

Auxiliary device for displacing a payload receptacle of a lift and device for monitoring the position and the movement of a cage in a shaft of a lift

5 The invention relates to an auxiliary device for displacing a payload receptacle of a lift and to a device for monitoring the position and the movement of a cage in a shaft of a lift.

10 Lifts with an auxiliary device of that kind are usually used for the transport of persons or goods in vertical direction between at least two vertically offset stations and are arranged in a lift shaft in or at a building. The wall bounding the lift shaft has at the level of each station a loading/unloading opening which is closable by means of a door device and at which a waiting zone adjoins, in which the payloads are disposed before loading or after unloading of the payload receptacle. Such a lift essentially comprises a payload receptacle such as a platform or a cage, a counterweight for the payload receptacle, a drive device, a braking device, at least one flexible support and drive element, such as for
15 example a cable or rope, and the necessary electronic power and control system. The flexible support and drive element connects the payload receptacle with its counterweight and runs between the payload receptacle and counterweight by way of a drive wheel of the drive device. The drive device is disposed in the transport shaft above the zone thereof usable by the payload receptacle. If braking takes place in consequence of a technical problem, thus an emergency braking, the load receptacle is usually not disposed
20 in a station. The auxiliary device then has to be actuated in order to bring the load receptacle to a station in the shortest time, so that the persons and/or goods being transported do not have to remain in or on the load receptacle in the transport shaft. The auxiliary device comprises on the one hand a temporarily activatable brake release device, by which the braking device is released, and on the other hand an auxiliary drive device
25 actuatable in the case of emergency in order to raise or lower the load receptacle when the release device is activated; in that case, the load receptacle has to be brought into one of the stations or at least in to a region in the vicinity of a station where a risk-free unloading can take place. The auxiliary drive device is generally constructed so that it allows manual actuation of the drive pulley, which in normal operation is actuated by motor, of the drive device; consequently, this drive pulley can also be considered as part of the auxiliary drive device. For lifts which are mounted in buildings with few storeys and are designed for transport of relatively small payloads, simple, manually actuatable and mechanically operating brake release and auxiliary drive devices are preferably provided.

EP 0 947 460 A1 describes such an auxiliary device for a lift for persons, with a release device and an auxiliary drive device. This possesses a crank rod linkage, which is so constructed that it is used not only for activating a brake release device, but also for the drive of an auxiliary drive device. The upper end region of the crank rod linkage can be coupled with the brake release element and with the element of the auxiliary drive and is disposed in the uppermost part of the transport shaft. The crank rod linkage is constructed to be pivotable and mounted in such a manner that it can be pivoted from a rest position in which it is disposed entirely in the lift shaft into an operative position in which its lower end region projects through a window opening of a wall bounding the lift shaft. The window opening lies in the upper region of the uppermost station, so that the crank rod linkage can be readily actuated at its lower end by way of appropriate handle elements by a person standing in the waiting zone of the station. The disadvantage of this device is to be seen in that the actuation thereof has to take place at the level of the uppermost station; this disadvantage is of particular significance when this station is disposed within a residential unit, as is frequently the case in superior dwellings and particularly in maisonette dwellings and penthouse dwellings.

There is known from DE GM 296 15 921 U1 an auxiliary device which is improved with respect thereto and in which the operation of the device can take place from a location disposed at a certain distance from the uppermost station of the lift. However, this auxiliary device is of comparatively complicated construction. A substantial disadvantage of such auxiliary devices resides in the fact that it is not possible for a person who is actuating it to observe the movement, which is taking place in the uppermost region of the lift shaft, of the auxiliary drive device as generally no direct visual link exists between this uppermost region of the lift shaft and the person carrying out the operation. Certainly with a suitable arrangement of an observation window the flexible support and drive element at which the load receptacle is suspended can be observed without further measures from a location outside the lift shaft and thus an indication obtained about the movement of the payload receptacle, but in many cases this is considered to be an inadequate solution. In order to actually observe an element of the auxiliary drive device such as the drive pulley the person carrying out the operation is obliged to move at least his or her head and neck region into the lift shaft, which forms a source of risk for this person and can hinder them during actuation of the auxiliary device. Moreover, the view of the uppermost region of the lift shaft through the payload receptacle is obstructed if this is disposed above the location of the person carrying out the operation.

It is therefore an object of the invention to propose an auxiliary device for displacing a payload receptacle of a lift and a device for monitoring the position and the movement of a cage in a shaft of a lift which are simple with respect to construction, arrangement and operation and which can be operated from a storey lying at one or more levels below the uppermost storey.

In accordance with the invention this object is met by the features of patent claim 1 and, alternatively thereto, by the features of the subordinate patent claim 11.

Preferred developments of the auxiliary device, as well as the device for monitoring the position and movement of a cage in a shaft of a lift, according to the invention are claimed in the dependent claims.

The auxiliary device according to the invention comprises an image transmission device which essentially consists of a sensor, a display device and a transfer path. The sensor serves the purpose of detecting at least one image of the movement of the auxiliary drive; the display device serves the purpose of making visible the images, which are picked up by the sensor, for the attention of the person carrying out the operation; and the transfer path serves for transmission to the display device of the images detected by the sensor. In the case of arrangement of the operating elements of the auxiliary device far below the uppermost floor, thanks to an image transmission device of that kind the display device can be mounted in the immediate vicinity of the operating elements of the brake release and auxiliary drive device.

In the case of the device according to the invention for monitoring the position and the movement of a cage in a shaft of a lift there is provided a first means for monitoring the movement of the cage, which comprises a unit for detection of the movement, an information transmission path and a display unit. In addition, there is provided a second means for monitoring the position of the cage, which comprises a means for reproducing the position of the cage.

In a first embodiment of the auxiliary device the image transmission device thereof is formed by at least two mirrors. The first mirror serves as a sensor and is oriented towards the auxiliary drive; the second mirror serves as a display device and is oriented towards an

observation window, which is arranged in the wall of the lift shaft at the location provided for the person carrying out the operation. The transfer path is formed by the optical coupling region between the first and the second mirror. This arrangement is comparatively simple in construction and reliable in operation. Moreover, it allows
5 visualisation on the display device not only of an image of the movement of the auxiliary drive, but also of the constructional elements of the auxiliary drive itself and the surroundings thereof. However, attention must be given to mounting the mirror so that the payload receptacle does not reach into the transfer path and thereby interrupt it. Moreover, measures must be undertaken in order to sufficiently brighten the lift shaft,
10 including when the auxiliary device has to be set in motion due to a mains failure. The image transmission device can also comprise one or more additional mirrors arranged along the transfer path between the first and the second mirror. In that case, each mirror is oriented towards the two mirrors adjacent thereto in the transfer path. The additional mirrors in such an arrangement can be considered to be components of the transfer path.
15 In order to obtain good image quality, it can be advantageous if individual mirrors have reflection surfaces which are not planar, but concave or convex.

Apart from the purely optical image transmission device with mirrors, there can also be provided an image transmission device in which the transfer path is formed by a
20 continuous conductor connection. This gives rise to, inter alia, the following advantages; the transfer path can be extended as desired; there is no risk that the transfer path is interrupted by the payload receptacle; the display device can be mounted at a location which is optimum for the person carrying out the operation; and it is not necessary to provide an actual observation window in the wall of the lift shaft, because a small passage
25 in this wall suffices for passing through the conductor connection. By contrast to the image transmission device with mirrors, it is further not necessary to provide emergency lighting for the entire transfer path, as merely sufficient light has to be present to guarantee the function of the sensor.

30 In the case of an auxiliary device of which the image transmission device functions in optimum manner, the sensor is formed by a video camera and the display device by a monitor, wherein the conductor connection is formed by an electrical conductor connection connecting the video camera with the display device. As in the case of the image transfer device with mirrors, there appears on the display device, i.e. on the monitor, an image of
35 the auxiliary drive device and also its immediate environment. It is thereby possible to

obtain more accurate indications of malfunctions. Several video cameras can also be mounted at different places within the lift shaft, wherein the images detected by them can be alternatively and selectably visualised on the monitor.

- 5 Auxiliary devices with an image transmission device of which the transfer path is formed by a conductor connection can also be conceived in such a manner that they comprise a rotary element which rotates fixedly with the shaft of the auxiliary drive device and the rotation of which is detected by the sensor. In that case there appears on the display device not an image of the auxiliary drive itself, but an image of the movement of the
10 auxiliary drive.

A conventional tachometer device can be mounted, as the sensor, at the shaft of such a rotary element which is preferably identical with the shaft of the auxiliary drive. The conductor arrangement in this case is an electrical conductor arrangement. The display
15 device, namely a conventional tacho display, can reproduce the image not only of a movement of the auxiliary drive device, but also of the speed thereof.

In another construction of the image transfer device with a conductor connection between the sensor and display device, the rotary element is constructed as a rotary disc and has
20 light-permeable zones which are arranged at mutual angular spacings and generally at a constant radial spacing from the rotational axis of the rotary element. As rotary element or rotary disc there is preferably used a drive pulley of the drive of the lift, over which the flexible support and actuating elements for the payload receptacle run; such a drive pulley constantly rotates during displacement of the payload receptacle. Arranged on one side of
25 the rotary disc is a light source which is so oriented that the light beam emitted by it is incident on a sector of the radial region of the rotary disc in which the light-permeable zones of the rotary disc are disposed. The sensor is arranged on the opposite side of the rotary disc. The display device shows an image of the movement of the drive or of the auxiliary drive or of the rotary disc. The display device is, for example, a monitoring light
30 which blinks at the rhythm in which the light-permeable zones rotate away below the beam emitted by the light source, so that a bright/dark alternation is visible. The spacing in terms of time of the bright/dark alternation is a measure of the speed of the auxiliary drive and thus also of the payload receptacle.

- 35 In an image transmission device of that kind the light source can be formed by a first

element of a light barrier and the sensor by the complementary second element of the light barrier. The conductor connection is, in that case an electrical conductor connection.

5 In an image transmission device which is similar to that just described the sensor is formed by an input of an optical conductor arrangement. The optical conductor arrangement itself is the conductor connection or the transfer path. The output of the optical conductor connection is oriented towards the display device, which acts in the manner of a monitoring light. As in the case of the image transmission device with a tachometer or light barrier there is in this case transmitted not an image of the drive pulley itself, but
10 merely an image of the movement of the drive pulley. However, it is possible with a development of this arrangement to transmit an image of the drive pulley itself; for this purpose several optical conductors, for example n^2 optical conductors must be used, the inputs and outputs of which are respectively arranged in n columns to n lines; the larger the number n of optical conductors, the finer the scanning-pattern image that is received of
15 the drive pulley.

The initially described construction of the image transmission device with mirrors has, as already mentioned, a non-material transfer path; this would be particularly advantageous in cases in which an existing lift has to be subsequently equipped with an image
20 transmission device. However, this is usually not possible with mirrors which need for that purpose a free space for the beam path near the load receptacle. Thereagainst, a comparatively simple and space-saving image transmission device can be realised if a non-material transfer path in the form of a radio or laser connection is used.

25 The new auxiliary device comprises, in accordance with the invention, an image transmission device which, as explained, can be constructed in very diverse ways. It is also possible to provide image transmission devices which consist of several serially arranged part devices constructed and operable in accordance with several of the above-described principles.

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Advantageously, in the case of the device according to patent claim 11 a drive unit for movement of the cage is provided. The unit for detection of the movement of the cage enables a conclusion about the movement of the cage to be made by way of the detection of the movement of a movable part of the drive unit.

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Moreover, a speed-limiting unit can be provided, wherein the unit for detection of the movement of the cage enables a conclusion about the movement of the cage to be made by way of the detection of the movement of a movable part of the speed-limiting unit.

- 5 The unit for detection of the movement of the cage can advantageously comprise a flexible shaft which is connected with the movable part of the drive unit. The display unit comprises a rotating disc or a tachometer.

10 The unit for detection of the movement of the cage comprises, in a further embodiment of the invention, a flexible shaft which is connected with the movable part of the speed-limiting unit. The display unit comprises a rotating disc or a tachometer.

In one embodiment of the invention the speed-limiting unit comprises a cable, wherein the means for reproducing the position of the cage comprises marks at the cable of the speed-limiting unit.

Moreover, a support means, which is connected with the cage, can be provided, wherein the means for producing the position of the cage comprises marks at the support means.

- 20 Further details and advantages of the invention are described in explanatory manner in the following on the basis of embodiments and by reference to the drawing. There:

Figure 1A shows a first auxiliary device according to the invention, with an image transmission device with mirrors, from the side,

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Figure 1B shows the auxiliary device illustrated in Figure 1A, from above,

Figure 2A shows a second auxiliary device according to the invention, with an image transmission device with a video system, in the same representation as Figure 1A,

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Figure 2B shows the auxiliary device illustrated in Figure 2A, in the same representation as Figure 1B,

35 Figure 3 shows a third auxiliary device according to the invention, with an image

transmission device with a tachometer, in the same representation as Figure 1A,

5 Figure 4A shows a fourth auxiliary device according to the invention, with an image transmission device with a light barrier, in the same illustration as Figure 1A,

10 Figure 4B shows the drive pulley illustrated in Figure 4A, in enlarged representation, 4A, in a view in the direction of arrow IV of Figure 4A,

Figure 5 shows a fifth auxiliary device according to the invention, with an image transmission device with a transfer path formed by an optical conductor arrangement, and

15 Figure 6 shows a sixth auxiliary device according to the invention, with an image transfer device with a non-material transfer path.

Figure 1A shows a lift 10 with a lift shaft 11, which serves several stations - denoted in the following as stopping points or storeys - 12.1, 12.2, 12.3, 12.4, 12.5 and 12.6 in floors
20 arranged one above the other, wherein the station 12.1 is disposed in the basement and the station 12.6 at the uppermost floor. At each station, a door opening, which is closable by means of a not-illustrated door, is present in the wall of the lift shaft 11 and gives access to a payload receptacle (= lift cage) 14 when this is at rest in the station. The payload receptacle 14 is constructed as a cage and is vertically movable within the lift
25 shaft 11. It is fastened at one end of a flexible support and drive element 16. Starting from the payload receptacle 14 the flexible support and drive element 16 runs upwards to a drive pulley 18 in the uppermost region of the lift shaft 11, runs around this drive pulley 18 and runs back down to a counterweight 20 of the payload receptacle 14. A drive device 22 serves for driving the drive pulley 18. In the following the drive pulley 18 in conjunction
30 with the drive device 22 is also termed drive unit. Disposed in the uppermost region of the lift shaft 11 are, moreover, a braking device 24, a temporarily activatable brake release device 26 and an auxiliary drive device 28 for the drive pulley 18. The brake release device 26 and the auxiliary drive device 28 are components of an auxiliary device 30, which serves the purpose of moving the payload receptacle 14 when, due to technical
35 problems, it is blocked by the braking device 24 between two adjacent ones of the stations

12.1 to 12.4.

A speed limiter 51 is provided in the upper region of the lift shaft 11 for speed monitoring. A limiter cable 52 is guided from the speed limiter 51 over a deflecting roller 53 mounted in the shaft pit and back to the speed limiter 51. The limiter cable 52 is mechanically connected with the lift cage 14. If the speed of the lift cage 14 rises above a defined upper speed nominal value, the speed limiter 51 triggers a braking device, which is not shown in Figure 1 and which brakes the lift cage 14 safely to a halt and retains it in this position.

A waiting area is disposed in front of the lift cage 10 at each floor; the pedestrian floor surfaces of the waiting areas are denoted by 13.1 to 13.6. For displacement of the payload receptacle 14, which according to Figure 1 is blocked between the stations 12.2 and 12.3, to the station 12.2 the brake release device 26 is activated in not-illustrated manner by an operative 1 who is located at the level of the station 12.1, in the present case in the waiting area thereof, and who actuates the auxiliary drive device 28 during the activation of the brake release device 26. The drive pulley 18 rotates under the action of the auxiliary drive 28, whereby the flexible support and drive element 16 is set into motion with the consequence that the payload receptacle 14 is, in accordance with the respective rotational direction of the drive pulley 18, raised, or as envisaged here, lowered. The auxiliary device 30 according to the invention moreover comprises an image transmission device 40, with the assistance of which it is possible for the operative 1 to observe the movement of the drive pulley 18 from his or her location outside the lift shaft 11 and without a direct visual link to the drive pulley 18. An arrangement of the operating elements of the auxiliary device 30 as well as the display device of the image transmission device 40 in the lowermost floor, thus in the basement, can be worthy of recommendation, since a separate monitoring and operating space can optionally be bounded off there so that, for example, an actuating device and other devices of the auxiliary device 30 can be accommodated in vandal-proof manner, but it is obviously also possible to select a higher floor for that purpose.

The image transmission device 40 essentially consists of a sensor 42, a display device 44 and a transfer path 46, which connects the sensor 42 with the display device 44. The previously described parts are, in principle, the same in all described embodiments. The various auxiliary devices 30 differ in practice only by the different construction of their image transmission devices 40.

The embodiment illustrated in Figures 1A and 1B shows an image transmission device with mirrors. The sensor 42 is formed by a first mirror similarly denoted by 42. This first mirror is oriented not only towards the drive pulley 18, but also towards the display device 44, which is formed by a second mirror similarly denoted by 44. The second mirror 44 is oriented towards the first mirror 42 and, moreover, is so arranged that it is viewable from the lowermost station 12.1 by way of a window opening 13 of the wall of the lift shaft 11. The first mirror 42 thus reflects the image of the drive pulley 18 and projects it onto the second mirror 44; the second mirror 44 reflects the image of the drive pulley 18 in direction towards the window opening 13. Figure 1B shows that a free space 11.1 for the transfer path 46, which here is formed merely by the beam path, is present in the lift shaft 11 laterally near the payload receptacle 14 and the counterweight 20. In the following the components of speed limiter 51, limiter cable 52 and deflecting roller 53 are termed unit for speed limitation.

The image transmission device can also be so arranged that it reproduces one or more of the movable parts of the unit 51, 52, 53 for speed limitation.

Figures 2A and 2B show a second auxiliary device 30 for a lift 10, which differs from the lift illustrated in Figures 1A and 1B by a differently designed image transmission device 40 and - in connection therewith - by the absence of the free space 11.1, which is not necessary here, in the lift shaft 11; such a free space 11.1 is also redundant in all further described embodiments. The image transmission device 40 is here formed by a video system, with a video camera 42 as sensor, a monitor 44 as display device and an electric conductor connection 46 as transfer path between the video camera 42 and the monitor 44. The video camera 42 is disposed in the uppermost region of the lift shaft 11 and is so arranged that it picks up images of the drive pulley 18. The monitor 44 is disposed in the lowermost station 12.1; it can be arranged behind a door for protection against destruction. An emergency current unit 47 for the video system is arranged in the lift shaft 11 in the region of the station 12.1.

In Figure 3 there is illustrated a third auxiliary device 30 for a lift 10 with yet another image transmission device 40. In that case, the sensor is formed by a tachometer unit 42 arranged at drive pulley 18. The display device is a conventional tacho display device 44 viewable from a location in the lowermost station. The tachometer unit 42 and tacho

display 44 are connected together by an electric conductor connection 46, which forms the transfer path. The tachometer unit 42 can be arranged, instead of at the shaft 19, also at a rotary element rotating in fixed relationship with the drive pulley 18.

5 A fourth auxiliary device 30 for the lift 10 is illustrated in Figures 4A and 4B. The image transmission device 40 of this auxiliary device 30 requires the drive pulley 18 to have light-permeable zones 19, which are arranged in mutual angular spacings at a constant radius. According to Figure 4B the light-permeable zones 19 are formed by slot-shaped passages. A light-emitting first element 48 of a light barrier 42, 48 is oriented towards a location
10 through which, on rotation of the drive pulley 18, the light-permeable zones 19 thereof run. The second element 42 of the light barrier 42, 48 is arranged on the other side of the drive pulley 18 and forms the sensor of the image transmission device 40. This second element 42 of the light barrier 42, 48 is connected by way of an electric conductor connection 46, which is used as transfer path, with the display device 44. The display device 44 is a
15 monitoring light with a bright/dark display, which is viewable in the lowermost station 12.1. Instead of the drive pulley 18 there can also be provided another rotary element, which rotates in fixed relationship with the drive pulley, in the form of a rotary disc with light-permeable zones.

20 Figure 5 shows a fifth auxiliary device 40 for the lift 10, which is very similar to the auxiliary device described with respect to Figures 4A and 4B and which likewise has a drive pulley 18 or another rotary disc with light-permeable zones 18. Here, however, a conventional light source or lamp 48 is provided as light-emitting element and the sensor is formed by an input 42 of an optical conductor arrangement 46, which is used as transfer path. The
25 output of the optical conductor arrangement 46, which can be considered as the display device 44, is oriented towards a translucent surface 49 viewable from outside the lift shaft 11; the effect of the display device is that of a monitoring lamp with a bright/dark display.

Finally, in Figure 6 there is illustrated a sixth auxiliary device 30 for the lift 10, wherein the
30 image transmission device 40 comprises an emitter 42.1 coupled with the sensor 42 and a receiver 44.1 coupled with the display device 44 as well as a non-material transfer path 46 in the form of a radio or laser beam connection.

The arrangements, which are shown in Figures 1 to 6, of the image transmission device 40
35 with display device 44 represent merely one of the possible embodiments of the invention.

The components of the image transmission device 40 together with the display device 44 are to be arranged in the lift shaft 11 where, with respect to the storey, the technical and constructional requirements appear most appropriate.

- 5 In Figures 1 to 6 a sight-free visualisation of the unit 51, 52, 53 for speed limitation by means of the image transmission device 40 is not, in fact, illustrated, but a corresponding arrangement of the image transmission device 40 for sight-free visualisation of the unit 51, 52, 53 for speed limitation is possible. It is to be decided in accordance with the respective application how the image transmission device 40 is to be arranged. In principle, the
10 above-mentioned embodiments also apply in the case of the sight-free visualisation of the unit 51, 52, 53 for speed limitation.

Moreover, coloured marks 60 or marks 60 of another kind can be applied to the support cable 16 or the limiter cable 52 in order to determine the position of the lift cage 14.

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The invention is suitable for lifts without an engine room. By that there are to be understood lifts which have no actual engine room. The drive thereof is thus disposed in the lift shaft near the counterweight and the lift cage.

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Patent Claims

1. Auxiliary device for moving a payload receptacle of a lift, comprising an auxiliary drive device (30), which can be coupled with a drive unit (22, 18) for the payload
5 receptacle (14), and a unit (51, 52, 53) for speed limiting, characterised in that an image transmission device (40) is arranged for sight-free visualisation of a movable component of the drive unit (22, 18) or a movable component of the unit (51, 52, 53) for speed limiting, the device comprising
 - a sensor (42) for detecting images representing the movement of the drive unit (22,
10 18) or of the unit (51, 52, 53) for speed limiting,
 - display device (44) for visualisation of the images detected by the sensor (42) and
 - a transfer path (46) for transferring the images detected by the sensor (42) to the display device (44).
- 15 2. Auxiliary device according to claim 1, characterised in that
 - the sensor (42) is formed by a first mirror oriented towards the drive unit (22, 18) or the unit (51, 52, 53) for speed limiting, and
 - the display device (44) is formed by a second mirror and
 - the second mirror is oriented towards the first mirror for formation of the transfer
20 path (46).
3. Auxiliary device according to claim 1, characterised in that the transfer path (46) is formed by a conductor connection.
- 25 4. Auxiliary device according to claim 1 or 3, characterised in that
 - the sensor (42) is constructed as a camera,
 - the display device (44) is constructed as a monitor and
 - the transfer path (46) is an electric conductor connection.
- 30 5. Auxiliary device according to claim 1 or 3, characterised in that the sensor (42) is constructed for detecting images of the movement of a rotating rotary element (18) connected with the drive unit (22, 18).
6. Auxiliary device according to claim 5, characterised in that
35 - the rotary element is a shaft of the drive unit (22, 18),



- the sensor (42) is constructed as a tachometer element and arranged at the shaft and
- the display device (44) is a tacho display.

5 7. Auxiliary device according to claim 5, characterised in that

- the rotary element is formed by a drive pulley (18) of the drive unit (22, 18), the pulley having light-permeable zones (19) arranged at mutual angular spacings along a circle arranged concentrically with the pulley rotational axis,
- a light source (48) is arranged on one side of the rotary element and
- 10 - the light emitted by the light source (48) and sensed by the sensor (42) is arranged on the other side of the rotary element.

8. Auxiliary device according to claim 7, characterised in that

- the light source (48) and the sensor (42) are formed by elements of a light barrier
- 15 and
- the conductor connection (46) is an electric conductor connection.

9. Auxiliary device according to claim 7, characterised in that

- the sensor (42) is formed by the input of an optical conductor arrangement,
- 20 - the conductor connection (46) is the optical conductor arrangement and
- the display arrangement (44) is the output of the optical conductor arrangement.

10. Auxiliary device according to at least one of the preceding claims, characterised in that

- 25 - the sensor (42) is coupled with an emitter (42.1),
- the display device (44) is coupled with a receiver (44.1) and
- the transfer path (46) is formed by a radio or laser light connection.

11. Device for monitoring the position and movement of a cage in a shaft of a lift, in
30 which a first means for monitoring the movement of the cage (14) is provided and comprises a unit for detection of the movement, a data transmission path and a display unit, and in which a second means for monitoring the position of the cage (14) is provided and comprises a means for reproducing the position of the cage.

35 12. Device according to patent claim 11, in which a drive unit (22, 18) for movement of



the cage (14) is provided and in which the unit for detection of the movement of the cage (14) enables a conclusion about the movement of the cage (14) to be made by way of the detection of the movement of a movable part of the drive unit (22, 18).

5 13. Device according to patent claim 11, in which a speed-limiting unit (51, 52, 53) is provided and in which the unit for detection of the movement of the cage (14) enables a conclusion about the movement of the cage (14) to be made by way of the detection of the movement of a movable part of the speed-limiting unit (51, 52, 53).

10 14. Device according to claim 12, in which the unit for detection of the movement of the cage (14) comprises a flexible shaft connected with the movable part of the drive unit (12, 18) and in which the display unit comprises a rotating disc or a tachometer.

15 15. Device according to claim 13, in which the unit for detection of the movement of the cage (14) comprises a flexible shaft connected with the movable part of the speed-limiting unit (51, 52, 53) and in which the display unit comprises a rotating disc or a tachometer.

20 16. Device according to one of patent claims 13 to 16, in which the speed-limiting unit (51, 52, 53) comprises a cable (52) and in which the means for reproducing the position of the cage (14) comprises marks (60) at the cable (52) of the speed-limiting unit (51, 52, 53).

25 17. Device according to one of patent claims 11 to 16, in which a support means (16) connected with the cage (14) is provided and in which the means for reproducing the position of the cage (14) comprises marks (60) at the support means (16).

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