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(54) **ELEVATOR HOIST DEVICE**

AUFZUGSSEILVORRICHTUNG

DISPOSITIF DE TREUIL POUR ASCENSEUR

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EP 2 322 464 B1

Description

TECHNICAL FIELD

[0001] The present invention relates to an elevator hoist device or apparatus used for moving an elevator car up and down in an elevator, and more specifically to a hoist device or apparatus including a sheave supported by a shaft in a manner of cantilever.

BACKGROUND ART

[0002] FIG. 6 shows an elevator hoist apparatus in which a sheave is supported on a shaft in the form of a cantilever. The elevator hoist apparatus 101 includes a stator 104 and a rotor 111. The stator 104 includes a stator core 103 attached to an internal periphery of a frame 102. The rotor 111 includes a rotor core 105 attached to a shaft 106 which is supported rotatably by a first bearing 107 (referred to as a sheave's side bearing hereinafter) and a second bearing 108 (referred to as an anti-sheave's side bearing hereinafter), on first and second brackets 109 and 110 installed in the frame. The elevator hoist apparatus further includes a sheave 112 which is mounted on a projecting end portion of the shaft 106 projecting outwards to an outer side of the sheave's side bearing 107.

[0003] The external periphery of the sheave 112 is formed with a wire rope wind-up surface 114 including a plurality of wire rope grooves 113 arranged in a row. (cf. patent document 1, as an example)

PRIOR ART LITERATURE

Patent Document(s)

[0004]

Patent Document 1: JP 53-5963 U

Patent Document 2: EP 1845 051 A1 shows an elevator hoist apparatus including a stator (8), a frame (1d, 1), a rotor (5, 7) mounted on a rotary shaft (3), and a bearing (2 in FIGS. 2, 4, 9; 2a in FIG. 6, 7) which includes two roller bearings.

Patent Document 3: US 4,355,785 A relates to a drive apparatus for application such as traction elevator system (cf. column 1, lines 12, 13), and teaches, in a paragraph of column 2, lines 44-65, that the center line 52 of the working surface of a sheave 42 coincides with the center line of a first bearing assembly 40.

Patent Document 4: EP 1 657 207 A1 shows an elevator hoist apparatus designed to decrease the thickness or axial width specifically for an elevator without a machine room. The elevator hoist apparatus includes a stator (218) fixed in a basic body 202 (203, 204), a rotating body 219 which serves as a rotor, and which is supported on a main shaft 217, and a drive sheave 220, and a bearing 240 which includes two roller bearings.

SUMMARY OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0005] In the conventional elevator hoist apparatus having the above-mentioned cantilever sheave support structure, an overhang dimension or length D of the shaft 106 is expressed by a following equation 1 by using a dimension A from an end of the wire rope wind-up surface 114 toward the sheave's side bearing 107, to a sheave shaft load center (the middle of the wire rope wind-up surface 114), a dimension B from a sheave's side end face of the sheave side bearing 107 to the middle of the sheave side bearing 107, and a distance or spacing C from the sheave's side end face of the sheave's side bearing 107 to the end of the wire rope wind-up surface 114 toward the sheave side bearing 107.

$$D=A+B+C \cdots\cdots\cdots \text{Equation 1}$$

Following equations 2 and 3 are obtained by using a distance E between the middle of the sheave's side bearing 107 and the middle of the anti-sheave's side bearing 108, a force L1 applied to the sheave's side bearing 107 by a sheave

shaft load W and a force L2 applied to the anti-sheave's side bearing 108.

$$L1=W\cdot(D+E)/E=W\cdot(A+B+C+E)/E \quad \cdots\cdots\cdots \text{Equation 2}$$

$$L2=W\cdot D/E=W\cdot(A+B+C)/E \quad \cdots\cdots\cdots\cdots\cdots \text{Equation 3}$$

[0006] As expressed by the equations 2 and 3, in the structure of the existing hoist apparatus, when the sheave 12 having a great width is required, the dimension A becomes greater, the overhang dimension D becomes greater, and hence the forces L1 and L2 increase. As a result, the hoist apparatus requires the bearings, shaft and frame of greater sizes, resulting in disadvantage of weight increase and cost increase of the hoist apparatus.

[0007] Even when the sheave width is increased, it is possible to increase the dimension E in proportion to an increase of the dimension D of FIG. 6, and thereby to avoid the need for greater bearings and shaft. However, in this case, the lengths of the frame and shaft are increased by the increase of dimension E. As a result, the overall size and installation space of the hoist apparatus are increased, and the hoist apparatus encounters the problem of weight increase and cost increase.

[0008] Furthermore, the shaft receives a bending moment M due to the sheave shaft load W.

$$M= W\cdot D = W\cdot(A+B+C) \quad \cdots\cdots\cdots \text{Equation 4}$$

[0009] In the case of the sheave having a greater width, the dimension A is greater, and the bending moment M becomes greater, as evident from the equation 4. Therefore, to solve the problem of inclination of the sheave caused by deflection of the shaft due to the sheave shaft load W, the hoist apparatus requires the use of a thick shaft having a greater shaft diameter, and hence encounters the disadvantage of weight increase and cost increase.

[0010] When the sheave width and the sheave load are great, an existing system employs a hoist apparatus 120 of a dual support structure having a sheave 1 24 between bearings 1 22 and 1 23 supporting a shaft 121, as shown in FIG. 7. However, this structure supporting the sheave on both sides is disadvantageous in that installation and replacement of the sheave are difficult after the assembly of the hoist apparatus.

[0011] It is an object of the present invention to provide hoist apparatus of a cantilever structure suitable for a greater sheave width and a greater sheave load.

MEANS FOR SOLVING THE PROBLEM

[0012] In an elevator hoist apparatus comprising a stator including a stator core attached to an internal periphery of a frame, a rotor including a rotor core attached to a shaft supported rotatably by first and second bearings which receive the shaft on an inner race's side and which receive, on an outer race's side, first and second brackets provided in the frame, and a sheave mounted on a projecting end portion of the shaft projecting to an outer side of the first bearing, the first bearing being a sheave's side bearing on a sheave's side of the rotor and the second bearing being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side, the invention of Claim 1 is arranged so that the sheave includes a wire rope wind-up surface which is formed on an external peripheral side of the sheave and which includes a plurality of wire rope grooves arranged in a row, and a bearing insertion portion which is formed on an internal peripheral side of the wire rope wind-up surface and which receives the first bearing inserted in the bearing insertion portion, a widthwise middle of the first bearing inserted in the bearing insertion portion is positioned on an inner side of a sheave shaft load center of the wire rope wind-up surface that is a rotor's side of the sheave shaft load center of the wire rope wind-up surface, and an end face of the first bearing confronting the second bearing is positioned on a sheave shaft load center's side of an end of the wire rope wind-up surface on the rotor's side.

[0013] In an elevator hoist apparatus comprising a stator including a stator core attached to an internal periphery of a frame, a rotor including a rotor core attached to a shaft supported rotatably by first and second bearings which receive the shaft on an inner race's side and receive first and second brackets provided in the frame on an outer race's side, and a sheave mounted on a projecting end portion of the shaft projecting to an outer side of the first bearing, the first bearing being a sheave's side bearing on a sheave's side of the rotor and the second bearing being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side, the invention of Claim 3 is arranged so that the sheave includes a wire rope wind-up surface which is formed on an external peripheral side of the sheave and which

includes a plurality of wire rope grooves arranged in a row, and a bearing insertion portion which is formed on an internal peripheral side of the wire rope wind-up surface and which receives the first bearing inserted in the bearing insertion portion, a widthwise middle of the first bearing is positioned at the sheave shaft load center, and an end face of the first bearing confronting the second bearing is positioned on a sheave shaft load center's side of an end of the wire rope wind-up surface on the rotor's side.

[0014] In an elevator hoist apparatus comprising a stator including a stator core attached to an internal periphery of a frame, a rotor including a rotor core attached to a shaft supported rotatably by first and second bearings receiving the shaft on an inner race's side and receiving first and second brackets provided in the frame on an outer race's side, and a sheave mounted on a projecting end portion of the shaft projecting to an outer side of the first bearing, the first bearing being a sheave's side bearing on a sheave's side of the rotor and the second bearing being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side, the invention of Claim 5 is arranged so that the sheave includes a wire rope wind-up surface which is formed on an external peripheral side of the sheave and which includes a plurality of wire rope grooves arranged in a row, and a bearing insertion portion which is formed on an internal peripheral side of the wire rope wind-up surface and which receives the first bearing inserted in the bearing insertion portion, a widthwise middle of the first bearing is positioned on an outer side of the sheave shaft load center that is on an anti-rotor's side of the sheave shaft load center, and an end face of the first bearing confronting the second bearing is positioned on a sheave shaft load center's side of an end of the rope wire wind-up surface on the rotor's side.

Effect of the Invention

[0015]

(1) In the elevator hoist apparatus of Claim 1, the widthwise middle of the first bearing inserted in the bearing insertion portion is positioned on the inner side of the sheave shaft load center of the wire rope wind-up surface, the inner side being a rotor's side of the sheave shaft load center of the wire rope wind-up surface, and at the same time the end face of the first bearing confronting the second bearing is positioned on the sheave shaft load center's side of the end of the wire rope wind-up surface on the rotor's side so that the end face of the first bearing confronting the second bearing is located between the end of the wire rope wind-up surface on the rotor's side and the sheave shaft load center. Therefore, it is possible to decrease the overhang dimension D, as compared to the hoist apparatus of the earlier technology shown in FIG. 6. As a result, the force L1 acting on the sheave side bearing 7 and the force L2 acting on the anti-sheave side bearing 8 become smaller in magnitude, and hence it becomes possible to reduce the sizes and weights of these bearings, the shaft and the frame and to reduce the cost. Moreover, the bending moment M due to the sheave shaft load W becomes smaller. Accordingly, even in the case of a thinner shaft, it is possible to decrease the deflection of the shaft due to the sheave shaft load W, and to decrease the inclination of the sheave.

(2) In the elevator hoist apparatus of Claim 3, the widthwise middle of the sheave side bearing is positioned at the sheave shaft load center. Therefore, it is possible to decrease the overhang dimension D to zero. As a result, the force L1 become equal to the sheave shaft load W, so that it is possible to decrease the radial load applied on the sheave side bearing as compared to the construction of Claim 1. Furthermore, the force L2 applied on the anti-sheave side bearing becomes equal to zero, so that it is possible to reduce the size of the bearing further as compared to the construction of Claim 1. Moreover, the bending moment M due to the sheave shaft load W is eliminated, so and the shaft undergoes no deflection, and it is possible to eliminate the inclination of the sheave due to deflection of the shaft. In addition, it is possible to make the shaft thinner in size and lighter in weight.

(3) In the hoist apparatus of Claim 5, the sheave shaft load W is supported between the first bearing and second bearing. Therefore, this hoist apparatus can restrain the deflection of the shaft, eliminate the inclination of the sheave, and support the sheave in a stable state like the hoist apparatus of the dual support type as shown in FIG. 7. In addition, this hoist apparatus can maintain the superior usability of the cantilever type hoist apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG. 1 A is a sectional view of a hoist apparatus according to a first embodiment. FIG. 1 B is a side view.
FIG. 2A is a sectional view of a hoist apparatus according to a second embodiment. FIG. 2B is a side view.
FIG. 3A is a sectional view of a hoist apparatus according to a third embodiment. FIG. 3B is a side view.
FIG. 4 is a view illustrating a joining method of joining a shaft and a sheave.
FIG. 5 is a view illustrating a joining method of joining the shaft and the sheave.
FIG. 6A is a sectional view of a cantilever type hoist apparatus of earlier technology. FIG. 6B is a side view.

FIG. 7A is a sectional view of a dual support type hoist apparatus of earlier technology. FIG. 7B is a side view.

MODE(S) FOR CARRYING OUT THE INVENTION

[0017] FIG. 1 shows an elevator hoist apparatus or device 1 according to a first embodiment. The elevator hoist apparatus 1 includes a stator 4 and a rotor 11. The stator 4 is formed by attaching or fixing a stator core 3 to an internal periphery of a frame 2. The rotor 11 is formed by supporting a shaft 6 to which a rotor core 5 is attached or fixed, by a first bearing 7 (hereinafter referred to as a sheave's side bearing) and a second bearing 8 (hereinafter referred to as an anti-sheave's side bearing), rotatably on first and second brackets 9 and 10 installed in the frame 2. The elevator hoist apparatus 1 further includes a sheave 12 (wheel with a groove for a rope to run on) mounted on a projecting end portion of the shaft 6 which projects to an outer side of the sheave bearing 7.

[0018] The sheave 12 includes a wire rope wind-up surface 14 which is formed in an external periphery of the sheave 12, and which is formed with a plurality of wire rope grooves 13 arranged in a row.

[0019] The sheave 12 includes a bearing insertion portion 1 5 which is formed on an internal peripheral side of the wire rope wind-up surface 14 or radial inner side surrounded by the wire rope wind-up surface 14, and adapted to receive the sheave side bearing 7 inserted into the bearing insertion portion 15. Thus, the sheave side bearing 7 is inserted in the bearing insertion portion 15.

[0020] In the first embodiment, the sheave's side bearing 7 is located between the position at which the sheave's side bearing 7 is inserted, and covered, entirely in the bearing insertion portion 15, and the position at which the end face of the sheave's side bearing 7 facing toward the sheave shaft load center is located at the position of the sheave shaft load center. This relationship between the position of the sheave's side bearing 7 and the position of the sheave 12 is expressed by a following mathematical expression, $2B<C<A$.

[0021] By placing the sheave's side bearing 7 within the bearing insertion portion 1 5 as explained above, it is possible to decrease the overhang dimension D, as compared to the hoist apparatus of the earlier technology shown in FIG. 6. As a result, the force L1 acting on the sheave's side bearing 7 and the force L2 acting on the anti-sheave side bearing 8 become smaller in magnitude, and hence it becomes possible to reduce the sizes and weights of these bearings, the shaft and the frame, and to reduce the cost. Moreover, the bending moment M due to the sheave shaft load W becomes smaller, too. Accordingly, even in the case of a thinner shaft, it is possible to decrease the deflection of the shaft due to the sheave shaft load W, and to decrease the inclination of the sheave.

[0022] FIG. 2 shows an elevator hoist apparatus 1 according to a second embodiment. In the second embodiment, the sheave's side bearing 7 inserted in the bearing insertion portion 15 is so positioned that the widthwise middle or middle in the widthwise direction, of the sheave's side bearing 7 is located at the sheave shaft load center. This relationship between the position of the sheave side bearing 7 and the position of the sheave 12 is expressed by a following mathematical expression, $C=A+B$. In the other respects, the second embodiment is the same as the first embodiment, and repetitive explanation is omitted.

[0023] By positioning the widthwise middle of the sheave side bearing 7 at the sheave shaft load center as explained above, it is possible to decrease the overhang dimension D to zero. As a result, the force L1 become equal, in magnitude, to the sheave shaft load W, so that it is possible to decrease the radial load applied on the sheave's side bearing 7 as compared to the construction of Claim 1. Furthermore, the force L2 applied on the anti-sheave's side bearing 8 becomes equal to zero, so that it is possible to reduce the size of the bearing further as compared to the construction of Claim 1. Moreover, the bending moment M due to the sheave shaft load W is eliminated, so and the shaft undergoes no deflection, and it is possible to eliminate the inclination of the sheave due to deflection of the shaft. In addition, it is possible to make the shaft thinner in size and lighter in weight.

[0024] FIG. 3 shows an elevator hoist apparatus 1 according to a third embodiment. In the third embodiment, the sheave's side bearing 7 is so positioned that the widthwise middle or middle in the widthwise direction of the sheave's side bearing 7 is positioned on the outer side of the sheave shaft load center (on the opposite side of the sheave shaft load center, opposite to the side on which the anti-sheave's side bearing 8 is located). This relationship between the position of the sheave's side bearing 7 and the position of the sheave 12 is expressed by a following mathematical expression, $0<D$.

[0025] As explained above, the sheave shaft load W is supported between the sheave's side bearing 7 and anti-sheave's side bearing 8. Therefore, this arrangement can restrain the deflection of the shaft, eliminate the inclination of the sheave, and support the sheave in a stable state like the hoist apparatus of the dual support type as shown in FIG. 7. In addition, this arrangement can maintain the superior usability of the cantilever type hoist apparatus.

[0026] In the examples of the first through third embodiments shown in FIGS. 1~3, the sheave 12 is fixedly mounted on the end portion of the shaft 6 by shrink fitting. However, it is optional to employ arrangements shown in FIGS. 4 and 5. In these arrangement of FIGS. 4 and 5, the end portion of shaft 6 is inserted into a shaft insertion portion 16 formed in the sheave 12, and fixed to the sheave 12 by nut 17 or bolts 18. These arrangements can facilitate operations such as replacement of the sheave.

EXPLANATION OF REFERENCE NUMERALS

[0027]

1 elevator hoist apparatus
2 frame
3 stator core
4 stator
5 rotor core
6 shaft
7 first bearing (sheave's side bearing)
8 second bearing (anti-sheave side bearing)
9 first bracket
10 second bracket
11 rotor
12 sheave (wheel for rope)
13 wire rope groove
14 wire rope wind-up surface
15 bearing insertion portion

Claims

1. An elevator hoist apparatus comprising a stator (4) including a stator core (3) attached to an internal periphery of a frame (2), a rotor (11) including a rotor core (5) attached to a shaft (6) supported rotatably, by first and second bearings (7, 8) receiving the shaft (6) on an inner race's side, and receiving first and second brackets (9, 10) provided in the frame (2) on an outer race's side, and a sheave (12) mounted on a projecting end portion of the shaft (6) projecting to an outer side of the first bearing (7), the first bearing (7) being a sheave's side bearing on a sheave's side of the rotor (11) and the second bearing (8) being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side,
wherein the sheave (12) includes a wire rope wind-up surface (14) which is formed on an external peripheral side and which includes a plurality of wire rope grooves (13) arranged in a row,
the elevator hoist apparatus **characterized in that** the sheave (12) further includes a bearing insertion portion (15) which is formed on an internal peripheral side of the wire rope wind-up surface (14) and which receives the first bearing (7) inserted in the bearing insertion portion (15), and
a widthwise middle, in a widthwise direction, of the first bearing (7) inserted in the bearing insertion portion (15) is positioned on an inner side of a sheave shaft load center of the wire rope wind-up surface (14), the inner side being a rotor's side toward the rotor.

2. The elevator hoist apparatus as claimed in Claim 1, wherein the first bearing (7) is inserted in the bearing insertion portion (15) so that $2B<C<A$ where A is a distance from a second end of the wire rope wind-up surface (14) to the sheave shaft load center (W) of the wire rope wind-up surface (14), B is a distance between the widthwise middle of the first bearing (7) and a first end of the first bearing (7), and C is a distance from the first end of the first bearing (7) to the second end of the wire rope wind-up surface (14), the first bearing (7) extending axially toward the rotor core (5) of the rotor (11), from the first (right) end of the first bearing (7) to a second (left) end of the first bearing ('7), the wire rope wide-up surface (14) extending axially from a first (right) end of the wire rope wind up surface (14) to the second (left) end of the wire rope wind up surface (14) toward the rotor core (5) of the rotor (11).

3. An elevator hoist apparatus comprising a stator (4) including a stator core (3) attached to an internal periphery of a frame (2), a rotor (11) including a rotor core (5) attached to a shaft (6) supported rotatably, by first and second bearings (7, 8) receiving the shaft on an inner race's side and receiving first and second brackets (9, 10) provided in the frame (2) on an outer race's side, and a sheave (12) mounted on a projecting end portion of the shaft projecting to an outer side of the first bearing (7), the first bearing (7) being a sheave's side bearing on a sheave's side of the rotor (11) and the second bearing (8) being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side,
wherein the sheave (12) includes a wire rope wind-up surface (14) which is formed on an external peripheral side and which includes a plurality of wire rope grooves (13) arranged in a row,
the elevator hoist apparatus **characterized in that** the sheave (12) further includes a bearing insertion portion (15)

which is formed on an internal peripheral side of the wire rope wind-up surface (14) and which receives the first bearing (7) inserted in the bearing insertion portion, and
a widthwise middle, in a widthwise direction, of the first bearing (7) inserted in the bearing insertion portion (15) is positioned at the sheave shaft load center.

4. The elevator hoist apparatus as claimed in Claim 3, wherein the first bearing (7) is inserted in the bearing insertion portion (15) so that C=A+B where A is a distance from a second end of the wire rope wind-up surface (14) to the sheave shaft load center (W) of the wire rope wind-up surface (14), B is a distance between the widthwise middle of the first bearing (7) and a first end of the first bearing (7), and C is a distance from the first end of the first bearing (7) to the second end of the wire rope wind-up surface (14), the first bearing (7) extending axially from the first (right) end of the first bearing (7) to a second (left) end of the first bearing (7) toward the rotor core (5) of the rotor (11), the wire rope wide-up surface (14) extending axially from a first (right) end of the wire rope wind up surface (14) to the second (left) end of the wire rope wind up surface (14), toward the rotor core (5) of the rotor (11).

5. An elevator hoist apparatus comprising a stator (4) including a stator core (3) attached to an internal periphery of a frame (2), a rotor (11) including a rotor core (5) attached to a shaft (6) supported rotatably, by first and second bearings (7, 8) receiving the shaft on an inner race's side and receiving first and second brackets (9, 10) provided in the frame (2) on an outer race's side, and a sheave (12) mounted on a projecting end portion of the shaft (6) projecting to an outer side of the first bearing (7), the first bearing (7) being a sheave's side bearing on a sheave's side of the rotor (11) and the second bearing (8) being an anti-sheave's side bearing on an anti-sheaves side opposite to the sheave's side,
wherein the sheave (12) includes a wire rope wind-up surface (14) which is formed on an external peripheral side and which includes a plurality of wire rope grooves (13) arranged in a row,
the elevator hoist apparatus **characterized in that** the sheave (12) further includes a bearing insertion portion (15) which is formed on an internal peripheral side of the wire rope wind-up surface (14) and which receives the first bearing (7) inserted in the bearing insertion portion, and
a widthwise middle, in a widthwise direction, of the first bearing (7) inserted in the bearing insertion portion is positioned on an outer side of the sheave shaft load center, the outer side being an anti-rotor's side.

Patentansprüche

1. Aufzugwindenvorrichtung, umfassend einen Stator (4), der einen Statorkern (3) enthält, der an einem Innenumfang eines Rahmens (2) angebracht ist, einen Rotor (11), der einen Rotorkern (5) enthält, der an einer Welle (6) angebracht ist, die durch erste und zweite Lager (7, 8) drehbar gelagert ist, die die Welle (6) auf einer Seite eines inneren Laufrings aufnehmen und erste und zweite Halterungen (9, 10), die in dem Rahmen (2) vorgesehen sind, auf einer Seite eines äußeren Laufrings aufnehmen, und eine Treibscheibe (12), die an einem vorstehenden Endabschnitt der Welle (6) montiert ist und zu einer Außenseite des ersten Lagers (7) vorsteht, wobei das erste Lager (7) ein treibscheibenseitiges Lager auf einer Seite der Treibscheibe des Rotors (11) ist, und das zweite Lager (8) ein treibscheibengegenseitiges Lager auf einer Gegenseite der Treibscheibe entgegengesetzt zu der Seite der Treibscheibe ist,

   wobei die Treibscheibe (12) eine Drahtseilaufwickelfläche (14) umfasst, die auf einer Außenumfangsseite gebildet ist und die eine Mehrzahl von Drahtseilrillen (13) umfasst, die in einer Reihe angeordnet sind,
   wobei die Aufzugwindenvorrichtung **dadurch gekennzeichnet ist, dass** die Treibscheibe (12) ferner einen Lagereinsetzabschnitt (15) umfasst, der an einer Innenumfangsseite der Drahtseilaufwickelfläche (14) gebildet ist und der das erste Lager (7), das in den Lagereinsetzabschnitt (15) eingesetzt ist, aufnimmt, und
   dass in Richtung der Breite eine in Richtung der Breite gesehene Mitte des ersten Lagers (7), das in den Lagereinsetzabschnitt (15) eingesetzt ist, auf einer Innenseite eines Treibscheibenwellen-Lastschwerpunkts der Drahtseilaufwickelfläche (14) angeordnet ist, wobei die Innenseite eine Seite des Rotors in Richtung des Rotors ist.

2. Aufzugwindenvorrichtung nach Anspruch 1,
wobei das erste Lager (7) derart in den Lagereinsetzabschnitt (15) eingesetzt ist, dass 2B<C<A ist, wobei A ein Abstand von einem zweiten Ende der Drahtseilaufwickelfläche (14) zu dem Treibscheibenwellen-Lastschwerpunkt (W) der Drahtseilaufwickelfläche (14) ist, B ein Abstand zwischen der Mitte der Breite nach des ersten Lagers (7) und einem ersten Ende des ersten Lagers (7) ist, und C ein Abstand von dem ersten Ende des ersten Lagers (7) zu dem zweiten Ende der Drahtseilaufwickelfläche (14) ist, wobei sich das erste Lager (7) axial in Richtung des

Rotorkerns (5) des Rotors (11) von dem ersten (rechten) Ende des ersten Lagers (7) zu einem zweiten (linken) Ende des ersten Lagers ('7) erstreckt, wobei sich die Drahtseilaufwickelfläche (14) axial von einem ersten (rechten) Ende der Drahtseilaufwickelfläche (14) in Richtung des zweiten (linken) Endes der Drahtseilaufwickelfläche (14) zu dem Rotorkern (5) des Rotors (11) erstreckt.

3. Aufzugwindenvorrichtung, umfassend einen Stator (4), der einen Statorkern (3) enthält, der an einem Innenumfang eines Rahmens (2) angebracht ist, einen Rotor (11), der einen Rotorkern (5) enthält, der an einer Welle (6) angebracht ist, die durch erste und zweite Lager (7, 8) drehbar gelagert ist, die die Welle auf einer Seite eines inneren Laufrings aufnehmen und erste und zweite Halterungen (9, 10), die in dem Rahmen (2) vorgesehen sind, auf einer Seite eines äußeren Laufrings aufnehmen, und eine Treibscheibe (12), die an einem vorstehenden Endabschnitt der Welle montiert ist und zu einer Außenseite des ersten Lagers (7) vorsteht, wobei das erste Lager (7) ein treibscheibenseitiges Lager auf einer Seite der Treibscheibe des Rotors (11) ist, und das zweite Lager (8) ein treibscheibengegenseitiges Lager auf einer Gegenseite der Treibscheibe entgegengesetzt zu der Seite der Treibscheibe ist,

wobei die Treibscheibe (12) eine Drahtseilaufwickelfläche (14) umfasst, die an einer Außenumfangsseite gebildet ist und die eine Mehrzahl von Drahtseilrillen (13) umfasst, die in einer Reihe angeordnet sind,
wobei die Aufzugwindenvorrichtung **dadurch gekennzeichnet ist, dass** die Treibscheibe (12) ferner einen Lagereinsatzabschnitt (15) umfasst, der an einer Innenumfangsseite der Drahtseilaufwickelfläche (14) gebildet ist und der das erste Lager (7), das in den Lagereinsetzabschnitt eingesetzt ist, aufnimmt, und
dass in Richtung der Breite eine in Richtung der Breite gesehene Mitte des ersten Lagers (7), das in den Lagereinsatzabschnitt (15) eingesetzt ist, an dem Treibscheibenwellen-Lastschwerpunkt angeordnet ist.

4. Aufzugwindenvorrichtung nach Anspruch 3,
wobei das erste Lager (7) derart in den Lagereinsetzabschnitt (15) eingesetzt ist, dass C=A+B ist, wobei A ein Abstand von einem zweiten Ende der Drahtseilaufwickelfläche (14) zu dem Treibscheibenwellen-Lastschwerpunkt (W) der Drahtseilaufwickelfläche (14) ist, B ein Abstand zwischen der Mitte der Breite nach des ersten Lagers (7) und einem ersten Ende des ersten Lagers (7) ist, und C ein Abstand von dem ersten Ende des ersten Lagers (7) zu dem zweiten Ende der Drahtseilaufwickelfläche (14) ist, wobei sich das erste Lager (7) axial von dem ersten (rechten) Ende des ersten Lagers (7) zu einem zweiten (linken) Endes des ersten Lagers (7) in Richtung des Rotorkerns (5) des Rotors (11) erstreckt, wobei sich die Drahtseilaufwickelfläche (14) axial von dem ersten (rechten) Ende der Drahtseilaufwickelfläche (14) zu dem zweiten (linken) Ende der Drahtseilaufwickelfläche (14) in Richtung des Rotorkerns (5) des Rotors (11) erstreckt.

5. Aufzugwindenvorrichtung, umfassend einen Stator (4), der einen Statorkern (3) enthält, der an einem Innenumfang eines Rahmens (2) angebracht ist, einen Rotor (11), der einen Rotorkern (5) enthält, der an einer Welle (6) angebracht ist, die durch erste und zweite Lager (7, 8) drehbar gelagert ist, die die Welle auf einer Seite eines inneren Laufrings aufnehmen und erste und zweite Halterungen (9, 10), die in dem Rahmen (2) vorgesehen sind, auf einer Seite eines äußeren Laufrings aufnehmen, und eine Treibscheibe (12), die an einem vorstehenden Endabschnitt der Welle (6) montiert ist und zu einer Außenseite des ersten Lagers (7) vorsteht, wobei das erste Lager (7) ein treibscheibenseitiges Lager auf einer Treibscheibenseite des Rotors (11) ist, und das zweite Lager (8) ein treibscheibengegenseitiges Lager auf einer Gegenseite der Treibscheibe entgegengesetzt zu der Treibscheibenseite ist,

wobei die Treibscheibe (12) eine Drahtseilaufwickelfläche (14) umfasst, die an einer Außenumfangsseite gebildet ist und die eine Mehrzahl von Drahtseilrillen (13) umfasst, die in einer Reihe angeordnet sind,
wobei die Aufzugwindenvorrichtung **dadurch gekennzeichnet ist, dass** die Treibscheibe (12) ferner einen Lagereinsetzabschnitt (15) umfasst, der an einer Innenumfangsseite der Drahtseilaufwickelfläche (14) gebildet ist und der das erste Lager (7), das in den Lagereinsetzabschnitt eingesetzt ist, aufnimmt, und
dass in Richtung der Breite eine in Richtung der Breite gesehene Mitte des ersten Lagers (7), das in den Lagereinsetzabschnitt eingesetzt ist, auf einer Außenseite des Treibscheibenwellen-Lastschwerpunkts angeordnet ist, wobei die Außenseite eine Rotorgegenseite ist.

Revendications

1. Appareil de levage pour ascenseur, comprenant un stator (4) incluant un noyau de stator (3) attaché sur une périphérie interne d'un cadre (2), un rotor (11) incluant un noyau de rotor (5) attaché à un arbre (6) supporté en rotation, par un premier et un second palier (7, 8) recevant l'arbre (16) sur un côté des pistes intérieures, et recevant une première et une seconde monture (9, 10) prévues sur le cadre (2) sur un côté des pistes extérieures, et une

poulie (12) montée sur une portion terminale en projection de l'arbre (6) qui se projette vers un côté extérieur du premier palier (7), le premier palier (7) étant un palier côté poulie disposé sur un côté du rotor (11) vers la poulie et le second palier (8) étant un palier côté opposé à la poulie disposé sur un côté opposé au côté poulie,
dans lequel la poulie (12) inclut une surface d'enroulement de câble (14) qui est formée sur un côté périphérique extérieur et qui inclut une pluralité de rainures à câble (13) arrangées dans une rangée,
l'appareil de levage pour ascenseur étant **caractérisé en ce que** la poulie (12) inclut en outre une portion d'insertion de palier (15) qui est formée sur un côté périphérique intérieur de la surface d'enroulement de câble (14) et qui reçoit le premier palier (7) inséré dans la portion d'insertion de palier (15), et
un milieu, dans une direction dans le sens de la largeur, du premier palier (7) inséré dans la portion d'insertion de palier (15), est positionné sur un côté intérieur d'un centre de charge sur l'arbre de poulie de la surface d'enroulement de câble (14), le côté intérieur étant un côté rotor tourné vers le rotor.

2. Appareil de levage pour ascenseur selon la revendication 1, dans lequel le premier palier (7) est inséré dans la portion d'insertion de palier (15) de sorte que $2B < C < A$, où A est une distance depuis une seconde extrémité de la surface d'enroulement de câble (14) jusqu'au centre de charge de l'arbre de poulie (W) de la surface d'enroulement de câble (14), B est une distance entre le milieu, dans le sens de la largeur, du premier palier (7) et une première extrémité du premier palier (7), et C est une distance depuis la première extrémité du premier palier (7) jusqu'à la seconde extrémité de la surface d'enroulement de câble (14), le premier palier (7) s'étendant axialement vers le noyau de rotor (5) du rotor (11), depuis la première extrémité (à droite) du premier palier (7) jusqu'à une seconde extrémité (à gauche) du premier palier (7'), la surface d'enroulement de câble (14) s'étendant axialement depuis une première extrémité (à droite) de la surface d'enroulement de câble (14) jusqu'à la seconde extrémité (à gauche) de la surface d'enroulement de câble (14) vers le noyau de rotor (5) du rotor (11).

3. Appareil de levage pour ascenseur comprenant un stator (4) incluant un noyau de stator (3) attaché à une périphérie intérieure d'un cadre (2), un rotor (11) incluant un noyau de rotor (5) attaché à un arbre (6) supporté en rotation, par un premier et un second palier (7, 8) qui reçoivent l'arbre sur un côté des pistes intérieures et qui reçoivent une première et une seconde monture (9, 10) prévues dans le cadre (2) sur un côté des pistes extérieures, et une poulie (12) montée sur une portion terminale en projection de l'arbre, qui se projette vers un côté extérieur du premier palier (7), le premier palier (7) étant un palier côté poulie sur un côté du rotor (11) vers la poulie, et le second palier (8) étant un palier côté opposé à la poulie, sur un côté de la poulie opposé au côté poulie,
dans lequel la poulie (12) inclut une surface d'enroulement de câble (14) qui est formée sur un côté périphérique extérieur et qui inclut une pluralité de rainures à câble (13) arrangées dans une rangée,
l'appareil de levage pour ascenseur étant **caractérisé en ce que** la poulie (12) inclut en outre une portion d'insertion de palier (15), qui est formée sur un côté périphérique intérieur de la surface d'enroulement de câble (14) et qui reçoit le premier palier (7) inséré dans la portion d'insertion de palier, et un milieu, dans la direction dans le sens de la largeur, du premier palier (7) inséré dans la portion d'insertion de palier (15), est positionné au niveau du centre de charge de l'arbre de poulie.

4. Appareil de levage pour ascenseur selon la revendication 3, dans lequel le premier palier (7) est inséré dans la portion d'insertion de palier (15), de telle façon que $C = A + B$, où A est une distance depuis une seconde extrémité de la surface d'enroulement de câble (14) jusqu'au centre de charge de l'arbre de poulie (W) de la surface d'enroulement de câble (14), B est une distance entre le milieu, dans le sens de la largeur, du premier palier (7) et une première extrémité du premier palier (7), et C est une distance depuis la première extrémité du premier palier (7) jusqu'à la seconde extrémité de la surface d'enroulement de câble (14), le premier palier (7) s'étendant axialement depuis la première extrémité (à droite) du premier palier (7) jusqu'à une seconde extrémité (à gauche) du premier palier (7) vers le noyau de rotor (5) du rotor (11), la surface d'enroulement de câble (14) s'étendant axialement depuis une première extrémité (à droite) de la surface d'enroulement de câble (14) jusqu'à la seconde extrémité (à gauche) de la surface d'enroulement de câble (14), vers le noyau de rotor (5) du rotor (11).

5. Appareil de levage pour ascenseur comprenant un stator (4) incluant un noyau de stator (3) attaché à une périphérie intérieure d'un cadre (2), un rotor (11) incluant un noyau de rotor (5) attaché à un arbre (6) supporté en rotation, par un premier et un second palier (7, 8) qui reçoivent l'arbre sur un côté des pistes intérieures et qui reçoivent une première et une seconde monture (9, 10) prévues dans le cadre (2) sur un côté des pistes extérieures, et une poulie (12) montée sur une portion terminale en projection de l'arbre (6) qui se projette vers un côté extérieur du premier palier (7), le premier palier (7) étant un palier côté poulie sur un côté du rotor (11) vers la poulie, et le second palier (8) étant un palier du côté opposé à la poulie sur un côté opposé au côté poulie,
dans lequel la poulie (12) inclut une surface d'enroulement de câble (14) qui est formée sur un côté périphérique extérieur et qui inclut une pluralité de rainures à câble (13) arrangées dans une rangée,

l'appareil de levage pour ascenseur étant **caractérisé en ce que** la poulie (12) inclut en outre une portion d'insertion de palier (15) qui est formée sur un côté périphérique intérieur de la surface d'enroulement de câble (14) et qui reçoit le premier palier (7) inséré dans la portion d'insertion de palier, et un milieu, dans la direction dans le sens de la largeur, du premier palier (7) inséré dans la portion d'insertion de palier, est positionné sur un côté extérieur du centre de charge de l'arbre de poulie, le côté extérieur étant un côté opposé au rotor.

FIG.1B

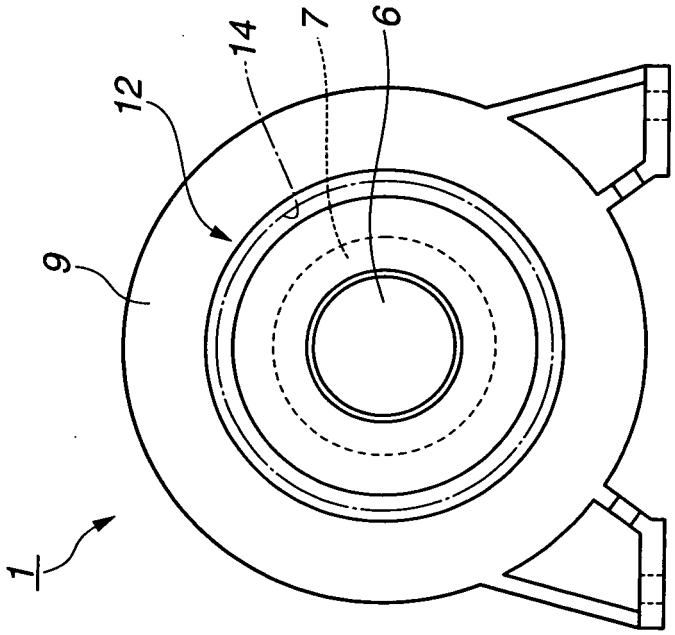
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FIG.1A

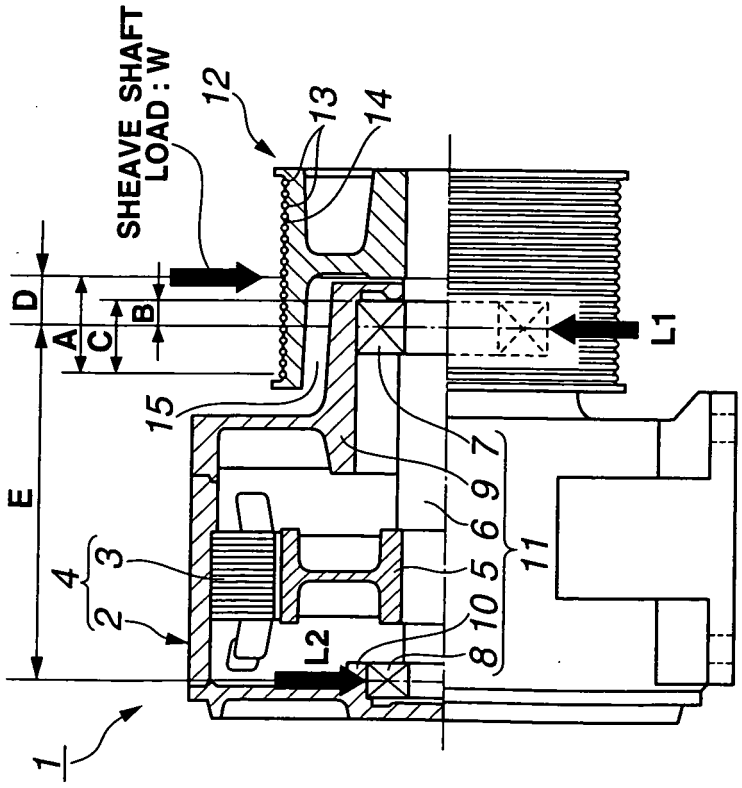
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FIG.2B

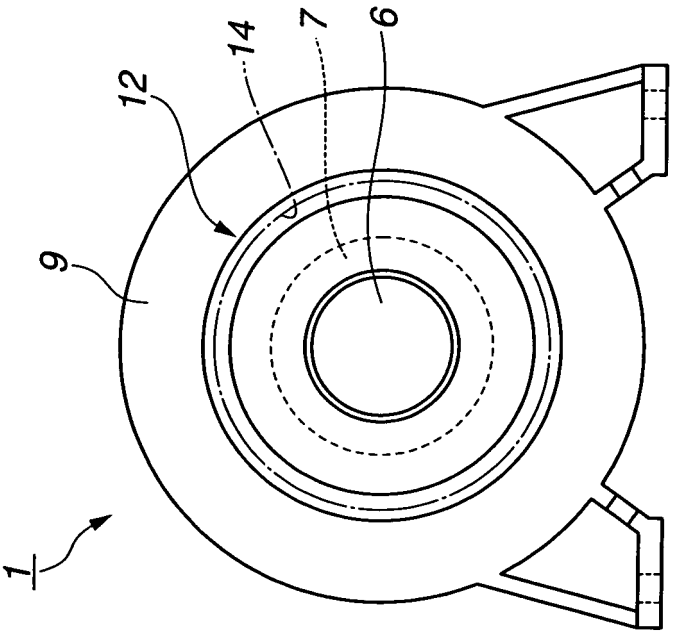
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FIG.2A

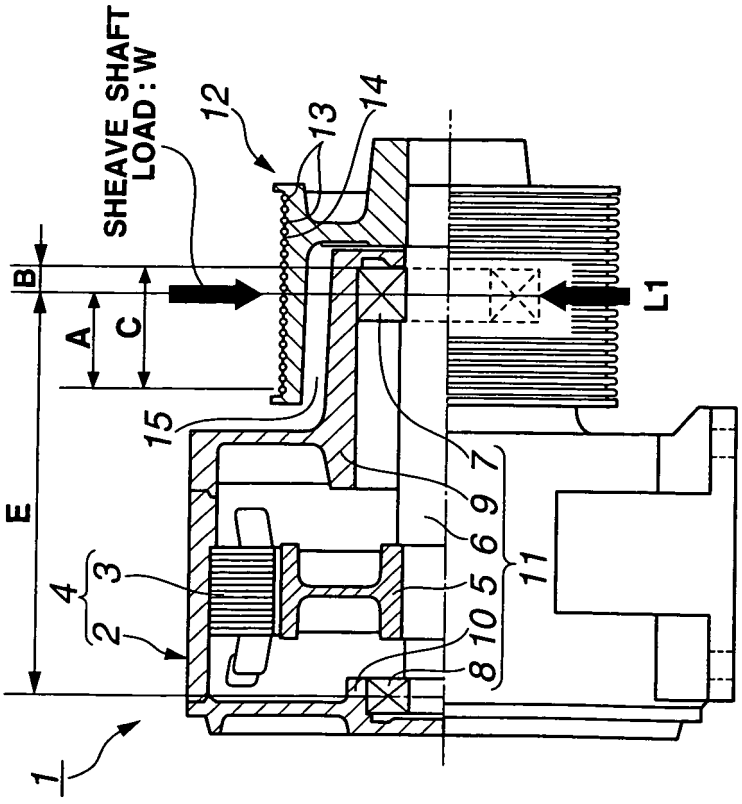
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FIG.3B

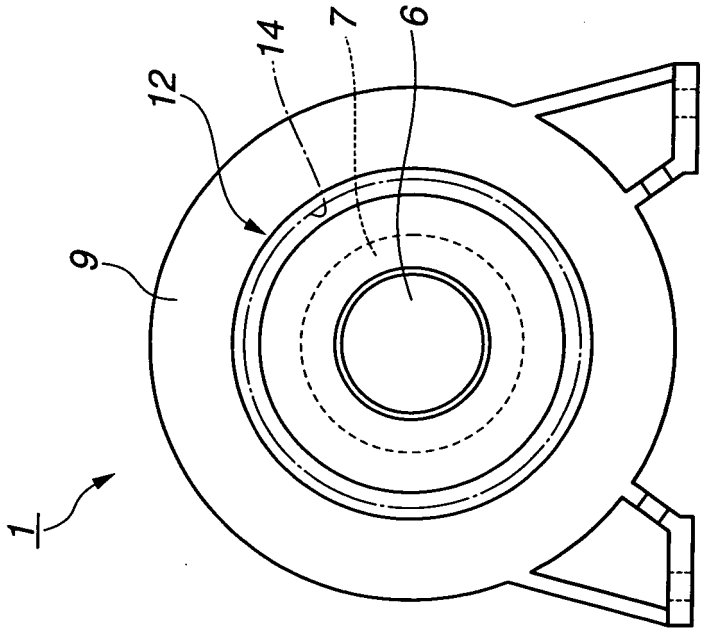
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FIG.3A

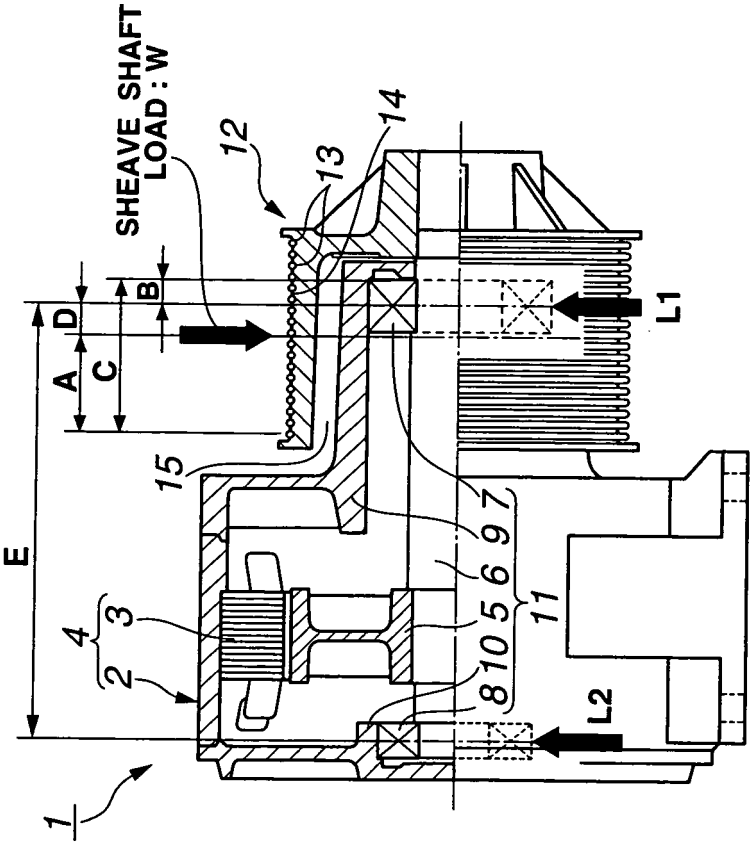
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FIG.4

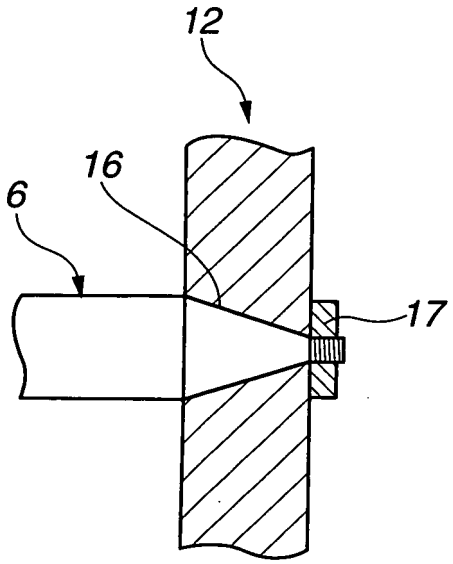

FIG.5

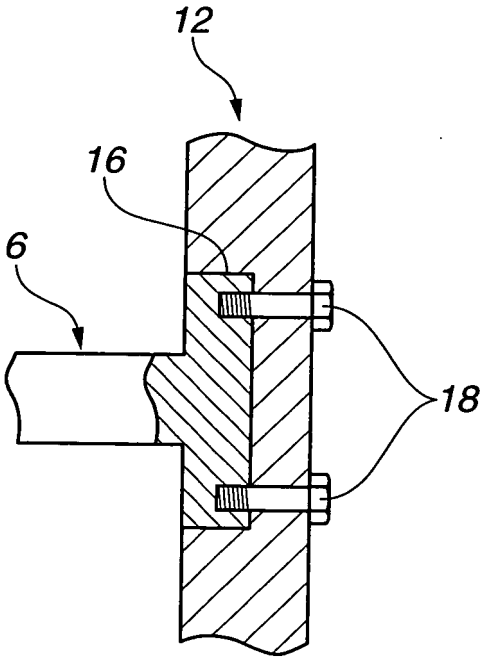

FIG.6B

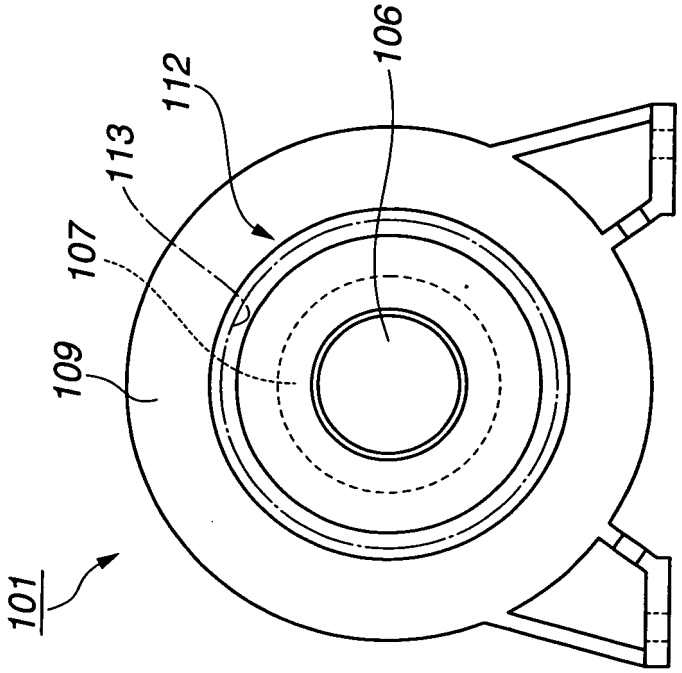
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FIG.6A

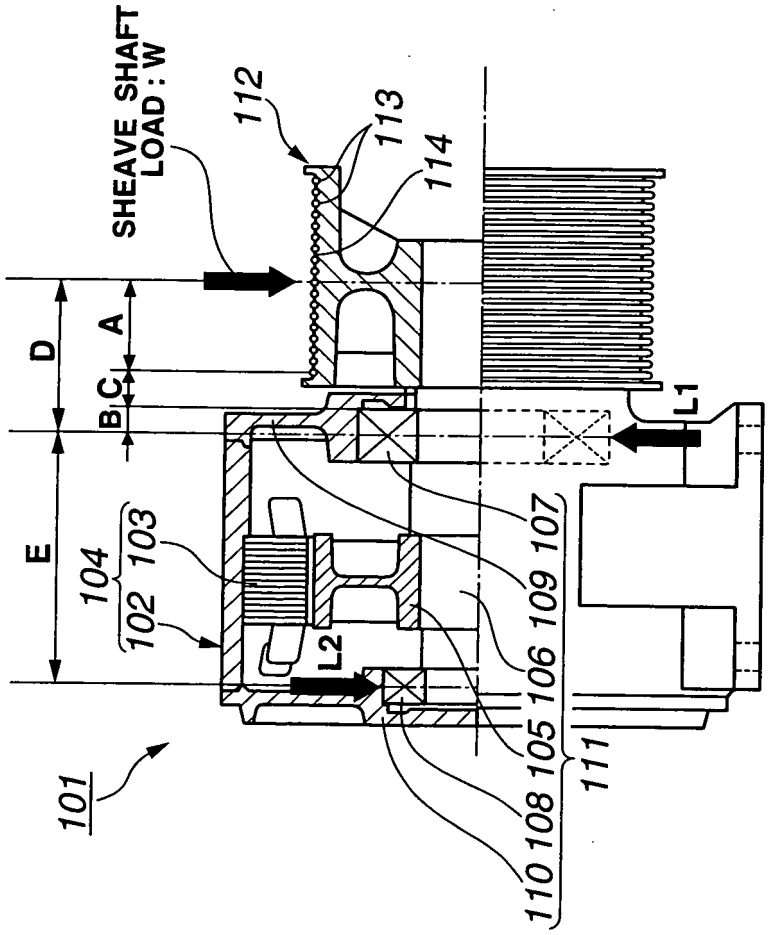
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FIG.7B

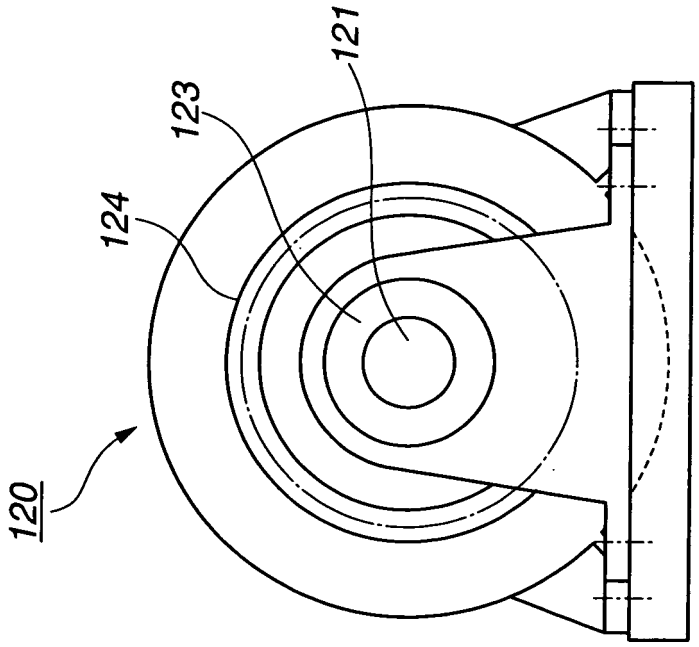
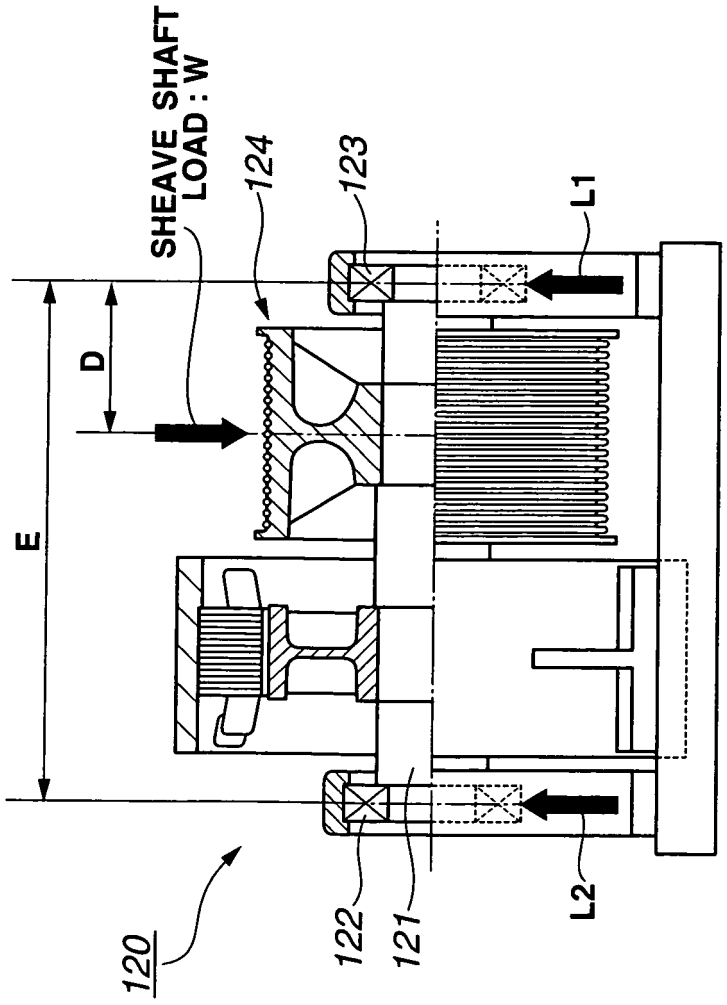


FIG.7A



REFERENCES CITED IN THE DESCRIPTION

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