showing an elevator apparatus according to the present invention;

Fig. 4 is a partially sectional view of an hoisting machine of an elevator apparatus of another embodiment of the present invention;

Fig. 5 is a front view showing an arrangement of practical device and apparatus of the elevator apparatus according to the present invention;

Fig. 6 is an enlarged plan view of Fig. 5; and

Fig. 7 is a partially sectional view of an hoisting machine of an elevator apparatus of another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0009] An embodiment of the present invention will be described hereunder, referring to Figs. 1 to 3.

[0010] A cage 3 is guided to be able to ascend and descend in an up and down direction by a pair of guide rails 2A, 2B for cage provided to be upright inside an elevator shaft 1 at a distance therebetween. The cage 3 has a cage door 3D for passengers and supports shafts of a pair of guide pulleys 4A, 4B on both width sides of a bottom of the cage. A main rope 5 is wound on the guide pulleys 4A, 4B and passes through the bottom of the cage 3. One end of the main rope 5 is supported, for example, on a beam 6 on the ceiling side of the elevator shaft 1.

[0011] Further, in the elevator shaft 1, a pair of counterweight guide rails 7A, 7B are provided uprightly with a distance therebetween in parallel to the cage guide rails 2A, 2B, and a counterweight 8 is guided thereby to be movable in a vertical direction. A shaft of a guide pulley 9 is supported to an upper portion of the counterweight 8, and the other end of the above-mentioned main rope 5 is wound on the guide pulley 9 and supported on the beam 6 on the ceiling side.

[0012] On the other hand, on an upper portion of the elevator shaft 1, a support rest 10 is mounted and a hoisting machine 11 is supported on the support base 10. The hoisting machine 11 has a sheave 26, and the sheave 26 winds thereon the main rope 5 led to the guide pulley 9 of the counterweight 8 through the guide pulleys 4A, 4B at the bottom of the cage 3.

[0013] Next, a concrete constitution of the hoisting machine 11 is explained. The hoisting machine 11 is fundamentally constructed on the base 12 fixed to the support rest 10. That is, a fixed frame 13 having a vertical plane 14 is provided on the base 12, and a fixed shaft 15 perpendicular to the vertical plane 14 and extending horizontally is cantilevered by the fixed frame 13. The fixed shaft 15 has a large diameter portion 15a at the side of the vertical plane 14 and a small diameter portion 15b at a free end side. A rotating frame 16 is rotatably supported on the small diameter portion 15b of the fixed shaft 15 through bearings 18A, 18B.

[0014] The rotating frame 16 is formed in a shape of cylinder with bottom or in a cup-shape by a disc-shaped bottom portion 17 and a peripheral wall 19 formed at the periphery thereof, and a bearing retaining portion 18 is formed at the center of the bottom portion 17. The rotating frame 16 is rotatably supported on the small diameter portion 15b of the fixed shaft 15 through the bearings 18A, 18B, whereby an bottom-having cylinder shaped opening side peripheral edge, that is, an opening side peripheral edge of the peripheral wall 19 is placed to be equally close to the vertical plane 14 of the fixed frame 13. It is desirable for stable rotation of the rotating frame 16 to arrange the bearings 18A, 18B at an axial interval therebetween. An outer peripheral surface 20 of the bear-

ing retaining portion 18 of the rotating frame 16 and inner and outer peripheral surfaces of the peripheral wall 19 each are formed concentrically with a shaft center of the fixed shaft 15.

[0015] The rotating frame 16, which is supported to be concentric with the fixed shaft 15 in this manner, supports a rotor 21 on the inner periphery of the peripheral wall 19. The rotor 21 can be formed by adhering a plurality of permanent magnet pieces on the inner periphery of the peripheral wall 19, or arranging a rotor core having a plurality of permanent magnetic pieces embedded therein on the inner periphery of the peripheral wall 19.

[0016] A stator 22 having a radial gap to the rotor 21 is fixed to the fixed frame 13. The stator 22 is composed of a stator core 23 formed by laminating silicon steel plates each having a hole at the center through which the above mentioned fixed shaft passes, and a stator winding 24 wound on the stator core 23. The stator 22 is fixed to the fixed frame 13 through a bracket 25.

[0017] An outer rotation type motor is composed of the rotor 21, the stator 22, the fixed frame 13 supporting the stator 22, the rotating frame 16 supporting the rotor 21 and the fixed shaft 15 supporting the rotating frame 16. Here, an outer diameter portion of the motor is an outer peripheral surface of the peripheral wall 19 of the rotating frame 16 supporting the rotor 21.

[0018] Further, the rotating frame has the sheave 26 fixed to an outer side of the bottom-having cylindrical bottom portion 17, that is, to the rotating frame 16 at an opposite side to the fixed frame 13. That is, the sheave 26 is fixed by utilizing the outer peripheral surface 20 of the bearing retaining portion 18 formed at the bottom portion 17 of the rotating frame 16 so as to be concentric with the fixed shaft 15. In this construction, since the rotating frame 16 forms a rotating portion of the motor, the sheave 26 is to be mounted on and fixed to the rotating portion of the motor. In order to make the motor small in size, the sheave 26 is formed so that rope grooves 26G are smaller in diameter than the outer diameter of the motor, that is, the outer peripheral surface of the peripheral wall 19 of the rotating frame 16. The sheave 26 is fixed to the rotating frame 17 by screwing bolts 27 into the bottom portion 17 of the rotating frame 16. Further, a mounting hole 28 is formed at a central portion of the sheave 26 so that the center of the mounting hole 28 is the same as the center of rope grooves 26G, and the diameter of the mounting hole 28 is formed in such size that the bearing retaining portion 18 can be inserted in the hole with a very small gap with the outer peripheral surface of the bearing retaining portion 18. Therefore, since the outer peripheral surface of the bearing retaining portion 18 is formed to be concentric with the shaft center of the fixed shaft 15, the center of the rope grooves 26G coincides with the shaft center of the fixed shaft 15 only by mounting the sheave 26G on the outer peripheral surface of the bearing retaining portion 18 of the rotating frame 16.

[0019] Further, the sheave 26 has the rope grooves 26 each formed in V-groove in order to secure necessary frictional force between the main rope 5 when the main rope 5 is wound on the sheave 26 and driven to ascend and descend the cage 3 and the counterweight 8. The sheave 26 is made of material which is a different kind from the rotating frame 16 and excellent in wear resistance so that it can be used for long time, irrespective of friction with the main rope 5.

[0020] Further, as for the sheave 26, if it has a function of winding the main rope 5 and driving it, its shape is not limited to a specific shape, for example, it can be formed in a cylindrical shape on the outer peripheral surface of which rope grooves 26G are cut.

[0021] In addition to the above-mentioned matters, a brake 29 is provided on the periphery of the peripheral wall 19 of the rotating frame 16. The brake 29 comprises a pair of brake arms 30A, 30B each one end of which is pivotally supported on the base 12, brake shoes 31A, 31B supported by shafts on intermediate portions of the brake arms 30A, 30B so as to face the outer peripheral surface of the peripheral wall 19, a pair of brake shafts 32A, 32B passing through the other ends of the brake arms 30A, 30B and facing each other , brake springs 33A, 33B provided so as to attract the brake shafts 32A, 32B and an electromagnet 34 operating so as to distract the brake shafts 32A, 32B against the brake springs 33A, 33B. By utilizing the peripheral wall 19 of the rotating frame 16 opposite to the brake shoes 31A, 31B as a rotating drum, a drum type brake is constructed.

[0022] The peripheral wall 19 of the rotating frame 16 also wears away in some degree by sliding in contact with the brake shoes 31A, 31B, however, since the sliding in contact with the peripheral wall 19 of the brake shoes 31A, 31B occurs right before the cage 3 sufficiently decreases in speed and stops, the wear amount is very small compared with that due to contact of the sheave 26 and the main rope 5. Therefore, exchanging time period of the peripheral wall 19 of the rotating frame 16 which is a rotating drum of the brake 29 is longer than the rope drum 26 is exchanged once every 5 to 10 years.

[0023] Further, a cylindrical member 35 extending concentrically with the fixed shaft 15 from the bottom portion 17 of the rotating frame 16 is provided in a space surrounded by the fixed frame 13 and the rotating frame 16. The cylindrical member 35 extends so as to cross the vertical plane 14 of the fixed frame 13 at right angles, and has a plurality of slits (not shown) distantly arranged in the circumferential direction thereof. A sensor 36 is supported on the fixed frame 13 so as to sandwich the slits of the cylindrical body 35 from both sides and detects speed of the motor.

[0024] Further, since the cylindrical member 35 and the sensor 36 should be free from dusts, a sealing portion is formed between the vertical plane 14 of the fixed frame 13 and an end of the peripheral wall 19 to prevent dust entrance. As a concrete structure of the sealing portion, a structure that prevents dust entrance by providing a seal body 37 sliding on any one of the vertical plane 14

and the peripheral wall 19 relative to the other, or a structure that prevents dust entrance by projecting a partition wall 14R from the side of the vertical plane 14 adjacent to the end of the peripheral wall 19 so as to oppose the whole periphery of the inner peripheral surface of the peripheral wall 19 with a small gap therebetween, are considered. However, the sealing body 37 and the partition wall 14R can be jointly used or only one of the sealing body 37 and the partition wall 14R can be used for prevention of dust entrance, according to a place and circumstance in which the elevator apparatus is installed.

[0025] In the above construction, since maintenance inspection of the brake 29 can be viewed from the outside by person's eyes, it is unnecessary to disassemble for effecting maintenance inspection. However, since the hoisting machine 11 is made small in size, maintenance inspection of the motor, sensor 36, etc. can not be effected without disassembling. However, according to the present embodiment of the present invention, the rotor 21 of the motor, the cylindrical member 35 and the sheave each fixed to the rotating frame 16 can be simultaneously taken off by extracting the rotating frame 16 from the fixed shaft 15 toward the opposite side to the fixed frame 13. After the rotating frame 16 is extracted from the fixed shaft 15, it is possible to effect maintenance inspection of the stator 22 of the motor and the sensor 36 fixed supported by the fixed frame 13 as they are, and parts can be exchanged if necessary. On the other hand, since cup-shaped inside of the extracted rotating frame 16 can be viewed by eyes, it is possible to effect maintenance inspection of the rotor 21 and the cylindrical member 35 and exchange of parts.

[0026] After the maintenance inspection, the rotating frame 16 is mounted on the fixed shaft 15 in turn reverse to the disassembling, whereby the operation is completed.

[0027] Further, the sheave 26 may slip in some cases relative to the main rope 5 due to wear of the rope grooves 26G in its use for a long time, in this case the sheave 26 should be exchanged. However, according to the present embodiment of the invention, a new sheave 26 is fixed, with the rope grooves 26G being concentric with the fixed shaft 15 by taking off the bolts 27 to withdraw the sheave 26 from the rotating frame 16, inserting the new sheave 26 using the outer peripheral surface 20 of the bering retaining portion 18 as a guide, and screwing the bolts 27 into the rotating frame 16.

[0028] In this manner, according to the present embodiment of the invention, it is possible to easily disassemble and assemble the hoisting machine 11 and alignment after assembling becomes simple, so that the working time for the disassembling and assembling can be shortened.

[0029] Fig. 4 shows another embodiment of the present invention. What is different from the previously described embodiment is a peripheral shape of the rotating frame 16, and the same reference numbers as in Figs 1 to 3 denote the same parts, so that repeated explanation thereof is omitted.

[0030] According to the present embodiment, a disc 38 crossing the fixed shaft 15 at right angles is formed on extension of the bottom portion 17 of the peripheral wall 19 of the rotating frame 16 and a well-known electromagnetic disc brake (not shown) is arranged so as to sandwich the disc 38, whereby a hoisting machine 11 with electromagnetic disc brake can be provided.

[0031] Further, instead of the disc 38, a disc 39 is formed on the opening side of the peripheral wall 19 of the rotating frame 16 and an electromagnetic disc brake (not shown) is arranged so as to oppose the disc 39, whereby the disc 39 becomes a reinforcing annular ring of thick thickness and it is possible to raise the rigidity of the peripheral wall 19 on the opening side, so that it is possible to make thin the thickness of the peripheral wall 19.

[0032] Next, Figs. 5 and 6 show an optimum arrangement of device and apparatus inside the elevator shaft. In Figs 5 and 6, the same reference numbers as in Figs. 1 to 3 denote the same parts and repeated explanation is omitted.

[0033] Inside the elevator shaft, a pair of cage guide rails 2A, 2B are vertically arranged at an interval on the both sides of the cages 3 in the width direction parallel with the cage door 3D. Further, guide pulleys 4A, 4B are supported by shaft on the bottom portion of the cage 3 at an interval in the same width direction, and the guide pulleys 4A, 4B are arranged on an opposite side to the cage door 3D with respect to the cage guide rails 2A, 2B.

[0034] In a space between the guide rail 4A side of the cage 3 and a side wall of the elevator shaft 1, a pair of counterweight guide rails 7A, 7B are vertically arranged at an interval along the direction of inlet outlet of the cage 3 and guide to ascend and descend the counterweight 8. Further, the pair of counterweight guide rails 7A, 7B are arranged, viewed it on plane, on an opposite side to the cage door 3D with respect to the cage guide rail 2A.

[0035] On the other hand, viewing it on plane, they are arranged so that a diameter-directional one end of the sheave 26 of the hoisting machine 11 overlaps or is adjacent to the end of the guide pulley 4A projecting outside from the side wall of the cage 3. The side face of the sheave 26 is arranged in parallel with the interval direction of the pair of counterweight guide rails 7A, 7B, and the other diameter-directional end is positioned on the side of the counterweight guide rail 7B.

[0036] On the upper portion of the counterweight 8, the guide pulley 9 is supported by shaft. The guide pulley 9 is arranged to incline against the interval direction of the counterweight guide rails 7A, 7B so that a diameter-directional end of the guide pulley 9 overlaps or is adjacent to the other diameter-directional end of the sheave 26.

[0037] In the above-mentioned relation to the cage 3, the counterweight 8, the respective guide pulleys 4A, 4B, 9 and the sheave 9 are arranged, so that they can be effectively installed in a narrow inside of the elevator shaft

1, and even if the hoisting machine is installed inside the elevator shaft 1, it is unnecessary to increase the area of the elevator shaft 1.

[0038] Each embodiment as described above is of the hoisting machine 11 using the outer rotation type motor in which the rotor 21 inside the rotating frame 16 is arranged on the outer diameter side of the stator 22, however, the same effect can be obtained even if an inner rotation type motor in which the rotor 21 is arranged on the inner diameter side of the stator 22 is used for the hoisting machine 11, as shown in Fig. 7.

[0039] In the case of the above-mentioned inner rotation type motor, the stator 22 is supported on the fixed frame 13 through a retaining member 22Y positioned on the outer diameter side of the stator 22, so that an outer diameter portion as the motor is an outer peripheral portion of the retaining member 22Y.

[0040] As mentioned above, a sheave of a hoisting machine used for an elevator apparatus according to the present invention is mounted on a rotating frame, which is one of rotating portion, supported by the fixed shaft. However, in the case where the motor of which the rotor is constituted on a rotating shaft is used for a hoisting machine, it also is considered to mount a sheave on the rotating shaft and fix it thereto, however, since the rotating shaft is small in diameter, it is troublesome in structure to detachably mount the sheave there, so that in such a case, it is necessary to detachably mount the sheave on a rotating portion of the motor other than the rotating shaft.

[0041] As explained above, according to the present invention, it is possible to provide an elevator apparatus provided with a hoisting machine in which disassembling and assembling can be easily carried out.

Claims

1. An elevator hoisting machine (11) for installation inside an elevator shaft (1) and having a sheave (26) for driving a rope (5) to cause an elevator cage (3) to ascend and descend, wherein
said sheave (26) is detachably mounted on a rotating portion (16) other than the shaft of a motor (21, 22) driving said sheave (26), said rotating portion (16) being rotatably supported on a fixed shaft (15) supported by a fixed frame (13),
said rotating portion (16) is cup-shaped with a bottom part (17) carrying said sheave (26) and having a central part (18) supported on said fixed shaft (15), and with its open end facing said fixed frame (13),
said fixed shaft (15) is cantilevered by said fixed frame (13),
said motor (21, 22) is disposed between said rotating portion (16) and said fixed frame (13), and
a drum type brake (29) is arranged to act on the peripheral wall (19) of said rotating portion (16),
characterised in that said motor (21, 22) has its rotor (21) arranged inside its stator (22).

2. The hoisting machine of claim 1, wherein said sheave (26) has a diameter smaller than the outer diameter of said motor (21, 22).

3. The hoisting machine of claim 1 or 2, wherein said sheave (26) and said rotating portion (16) are made of different materials.

4. The hoisting machine of any preceding claim, wherein said brake (29) and said motor (21, 22) axially overlap each other.

5. The hoisting machine of any preceding claim, wherein the bottom part (17) of said rotating portion (16) has an outer peripheral surface concentric with said fixed shaft (15), and said sheave (26) has a concentric mounting hole (28) fittable on the outer peripheral surface of said bottom part (17).

6. The hoisting machine of any preceding claim, wherein a sealing is provided between said fixed frame (13) and a peripheral portion (19) of said rotating portion (16) forming said open end.

7. The hoisting machine of any preceding claim, wherein said rotor (21) has permanent magnets (21) fixed to said rotating portion (16), and said stator (22) is mounted on said fixed frame (13).

Patentansprüche

1. Aufzug-Hebevorrichtung (11) zum Einbau in einen Aufzugschacht (1) mit einer Seilscheibe (26) zum Antrieb eines Seils (5) zum Anheben und Absenken eines Aufzugkorbs (3), wobei
die Seilscheibe (26) an einem von der Welle eines die Seilscheibe (26) antreibenden Motors (21, 22) verschiedenen rotierenden Teil (16) abnehmbar montiert und der rotierende Teil (16) auf einer von einem festen Rahmen (13) getragenen festen Achse (15) drehbar gelagert ist,
der rotierende Teil (16) becherförmig gestaltet ist und einen die Seilscheibe (26) tragenden Bodenabschnitt (17) sowie einen auf der festen Achse (15) gelagerten Mittelabschnitt (18) aufweist, wobei sein offenes Ende dem festen Rahmen (13) zugewandt ist,
die feste Achse (15) von dem festen Rahmen (13) auskragt,
der Motor (21, 22) zwischen dem rotierenden Teil (16) und dem festen Rahmen (13) angeordnet ist und eine an der Umfangswand (19) des rotierenden Teils (16) angreifende Trommelbremse (29) vorgesehen ist,
dadurch gekennzeichnet, daß der Rotor (21) des

Motors (21, 22) innerhalb von dessen Stator (22) angeordnet ist.

2. Hebevorrichtung nach Anspruch 1, wobei der Durchmesser der Seilscheibe (26) kleiner ist als der Außendurchmesser des Motors (21, 22).

3. Hebevorrichtung nach Anspruch 1 oder 2, wobei die Seilscheibe (26) und der rotierende Teil (16) aus unterschiedlichen Werkstoffen bestehen.

4. Hebevorrichtung nach einem der vorhergehenden Ansprüche, wobei die Bremse (29) und der Motor (21, 22) einander axial überlappen.

5. Hebevorrichtung nach einem der vorhergehenden Ansprüche, wobei der Bodenabschnitt (17) des rotierenden Teils (16) eine zu der festen Achse (15) konzentrische äußere Umfangsfläche hat und die Seilscheibe (26) ein auf die äußere Umfangsfläche des Bodenabschnitts (17) aufsetzbares konzentrisches Montageloch (28) aufweist.

6. Hebevorrichtung nach einem der vorhergehenden Ansprüche, wobei zwischen dem festen Rahmen (13) und einem das offene Ende bildenden Umfangsabschnitt (19) des rotierenden Teils (16) eine Dichtung vorgesehen ist.

7. Hebevorrichtung nach einem der vorhergehenden Ansprüche, wobei der Rotor (21) an dem rotierenden Teil befestigte Dauermagnete (21) aufweist und der Stator (22) an dem festen Rahmen (13) montiert ist.

Revendications

1. Machine de traction d'ascenseur (11) destinée à être installée à l'intérieur d'une cage d'ascenseur (1) et ayant une poulie (26) destinée à entraîner un câble (5) afin d'amener une cabine d'ascenseur (3) à monter et à descendre, dans laquelle ladite poulie (26) est montée de manière amovible sur une partie rotative (16) autre que l'arbre d'un moteur (21, 22) entraînant ladite poulie (26), ladite partie rotative (16) étant supportée à rotation sur un arbre fixe (15) supporté par un châssis fixe (13), ladite partie rotative (16) est en forme de coupelle, avec une partie inférieure (17) portant ladite poulie (26) et ayant une partie centrale (18) supportée sur ledit arbre fixe (15), et avec son extrémité ouverte faisant face audit châssis fixe (13), ledit arbre fixe (15) est en console sur ledit châssis fixe (13), ledit moteur (21, 22) est disposé entre ladite partie rotative (16) et ledit châssis fixe, un frein de type à tambour (29) est disposé pour agir sur la paroi périphérique (19) de ladite partie rotative (16),
caractérisé en ce que ledit moteur (21, 22) a son rotor (21) disposé à l'intérieur de son stator (22).

2. Machine de traction selon la revendication 1, dans laquelle ladite poulie (26) a un diamètre inférieur au diamètre extérieur dudit moteur (21, 22).

3. Machine de traction selon la revendication 1 ou 2, dans laquelle ladite poulie (26) et ladite partie rotative (16) sont fabriquées en des matériaux différents.

4. Machine de traction selon l'une quelconque des revendications précédentes, dans laquelle ledit frein (29) et ledit moteur (21, 22) se chevauchent axialement l'un l'autre.

5. Machine de traction selon l'une quelconque des revendications précédentes, dans laquelle la partie inférieure (17) de ladite partie rotative (16) a une surface périphérique extérieure concentrique par rapport à l'arbre fixe (15), et ladite poulie (26) a un orifice de montage concentrique (28) qui peut s'agencer sur la surface périphérique extérieure de ladite partie inférieure (17).

6. Machine de traction selon l'une quelconque des revendications précédentes, dans laquelle une étanchéité est réalisée entre ledit châssis fixe (13) et une partie périphérique (19) de ladite partie rotative (16) formant ladite extrémité ouverte.

7. Machine de traction selon l'une quelconque des revendications précédentes, dans laquelle ledit rotor (21) a des aimants permanents (21) fixés sur ladite partie rotative (16), et ledit stator (22) est monté sur ledit châssis fixe (13).

FIG.1

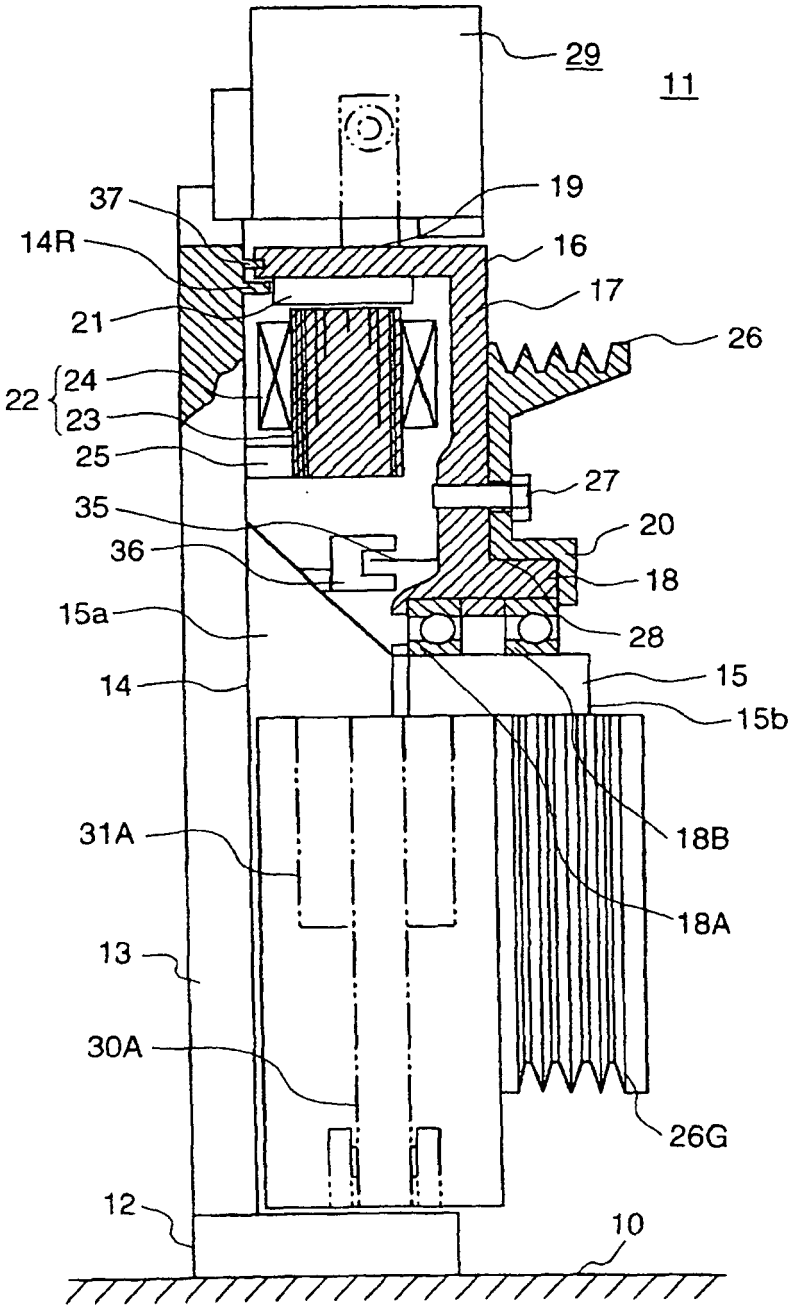

29
11
37
19
14R
16
17
21
26
22
24
23
25
27
35
20
36
18
15a
28
15
14
15b
18B
31A
18A
13
30A
26G
12
10

FIG.2

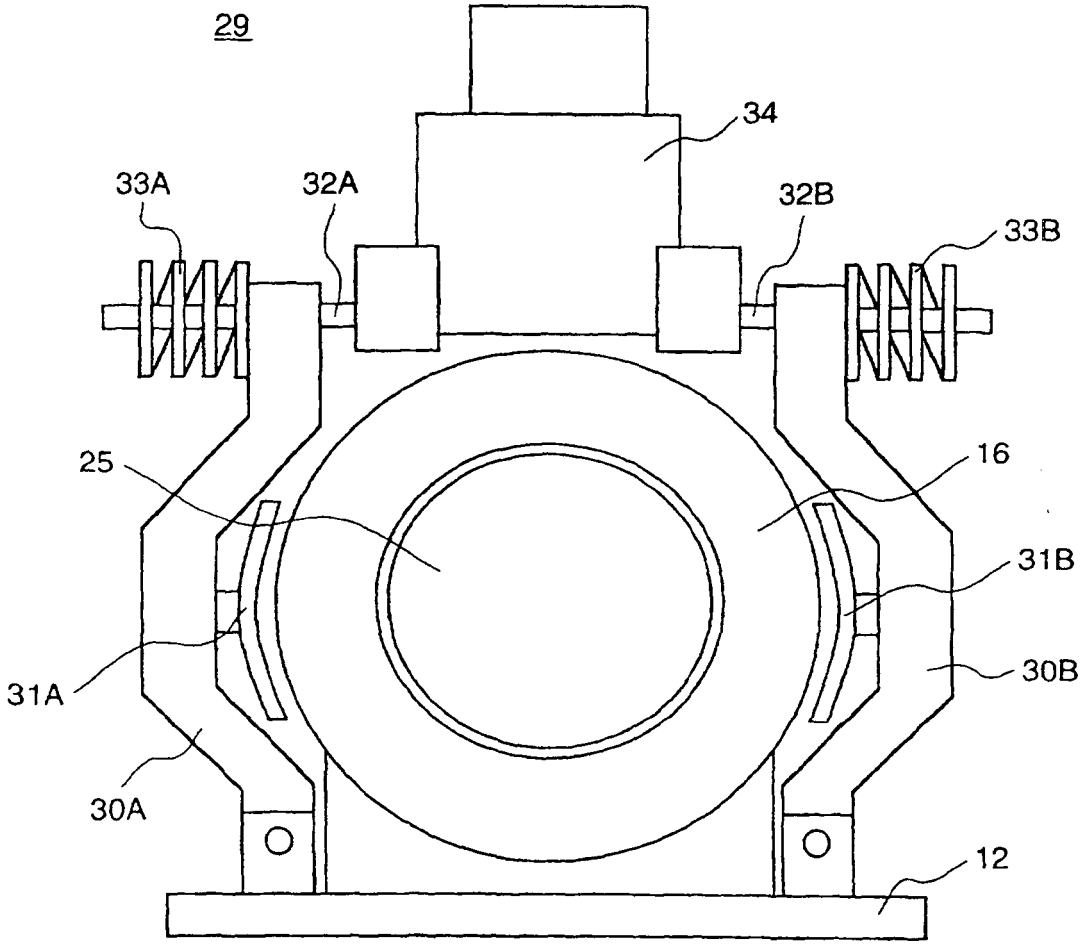


FIG.3

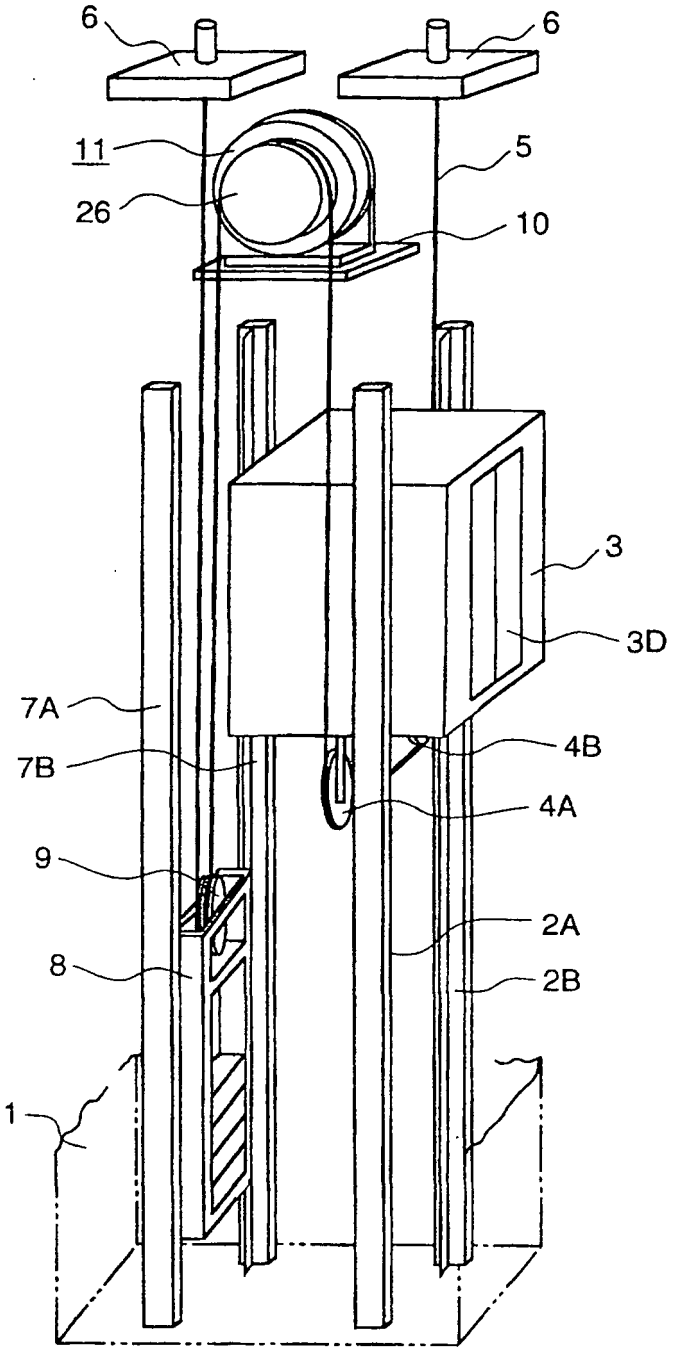


FIG.4

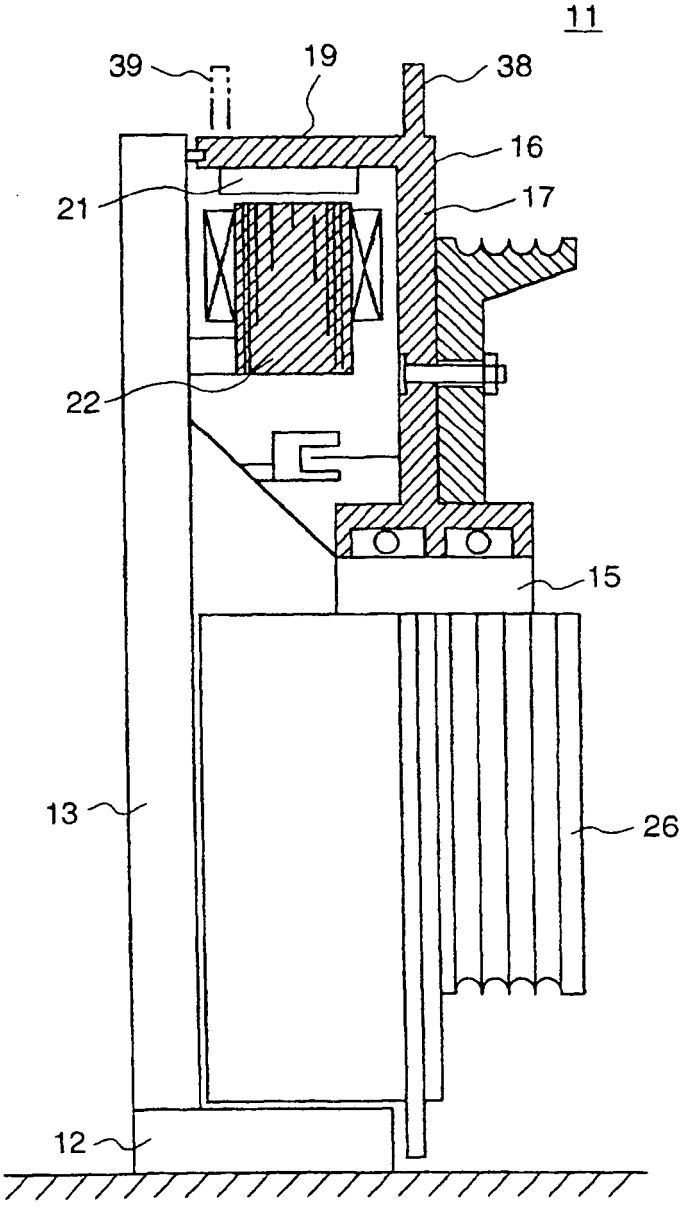


FIG.5

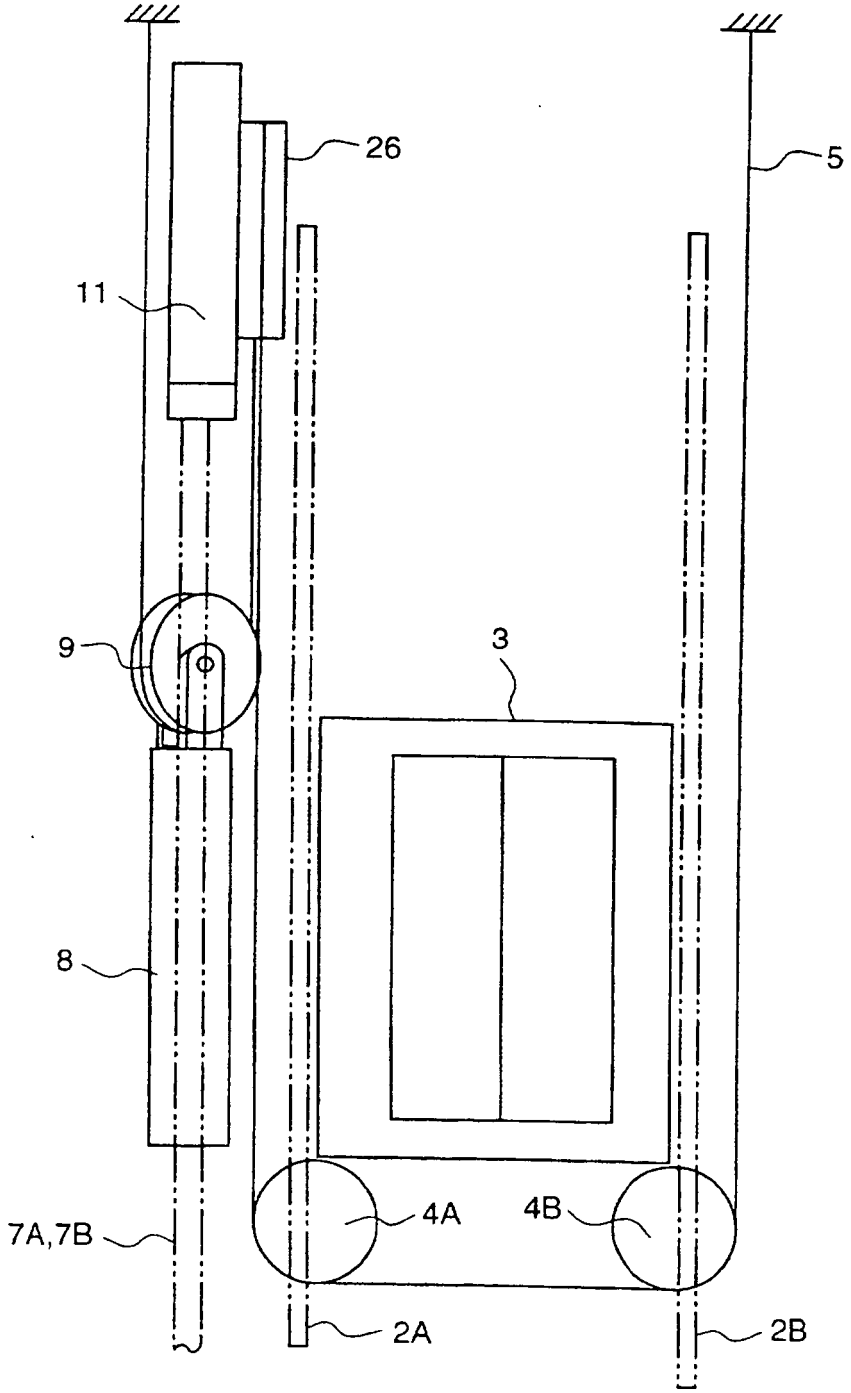


FIG.6

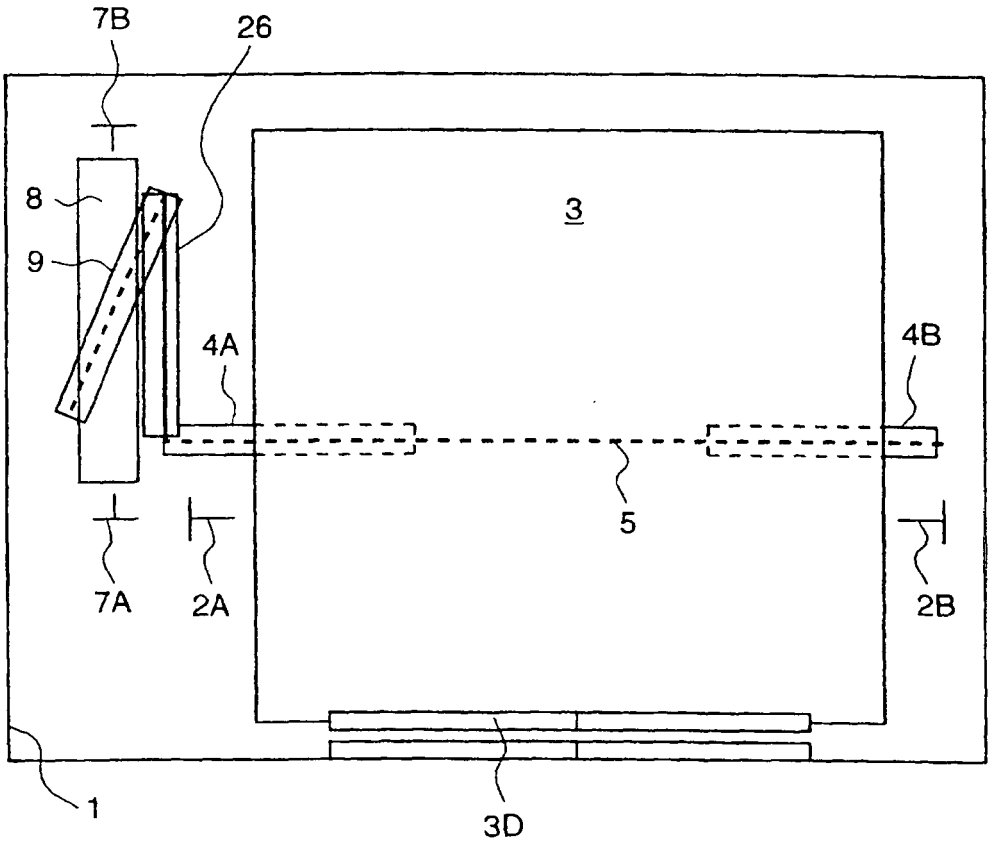
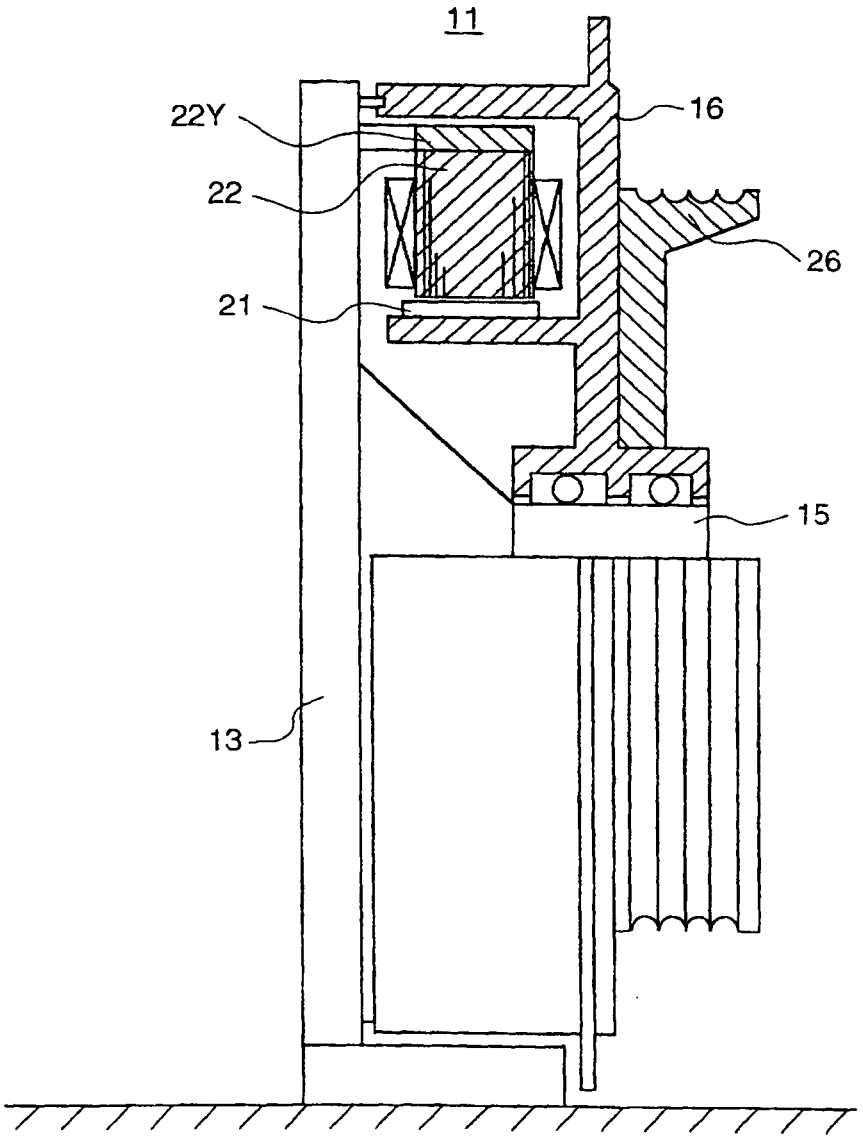


FIG.7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 63277190 A **[0002]**
- JP 7045315 B **[0002]**
- JP 9506237 A **[0002]**
- US 5018603 A **[0004]**
- WO 9500432 A **[0004]**
- EP 0949743 A **[0004]**