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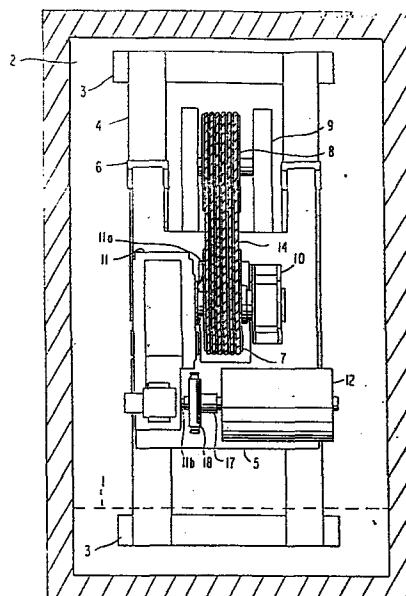
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⑤④ **Elevator drive apparatus.**

⑤⑦ A drive apparatus for an elevator has a base member (5) and a driving sheave (7) mounted on the base member. The ends of a rotational shaft (11a) of the driving sheave are supported by a reduction gear mechanism (11) and a bearing holder (10) mounted on the base member on opposite sides of the driving sheave (7). An electric motor (12) for driving the gear mechanism is mounted at one end of the base member, preferably opposite a deflector sheave (8) mounted at the other end. This symmetrical arrangement reduces the size of the apparatus and vibrations.



Elevator Drive Apparatus

This invention relates to a drive apparatus for an elevator. Such an apparatus may be adapted to be installed in a machine room above an elevator shaft or hoistway.

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Conventional electric elevators are provided with an electric drive apparatus located above the hoistway for raising and lowering the car suspended by a main cable. The car is essentially disposed in the cross-sectional center of the hoistway, and the center portion of the car is suspended by the main cable reeled on a driving sheave of the apparatus. One drawback of a drive apparatus of this type is that the driving sheave is not centrally mounted and the machine room space thus projects laterally outwardly from the upper portion of the hoistway, which is undesirable from a space saving standpoint in buildings.

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Another drawback of a drive apparatus of this type is that the machine room space is increased because of the inefficient arrangement of the apparatus components. Furthermore, if space design limitations for the
5 elevator cannot be overcome, then a given elevator drive apparatus may be limited to installation only in small buildings.

It is an object of this invention to produce a drive
10 apparatus for an elevator which is designed to eliminate or at least to reduce at least one of the above-mentioned defects of conventional devices by providing a drive apparatus that efficiently utilizes the space in the machine room.

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According to the invention, there is provided a drive apparatus for an elevator characterized by:

- a). a base member for mounting in a machine room;
- 20 b) a driving sheave mounted on said base member, a rotational shaft for said driving sheave being arranged transversely of said base member;
- c) a bearing holder mounted on said base member at one side of said driving sheave for supporting one end of
25 said rotational shaft;
- d) a reduction gear mechanism mounted on said base member at the other side of said driving sheave for supporting the other end of said rotational shaft; and
- e) drive means mounted on said base member and coupled
30 to said reduction gear mechanism to drive said sheave.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying
35 drawings, in which:

Fig. 1 shows a side sectional view of an elevator employing a drive apparatus according to one embodiment of the present invention;

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Fig. 2 shows a sectional view of the drive apparatus from the right hand side of Fig. 1;

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Fig. 3 shows a plan view of the drive apparatus of Fig. 1; and

Fig. 4 shows a sectional view of a reduction gear mechanism.

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Figs. 1 to 3 show a hoistway 1 for an elevator car 15 installed in a building. A machine room 2 is provided above the hoistway, and communicates therewith through holes 2b in the floor 2a of the machine room. A traction drive base bed 3 is mounted on the floor 2a, and a

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machine bed 4 is supported on the base bed at both of its ends. A base member 5 is mounted in the center of the machine room 2 on the machine bed 4 by damping members 6 made of vibration absorbing material. A

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driving sheave 7 is centrally mounted lengthwise (Fig. 1) above the base member 5 on a transverse output shaft 11a as described below. A deflector sheave 8 arranged behind and below the driving sheave is journaled to a support member 9 suspended from the base member. A bearing holder 10 is mounted on the base member 5

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alongside the driving sheave 7. A reduction gear mechanism 11 is installed on the base member 5, and is driven by an input shaft 11b arranged at one end of the base member.

As shown in Fig. 4, the reduction gear mechanism includes an output shaft 11a, a casing 11c, and first, second, third, fourth, fifth and sixth gear wheels 11d through 11i all of the parallel tooth type. One end 11k of the output shaft 11a is rotatably supported by bearings 11j, while its other end 11l is rotatably supported by the bearing holder 10.

10 An electric drive motor 12 mounted on the base member 5 is connected to the input shaft 11b of the reduction gear mechanism by a coupling 18. A concrete cinder floor 13 covers the main floor 2a. A main cable 14 is reeled around the driving sheave 7 and deflector sheave 8, and
15 passes through the holes 2b to the hoistway 1 from the machine room 2. An elevator car 15 is connected to one end of the main cable, and includes a frame 15a in which a cab 15b is supported by vibration absorbing rubber members 15c. A counter weight 16 is connected to the
20 other end of the cable. A brake unit 17 is provided on the input shaft 11b.

With the bearing holder 10, the reduction gear mechanism 11 and the electric drive motor 12 arranged around the
25 driving sheave 7 as described above, the overall drive apparatus is substantially symmetrical on both the right and left sides of the centered driving sheave 7, whereby the apparatus can be installed in a narrow machine room 2 formed to correspond with the upper space of the
30 hoistway 1. Thus, the elevator can be set up inside a small space in buildings.

Further, with one end of the shaft 11a of the driving sheave supported by the bearing holder 10 independent of
35 the gear mechanism 11, the load on the gear mechanism

and attendantly its size is considerably reduced. Since the drive motor 12 is independently mounted on the base member 5, it can comprise any appropriate mass produced type of motor whereby the cost of the drive apparatus is further reduced. With both ends of the driving sheave shaft being independently supported and journaled the operational flexing of the shaft is decreased and the mesh between the gears of the reduction mechanism is improved, whereby the level of vibration and noise occurring in the gear mechanism is reduced. The propogation of any vibration to the hoistway 1 or to the building is minimized by the base member 5 being supported by damping member 6. Further, the propagation of vibration to the cab 15b is prevented by the cab being supported by the vibration absorbing rubber members 15c on the car frame 15a, whereby the environment created in and around the elevator is quiet and pleasing to the passengers.

Briefly summarized, the invention provides a bearing holder for journaling the rotating shaft of the driving sheave and disposed on one side of the sheave, and a reduction gear mechanism disposed on the other side of the sheave. An electric motor for driving the input shaft of the gear mechanism is disposed at one end of a base member centrally mounting the sheave and other components, opposite a deflector sheave from which a counterweight is suspended. This symmetrical arrangement not only minimizes the size and space requirements of the apparatus, but also reduces operational noise and vibration.

Claims:

- 5 1. A drive apparatus for an elevator characterized by:
a) a base member (5) for mounting in a machine room (2);
b) a driving sheave (7) mounted on said base member, a
rotational shaft (11a) for said driving sheave being
10 arranged transversely of said base member;
c) a bearing holder (10) mounted on said base member at
one side of said driving sheave for supporting one end
of said rotational shaft;
d) a reduction gear mechanism (11) mounted on said base
15 member at the other side of said driving sheave for
supporting the other end of said rotational shaft; and
e) drive means (12) mounted on said base member and
coupled to said reduction gear mechanism to drive said
sheave.
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- 2.. Apparatus according to claim 1 characterized in that
said base member is elongate.
3. Apparatus according to claim 2 characterized in that
25 said driving sheave (7) is mounted centrally of the
length of said base member (5).
4. Apparatus according to any one of the preceding
claims characterized in that said drive means (12) is
30 mounted on said base member at a side of said driving
sheave opposite to its output side.
5. Apparatus according to any one of the preceding
claims characterized by a deflector sheave (8) mounted
35 on said base member for deflecting a cable reeled around
said driving sheave.

6. Apparatus according to claim 5 when dependent on claim 4 characterized in that said deflector sheave (8) and said drive means (12) are mounted at opposite sides of said driving sheave (7).

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7. Apparatus according to any one of the preceding claims characterized in that said driving sheave (7) is mounted in a central area of a machine room.

10 8. Apparatus according to any one of the preceding claims characterized in that said drive means is an electric motor.

15 9. An elevator characterized by drive apparatus according to any one of the preceding claims.

FIG. 1

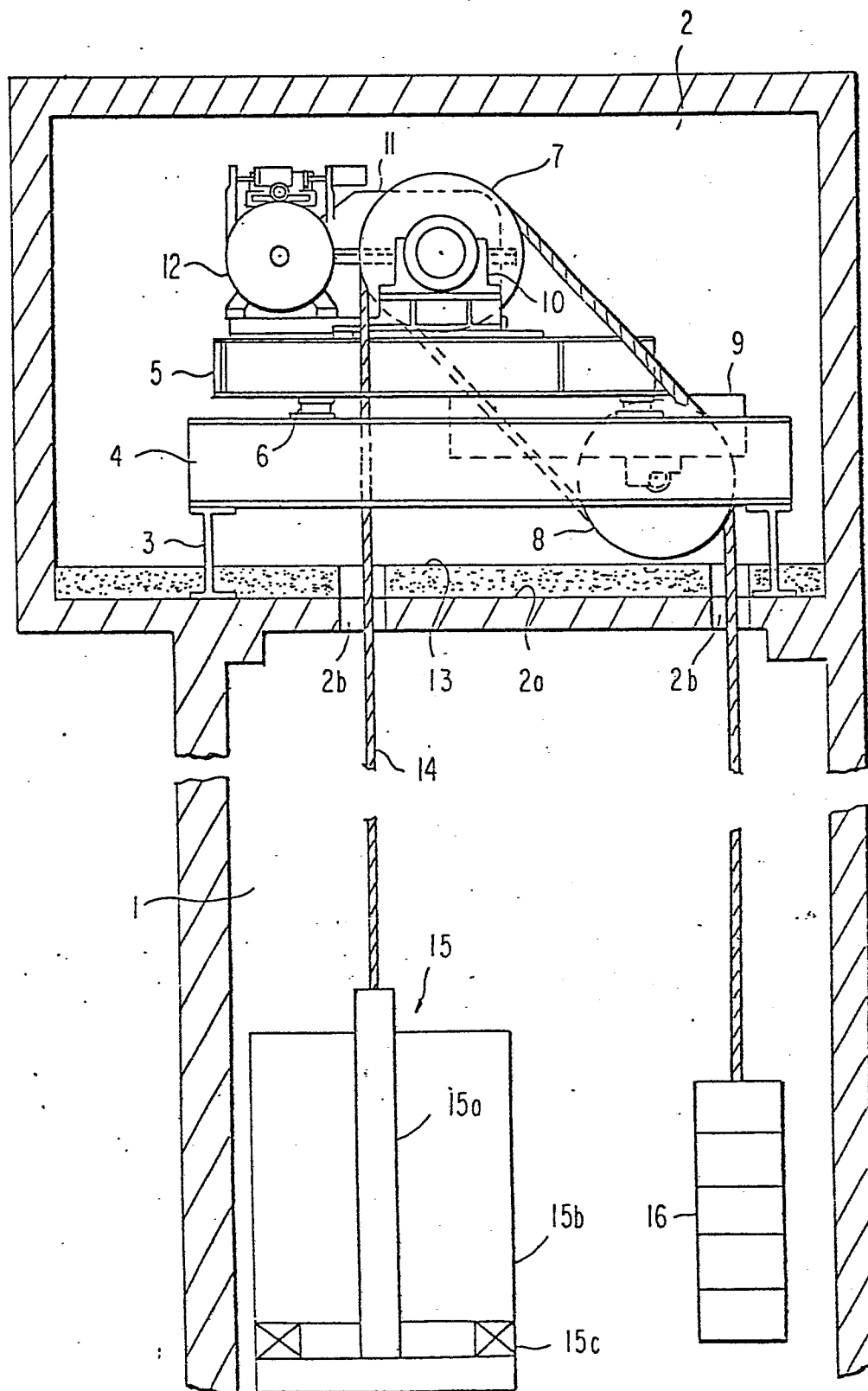
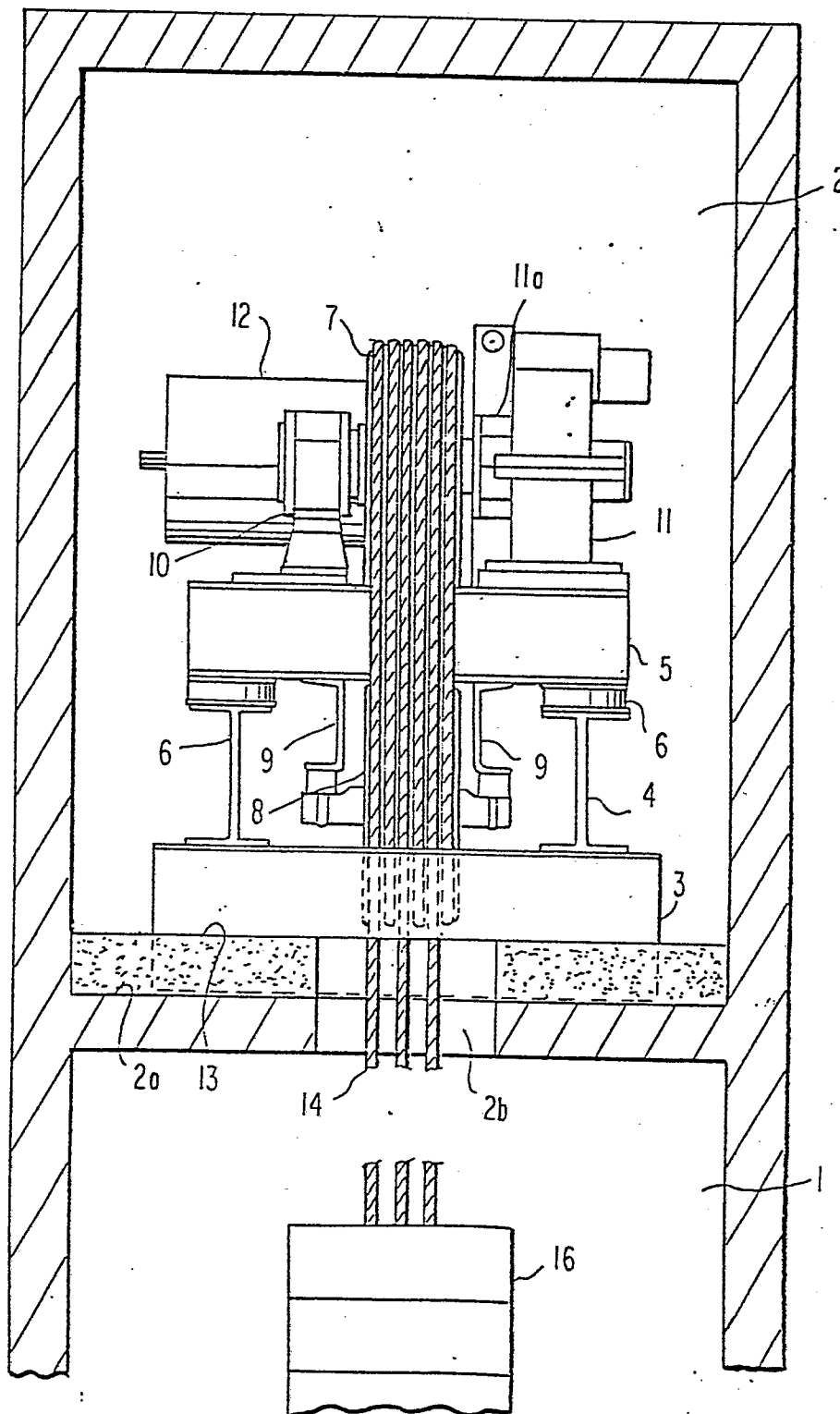


FIG. 2



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Fig 3

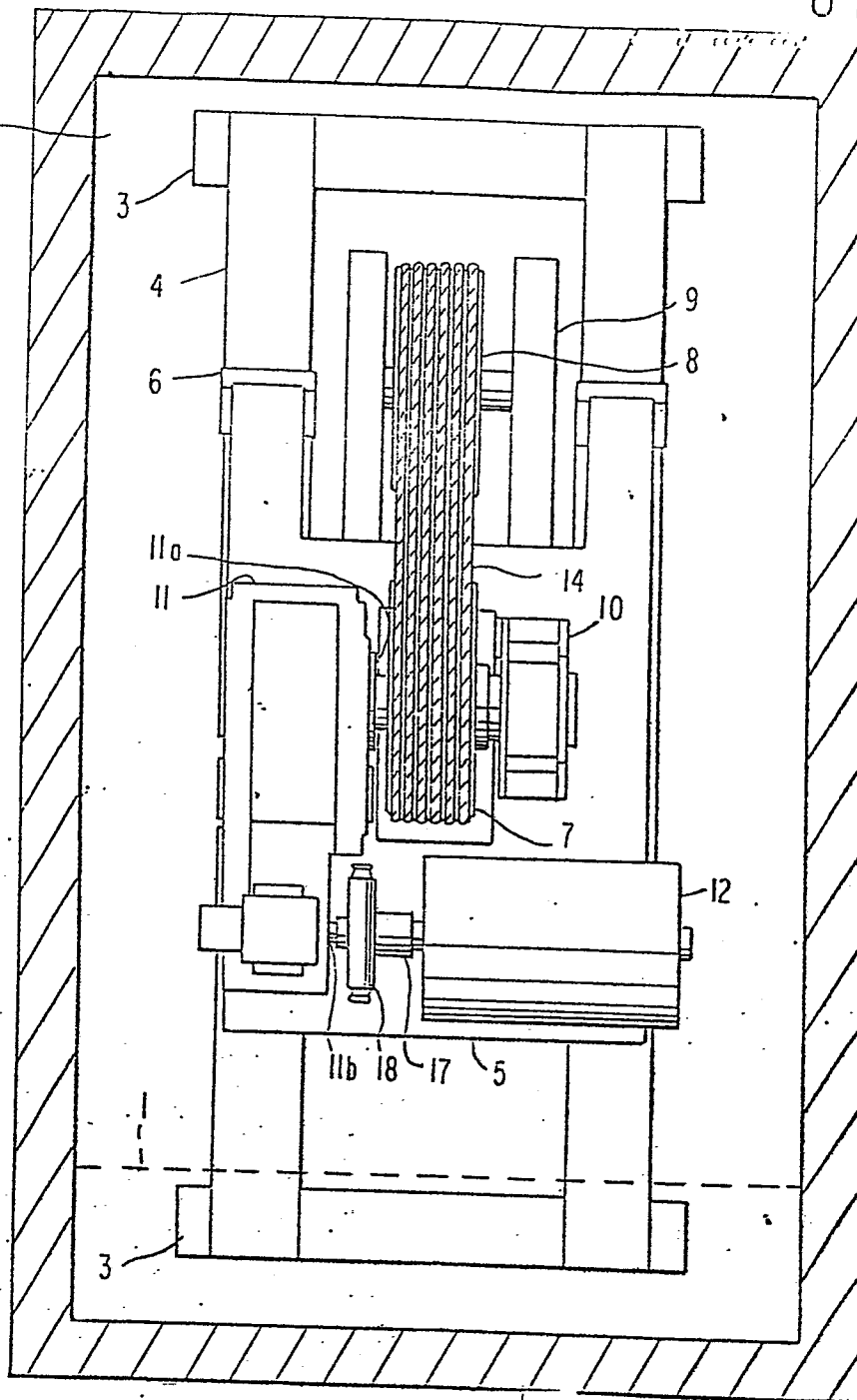


FIG 4

