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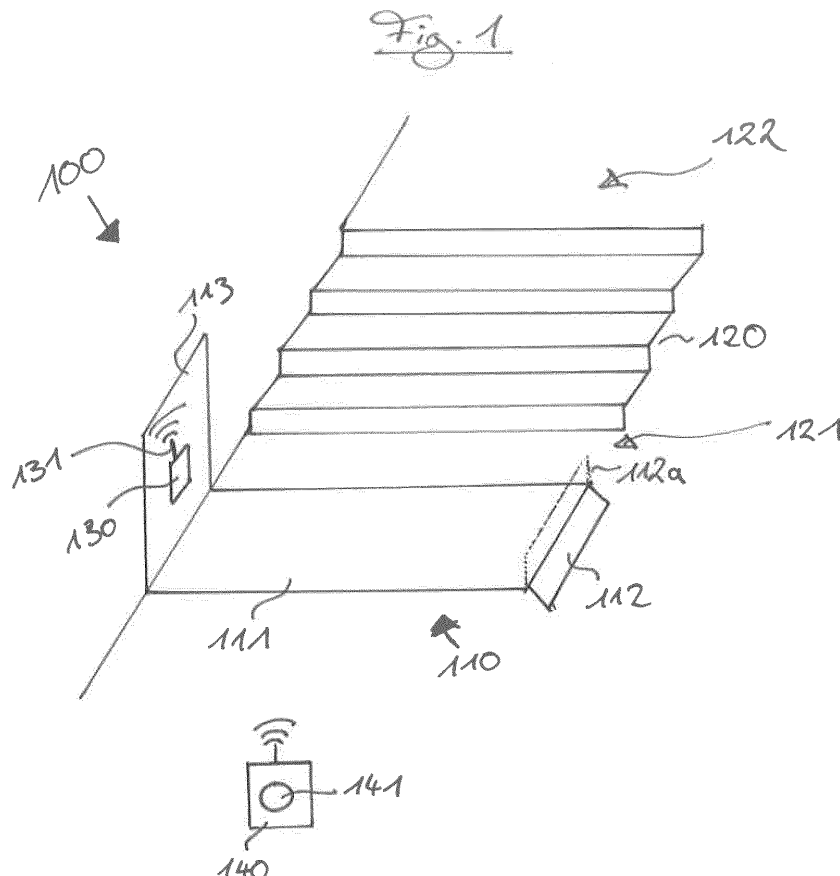
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(54) **Method of controlling operation of a lift system**

(57) The invention relates to a method of controlling operation of a lift system (100) with a stair lift and/or a platform lift (110) wherein a lock device (130) prevents operation of the lift system (100) after a certain operating

time of the lift system (100), if a certain condition is not met within the certain operating time of the lift system (100).



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Description

[0001] The invention relates to a method of controlling operation of a lift system comprising a stair lift or a platform lift, as well as a corresponding lift system with a stair lift or a platform lift.

Prior art

[0002] For handicapped persons of limited mobility or those confined to wheelchairs, it is particularly difficult to climb steps or other obstacles. A stair lift can be used to transport a handicapped person between a first elevation and a second elevation, e.g. up and down a staircase by means of transport device such as a chair. In general, stair lifts comprise a guide rail extending along a stair case periphery and a motorised carriage with a chair, arranged to drive the carriage and chair along the rail.

[0003] Platform lifts can be used to raise a handicapped person, e.g. in a wheelchair, to a higher elevation, or to transport a handicapped person between floors in a building. Such platform lifts can also be used to transport loads.

[0004] Such lift systems comprising stair lifts or platform lifts can be installed in buildings in order to provide access to the building for handicapped persons. For this purpose, stair lifts and platform lifts can for example be leased or rented from a manufacturer. It is of utmost importance that such lift systems are regularly serviced in order to ensure safe and reliable operation at all times. However, many institutions using such lift systems do not pay sufficient attention to regular servicing, thereby taking risks regarding comfort and safety of for example handicapped users. Such usage of a lift system after the lapse of a servicing interval without adequate servicing can be considered hazardous or unauthorised operation of a lift system.

[0005] Thus, it is an object of the invention to provide a method for preventing unauthorised operation of a lift system comprising a stair lift or a platform lift.

Disclosure of the invention

[0006] This object is achieved by a method of controlling operation of a lift system and a corresponding lift system comprising the features of the respective independent claims.

[0007] The invention comprises a locking device for preventing unauthorised operation of the lift system. If a predetermined condition is not met within a predetermined operating interval of the lift system, the locking device is adapted to prevent further operation of the lift system, i. e. to deactivate the lift system, after a predetermined operating interval or another predetermined interval. Examples of such predetermined conditions to be met comprise for example the observation of service intervals, i.e. effecting a servicing of the lift system within a specified service interval, usage of the lift system by

authorised users only, and payment of lease fees within predetermined time intervals. The terms "operating interval" and "interval" as used in the present context can either refer to a time interval, or a measure of usage, for example a specified number of movements of the lift system between a first elevation and a second elevation. The locking device expediently comprises a controller such as a CPU or a computer, which can be controlled by input of command signals, and which is adapted to generate signals to enable deactivation and/or activation of the lift system. For example, when a predetermined condition has been met, a password or code can be automatically transmitted to a controller of the locking device via an internet or another remote connection. Also it is possible to provide a user of the actual lift with a password or code, which can then be entered manually.

[0008] The lift system according to the invention is especially adapted to enable handicapped persons of limited mobility, especially persons confined to wheelchairs, to be able to move between different elevations. The platform lift can be provided in a vertically moving or a transversely moving manner. The lift according to the invention can also be provided as a chair lift or an escalator.

Advantages of the invention

[0009] When or as long as a predetermined condition is met, it can be ensured that the lift system is fully operable. Misuse or unauthorised use of the lift system can be effectively prevented.

[0010] Advantageous embodiments of the invention are the subject matter of the dependent claims.

[0011] Preferably, the predetermined condition is a servicing of the lift system within a predetermined operating interval. Only if it is confirmed that a servicing of the lift system has been performed within such an interval, will operation of the elevator system be maintained. If this predetermined condition is not met within such an interval, the lift is deactivated. A further example of such a condition to be met is fulfilment of a financial obligation, such as a rent or lease payment, within a predetermined time interval.

[0012] Advantageously, the locking device of the elevator system, or any other expedient component, comprises a receiver adapted to receive signals from a remotely provided transmitter, confirming that the predetermined condition has been met. For example, it is possible to centrally control a number of lift systems in this way in an effective manner. Only when, for example, a corresponding signal, which can be a code or a password, is transmitted to the locking device, continued operation will be ensured. The term "remote" in this connection can mean a few metres or any number of kilometres away from the lift system.

[0013] Advantageously, the predetermined signal is transmitted to the receiver by a remotely provided transmitting device. It is, however, also possible to directly enter such a signal, for example a code or a password,

manually into the locking device. Remote transmission can include short distance wireless transmission, such as Bluetooth or long distance wireless transmission or internet transmission.

[0014] Expediently, operation of the lift system is prevented by deactivating the lift system when the transport device, for example the platform of a platform lift or the chair of a stair lift, is in the first elevation or the second elevation. Hereby, it can be ensured that the lift system is not deactivated whilst the transport device is in an intermediate position between the first elevation and the second elevation. This measure ensures that for example a handicapped person will not be trapped between elevations.

[0015] Further advantageously, a warning signal is generated when or shortly before the predetermined operating time has lapsed without the predetermined condition having been met. Thus warning users that further operation of the lift system will be prevented, for example after lapse of a grace interval, can be effected. Such a grace interval can be chosen to be, for example, 1 hour or 1 day. A grace interval is an example of "another predetermined interval" as mentioned in claim 1.

[0016] The locking device is especially adapted to directly influence mechanical and/or electrical components of the lift system. In order to prevent operation of the lift system, the locking device can disable certain mechanical and/or electrical components of the lift system. The locking device can especially disable all of the mechanical and/or electrical components of the lift system.

[0017] After lapse of the predetermined operating interval and not meeting the predetermined operating condition within this interval, the locking device can determine whether the predetermined condition is met for another operating interval. Thus, it can regularly be checked whether the predetermined condition is met and whether the lift system is operated with correct authorisation. For example, if a servicing is performed too late or a lease fee is paid after lapse of an agreed interval, the lift system can easily be taken back into operation.

[0018] As mentioned, the predetermined operating time of the lift system can be chosen in order to give the user a reasonable amount of time to meet the predetermined condition, e.g. to effect servicing. The predetermined operating time can also be a demo time, during which the lift system can be tested by a user. After corresponding activation within the demo time, the lift system can further be operated throughout a predetermined interval. The predetermined operating interval can especially be chosen between 30 days and 180 days.

[0019] Preferably the locking device comprises a receiver. The predetermined condition can also be defined as reception of a predetermined unlocking signal by said receiver. Receiving said signal indicates that the certain condition is met. The receiver can for example be a radio receiver.

[0020] An unlock signal transmitting device can be provided to transmit the unlock signal. Such a transmitting

device can, for example, be a radio transmitter. It can also be adapted to send a signal via the internet. Also, it is possible to provide the transmitting device with a comparatively short range of transmission, for example 2 to 3 meters. In this latter case, the transmitting device can be used in the direct vicinity of an elevator system.

[0021] It is, for example, possible for a manufacturer or a servicing company to directly transmit an unlock signal to the locking device so that no further action by a user is required. Also, it is possible to provide the user with a code or a password, which he can then enter, for example, into the transmitting device with the short range of transmission.

[0022] Advantageously, the locking device is adapted to prevent further operation of the lift system, when the stair lift or the platform lift is in a lower elevation, e.g. a ground level, if the predetermined operating time is elapsed and the predetermined condition is not met. This way it can also be avoided that users of the lift system are trapped when the predetermined operating interval expires while a transport process between two elevations is in progress. The stair lift or the platform lift thus must return to the ground level, before further operation of the lift system is prevented. Thus, all users can safely dismount the lift system in the ground level.

[0023] The invention will now be described further, by way of example, with reference to the accompanying drawings, in which

30 Figure 1 schematically shows a preferred embodiment of a lift system according to the invention, and

35 Figure 2 shows a block diagram of a preferred embodiment of a method of controlling operation of a lift system according to the invention.

Detailed description

40 **[0024]** Figure 1 schematically shows a lift system 100. The lift system shown depicts an "inclined" platform lift, i.e. which moves along an inclined trajectory such as a flight of stairs or a staircase. The invention is equally applicable e.g. to "vertical" platform lifts (i.e. performing a vertical movement) or corresponding inclined or vertical chair lifts. The lift system 100 comprises a platform lift 45 110 with a transport means 111 in the embodiment shown a platform 111. The platform lift 110 is installed on a staircase 120. By using the platform lift 110, a person e.g. 50 confined to a wheelchair (not shown in figure 1) can be enabled to move between a ground floor (first elevation) and a first floor (second elevation). For this purpose the platform 111 of platform lift 110 is powered by an electric drive 113, so that it can be moved between the ground 55 floor 121 and the first floor 122.

[0025] A person confined to a wheelchair can access platform 111 of the platform lift 110 via a ramp 112. After the person has accessed platform 111, the ramp can be

moved into a secure position 112a, for example to prevent the wheelchair rolling off.

[0026] In order to prevent unauthorised operation of lift system 100, there is provided a locking device 130, which, upon activation can prevent operation of the lift system. Preferred embodiments of such an activation (and corresponding de-activation of the lift system) will now be described with reference to the method according to the invention.

[0027] A preferred embodiment of a method according to the invention is schematically shown in figure 2 in form of a block diagram and will be explained referring to figure 1 and figure 2.

[0028] In a step 201, a manufacturer installs platform lift 110 on staircase 120 and ensures normal operation. In this connection, in step 202, a predetermined operating interval of lift system 100, for example 180 days or 1 year is set. The operating interval can be set according to specific conditions, for example expected amount of usage and thus resulting wear over a specified time interval or taking into account a time period for which a user has paid a rental fee (step 202).

[0029] In step 203, which can either be performed regularly or when the operating interval has lapsed, locking device 130 ascertains whether the predetermined condition has been met within the predetermined operating interval.

[0030] If this is the case, i.e. the predetermined operating condition has been met, the method reverts to step 202 and sets a new operating interval. This setting of a new operating interval can be achieved remotely, by communication of the locking device 130 with a remotely provided transmitter. This transmitter is adapted to send a corresponding signal (unlock signal) to receiver 131.

[0031] The resetting of the interval time can be performed automatically. Alternatively, it is possible to present a code or a password on a corresponding display device (not shown) of the locking device, which a user can then enter, for example using a touch screen or a keyboard.

[0032] It is also possible that in case it is ascertained that the predetermined condition has been met within the operating interval, a corresponding signal is generated by locking device 130 and transmitted to a remote control device. This control device can generate a corresponding message, for example for a servicing company or a manufacturer, to send the user a (physical) unlock transmitting device 140. The user can, for example, push a button 141 of this unlock transmitting device, so that the unlock transmitting device sends an unlock signal to locking device 130. The transmission range of transmitting device 140 will typically be 1 to 2 meters.

[0033] If receiver 131 has not received the unlock signal within the predetermined operating time, it is ascertained in step 203 that the predetermined condition has not been met. If this is ascertained in step 203, it is checked in step 204 whether the transport device, i.e. platform 111 is currently being moved between ground

floor 121 and first floor 122. If this is not the case, locking device 130 can be adapted to immediately prevent further operation of platform lift 110 (step 206).

[0034] However, if it is ascertained in step 204 that platform lift 110 is currently moving between the ground floor 121 and the first floor 122, locking device 130 is adapted to allow termination of this current transport movement (step 205). When this transport is terminated, i.e. platform 111 has arrived in the ground floor 121 or the first floor 122, locking device 130 is adapted to prevent further operation of platform lift 110 (step 206).

[0035] Advantageously, locking device 130, even after de-activation of the platform lift 110 as described above, will continue to allow operation of ramp 112. Thus, a user on platform lift 110 can still safely leave the platform 111.

[0036] Advantageously, locking device 130 continues checking whether the predetermined condition has been met (step 203) even after lapse of the operating interval without the operating condition having been met. Thus, if a predetermined operating condition is met at a later time, i.e. after lapse of the original operating, it can be ensured that platform lift 110 is re-activated.

Reference list

[0037]

100	lift system
110	platform lift
111	platform (transport means)
112	ramp
112a	ramp in secure position
113	electromotor
120	staircase
121	ground floor
122	first floor
130	lock device
131	receiver
140	unlock transmitting device
141	button

Claims

1. A method of controlling operation of a lift system comprising a stair lift or a platform lift (111) for transporting a passenger or a load by means of a transport device (110a) between at least a first elevation (121) and a second elevation (122), **characterised in that** by means of a locking device (130) operation of the lift system after a predetermined operating interval or after another predetermined interval is prevented, if a predetermined operating condition is not met within the predetermined operating interval.
2. Method of claim 1, wherein the predetermined operating condition comprises a servicing of the lift system within the predetermined time interval or fulfil-

ment of a financial obligation within the predetermined time interval.

3. The method of claim 1 or 2, wherein the locking device (130) comprises a receiver (131) adapted to receive signals from a remotely provided transmitter confirming that the predetermined operating condition has been met. 5
4. The method of claim 3, wherein the predetermined signal is transmitted to the receiver (131) by a remotely provided transmitting device (140). 10
5. The method of any one of the preceding claims, wherein operation of the lift system is prevented by deactivating the lift system, when the transport device (111) is in the first elevation or the second elevation. 15
6. The method according to any one of the preceding claims, wherein when or shortly before the predetermined operating time has lapsed without the predetermined operating condition having been met, a warning is generated, informing users that further operation of the lift system will be prevented after lapse of a grace interval. 20 25
7. The method of any one of the previous claims, wherein, if the predetermined operating interval has lapsed and the predetermined operating condition has not been met, the locking device (130) is adapted to allow renewed operation of the lift system (100) when the predetermined operating condition is met. 30
8. A lift system (100) comprising a stair lift or a platform lift (110) with a transport device (111), **characterised in that** a locking device (130) is provided, which is adapted to check whether a predetermined operating condition is met within a predetermined operating interval, and which is further adapted to prevent operation of the lift system, especially to deactivate transport device (111), after the predetermined operating interval or another predetermined interval has lapsed, if the predetermined operating condition has not been met within the predetermined operating interval. 35 40 45
9. The lift system of claim 9, wherein the locking device comprises a receiver (131) adapted to receive a predetermined signal as confirmation that the predetermined operating condition has been met. 50
10. The lift system (100) of claim 9, wherein a transmitting device (140) is adapted to transmit the predetermined signal to receiver (131) 55

Fig. 1

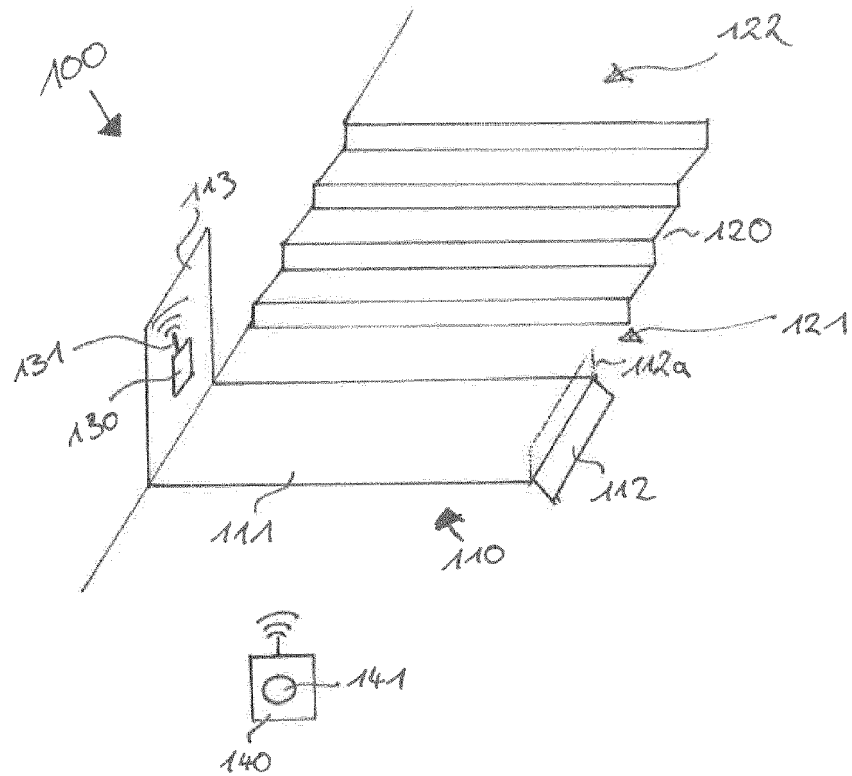
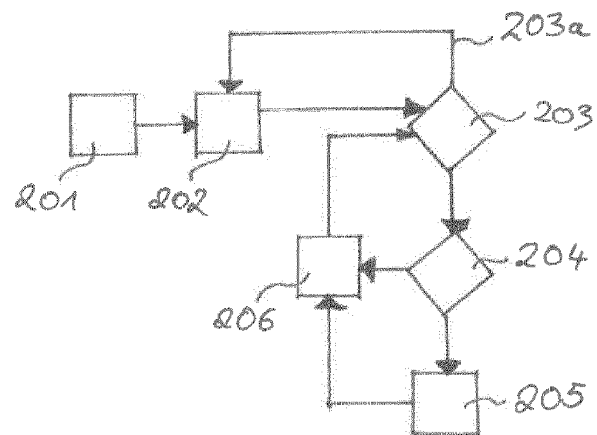


Fig. 2





EUROPEAN SEARCH REPORT

Application Number
EP 14 16 2421

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Place of search The Hague		Date of completion of the search 18 September 2014	Examiner Miklos, Zoltan
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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