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(54) Energy saving lift system

(57) A lift system with reduced power comprising a car running inside a special lift-shaft and at least a drive unit which allows the raise and the lower of the lift, characterised by the fact that said drive unit comprises at least two power systems and said car is provided with a sensor system to detect its load in order to switch the drive of said lift on one of said systems.

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Description

[0001] The present invention relates to a lift system with reduced power.

[0002] More particularly, the present invention relates to a lift system with reduced power, which is particularly suitable for hydraulic and electric lift systems with or without a counterweight system.

[0003] As it is known, due to manufacturing rules, lift capacities depend on car sizes, as it is supposed that the cars themselves can be completely filled up, particularly in an emergency. Car sizes comply with architectural concepts or local regulations, such as cars for handicapped and sick people transportation.

[0004] Anyway, according to the current provisions, a motor must be installed and its power must correspond to the maximum load, i.e. its own weight plus the capacity of the lift.

[0005] It is also known that a lift in operation is seldom used at full load. Therefore, for example, a lift used in European houses such as a 4-5 storey block of flats generally having an 8 person capacity, is normally used by 1 -2 or at the most by 3 persons.

[0006] Even a bedlift, for example, has a 1,000 kgs capacity, but the load in the car is generally of 200-300 kgs. In other words these lift systems are mostly used with loads that are greatly lower than the nominal one of the lift itself.

[0007] But the power systems installed and the relevant connections must be provided for the maximum load of the lift, therefore both first installation costs and overheads incurred refer to the maximum load even though the lift is normally used with lower loads.

[0008] It is easy to understand that, in these cases, in order to eliminate the above-mentioned drawbacks, the need for lift systems equipped with such devices arises.

[0009] Therefore, subject of the present invention is to provide a lift system with reduced power that besides keeping the usual functionality allows fixing the above-mentioned drawbacks.

[0010] According to the present invention, these and other purposes resulting from the following description are achieved providing a lift system with reduced power comprising a car running inside a special lift-shaft and at least a drive unit for the raise and the lower of the lift wherein said drive unit comprises at least two power systems and said car is equipped with a sensor system to detect the load inside it in order to switch the drive of said lift on one of said power systems.

[0011] The manufacturing and operating features of the lift system with reduced power of the present invention will be better understood from the following description wherein some preferred embodiments of the present invention are given by way of non-limitative examples.

[0012] The lift system subject of the present invention comprises a car for the load transportation running inside a special lift-shaft and a drive unit allowing the raise and the lower of the lift.

[0013] The drive unit comprises a first power system and a second one.

[0014] The first one is sized for the actual performance that is to say with a load being much lower than the maximum one allowed. In particular, the motor and the connection with the relevant energy meter are sized for this performance.

[0015] The second power system is sized according to the current provisions and it is therefore able to securely raise and lower the lift at its full load capacity but at a reduced speed compared to the one of the performance that is actually carried out.

[0016] The power installed is essentially equal to the one installed for the performance which is actually carried out. The sensor system to detect the load inside the car detects the actual load and allows switching the drive of the lift on the first or on the second power system of the drive unit.

[0017] Even in the case of a hydraulic lift system without counterweight wherein the nominal capacity is generally the same as the lift system weight, for the lift system with reduced power of the present invention a first power system on the basis of the performance that is actually carried out can be sized together with a second power system complying with the current provisions on the basis of the power reduction carried out for said first power system.

[0018] With the lift system with reduced power of the present invention a power saving comprised between 35% and 45% of the power that is installed and used in a lift system of the prior art is obtained.

[0019] For example, in the case of a bedlift the first power system is sized for a car load of 200-300 kgs, while the second one is sized in order to raise and lower the lift at the nominal capacity of 1,000 kgs plus the dead weight at a lower speed.

[0020] In this case the power saving is comprised between 40% and 45% in comparison to a lift of the prior art, with a subsequent speed decrease comprised between 40% and 45%.

[0021] Even in the case of a hydraulic or an electric lift system with counterweight, with the lift system with reduced power of the present invention the utmost advantage can be obtained by counterweighing the lift system of about 30% of the nominal capacity thus allowing a power reduction of about 40% compared to the power used by a lift system of the prior art with the same features.

[0022] The lift system with reduced power of the present invention allows the installation of powers that are 40% - 45% lower than the ones installed in a lift system of the prior art, with a reduction of installation costs and overheads during the performance. For example, with a lift system of the present invention used in houses a saving comprised between 30% and 40% is obtained compared to a lift system of the prior art both in terms of non-recurring payment at the installation and also in

terms of fixed and yearly amounts that are proportional to the installed power.

[0023] As it can be understood from the previous description, the lift system of the present invention is easy to manufacture and install moreover, it is highly functional and versatile thus allowing to reach the subject of the present invention and the elimination of the reported drawbacks with reference to the prior art.

[0024] In order to meet specific requirements, a technician skilled in the art will be able to make many changes and variants, or combination of variants to the above described lift system with reduced power of the present invention, such as the use of multispeed motors, of VVVF (Variable Voltage Variable Frequency) systems; or the use of two pumps instead of one, or the use of two motors instead of one, or the use with systems that are partly or completely independent but suitable to carry out a speed reduction when the load conditions of the car exceed a predefined value, or with other suitable systems.

[0025] It is therefore clear that the present invention is meant to include all the changes and variants falling within the spirit and the protection field of the following claims.

Claims

1. A lift system with reduced power comprising a car running inside a special lift-shaft and at least a drive unit which allows the raise and the lower of the lift, **characterised by** the fact that said drive unit comprises at least two power systems and said car is provided with a sensor system to detect its load in order to switch the drive of said lift on one of said systems.

2. The lift system with reduced power according to claim 1, **characterized by** the fact that the drive unit comprises a first power system and a second power system.

3. The lift system with reduced power according to claim 2, **characterized by** the fact that the first power system is sized for the performance that is actually carried out.

4. The lift system with reduced power according to claims 2 or 3 **characterized by** the fact that the second power system can raise and lower said lift at full load capacity at a reduced speed; the installed power being essentially equal to the one required for the performance that is actually carried out.

5. The lift system with reduced power according to any of the previous claims from 2 to 4 **characterized by** the fact that the sensor system for the detection of the car load switches the drive of the lift on the first or on the second power system of the drive unit.

6. The lift system with reduced power according to any of the previous claims, **characterized by** the fact that it comprises multispeed motors.

7. The lift system with reduced power according to any of the previous claims from 1 to 5 **characterized by** the fact that it comprises VVVF (Variable Voltage Variable Frequency) systems.

8. Use of the lift system with reduced power according to any of the previous claims from 1 to 5 in a hydraulic lift system without counterweight.

9. Use of the lift system with reduced power according to any of the previous claims from 1 to 5 in an electric lift system with or without counterweight.

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EUROPEAN SEARCH REPORT

Application Number
EP 02 02 2860

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Y	* column 2, line 11 - line 27 * * column 3, line 22 - line 27; figures 1,2 *	8	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 March 2003	Nelis, Y

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 02 2860

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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