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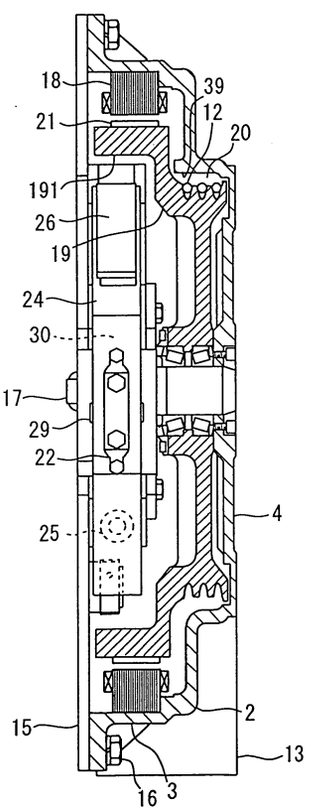
(54) Elevator traction machine

(57) An elevator traction machine comprises:

a base member (2);
a rotating member (19) having a central portion facing to the base member and an open peripheral portion extended from the central portion;
a sheave (20) rotating with the rotating member;
a rope (12) wound on the sheave;
a stator winding (18) provided on the interior circumferential surface of the base member;
an armature (21) provided on the outer circumferential surface of the open peripheral portion of the rotating member at a position larger in diameter than the outer diameter of the sheave; the armature facing the stator winding, the armature and the stator constituting an electric motor;
an encoder disposed on a main shaft for detecting the rotation of the sheave;

wherein an outer dimension of the main shaft in an axis direction is shorter than the outer dimension of the traction machine in a direction perpendicular to the axis direction.

Fig.2



EP 1 394 096 A1

Description

Background of the Invention

Field of the Invention

[0001] The present invention relates to an elevator traction machine comprising a frame having an electric motor and a sheave integrally provided therein.

Background Art

[0002] FIGS. 10 and 11 show a conventional elevator traction machine described in, for example, Japanese Patent Publication No. toku-hyo-hei 8-511758. FIG. 10 is a front view showing the traction machine when attached to an elevator guide rail, and FIG. 11 is a cross-sectional view taken along line A-A shown in FIG. 10. In the drawings, reference numeral 1 designates an elevator guide rail constructed in an upright position; 2 designates a ring-shaped recessed base member whose one side is open; 3 designates an opening edge by which the base member 2 is fixed to the guide rail 1; 4 designates a concave bottom of the base member 2 from which a main shaft 5 originates at right angles; and 6 designates a stator winding provided on the interior-side surface of the bottom 4 of the base member 2.

[0003] Reference numeral 7 designates a rotor rotatively supported on the main shaft 5. An armature 8 is provided on the surface of the rotor 7 facing the interior surface of the bottom 4 of the base member 2, with the stator winding 6 interposed between the armature 8 and the interior surface of the bottom 4 of the base member 2, thus constituting a disk-type electric motor. The outer peripheral edge of the rotor 7 facing the interior surface of the bottom 4 is formed into a brake disk 9. The portion of the rotor 7 on the side of the opening edge 3 of the base member 2 is formed into a sheave 10 whose diameter is smaller than that of the brake disk 9. Reference numeral 11 designates an electromagnetic brake which is disposed outside the outer peripheral edge of the base member 2 and which applies pressing force against the brake disk 9, to thereby brake the rotor 7. Reference numeral 12 designates a main cable wound around the sheave 10. Although not shown in the drawings, one end of the main cable 12 is connected to a car, and the other end of the same is connected to a counterweight.

[0004] The conventional elevator traction machine is constructed in the manner as mentioned above and is attached to the back of the guide rail 1 at a position close to the upper end of a shaft (not shown). The main cable 12 is wound around the sheave 10 and is actuated by means of frictional force stemming from the rotation of the sheave 10, thereby moving the car and the counterweight in opposite directions.

[0005] In the case of such a conventional elevator traction machine, the electromagnetic brake 11 is disposed so as to protrude from the outside of the base member 2, thus increasing the outer dimension of the traction machine. Further, since the electromagnetic brake 11 requires maintenance and inspection, a space for maintenance purpose must be ensured. Thus, the traction machine requires a wide space, which in turn imposes a limitation on installation of the traction machine or poses a difficulty in installing the traction machine.

Summary of the Invention

[0006] The present invention has been conceived to eliminate such a drawback of the conventional elevator traction machine and is aimed at providing an elevator traction machine that can be readily installed in a narrow space. Such an elevator traction machine is described in claim 1 with a preferred embodiment being described in claim 2.

[0007] According to a preferred embodiment, an elevator traction machine comprises a circularly-recessed base member having an opening edge. A main shaft is provided within the base member and originates from the center of the concave bottom of the base member at right angle. A circularly-recessed rotating member is provided within the base member in a fitting manner with the bottom surface thereof opposing the bottom surface of the base member, and the circularly-recessed rotating member is supported rotatively on the main shaft at the center thereof. A sheave is formed on the outer circumferential surface of the circularly-recessed member. A stator winding is provided on the interior circumferential surface of the base member. An armature is provided on the outer circumferential surface of the circularly-recessed member, and the armature opposes the stator winding. :The armature and the stator constitute an electric motor. A brake surface is formed along the interior circumferential surface of the circularly-recessed rotating member. Further, a brake is disposed within the circularly-recessed member, the brake opposing the brake surface, the brake having brake pieces for applying brake force to the brake surface.

[0008] In another aspect of the present invention, in the elevator traction machine, a support plate is attached to the opening edge of the base member to thereby constitute a space between the base member, and the support plate supports one end of the main shaft.

[0009] Other and further objects, features and advantages of the invention will appear more fully from the following description.

Brief Description of the Drawings

[0010]

FIG. 1 is a front view of an elevator traction machine according to a first embodiment of the present in-

vention.;
FIG. 2 is a cross-sectional view taken along line B-B shown in FIG. 1;
FIG. 3 is a view similar to FIG. 2, showing the configuration of an encoder provided in the traction machine shown in FIG. 1;
FIG. 4 is a rear side view of FIG. 1, showing a brake structure of the elevator traction machine from which a base member and a ring-shaped recessed rotating member are removed;
FIG. 5 is a perspective view of the base member when the traction machine shown in FIG. 1 is viewed from the back;
FIG. 6 is a perspective view of a main cable latch shown in FIG. 3;
FIG. 7 is a front view showing an elevator traction machine according to a second embodiment of the present invention;
FIG. 8 is a left-side view of the traction machine shown in FIG. 7, showing the support plate when pivotally moved about a hinge;
FIG. 9 shows an elevator traction machine according to a third embodiment of the present invention, while the support plate, the brake and the circularly-recessed rotating member are removed;
FIG. 10 is a front view showing a conventional elevator traction machine when attached to an elevator guide rail; and
FIG. 11 is a cross-sectional view taken along line A-A shown in FIG. 10.

Detailed Description of the Preferred Embodiments

First Embodiment

[0011] FIGS. 1 through 6 show an elevator traction machine according to a first embodiment of the present invention. Specifically, FIG. 1 is a front view of an elevator traction machine according to the first embodiment; FIG. 2 is a cross-sectional view taken along line B-B shown in FIG. 1; FIG. 3 is a view similar to FIG. 2, showing the configuration of an encoder provided in the traction machine shown in FIG. 1; FIG. 4 is a rear side view of FIG. 1, showing a brake structure of the elevator traction machine from which a base member and a ring-shaped recessed member are removed; FIG. 5 is a perspective view of the base member when the traction machine shown in FIG. 1 is viewed from the back; and FIG. 6 is a perspective view of a main cable latch shown in FIG. 3.

[0012] In the drawings, reference numeral 2 designates a circularly-recessed base member whose one side is open; 3 designates an opening edge of the base member 2; 4 designates a circular concave bottom portion of the bese member 2; 13 designates legs formed at a lower portion of the base member 2; and 14 designates main cable pathways which are formed so as to pass through the respective legs 13, which communicate with the recessed portion of the base member 2, and will be described later. Reference numeral 15 designates a support plate. The longitudinal direction of the support plate 15 is disposed vertically, and both ends are secured to the opening edges 3 of the base member 2. Reference numeral 16 designates fastener tools such as bolts to be inserted into the opening edge 3 and to be screwed into the support plate 15.

[0013] Reference numeral 17 designates a main shaft which originates from the bottom portion 4 of the base member 2 at right angles. The two respective ends of the main shaft 17 are supported at the center of the support plate 15 and at the center of the bottom portion 4 of the base member 2. The main shaft 17 is arranged so as to extend across a space, formed from the support plate 15 and the base member 2, in which there are disposed a circularly-recessed member and a brake, both of which will be described later. Reference numeral 18 designates a stator winding provided on the interior circumferential surface of the opening edge 3 of the base member 2.

[0014] Reference numeral 19 designates a circularly-recessed rotating member which is fitted into the base member 2 such that the bottom surface of the circularly-recessed member 19 opposes the bottom surface 4 of the base member 2. Further, the center of the circularly-recessed member 19 is rotatably supported by the main shaft 17 by means of bearings. Reference numeral 20 designates a sheave formed on the exterior circumferential surface in the vicinity of the bottom surface of the circularly-recessed member 19. Reference numeral 21 designates an armature provided on the exterior circumference of the circularly-recessed member 19 and whose diameter is greater than the outer diameter of the sheave 20 formed at the opening side. The armature 21 is disposed opposite the stator winding 18, thereby constituting an electric motor.

[0015] Reference numeral 22 designates a brake comprising an electromagnetic brake disposed within the circularly-recessed member 19. The brake 22 comprises brake arms 24, each of which is pivotally supported at one end thereof by means of a support pin 23 at the support plate 15; a brake springs 25 whose respective ends are connected to the support plate 15 and to the pivotal ends of the brake arms 24; brake pieces 26, each of which is disposed close to the corresponding support pins 23 and comprises a brake shoe opposing a brake surface 191 formed along the interior circumferential surface of the edge of the opening of the circularly-armed member 19; retainers 28, each of which comprises, as a primary member, a screw rod to be inserted into the corresponding brake arms 24 and retains the brake piece 25 by way of a spherical seat 27; and an electromagnet mechanism 30 which is attached to the support plate 15 on one hand and is joined on other hand to an intermediate portion of each of the brake arms 24 in the longitudinal direction thereof by means of joint pins 29.

[0016] In the brake 22, the pairs of brake arms 24,

brake springs 25, brake pieces 26, and electromagnet mechanisms 30 are arranged symmetrically with respect to the main shaft 17.

[0017] Reference numeral 12 designates a main cable wound around the sheave 20. Although not shown in the drawing, one end of the main cable 12 is connected to a car, and the other end of the main cable 12 is connected to a counterweight. Reference numeral 31 designates an encoder disposed in the vicinity of the end of the main shaft 17. The encoder 31 comprises detectors 32 attached to the support plate 15 and an actuation plate 33 which is connected to the circularly-recessed member 19 and rotates together with the circularly-recessed member 19.

[0018] Reference numeral 34 designates inspection holes formed so as to pass through the base member 2. The inspection holes 34 oppose the rim surface of the sheave 20 and are spaced apart from each other in the circumferential direction of the sheave 20. Reference numeral 35 designates main cable latches fitted to the respective inspection holes 34. A fastening section 36 is formed at on one side of the main cable latch 35, and the main cable latch 35 is fastened to the edge of the inspection hole 34 by means of mount screws 37. Further, an opposing surface 38 is formed in the main cable latch 35 and is disposed opposite the main cable 12 wound around the sheave 20, with a narrow clearance formed therebetween. (The inspection holes 34 should appear in Fig. 2 but not shown for brevity.)

[0019] The elevator traction machine having the foregoing configuration is primarily mounted on a mount within the shaft. The main cable 12 is inserted into the main cable pathways 14 and is wound around the sheave 20. The sheave 20 is rotated by means of the electric motor comprising the stator winding 18 and the armature 21. The main cable 12 is actuated by means of a frictional force, and the car and the counterweight are vertically moved in opposite directions.

[0020] In the configuration shown in FIGS. 1 through 6, the sheave 20 is integrally formed with the circularly-recessed member 19 on which the armature 21 is provided as a rotor. Further, the brakes 22 is provided for pressing the brake pieces 26 against the brake surface 191 formed along the interior circumferential surface of the opening edge of the circularly-recessed member 19.

[0021] The circularly-recessed member 19, constituting the drive sheave 20 and the rotor of the electric motor, and the brake 22 are disposed within the space defined by the base member 2 and the support plate 15. As a result, the outer dimension of the elevator traction machine can be diminished, and the elevator traction machine can be made compact.

[0022] Inspection and maintenance on the brakes 22 can be performed by way of the space communicating with the inspection holes 34 formed in the circularly-recessed member 19. Consequently, the space required for installing the traction machine and the space required for performing maintenance and inspection can be reduced, so that the elevator traction machine can be readily installed in a narrow space. Accordingly, there can be eliminated a problem of a limitation imposed on installation of the elevator traction machine and a difficulty in installing the elevator traction machine.

[0023] The stator winding 18 and the armature 21 are disposed along the opening edge 3 of the base member 2 . By virtue of such a configuration, the electric motor can be readily inspected by removal of the support plate 15, thus improving the efficiency of maintenance.

[0024] Further, the brakes 22 are attached to the support plate 15, and hence the brakes 22 can be easily removed from the base member 2 in conjunction with the support plate 15, thus enabling easy inspection of the brakes 22 and an improvement in the efficiency of maintenance.

[0025] The encoder 31 is disposed at the portion of the end of the main shaft 17 close to the support plate 14. Therefore, the space between the support plate 15 and the base member 2 can be effectively utilized, thus preventing the encoder 31 from projecting from the traction machine. The traction machine can be made compact by reducing the outer dimension. Consequently, the space required for installing a traction machine and a space required for performing maintenance and inspection on the traction machine can be reduced, thus facilitating installation of the elevator traction machine.

[0026] The condition of the main cable 12 wound around the sheave 20 can be inspected by way of the inspection holes 34. Further, the main cable latches 35 attached to each of inspection holes 34 can prevent occurrence of a problem of the main cable 12 loosening and coming off the cable grooves formed in the sheave 20.

[0027] Since the base member 12 has the legs 13, the traction machine can be mounted within the shaft by means of a simple configuration. Further, the traction machine can be mounted such that vibrations of the traction machine are isolated by means of a simple configuration; for example, by means of attaching rubber isolators to the legs 13. The main cable 12 is inserted into the main cable pathways 14 formed in the legs 13 of the base member 2 and is wound around the sheave 20. The main cable 12 can be protected without the need for providing protectors to the entrance and exit of the base member 2, respectively. By means of such a simple configuration, there can be prevented damage to the main cable 12, which would otherwise be caused when a foreign article comes into contact with the main cable 12 at either the entrance or exit of the base member 2.

[0028] At the time of vertical travel of the car, the electromagnet mechanism 30 of the brake 22 is energized, and the brake pieces 26 are retained in their receded positions against the pressing force of the brake spring 25, thereby releasing the circularly-recessed member 19; i.e., the sheave 20, from a braked state. In contrast, at the time of stopping of the car, the electromagnet mechanism 30 of the brake 22 is de-energized, so that

the brake spring 5 presses the brake pieces 26 against the brake surface 191 formed along the interior circumferential surface of the opening edge of the circularly-recessed member 19, thus braking the sheave 20.

[0029] As shown in FIG. 4, provided that the pressing force of the brake spring 25 is taken as C and the pressing force of the brake pieces 26 is D, the moment centered on the support pin 23 is expressed by CxL1=DxL2. Further, D>C can be induced from the relationship L1>L2.

[0030] Since the pressing force C of the brake spring 25 can be made smaller than the pressing force D of the brake pieces 26, the brake springs 25 can be made compact. Accordingly, the brake 22 can be efficiently housed within the circularly-recessed member 19.

Second Embodiment

[0031] FIGS. 7 and 8 show an elevator traction machine according to a second embodiment of the present invention. FIG. 7 is a front view showing an elevator traction machine of the second embodiment, and FIG. 8 is a left-side view of the traction machine shown in FIG. 7, showing the support plate when pivotally moved about a hinge. The remaining portions of the elevator traction machine of the present embodiment other than those illustrated in FIGS. 7 and 8 are constructed in the same manner as shown in FIGS. 1 through 6. In the drawings, those reference numerals which are the same as those provided in FIGS. 1 through 6 designate corresponding elements.

[0032] Reference numeral 15 designates a support plate, which is comprised of a pivotal plate 151, a stationary plate 152 and a hinge 153. The pivotal plate 151 is connected to the hinge 153 and is removably fastened to the upper portion of the opening edge 3 of the base member 2. The pivotal plate 151 has the brake 22 mounted thereon. The stationary plate 152 is attached to the lower portion of the opening edge 3 of the base member 2. The hinge 153 is provided at a position where a portion of the pivotal plate 151 opposes a portion of the stationary plate 152 and connects them together in a pivotable manner.

[0033] In the elevator traction machine of the foregoing configuration, the sheave 20 is integrally formed with the circularly-recessed member 19 having the armature 21 provided thereon. Further, there is provided the brake 22 for pressing the brake pieces 26 against the brake surface 191 formed along the interior circumferential surface of the opening edge of the circularly-recessed member 19. Although not described in detail, the elevator traction machine of the second embodiment shown in FIGS. 7 and 8 yields the same working-effect as that yielded in the first embodiment shown in FIGS. 1 through 6.

[0034] In the embodiment shown in FIGS. 7 and 8, the pivotal plate 151 which has the brake 22 mounted thereon and constitutes an upper portion of the support plate 15 is pivotally attached to the stationary plate 152 by means of the hinge 153. As shown in FIG. 8, the pivotal plate 151 released from the base member 2 is pivotally moved about the hinge 153, thus bringing the brake 22 into an exposed state. In this state, the maintenance and inspection on the brake 22 is performed. Thus, maintenance can be readily performed on the brake 22 or a like component, thus contributing to the efficiency of maintenance operation.

Third Embodiment

[0035] FIG. 9 shows an elevator traction machine according to a third embodiment of the present invention. FIG. 9 is similar to FIG. 1, showing the traction machine while the support plate 15, brake 22 and the circularly-recessed member 19 are removed. The remaining portions of the elevator traction machine of the present embodiment other than those illustrated in FIG. 9 are constructed in the same manner as shown in FIGS. 1 through 6. In the drawings, those reference numerals which are the same as those provided in FIGS. 1 through 6 designate corresponding elements.

[0036] Reference numeral 39 designates main cable guides. The main cable guides 39 are provided along the interior surface of the base member 2 so as to oppose the rim surface of the sheave 20. The main cable guides 39 are spaced a given distance apart from the outer periphery of the sheave 20 in its radial direction and are interposed between the inspection holes 34.

[0037] In the elevator traction machine of the foregoing configuration, the sheave 20 is integrally formed with the circularly-recessed member 19 having the armature 21 provided thereon. Further, there is provided the brake 22 for pressing the brake pieces 26 against the brake surface 191 formed along the interior circumferential surface of the opening edge of the circularly-recessed member 19. Although not described in detail, the elevator traction machine of the third embodiment shown in FIG. 9 yields the same working-effect as that yielded in the first embodiment shown in FIGS. 1 through 6.

[0038] In the embodiment shown in FIG. 9, the main cable guides 39 are provided along the interior surface of the base member 2 so as to oppose the rim surface of the sheave 20. At the time of the main cable 12 being wound around the sheave 20, the main cable 12 is inserted into the main cable pathway 14 of one leg 13 of the base member 2, and the leading end of the main cable 12 is guided along the surface of the main cable guide 39 by way of the inspection hole 34. When pushed in this state, the main cable 12 further proceeds deep into the base member 2 while being guided by the main cable guide 39.

[0039] Thereafter, the main cable 12 is guided by the next main cable guide 39 by way of the next inspection hole 34. Through repetition of these operations, the leading end of the main cable 12 can be pulled out from the main cable pathway 14 of the other leg 13 of the

base member 2. Thus, the main cable 12 can be wound around the cable grooves formed in the sheave 20 without difficulty, thereby improving the efficiency of installation and maintenance of the elevator traction machine.

[0040] The features and the effects of the present invention as described above will be summarized as follows.

[0041] In one aspect of the present invention, in an elevator traction machine, a main shaft is originated from a circularly-recessed base member whose one side is open. A circularly-recessed rotating member is provided within the base member in a fitting manner such that the bottom surface of the circularly-recessed rotating member opposes the bottom surface of the base member, and rotatively supported on the main shaft. A sheave is formed on the exterior circumferential surface of the circularly-recessed rotating member facing the bottom portion of the base member. A brake surface is formed on the interior circumferential surface of the edge of the circularly-recessed rotating member. A stator winding is provided on the interior circumferential surface of the base member in the vicinity of the opening edge. An armature is disposed on the outer circumferential surface of the circularly-recessed rotating member in the vicinity of the opening edge. A brake which opposes the brake surface and has brake pieces for applying brake force is disposed in an inner space of the circularly-recessed rotating member.

[0042] As a result, the sheave is integrally formed with the circularly-recessed member having the armature provided thereon. Further, there is provided the brake for pressing the brake pieces against the brake surface formed along the interior circumferential surface of the opening edge of the circularly-recessed member. As a result, the outer dimension of the traction machine can be reduced, and the brake or a like component can be subjected to inspection and maintenance by way of a space communicating with openings formed in the circularly-recessed member. Consequently, the space required for installing the traction machine and the space required for performing maintenance and inspection can be reduced, so that the elevator traction machine can be readily installed in a narrow space. Accordingly, there can be eliminated a problem of a limitation imposed on installation of the elevator traction machine and a difficulty in installing the elevator traction machine.

[0043] In another aspect of the present invention, in an elevator traction machine, a support plate is attached to the opening edge of the base member, to thereby constitute a space between the base member and the support plate, and the main shaft is supported by the bottom of the base member and the support plate.

[0044] Therefore, the sheave, the circularly-recessed member constituting a rotor of the electric motor, and the brake are provided in the space formed between the base member and the support plate. Accordingly, the present invention yields an advantage of reducing the outer dimension of the traction machine; i . e . , an advantage of rendering the traction machine compact.

[0045] In another aspect of the present invention, in an elevator traction machine, an encoder is disposed on the end of the main shaft close to the support plate and detects the rotation of the sheave.

[0046] Therefore, the space between the support plate and the base member can be effectively utilized, thus preventing projection of the encoder from the traction machine. The outer dimension of the traction machine can be reduced, and the traction machine can be made compact. Consequently, the space required for installing a traction machine and a space required for performing maintenance and inspection on the traction machine can be reduced, thus installation of the elevator traction machine is facilitated.

[0047] In another aspect of the present invention, in an elevator traction machine, inspection holes are formed in the base member so as to oppose a rim surface of the sheave and to be spaced apart from each other in the circumferential direction of the rim surface, and the inspection holes are provided with respective main cable latches such that one side of the main cable latch is fastened to the edge of the inspection hole and the other side of the main cable is spaced a narrow clearance apart from the main cable wound around the sheave.

[0048] Therefore, the main cable latch can prevent occurrence of a problem of the main cable loosening and coming off the cable grooves formed in the sheave, thereby the reliability of operation of the traction machine is improved and handling of the traction machine at the time of maintenance is facilitated.

[0049] In another aspect of the present invention, in an elevator traction machine, the legs are integrally formed with the base member, and main cable pathways are formed in the respective legs so as to permit insertion of the main cable.

[0050] Therefore, the main cable is inserted into the main cable pathways formed in the legs of the base member and is wound around the sheave. The main cable can be protected without the need for providing the entrance and exit of the base member with respective protectors. By means of such a simple configuration, there can be prevented damage to the main cable, which would otherwise be caused when a foreign article comes into contact with the main cable at either the entrance or exit of the base member.

[0051] In another aspect of the present invention, in an elevator traction machine, the main cable guide is provided on the interior surface of the base member so as to oppose the rim surface of the sheave and is spaced a given distance apart from the outer periphery of the sheave in the radial direction thereof.

[0052] Therefore, at the time of the main cable being wound around the sheave, the main cable is inserted into a space between the main cable guide and the sheave at one end, and the leading end of the main cable proceeds deep into the base member while being

guided along the surface of the main cable guide. The main cable can be withdrawn by way of the space at the other end. As a result, the main cable can be wound around the cable grooves formed in the sheave without involvement of difficulty, thus yielding an advantage of improving the efficiency of installation and maintenance of the elevator traction machine.

[0053] In another aspect of the present invention, in an elevator traction machine, the sheave is disposed on the surface of the circularly-recessed member facing the bottom surface of the base member, and an armature is disposed on the portion of the circularly-recessed member facing the opening edge of the base member.

[0054] Therefore, the stator winding and the armature are disposed on the opening edge of the base member. By virtue of such a configuration, the electric motor can be readily inspected by removal of the support plate, thus the efficiency of maintenance operation is improved.

[0055] In another aspect of the present invention, in an elevator traction machine, the brake is attached to the support plate and is disposed in a space between the support plate and the base member.

[0056] Therefore, the brake can be easily removed from the base member in conjunction with the support plate, thus easy inspection of the brake and an improvement in the efficiency of maintenance operation is enabled.

[0057] In another aspect of the present invention, in an elevator traction machine, the support plate comprises a pivotal plate which has the brake mounted thereon and is removably fastened to the base member; a stationary plate attached to the opening edge of the base member; and a hinge for connecting the pivotal plate and the stationary plate in a pivotable manner.

[0058] Therefore, the pivotal plate released from the base member is pivotally moved around the hinge, thus bringing the brake into an exposed state. In this state, maintenance and inspection on the brake is performed. Thus, maintenance can be readily performed on the brake or a like component, and the efficiency of maintenance operation is improved.

[0059] Obviously many modifications and variations of the' present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may by practiced otherwise than as specifically described.

[0060] The entire disclosure of a Japanese Patent Application No. 11-097586, filed on April 5, 1999 including specification, claims, drawings and summary, on which the Convention priority of the present application is based, are incorporated herein by reference in its entirety.

[0061] Further embodiments are derivable from the following list:

1. An elevator traction machine comprising:

a circularly-recessed base member having an open end;
a main shaft provided within the base member and originating from the center of the concave bottom of the base member at right angle;
a circularly-recessed rotating member provided within the base member in a fitting manner with the bottom surface thereof opposing the bottom surface of the base member, the circularly-recessed rotating member being supported rotatively on the main shaft at the center thereof;
a sheave formed on the outer circumferential surface of the circularly-recessed member,
a stator winding provided on the interior circumferential surface of the base member;
an armature provided on the outer circumferential surface of the circularly-recessed member, the armature opposing the stator winding, the armature and the stator constituting an electric motor;
a brake surface formed along the interior circumferential surface of the circularly-recessed rotating member; and
a brake disposed within the circularly-recessed member, the brake opposing the brake surface, the brake having brake pieces for applying brake force to the brake surface.

2. The elevator traction machine according to 1, further comprising a support plate which is attached to the opening edge of the base member to thereby constitute a space between the base member, the support plate supporting one end of the main shaft.

3. The elevator traction machine according to 1, further comprising an encoder disposed on the main shaft for detecting the rotation of the sheave.

4. The elevator traction machine according to 1, wherein a plurality of inspection holes are formed in the base member so as to oppose a rim surface of the sheave to be spaced apart from each other in the circumferential direction of the rim surface, and the inspection holes are provided with respective main cable latches such that one side of the main cable latch is fastened to the edge of the inspection hole and the other side of the main cable is spaced a narrow clearance apart from the main cable wound around the sheave.

5. The elevator traction machine according to 1, wherein legs are integrally formed with the base member, and main cable pathways are formed in the respective legs so as to permit insertion of the main cable.

6. The elevator traction machine according to 1, wherein a main cable guide is provided on the inte-

rior surface of the base member so as to oppose the rim surface of the sheave and is spaced a given distance apart from the outer periphery of the sheave in the radial direction thereof.

7 . The elevator traction machine according to 1-2, wherein the sheave is formed on the exterior surface of the circularly-recessed member at the bottom portion, and an armature is provided on the exterior surface of the circularly-recessed member at the opening edge.

8. The elevator traction machine according to 7, wherein a brake is attached to the support plate and is disposed in a space between the support plate and the base member.

9. The elevator traction machine according to 8, wherein the support plate comprises:

a stationary plate attached to the opening edge of the base member;
a pivotal plate which has the brake mounted thereon and is removably fastened to the base member;
a hinge for connecting the pivotal plate and the stationary plate in a pivotable manner.

Claims

1. An elevator traction machine comprising:

a base member (2);
a rotating member (19) having a central portion facing to the base member and an open peripheral portion extended from the central portion;
a sheave (20) rotating with the rotating member;
a rope (12) wound on the sheave;
a stator winding (18) provided on the interior circumferential surface of the base member;
an armature (21) provided on the outer circumferential surface of the open peripheral portion of the rotating member at a position larger in diameter than the outer diameter of the sheave;
the armature facing the stator winding, the armature and the stator constituting an electric motor;
an encoder disposed on a main shaft for detecting the rotation of the sheave;

wherein an outer dimension of the main shaft in an axis direction is shorter than the outer dimension of the traction machine in a direction perpendicular to the axis direction.

2. The elevator traction machine according to claim 1,

the rotating member is formed in an open recessed form having a central portion facing to the base member and an open peripheral portion extended from the central portion.

Fig.1

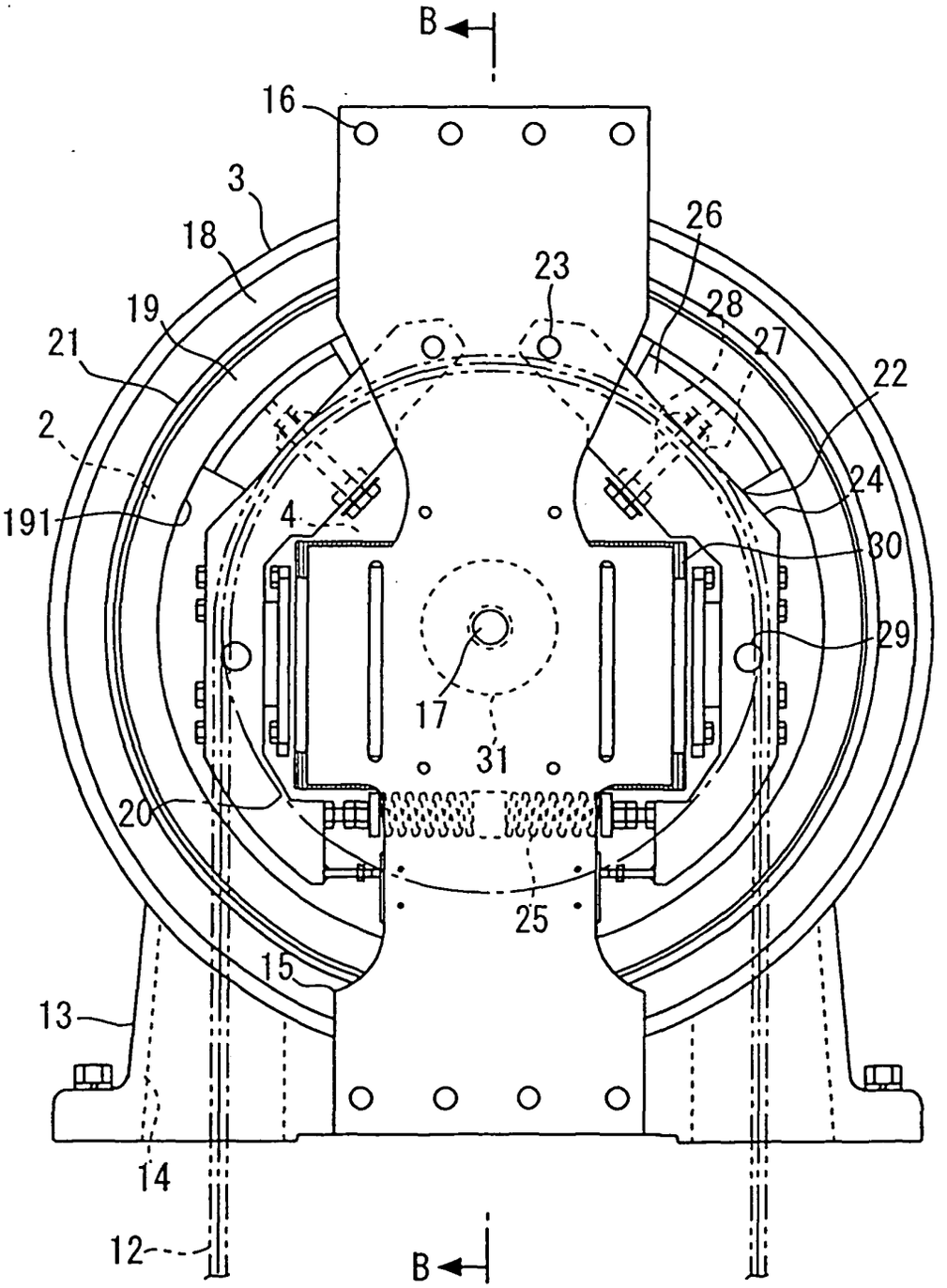


Fig.2

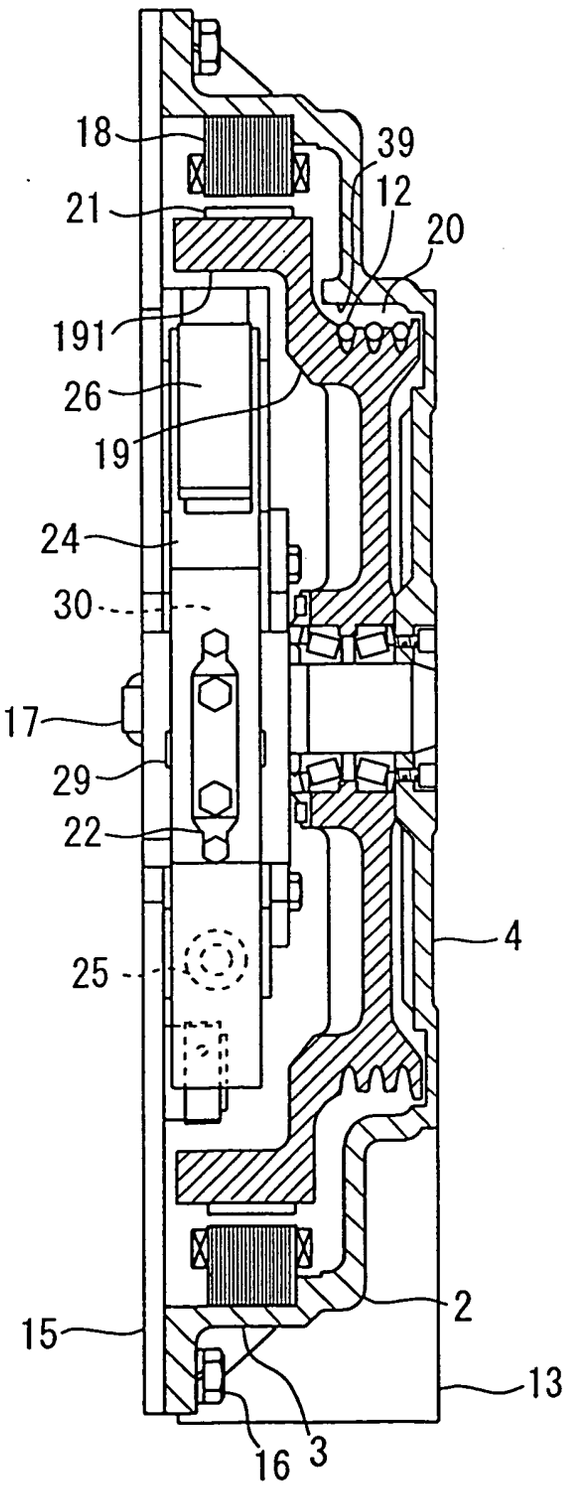


Fig.3

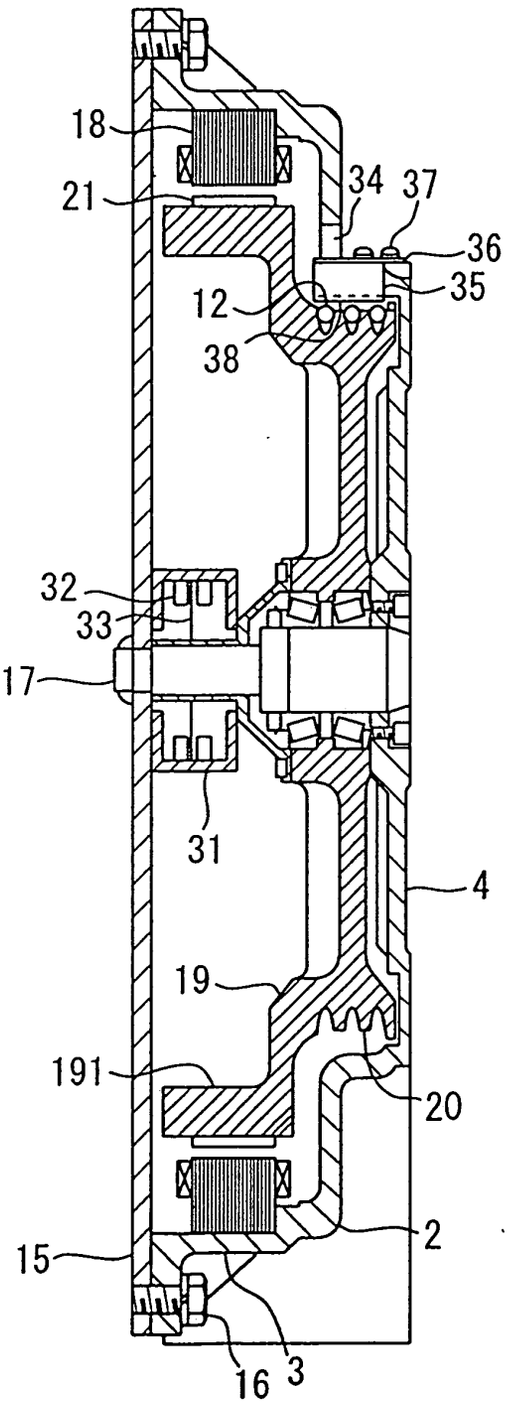


Fig.4

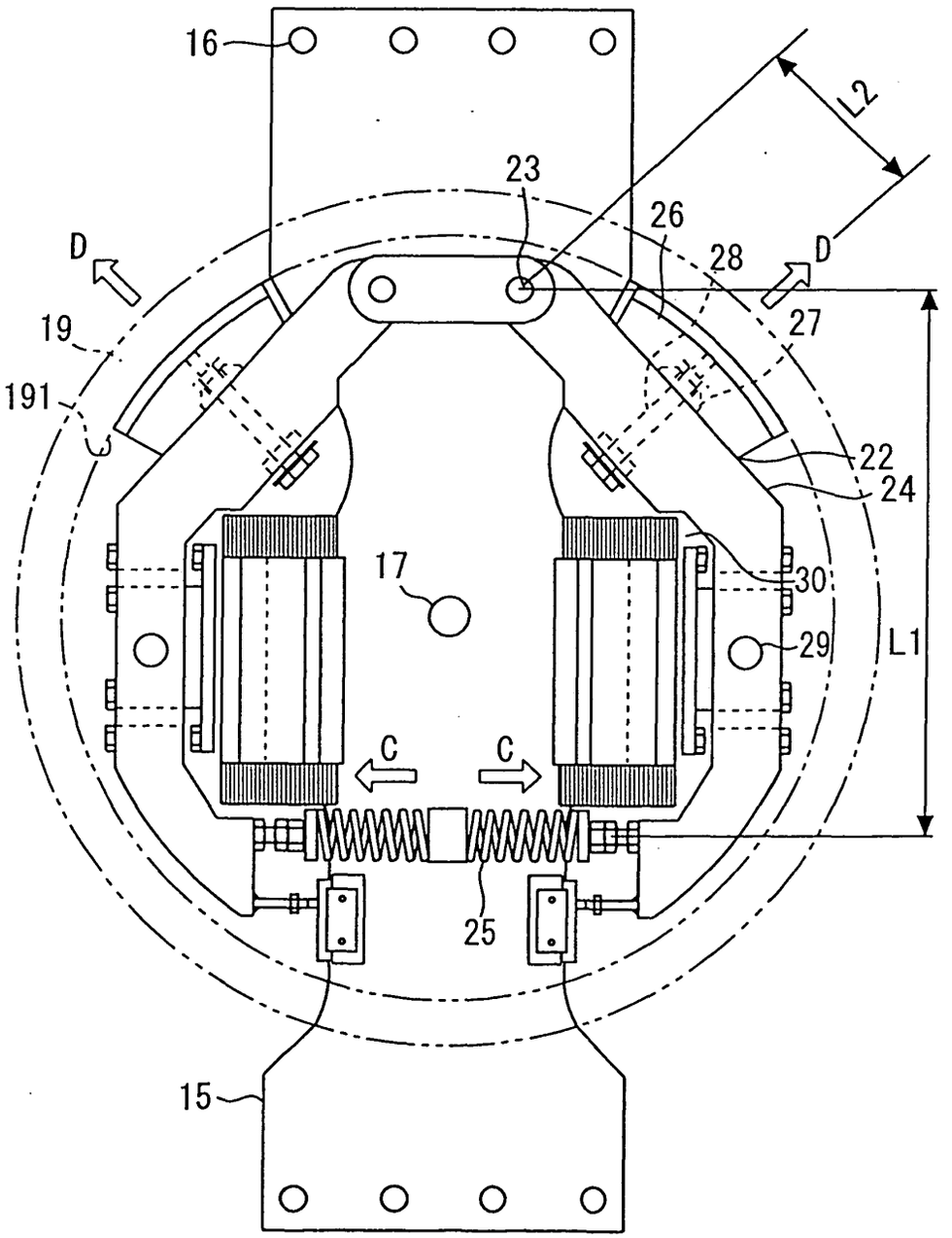


Fig.5

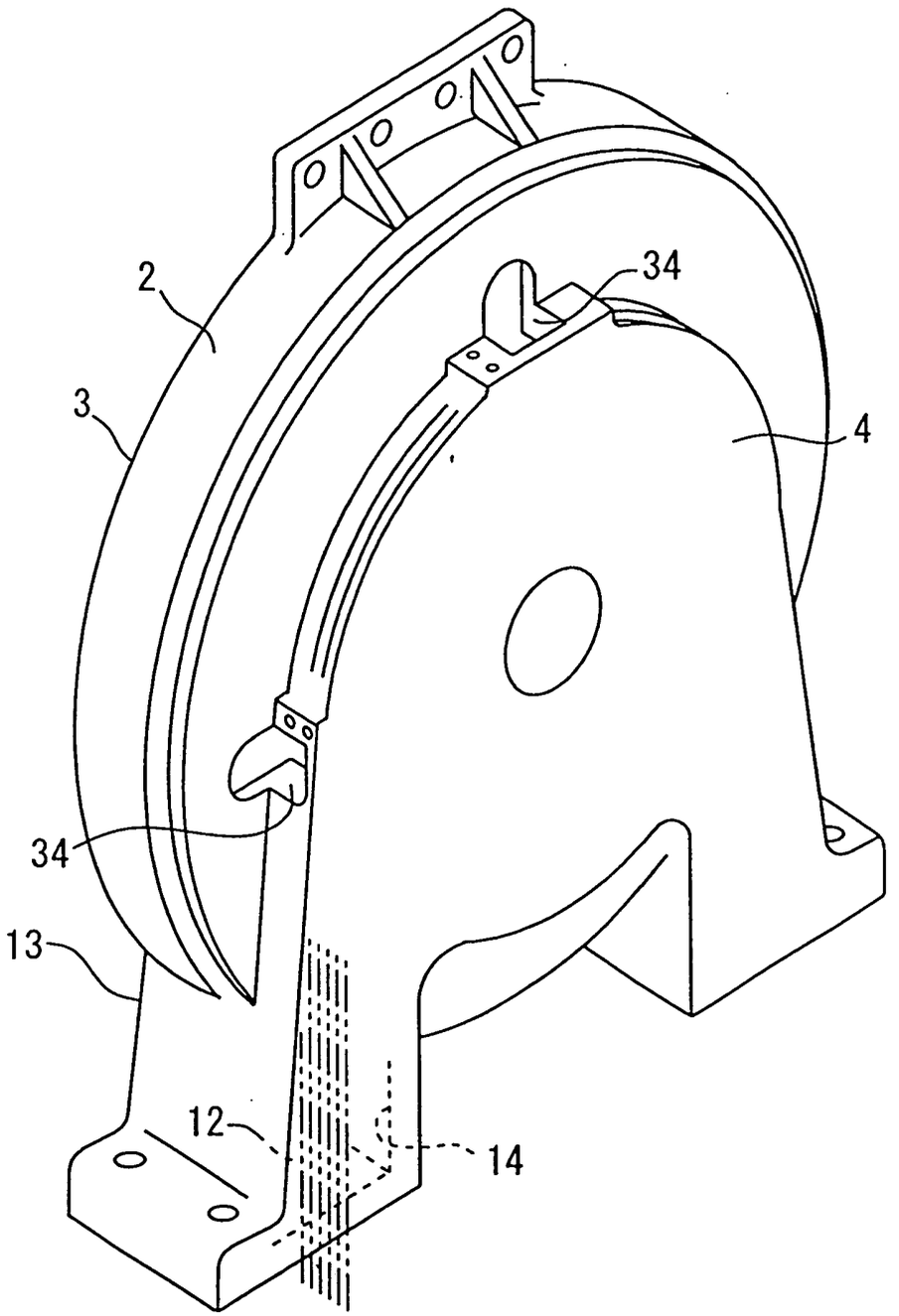


Fig.6

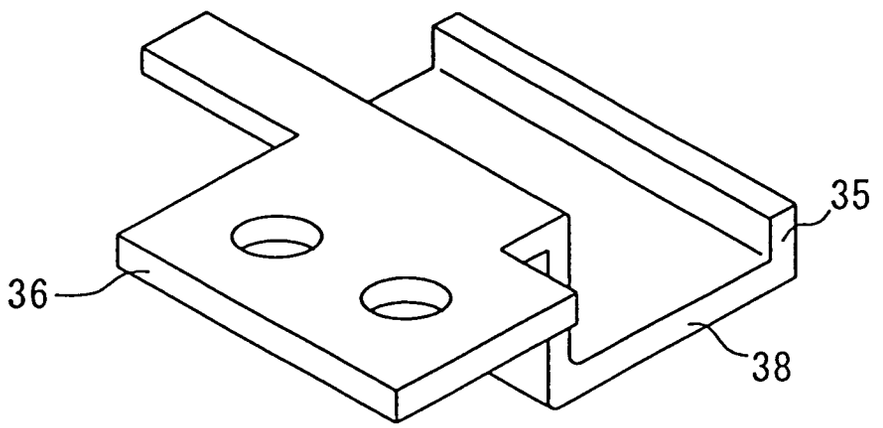


Fig.7

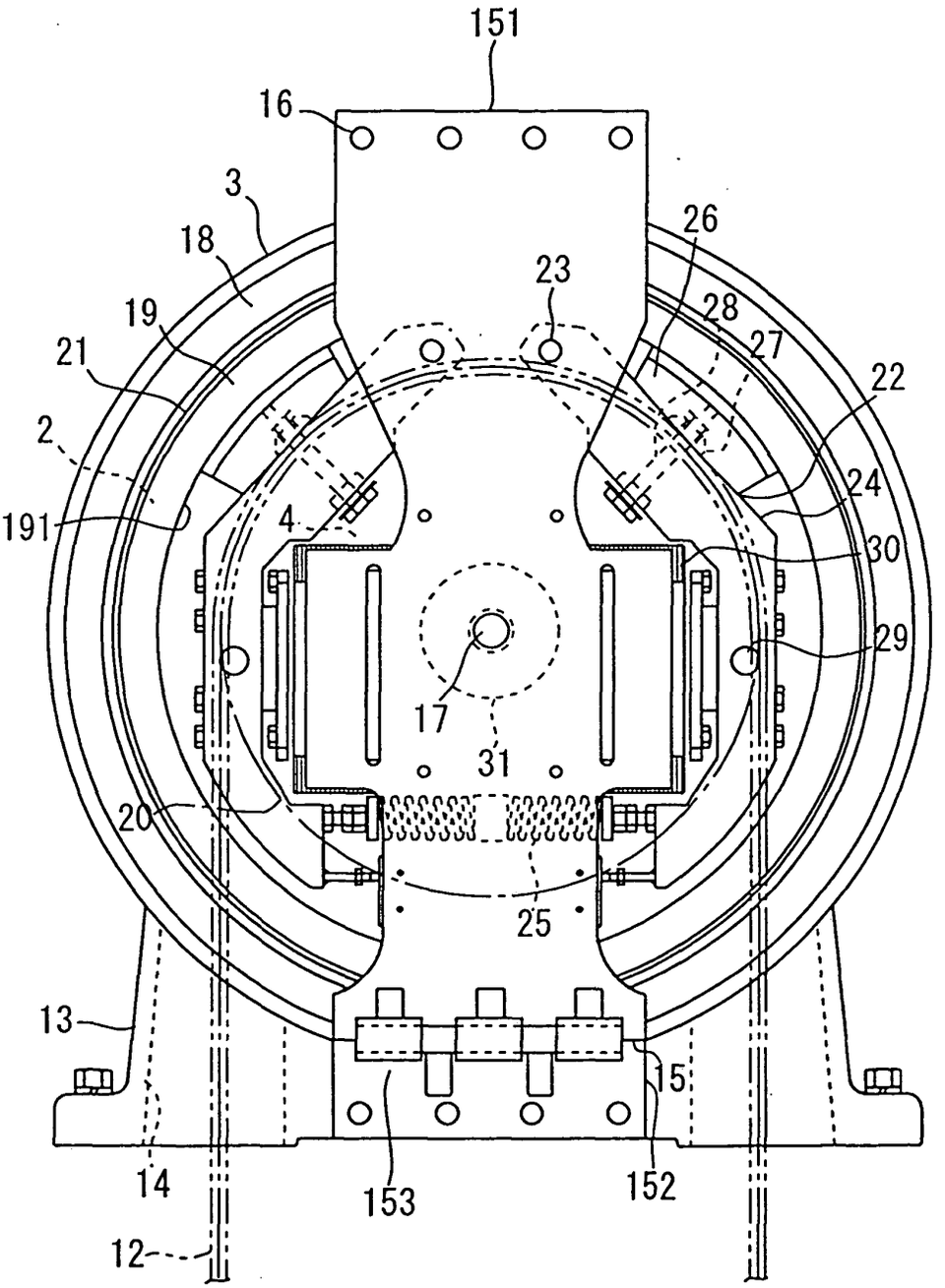

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Fig.8

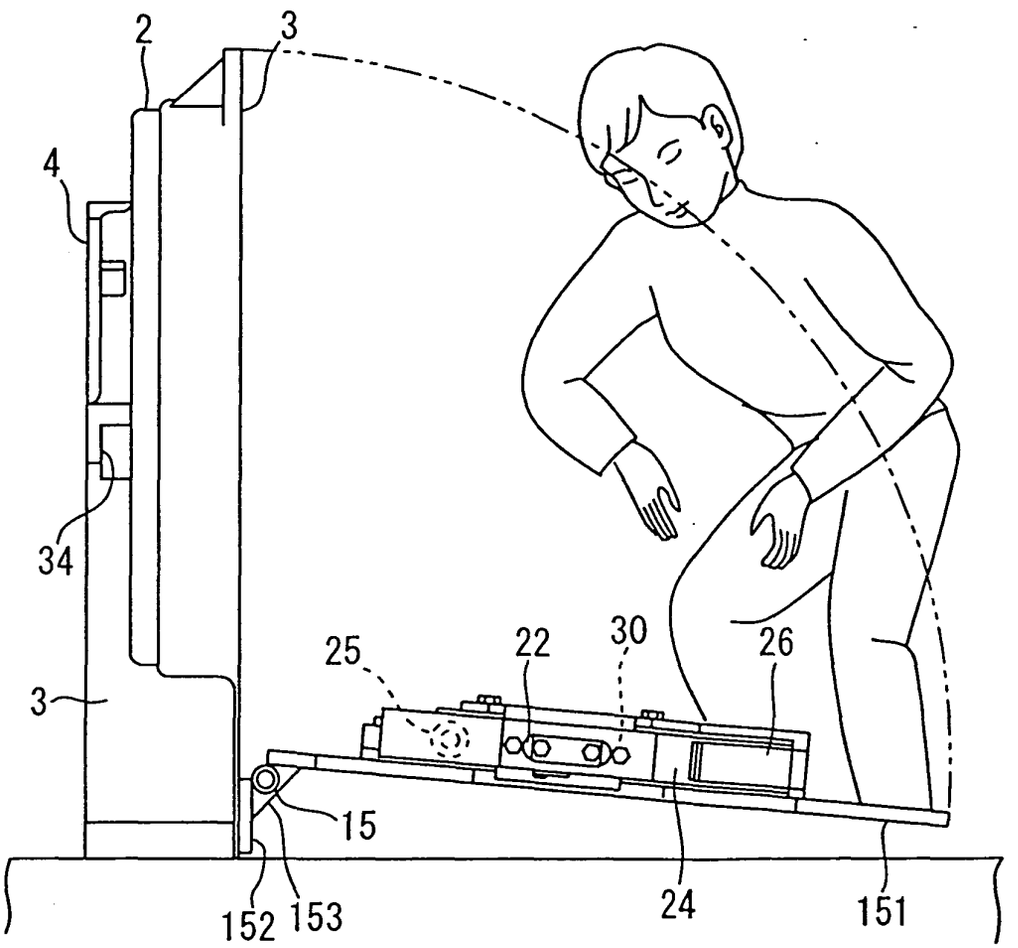


Fig.9

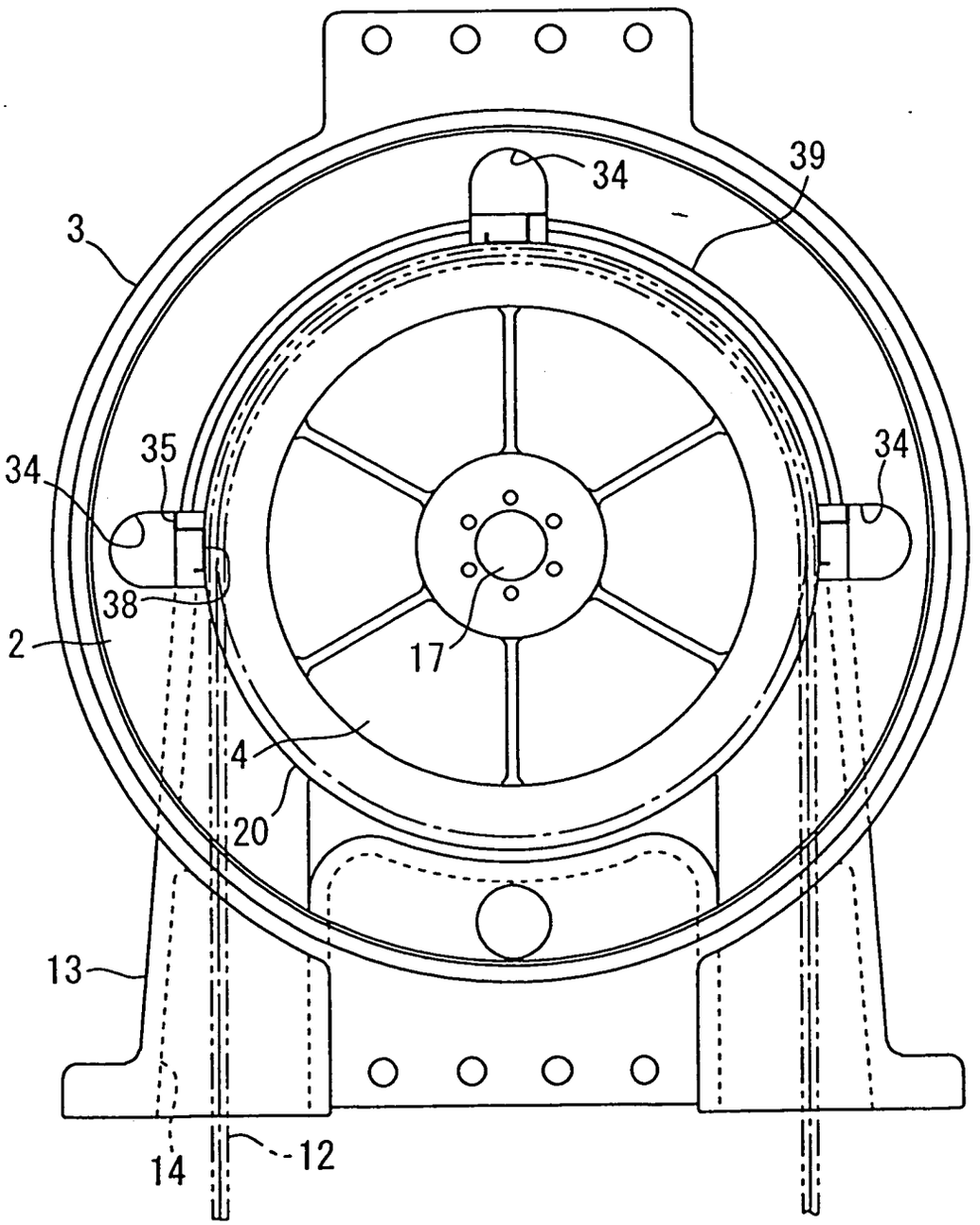


Fig.10

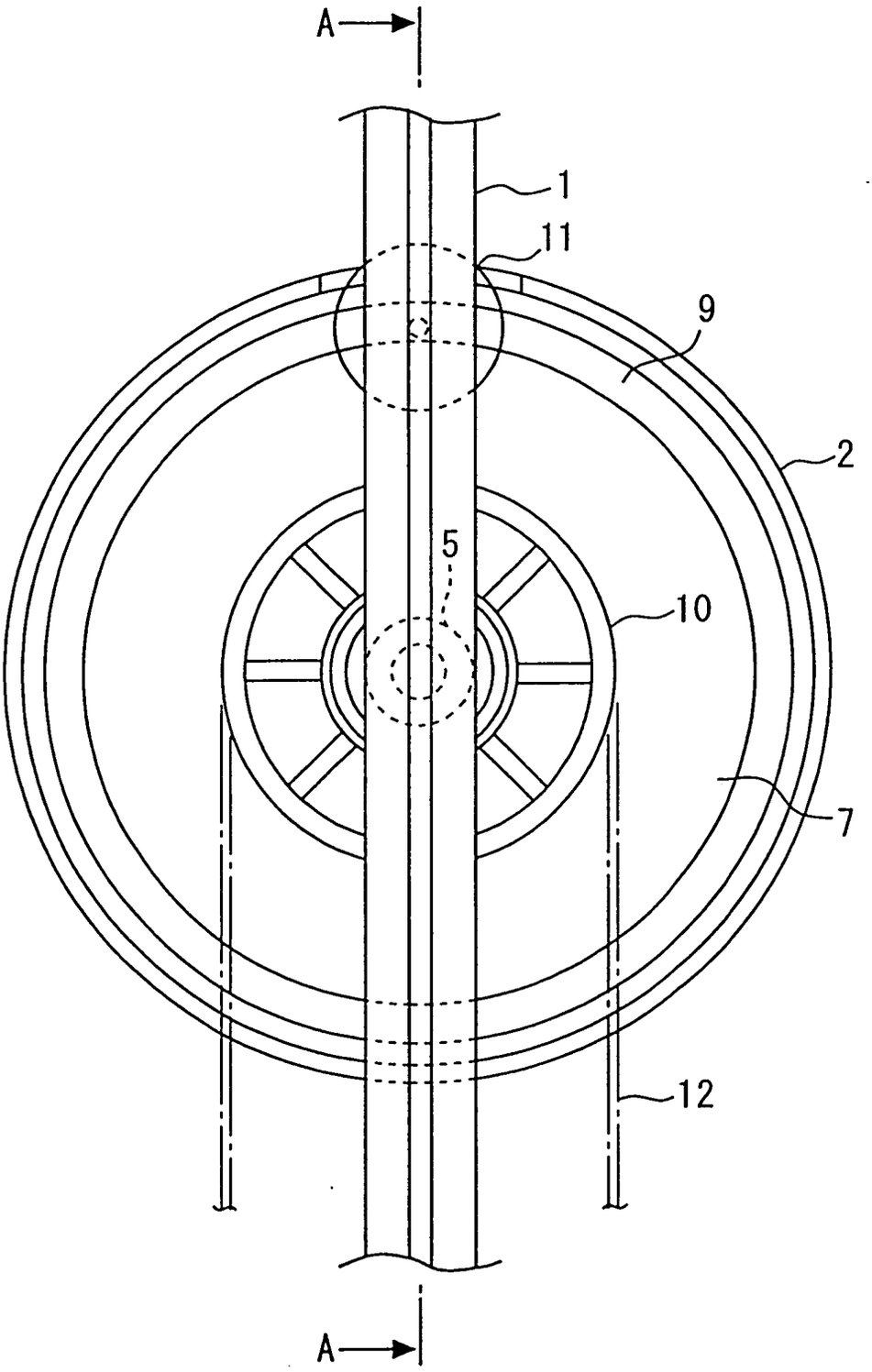
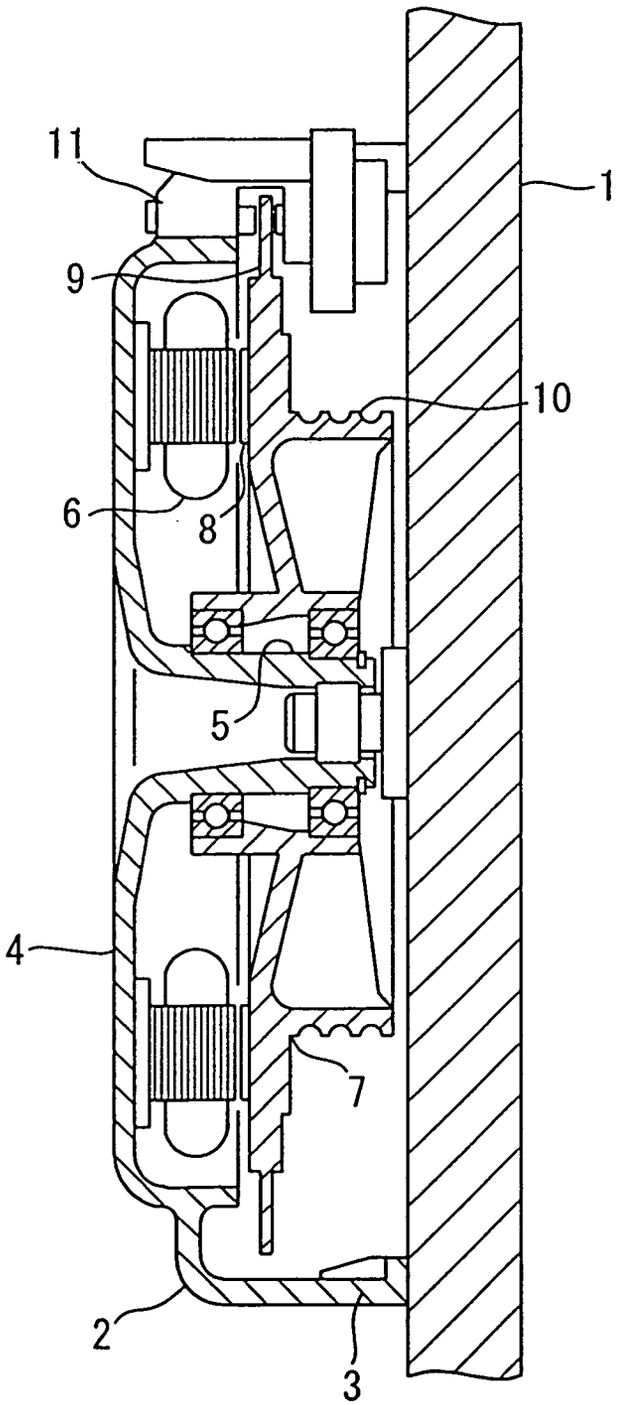


Fig.11



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Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	13 January 2004	Eckenschwiller, A

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