



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 377 516 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
08.03.2006 Bulletin 2006/10

(51) Int Cl.:
B66B 13/30 ^(2006.01) **B66B 9/04** ^(2006.01)
B66B 11/00 ^(2006.01)

(21) Application number: **01925882.1**

(86) International application number:
PCT/IT2001/000190

(22) Date of filing: **17.04.2001**

(87) International publication number:
WO 2002/081353 (17.10.2002 Gazette 2002/42)

(54) **HYDRAULIC DRIVE UNIT MOUNTED IN THE ELEVATOR SHAFT**

IM AUFZUGSSCHACHT EINGEBAUTE HYDRAULISCHE ANTRIEBSEINHEIT

UNITE D'ENTRAINEMENT HYDRAULIQUE MONTEE DANS LA CAGE D'ASCENSEUR

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**

(30) Priority: **05.04.2001 IT MI20010728**

(43) Date of publication of application:
07.01.2004 Bulletin 2004/02

(73) Proprietor: **I.G.V. S.P.A.
20060 Vignate (IT)**

(72) Inventor: **VOLPE, Giuseppe
I-20060 Vignate (IT)**

(74) Representative: **Mocchetti, Ilio G.
Via Aldrovandi, 7
20129 Milano (IT)**

(56) References cited:
WO-A-97/42119 WO-A-99/43596

EP 1 377 516 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The invention concerns an hydraulically-operated means for passenger or goods elevators.

[0002] The general term "elevator" is used here to indicate an installation constructed for carrying either passengers or goods, so that the general term "loading platform" applies both to a cabin for passengers or to a cage for goods.

[0003] Basically, elevators are of two kinds, worked either by cables or by hydraulic means.

[0004] In both cases some space is usually required in which to install the machinery for operating the elevator.

[0005] Where an elevator is of the hydraulic type, the machinery includes a hydraulic drive unit comprising a tank for the fluid, a pumping unit with a positive-displacement pump and electric motor, and a set of valves to work the various stages of movement.

[0006] In the room housing the machinery, there are also electric or electronic control panels for operating movement of the loading platform, for power and for lighting.

[0007] The European elevator directive 95/16/CE and the certification systems for warranties and quality at present in use permit installation of elevators that do not require a room for machinery.

[0008] Several solutions have been adopted for cable-operated elevators, such as installation of the winch, flat, in the elevator shaft.

[0009] The prior patent WO 97/42119A discloses a housing (18) to contain the machinery of a hydraulic elevator, placed adjacent to the doorway (12) of a landing of the shaft thus replacing a piece of permanent wall (14) of said shaft and partially occupying the landing.

[0010] Bearing in mind the limited space available for the housing (18) almost entirely contained within the thickness of the wall, use is made of the full height of the wall between two landings and a pump with a vertical axis is provided.

[0011] The prior patent WO 99/43596 A discloses a control cabinet (402) shown in Fig. 6 of said patent, comprising a drive motor controller (406) for the electrical system of an electric elevator with flat ropes (29), illustrated in Fig. 2 of said patent, instead of the round ropes (28) shown in Fig. 1 of said patent.

[0012] Said control cabinet (402) can slide from a position inside the hoistway (12) to a position adjacent to a landing (18) accessible to maintenance personnel.

[0013] In the case of hydraulically operated elevators where a room for machinery is not provided, the drive unit is installed either in the pit, or near to one of the floor doors or else in a cupboard placed in some free space.

[0014] All these solutions present the following drawbacks.

[0015] If the drive unit is installed in the pit, any maintenance work required means taking the elevator out of service to allow the technician to get down into the pit.

[0016] This also means that the pit must be big enough for the purpose.

[0017] If the drive unit is installed near one of the floor doors, overall dimensions are greater than those needed for an elevator with a machine room. In this case, and in order to repair or replace faulty parts such as the electric motor for example, the whole of the adjacent structures must be taken down.

[0018] If the drive unit is placed in a cupboard outside the elevator shaft, space is needed for it that could be otherwise used.

[0019] Cooling of the hydraulic fluid is also more complex involving higher costs for refrigeration systems, or else imposing a reduction in the number of journeys per hour that the elevator can make.

[0020] The weight of the cupboard also adds to the difficulty of carrying and installing it.

[0021] The invention here described eliminates these drawbacks as will now be explained.

[0022] Subject of the invention is an hydraulically-operated means for elevators carrying either passengers or goods worked by an hydraulic, drive unit of a flat, compact and substantially parallelepiped structure, placed in the elevator shaft at the level of any stop made by the loading platform, between the wall of said shaft, in common with that of the landing, and the vertical guide of said loading platform nearest to said wall.

[0023] The rear wall of the drive unit substantially matches with the lateral wall of the elevator shaft.

[0024] On the wall of the shaft in common with that of the landing, an aperture, at the position of the lateral wall of the drive unit, is made to permit said drive unit to be passed through it laterally.

[0025] At the position of the aperture made in the wall of the landing, to permit passage of the drive unit, there is a cupboard with a door at the front and having an internal side substantially aligned with the lateral wall of the elevator shaft to allow the drive unit to fit in between the loading platform guide and said door.

[0026] The drive unit can slide freely sideways using sliding means above and below.

[0027] The drive unit's upper guiding means consists of a bar placed on the lateral wall of the elevator shaft, said bar extending onto the internal side of the cupboard and being substantially aligned with said shaft.

[0028] Mounted by pins on said bar are pulleys, in the races of which the upper horizontal end of a vertical rib, on the rear wall of the drive unit, slides freely.

[0029] The lower guiding means comprises horizontal carrying rollers fixed transversally by pins onto plates placed at the base of the drive unit's structure, said rollers sliding freely in a horizontal channel.

[0030] Said horizontal channel comprises a fixed section that extends between a bracket, fixed from the lateral wall of the elevator shaft to the nearest guide for the loading platform, to the landing, and comprises a mobile section, substantially the same as the fixed section and connected to it by a crosswise hinge that allows said mobile

section to stand vertically, against the lateral wall of the drive unit, or be laid flat on the landing, aligned with the fixed section.

[0031] The lower guiding means consists of a horizontal telescopic complex comprising a pair of guides fixed to the base of the drive unit, a fixed channel that extends between a horizontal bracket, fixed between the lateral wall of the elevator shaft and the nearest guide for the loading platform, and the landing, and comprises an intermediate freely sliding channel.

[0032] Space is made in the lower end of the drive unit structure for an oil tank while uppermost is the set of valves placed vertically and the control solenoids lying horizontally.

[0033] The invention offers evident advantages.

[0034] The fact that the drive unit can be completely drawn out by hand onto the landing where the elevator has stopped, enables any internal component to be reached without the mechanic having to enter the elevator shaft.

[0035] This ensures the necessary space and accessibility for ordinary or special maintenance and repairs, in complete safety.

[0036] Installation of the drive unit inside the elevator shaft, isolated from the outside, signifies optimum cooling without the need for a system of refrigeration, and less noise perceptible from the landings.

[0037] Manual operation to bring the cabin to the nearest floor is done from the landing by pressing a button switch, there being thus no need to draw the drive unit out of its usual position.

[0038] The convenient position of the cupboard, one of whose sides is substantially aligned with the side wall of the elevator shaft, means that a part of the drive unit's structure is situated in said cupboard, so further reducing the bulk of the whole installation when mounted.

[0039] Characteristics and purposes of the disclosure will become still clearer from the following examples of its execution illustrated by diagrammatically drawn figures.

[0040] Fig. 1 Elevator shaft as in the invention, with extractable hydraulic drive unit, installed in place, and the cupboard beside the door opening at a landing, in perspective partially cut through.

[0041] Fig. 2 Elevator shaft, with the elevator, cross section.

[0042] Fig. 3 As above, with the drive unit being pulled out, cross section.

[0043] Fig. 4 As above, with the drive unit fully extracted, perspective.

[0044] Fig. 5 As in Figure 1, with the drive unit extracted, perspective.

[0045] Fig. 6 Detail of the upper guide system for extracting the drive unit, side view.

[0046] Fig. 7 Detail of the lower guide system for extracting the drive unit, side view.

[0047] Fig. 8 Detail of another version of the lower guide system for extracting the drive unit, perspective.

[0048] In Figures 1, 3, 4, the door at the shaft opening 25 on the landing 21 is not shown for simplicity.

[0049] The hydraulic drive unit 30 with its substantially flat and parallelepiped structure 31, which also houses a tank for oil, presents at the top a set of valves 35, the horizontally lying solenoids 36 for working the valves, and the button switch 37 for moving the cabin by hand in case of emergency.

[0050] The drive unit 30 is installed in the elevator shaft 20 for the elevator 10, said unit's rear wall 32 (Figures 2,3) substantially matching with the side wall 23 of said shaft, between the guide 15 of the elevator 10 and the door 61 of a cupboard 60 (Figure 1) placed in the front wall 22, with the door 26 (Figure 2) of the landing 21.

[0051] In the bottom 62 (Figure 5) of said cupboard 60 is an aperture 63 for passage of the drive unit 30 and, above said aperture, is the control panel 65 for movement, power and lighting.

[0052] The internal wall 64 of one side of the cupboard is substantially aligned with the side wall 23 of the elevator shaft 20.

[0053] The drive unit 30 can be drawn out onto the landing 21 sliding along a set of upper and lower guides.

[0054] The lower guide comprises a fixed channel 46 that extends from the horizontal bracket 45, fixed between the side wall 23 of the elevator shaft and the guide 15 of the elevator, to the landing 21.

[0055] The end of said channel 46 is joined to a second channel 47 substantially the same as the first, that, by means of a horizontal hinge 48, can bend vertically 47' (Figure 7) against the side wall 33 of the structure 31 of the drive unit, or can lie horizontally on the landing 21 as an extension of the channel 46 (Figures 3,4).

[0056] The drive unit slides in the channels 46, 47 facilitated by the rollers 40 supported by plates 41 and turning freely on pins 42.

[0057] The upper guide system for the drive unit comprises a horizontal bar 52 fixed onto the side wall 23 of the elevator shaft extending as far as the side 64 of the cupboard 60 and substantially aligned with said side wall 23.

[0058] By means of the pins 57, said bar 52 (Figure 6) supports the pulleys 55 within whose races 56 can freely slide the upper end of the flat rib 50 extending vertically from the rear wall 32 of the structure 31 of the drive unit.

[0059] Maintenance work is clearly facilitated by the fact that, on opening the door 61 of the cupboard 60 and lowering the front section 47 of the guide channel 46, the drive unit can be manually drawn right out onto the landing 21 where the elevator stops.

[0060] Alternatively, the lower guide for the drive unit is made as shown in Figure 8, with a pair of parallel guides 70 fixed to the lower wall of of the unit's structure 31, a channel 72 that extends from the horizontal bracket 45, fixed to the guide 15 of the elevator shaft 20, to the landing 21, and a freely sliding intermediate channel 71.

Claims

1. Hydraulically-operated elevator system for passengers or goods comprising a hydraulic drive unit (30), a loading platform (10) and an elevator shaft (20) with a vertical guide of the loading platform, characterized in that the hydraulic drive unit (30), with its flat compact substantially parallelepiped structure (31), is situated in the elevator shaft (20) at the position of any one stop of the loading platform (10), between the wall (22) of said elevator shaft (20) common with that of the landing (21) and the vertical guide (15) of said loading platform (10) nearest to said wall (22).
2. Hydraulically-operated means (30) as in claim 1, **characterized in that** the drive unit (30) presents a structure (31) in whose lower end is a tank for oil and at whose upper end is the set of valves (35) placed vertically, and operating solenoids (36) laid horizontally.
3. Hydraulically-operated means (30) as in claims 1, **characterized in that**, in the wall (22) of the elevator shaft (20), in common with that of the landing (21), an aperture (63) is made at the position of the lateral wall (33) of the drive unit (30), to allow said drive unit (30) to be passed through sideways and **characterized in that**, at the position of the aperture (63) in the wall (22) of the landing (21) for passage of the drive unit (30), there is a cupboard (60) with a door (61) at the front and with an internal side (62) substantially aligned with the side wall (23) of the shaft (20), the drive unit (30) being lodged between the guide (15) of the loading platform (10) and said door (61).
4. Hydraulically-operated means (30) as in claim 1, **characterized in that** the drive unit (30) can make freely sliding lateral translations on upper and lower guide systems.
5. Hydraulically-operated means (30) as in claim 4, **characterized in that** the upper guide system consists of a bar (52) placed on the side wall (23) of the elevator shaft (20) extending along the inner side (64) of the cupboard (60) substantially aligned with said shaft (20), there being pulleys (55) on said bar (52), held by pins (57), in whose races (56) can freely slide the upper horizontal end of a vertical rib (50) on the rear wall (32) of the drive unit (30).
6. Hydraulically-operated means (30) as in claim 4, **characterized in that** the lower guide system comprises horizontal carrying rollers (40) fixed transversally by pins (42) onto plates (41) placed on the base of the structure (31) of the drive unit (30), freely sliding in a horizontal channel (46,47).

7. Hydraulically-operated means (30) as in claims 1 and 6, **characterized in that** said horizontal channel (46,47) comprises a fixed section (46) extending from a bracket (45), fitted between the side wall (23) of the elevator shaft (20) and the guide (15) nearest the loading platform (10), to the landing (21), and comprises a mobile section (47) substantially the same as the fixed section (46), joined to this latter by a crosswise hinge (48), so that said mobile section (47) can stand upright (47') against the lateral wall (33) of the drive unit (30), or lie flat, aligned with the fixed section (46), on the landing (21).
8. Hydraulically-operated means (30) as in claims 1 and 4, **characterized in that** the lower guide system consists of a horizontal telescopic complex comprising a pair (70) of parallel guides fixed to the base of the drive unit (30), a fixed channel (72) extending from a horizontal bracket (45), mounted between the side wall (23) of the shaft (20) and the guide (15) nearest to the loading platform (10), to the landing (21) and has a freely sliding intermediate channel (71).

Patentansprüche

1. Öldynamischer Antrieb für einen Personen- oder Lastenaufzug, der eine hydraulische Steuergruppe 30, eine Ladeplattform 10 und einen Aufzugsschacht 20 mit senkrechter Führung der Ladeplattform umfasst, **dadurch gekennzeichnet, dass** die hydraulische Steuergruppe 30 mit flachem, kompaktem und im wesentlichen quaderförmigem Aufbau 31 im Schacht 20 untergebracht ist, übereinstimmend mit irgendeiner Haltestelle der Ladeplattform 10, zwischen der Wand 22 genannten Schachtes 20, mit gemeinsamer Wand des Podestes 21, und der senkrechten Führung 15 dieser Ladeplattform 10, die dieser Wand 22 am nächsten ist.
2. Öldynamischer Antrieb 30 gemäß Anspruch 1), **dadurch gekennzeichnet, dass** das Aggregat 30 einen Aufbau 31 aufweist, der im unteren Teil auch als Ölbehälter fungiert und im oberen Teil die senkrecht positionierte Ventilgruppe 35 und die Steuer-magnete 36 mit waagrechter Achse trägt.
3. Öldynamischer Antrieb 30 gemäß Anspruch 1), **dadurch gekennzeichnet, dass** an der Wand 22 des Laufsraumes 20 mit gemeinsamer Wand des Podestes 21, an der Seitenwand 33 des Aggregates 30 eine Öffnung 63 angebracht ist, die den Durchgang dieses Aggregates 30 mit seitlicher Bewegung ermöglicht, und **dadurch gekennzeichnet, dass** an der Öffnung 63 an der Wand 22 des Podestes 21 für den Durchgang

des Aggregates 30 ein Schrank 60 mit Frontklappe 61 angebracht ist und mit Innenseite 62, die im wesentlichen mit der Seitenwand 23 des Laufsraumes 20 ausgerichtet ist, was die Unterbringung des Aggregates 30 zwischen der Führung 15 der Ladeplattform 10 und der genannten Klappe 61 ermöglicht.

4. Öldynamischer Antrieb 30 gemäß Anspruch 1),
dadurch gekennzeichnet, dass das Aggregat 30 mit seitlicher Bewegung frei gleiten kann, wozu es sich oberer und unterer Führungssysteme bedient.
5. Öldynamischer Antrieb 30 gemäß Anspruch 4),
dadurch gekennzeichnet, dass das obere Führungssystem durch eine Stange 52 erhalten wird, die an der Seitenwand 23 des Laufsraumes 20 angebracht ist und die sich über die Innenseite 64 des Schrankes 60 erstreckt, die im wesentlichen mit diesem Laufsraum 20 ausgerichtet ist, wobei an dieser Stange 52 mittels Zapfen 57 Scheiben 55 angebracht sind, in deren Rillen 56 das obere waagrechte Ende einer senkrechten Rippe 50 der Hinterwand 32 des Aggregates 30 frei gleiten kann.
6. Öldynamischer Antrieb 30 gemäß Anspruch 4),
dadurch gekennzeichnet, dass das untere Führungssystem waagrechte Tragrollen 40 umfasst, die mit Zapfen 42 auf Bügeln 41 quer befestigt sind, welche am Boden des Aufbaus 31 des Aggregates 30 angebracht sind, und die in einer waagrechten Rinne 46-47 frei gleiten können.
7. Öldynamischer Antrieb 30 gemäß Anspruch 1) und 6),
dadurch gekennzeichnet, dass diese waagrechte Rinne 46-47 einen feststehenden Teil 46 umfasst, der sich zwischen einer Konsole 45, die zwischen der Seitenwand 23 des Laufsraumes 20 und der an der Ladeplattform 10 am nächsten gelegenen Führung 15 befestigt ist, und dem Podest 21 erstreckt, sowie einen beweglichen Teil 47 umfasst, der im wesentlichen gleich ist wie der feststehende Teil 46 und mit letztgenanntem mittels einem Quergelenk 48 verbunden ist, das diesem beweglichen Teil 47 erlaubt, sowohl die vertikale Stellung 47 einzunehmen, die über der Seitenwand 33 des Aggregates 30 liegt, als auch das waagrechte Umklappen, mit Ausrichtung am feststehenden Teil 46, am Podest 21.
8. Öldynamischer Antrieb 30 gemäß Anspruch 1) und 4),
dadurch gekennzeichnet, dass das untere Führungssystem aus einem waagrechten Teleskopkomplex besteht, der ein Paar paralleler Führungen 70 umfasst, die am Boden des Aggregates 30 befestigt sind, sowie eine feste Rille 72, die sich zwischen einer waagrechten Konsole 45, die zwischen der

Seitenwand 23 des Laufsraumes 20 und der an der Ladeplattform 10 am nächsten gelegenen Führung 15 befestigt ist, und dem Podest 21 erstreckt, und eine frei gleitende Zwischenrinne 71 umfasst.

Revendications

1. Actionnement oléodynamique pour des personnes ou des marchandises comprenant un groupe de commande hydraulique 30, une plate-forme de chargement 10 et une gaine 20 de l'ascenseur avec guide vertical de la plate-forme de chargement,
caractérisé par le fait que le groupe de commande hydraulique 30, qui présente une structure 31 plate, compacte, fondamentalement parallélépipède, est positionné dans la gaine 20, au niveau d'un arrêt quelconque de la plate-forme de chargement 10, entre la paroi 22 de ladite gaine 20 en commun avec celle du palier 21, et le guide vertical 15 de ladite plate-forme de chargement 10 le plus proche de ladite paroi 22.
2. Actionnement oléodynamique 30 comme dans la revendication 1),
caractérisé par le fait que la centrale 30 présente une structure 31 qui, dans sa partie inférieure, sert également de réservoir à huile et dans sa partie supérieure supporte le groupe de vannes 35 positionné verticalement et les solénoïdes 36 de commande à axe horizontal.
3. Actionnement oléodynamique 30 comme dans la revendication 1),
caractérisé par le fait que sur la paroi 22 de la gaine 20 en commun avec celle du palier 21, est prévue, au niveau de la paroi latérale 33 de la centrale 30, une ouverture 63 pour permettre le passage par translation latérale de ladite centrale 30 et
caractérisé par le fait qu'au niveau de l'ouverture 63 sur la paroi 22 du palier 21 pour le passage de la centrale 30, est prévue une armoire 60 muni d'une porte frontale 61 et ayant un côté interne 62 fondamentalement aligné à la paroi latérale 23 de la gaine 20, rendant possible l'emplacement de la centrale 30 entre le guide 15 de la plate-forme de chargement 10 et ladite porte 61
4. Actionnement oléodynamique 30 comme dans la revendication 1),
caractérisé par le fait que la centrale 30 peut cheminer librement par translation latérale, à l'aide des systèmes de guidage supérieur et inférieur.
5. Actionnement oléodynamique 30 comme dans la revendication 4),
caractérisé par le fait que le système de guidage supérieur est obtenu par une barre 52 prévue sur la

paroi latérale 23 de la gaine 20 et s'étendant sur le côté interne 64 de l'armoire 60, fondamentalement aligné à ladite gaine 20, étant prévues sur ladite barre 52, moyennant des pivots 57, des poulies 55 dans les gorges 56 desquelles peut cheminer librement l'extrémité supérieure horizontale d'une nervure verticale 50 de la paroi arrière 32 de la centrale 30.

6. Actionnement oléodynamique 30 comme dans la revendication 4),
caractérisé par le fait que le système de guidage inférieur comprend des rouleaux portants horizontaux 40 fixés transversalement par des pivots 42 sur des étriers 41 prévus sur le fond de la structure 31 de la centrale 30, cheminant librement dans une canalisation horizontale 46-47.
7. Actionnement oléodynamique 30 comme dans les revendications 1) et 6),
caractérisé par le fait que ladite canalisation horizontale 46-47 comprend une partie fixe 46 qui s'étend depuis une console 45, fixée entre la paroi latérale 23 de la gaine 20 et le guide 15 le plus proche de la plate-forme de chargement 10, jusqu'au palier 21 et comprend une partie mobile 47 fondamentalement égale à la partie fixe 46, raccordée à cette dernière par une charnière transversale 48 qui permet à ladite partie mobile 47 d'assumer soit la position verticale 47 superposée à la paroi latérale 33 de la centrale 30, soit de culbuter horizontalement, en s'alignant à la partie fixe 46, sur le palier 21.
8. Actionnement oléodynamique 30 comme dans les revendications 1) et 4),
caractérisé par le fait que le système de guidage inférieur est constitué par un groupe télescopique horizontal comprenant un couple de guides parallèles 70 solidaires du fond de la centrale 30, une canalisation fixe 72 qui s'étend depuis une console horizontale 45, fixée entre la paroi latérale 23 de la gaine 20 et le guide 15 le plus proche de la plate-forme de chargement 10, jusqu'au palier 21 et comprend une canalisation intermédiaire 71 qui chemine librement.

5

10

15

20

25

30

35

40

45

50

55

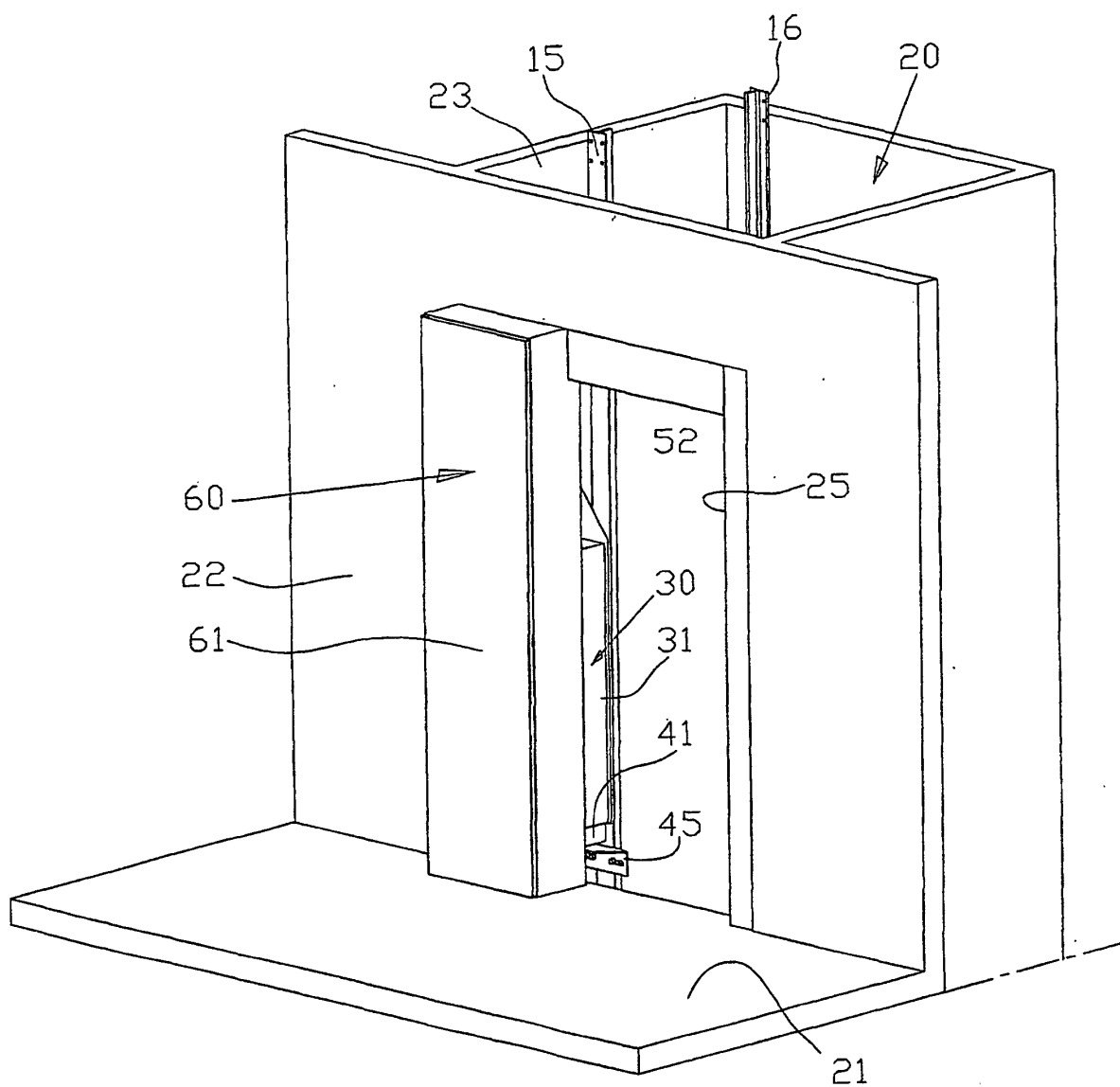


FIG.1

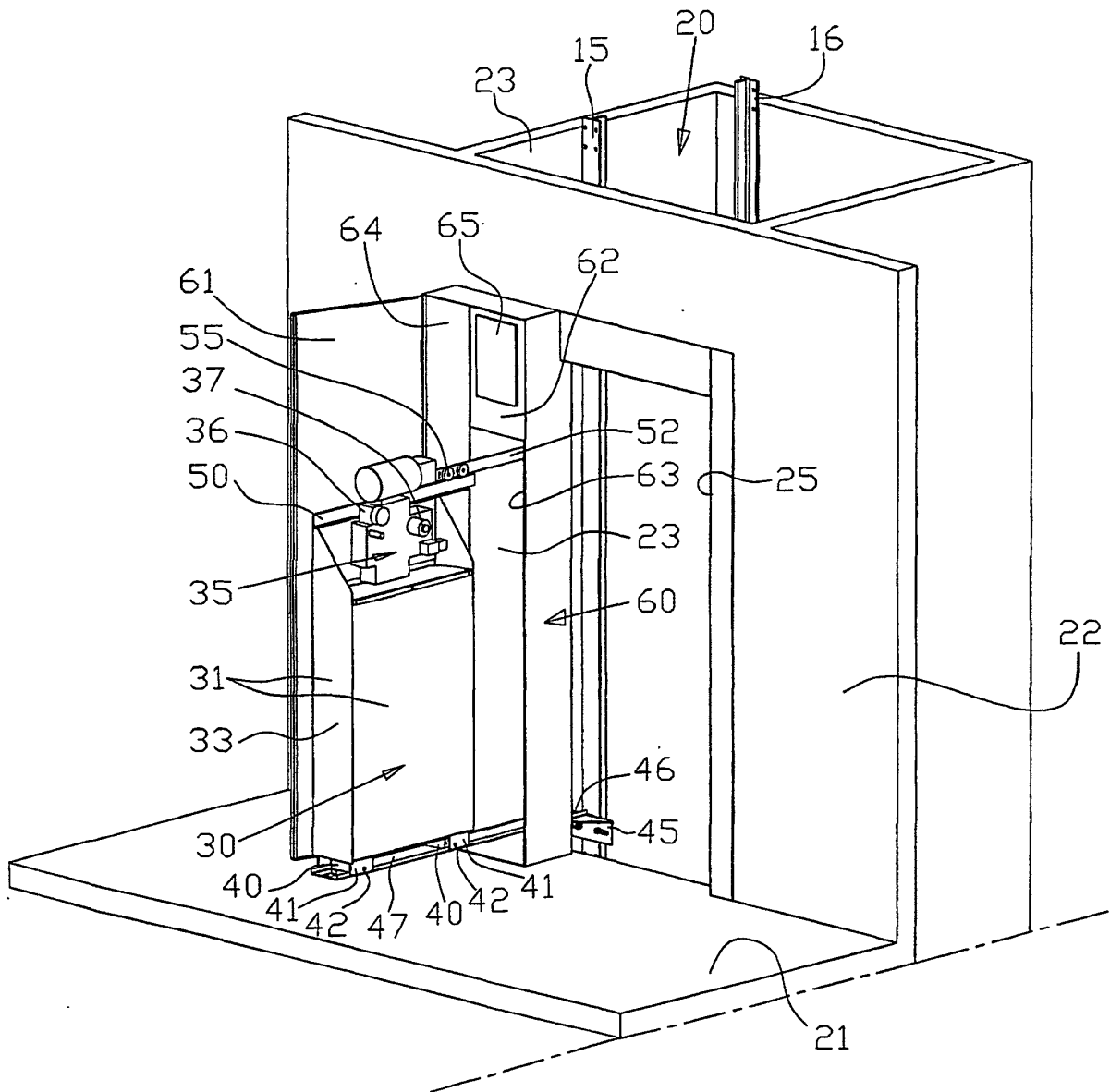


FIG. 5

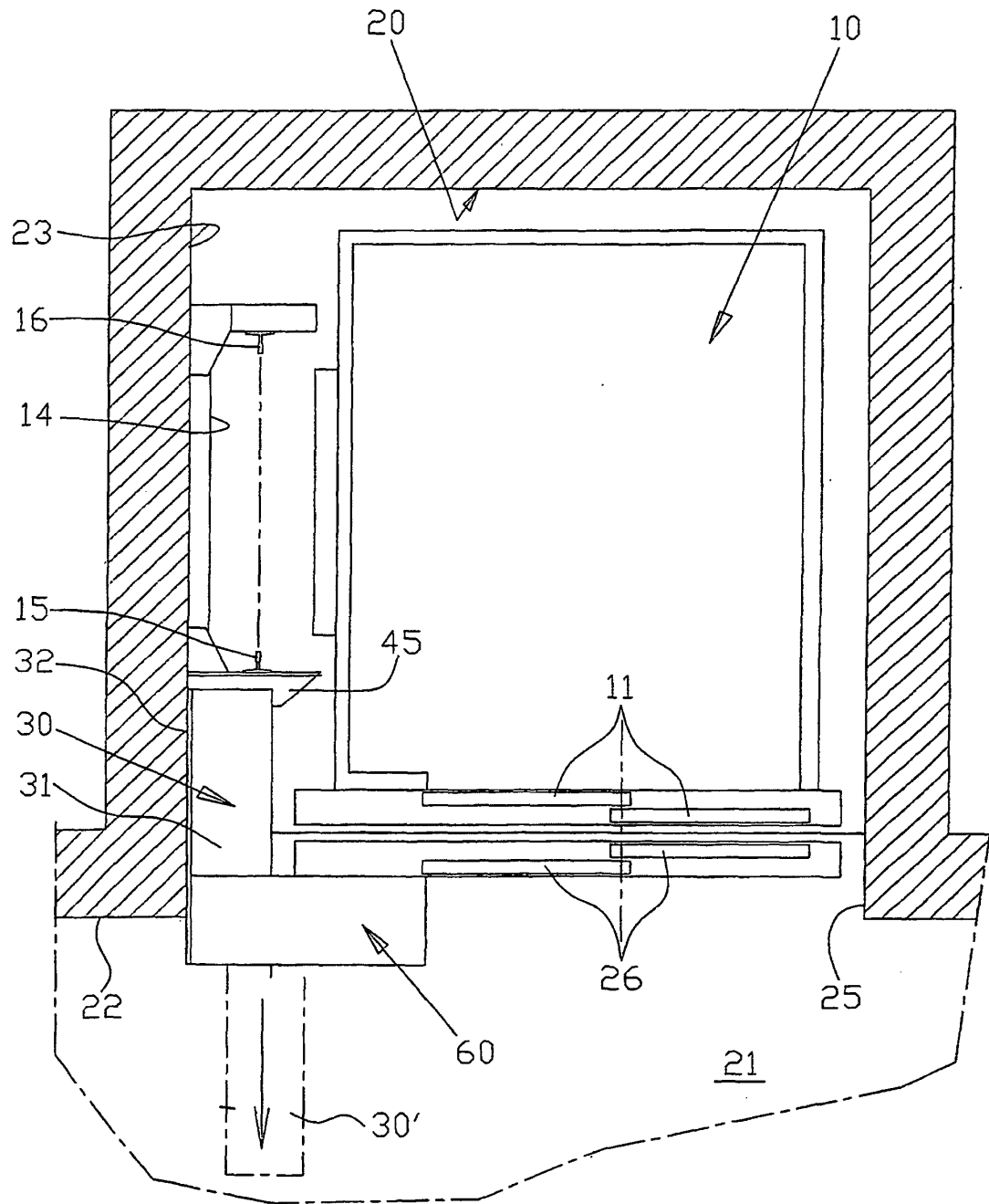


FIG.2

