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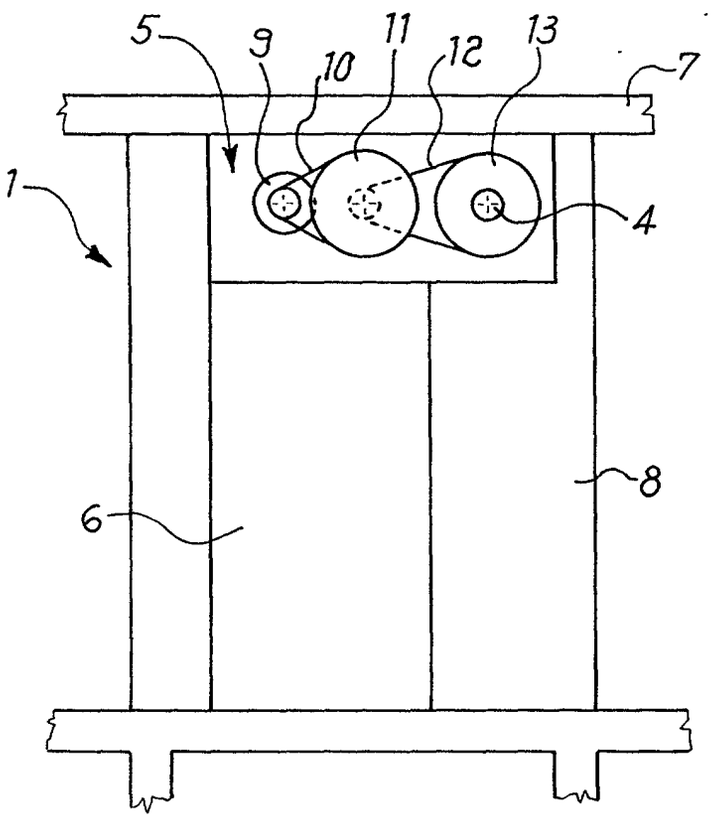
(54) Elevator without machine room

(57) An electrically driven lift system (1, 20) comprising a cab (2) connected to a clutch pulley, activated through a rigid spindle by a driving unit (5). The driving unit (5) is located between door (6) of the last floor reached and the overlying floor slab (7), and is entirely accessible.

Fig.2



EP 1 213 252 A2

Description

BACKGROUND OF THE INVENTION

Field of the invention

[0001] The present invention relates to an electrically driven lift system.

[0002] More particularly, the present invention relates to a lift system for people and/or goods with an electrically driven lift system of the type without machine room (MRL).

Description of the prior art

[0003] Electrically driven lift systems of the MRL type are known. Such lift systems comprise a cab connected to a counterweight, and means for moving said cab. The moving means of the cab comprise a clutch pulley, a driving unit and means for the transmission of the rotary motion from said driving unit to said pulley.

[0004] In such lift systems of the MRL type, the driving unit is installed in the inside of the lift shaft, or in boxes that, according to the thickness of the wall, occupy more or less large spaces adjoining the same.

[0005] In the first case, the machine located in the room is typically accessible from the cab roof, which causes the usual maintenance and emergency operations to be more difficult with respect to the usual systems with machine boxes.

[0006] In the second case (box), there is in general a further, even though reduced obstruction of the machine in the outside of the room, depending of the size thereof.

SUMMARY OF THE INVENTION

[0007] Object of the present invention is to eliminate the aforesaid drawbacks.

[0008] More particularly, object of the present invention is to provide an electrically driven lift system that realizes, with respect to the known art, a solution of the MRL type in such a manner that the maintenance and emergency operations can be carried out from the outside of the lift shaft and in any case such as not to further obstruct the passage areas adjoining said shaft, independently on the size of the wall.

[0009] According to the present invention, these and still other objects, which will be clear thanks to the following description, are achieved by means of an electrically driven lift, comprising a cabin connected to a counterweight, and means for moving said cabin comprising a clutch pulley; a driving unit, and a means for the transmission of the rotary motion from said driving unit to said clutch pulley, wherein said driving unit is located in correspondence of the last floor reached.

[0010] Preferably, the driving unit can be located between the part overlying the door of the last floor reached by the lift and the floor slab of the overlying floor or between the floor door of the last floor reached and the overlying floor slab. This arrangement of the driving unit allows not to utilize passage spaces of the rooms adjoining the lift shaft, while the complete accessibility of the system outside the shaft is entirely maintained.

[0011] The means for the transmission of the rotary motion is a rigid spindle that therefore needs not being inspected, isolated in the lift shaft, and that extends from the driving unit.

[0012] In particular, the driving unit may be an electric motor that imparts the motion to the rigid spindle through ratio-motors that may be of the belt type, such as pulleys with the related belts, or gear ratio-motors, such as a worm screw with a gear-wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The constructive and functional characteristics of the electrically driven lift system of the present invention will be better understood thanks to the following description, wherein reference is made to the attached drawings, which represent some preferred embodiments only reported by way of non limiting example, and wherein:

- Figure 1 shows the schematic top view of a section of a first embodiment of the electrically driven lift system of the present invention;
- Figure 2 shows the schematic view of the section obtained with a plane passing along the line indicated by II-II in Figure 1, of the electrically driven lift system of Figure 1;
- Figure 3 shows the schematic top view of a section of a second embodiment of the electrically driven lift system of the present invention; and
- Figure 4 shows the schematic view of the section obtained with a plane passing along the line indicated by IV-IV in Figure 3, of the electrically driven lift system of Figure 3.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0014] With reference to the figures, the electrically driven lift system of the present invention, indicated as a whole by 1 and 20, comprises a cab 2 connected through ropes to a counterweight 15, and caused to move by a clutch pulley 3. Said clutch pulley 3 is activated by a rigid spindle 4 connected to a driving unit 5. According to the present invention, said driving unit 5 is located between door 6 of the last floor reached by the lift and the floor slab 7 of the overlying floor and is entirely accessible from the outside in its components of traction and safety.

[0015] Cabin 2, mobile in the inside of the lift shaft 8, the ropes connecting with counterweight 15 and said clutch pulley 3 are known *per se* and therefore not further described.

[0016] The rigid spindle 4, suitably sized and support-

ed, connects the clutch pulley 3 to the driving unit 5, transmitting the motion from the latter to said clutch pulley 3. Spindle 4 realizes a positive connection that needs no maintenance operations. The driving unit 5 is located between the floor door 6 of the last floor reached and slab 7 of the overlying floor, occupying entirely or partly the thickness of the wall of the lift shaft 8 and possibly protruding therefrom, but at a height such that no obstructions are present in the passage zones that, therefore, remain free. Besides, the driving unit 5 comprises all the traction and safety gears, in particular a couple of brakes 16 that are positively connected to the rigid spindle 4 and therefore to the clutch pulley 3. In particular, as can be seen in Figures 1-4, the driving unit 5 comprises an electric motor 9 that through ratio-motors or gear ratio-motors causes the motion of the rigid spindle 4.

[0017] Figures 1 and 2 show an electrically driven lift system 1 according to an embodiment variation including a winch, a belt, a double ratio-motor, wherein the motion to the clutch pulley 3 is imparted by an electric motor 9, pulleys 11 and 13, the related belts 10 and 12, and the rigid spindle 4.

[0018] Figures 3 and 4 show an electrically driven lift system 20, according to a winch-and-gear embodiment variation, wherein the motion to the clutch pulley 3 is imparted by an electric motor 9, a worm screw 21, a gear-wheel 22, and the rigid spindle 4.

[0019] It is now evident that the electrically driven lift system 1 of the present invention allows an easy inspection an maintenance of all its gears and safety devices, through the removable door 14 that allows full access by skilled and authorized people. Such accessibility can be easily ensured by making use of the devices usually required and specified by the technique standards. It is also evident, as said previously, that it is not necessary to have access to the rigid spindle 4, as all of its traction and safety gears are entirely accessible in the inside of the driving unit 5.

[0020] The electrically driven lift system 1 of the present invention also allows to keep the passage outside the lift shaft entirely free.

[0021] As can be appreciated from the preceding description, the electrically driven lift system of the present invention has proved to be of simple and economical realization, maintaining a good constructive compactness and allowing the complete elimination of the drawbacks of the known technique.

[0022] Although the invention has been described in conjunction with specific embodiments, reported only by way of illustration, it is evident that many alternatives and variations will be apparent to those skilled in the art, in the light of the foregoing description.

[0023] Accordingly, the invention in intended to embrace all of the alternatives and variations that fall within the spirit and scope of the appended claims.

Claims

1. An electrically driven lift system (1, 20) comprising a cabin (2) connected to a counterweight (15), and moving means for said cabin (2); said moving means comprising a clutch pulley (3); a driving unit (5), and a means for the transmission of the rotary motion from said driving unit (5) to said clutch pulley (3), **characterized in that** said moving unit (5) is located in correspondence of the last floor reached by the lift system between the part overlying door (6) of said last floor and slab (7) of the overlying floor.

2. The electrically driven lift system according to claim 1, **characterized in that** the means for the transmission of the rotary motion is a rigid spindle (4), isolated in the lift shaft (8), and extending from the driving unit.

3. The electrically driven lift system according to claim 1 or 2, **characterized in that** the driving unit (5) occupies the thickness of the wall of the lift shaft (8).

4. The electrically driven lift system according to claim 1 or 2, **characterized in that** the driving unit (5) protrudes from the wall of the lift shaft (8) and is located at a height leaving the passage zones free.

5. The electrically driven lift system according to any of the preceding claims, **characterized in that** the driving unit (5) comprises all the traction and safety gears (16).

6. The electrically driven lift system according to claim 5, **characterized in that** the driving unit (5) comprises an electric motor (9) and a ratio-motor with a double reduction belt comprising a first belt (10), a first pulley (11), a second belt (12) and a second pulley (13).

7. The electrically driven lift system according to claim 5, **characterized in that** said driving unit (5) comprises an electric motor (9) and a gear-motor comprising a worm screw (21) that activates a gear-wheel (22).

8. The electrically driven lift system according to any of the preceding claims, **characterized in that** the driving unit (5) comprises a movable wall (14), arranged outside the lift shaft (18), to ensure the access to said driving unit (5).

9. The electrically driven lift system according to any of the preceding claims, **characterized in that** the driving unit (5) is installed in correspondence of the last floor reached, between the floor door and the slab of the overlaying floor.

Fig.2

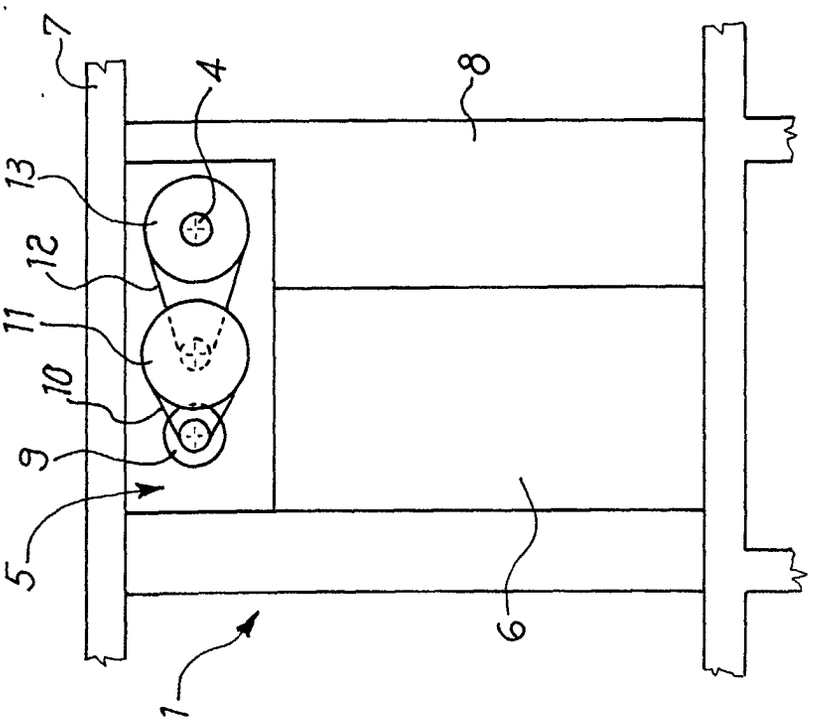


Fig.1

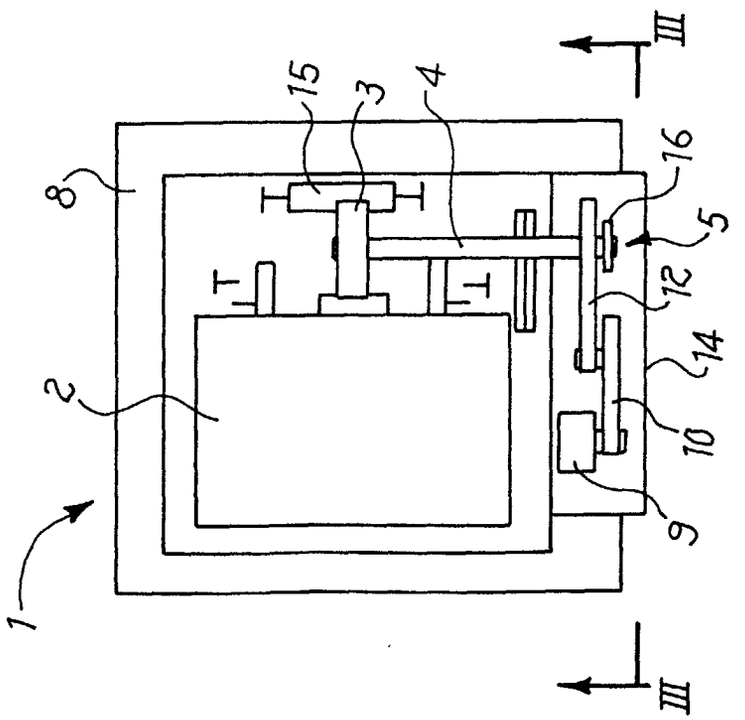


Fig.4

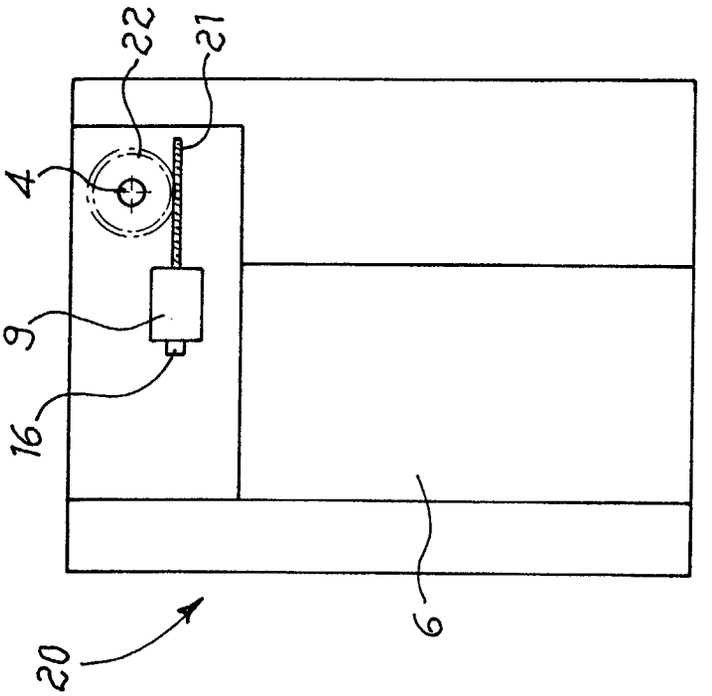


Fig.3