Patent claims

1. Lift installation (1, 1') with a lift cage (3), a counterweight (5), a support means (6) for supporting the lift cage (3) and the counterweight (5), wherein the counterweight (5) is connected with the support means (6) by way of at least one deflecting roller (7) mounted to be rotatable about a rotary bearing and wherein the support means (6) at least partly loops around the deflecting roller (7), wherein the rotary bearing of the deflecting roller (7) comprises a bearing part (15) stationary relative thereto and, in particular, an axial body, wherein the bearing part (15) is fixed to the counterweight (5) in an intended desired position, and with a safety device (2) for relative positional monitoring of the bearing part in the lift installation (1, 1'), wherein the safety device (2) is so constructed and arranged that a positional deviation of the bearing part from the desired position with respect to the counterweight (5) can be monitored, wherein the positional deviation, which can be monitored by the safety device (2), comprises a rotation of the bearing part (15) with respect to the counterweight (5), and wherein an alarm signal can be generated by the safety device (2) if a predeterminable positional deviation is exceeded.

2. Lift installation (1, 1') according to claim 1, characterised in that the positional deviation, which can be monitored by the safety device (2), from the desired position comprises a deviation component in a direction perpendicular to the direction of movement of the movable counterweight (5).

3. Lift installation (1, 1') according to one of claims 1 and 2, characterised in that the safety device (2) comprises a detection element (25) for detecting the positional deviation of the bearing part (15) from the desired position and a trigger element (26) which is co-operable with the safety device (2) for triggering the alarm signal, wherein the detection element (25) and the trigger element (26) are so constructed and arranged that they are co-operable for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part (15) from the desired position.

4. Lift installation (1, 1') according to claim 3, characterised in that the trigger element (26) is arranged in stationary position in the lift installation (1, 1'), particularly in a lift shaft (4).

5. Lift installation (1, 1') according to one of claims 3 and 4, characterised in that the detection element (25) and the trigger element (26) are mechanically co-operable on attainment of the predeterminable positional deviation of the bearing part (15) from the desired position, wherein a force action on, particularly a tension force along, the trigger element (26) can be generated by way of the detection element (25).

6. Lift installation (1, 1') according to any one of claims 3 to 5, characterised in that the trigger element (26) is of elongate construction and preferably extends longitudinally of the lift shaft (4), particularly substantially over the entire length thereof and parallel to the direction of movement of the counterweight (5) and in particular substantially at least over the length of the range of movement of the counterweight (5).

7. Lift installation (1, 1') according to claim 6, characterised in that a switching device (12, 13, 13'), which is actuable by way of the trigger element (26), of the safety device (2) is arranged in an end region of the trigger element (26).

8. Lift installation (1, 1') according to claim 7, characterised in that the trigger element (26) comprises a wire or a cable (11).

9. Lift installation (1, 1') according to claim 8, characterised in that the wire or the cable (11) is suspended at one end at an attachment (23) in the lift shaft (4) and tensioned by a weight (22) or stretched between two attachments.

10. Lift installation (1, 1') according to claim 9, characterised in that a frangible location (23.1) is present in the region of the attachment (23) or at least one of the attachments of the wire or cable (11).

11. Lift installation (1, 1') according to any one of claims 5 to 12, characterised in that the detection element (25) is mechanically directly, particularly rigidly, connected with the bearing part (15).

12. Lift installation (1, 1') according to any one of claims 3 to 11, characterised in that the detection element (26) comprises at least one entrainer which is movable towards the trigger element when there is a positional deviation from the desired position of the bearing

part (15).

13. Lift installation according to claim 12, characterised in that the entrainer comprises lateral, particularly elongate, limiters (24) between which the trigger element (26) is arranged, preferably contactlessly, when the bearing part (15) is in the desired position.

14. Method for relative positional monitoring of components in a lift installation (1, 1') with a safety device (2), particularly in a lift installation (1, 1') according to any one of claims 1 to 13, wherein the lift installation (1, 1') comprises a counterweight (5), which is displaceable in opposite sense to a lift cage (3) and to which a bearing part (15), which is stationary with respect to the counterweight (5) in an intended desired position, of a rotary bearing of a deflecting roller (7) mounted on the counterweight is attached, comprising the steps of:

- monitoring a relative rotational positional deviation of the bearing part (15) from the desired position with respect to the counterweight (5) by the safety device (2) and
- generating an alarm signal by the safety device (2) if a predeterminable relative positional deviation is exceeded.

15. Method according to claim 14, characterised in that the generation of the alarm signal is effected by mechanical co-operation of a detection element (25), which is connected with the bearing part (15), of the safety device (2) with a trigger element (26), which is arranged in the lift installation (1, 1') in, in particular, stationary location, of the safety device (2), wherein the mechanical co-operation preferably takes place in such a way that a force action on, particularly a tension force in, the trigger element (26) is produced.

Claims

1. An elevator installation including an elevator car, a counterweight, a support device supporting the elevator and the counterweight, wherein the counterweight is connected with the support device by at least one deflecting roller mounted to be rotatable about a rotary bearing and wherein the support device at least partly loops around the deflecting roller, wherein the rotary bearing has a bearing part stationary relative to the counterweight, wherein the bearing part is fixed to the counterweight in a desired position, and a safety device for positional monitoring of the bearing part in the elevator installation, wherein further:

the bearing part being an axial body;

the safety device being arranged for monitoring a positional deviation of the bearing part from the desired position with respect to the counterweight, wherein the positional deviation is a rotation of the bearing part about an axis of rotation of the bearing part; and

the safety device generating an alarm signal if the monitored positional deviation exceeds a predeterminable positional deviation, wherein the safety device includes a detection element for detecting the positional deviation of the bearing part from the desired position and a trigger element for triggering the alarm signal, wherein the detection element and the trigger element are configured and arranged for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part from the desired position, and wherein the trigger element is arranged in a stationary positon in an elevator shaft of the elevator installation.

2. The elevator installation according to claim 1, wherein the detection element and the trigger element are mechanically co-operable on attainment of the predeterminable positional deviation of the bearing part from the desired position, wherein a force action on the trigger element is generated by mechanical co-operation between the detection element and the trigger element.

3. The elevator installation according to claim 2, wherein the force action is a tension force on the trigger element.

4. The elevator installation according to claim 1, wherein the positional deviation monitored by the safety device includes a deviation component in a direction perpendicular to a direction of movement of the counterweight.

5. The elevator installation according to claim 1, including a switching device actuable by the trigger element and arranged in an end region of the trigger element.

6. An elevator installation including an elevator car, a counterweight, a support device supporting the elevator and the counterweight, wherein the counterweight is connected with the support device by at least one deflecting roller mounted to be rotatable about a rotary bearing and wherein the support device at least partly loops around the deflecting roller, wherein the rotary bearing has a bearing part stationary

relative to the counterweight, wherein the bearing part is fixed to the counterweight in a desired position, and a safety device for positional monitoring of the bearing part in the elevator installation, wherein further:

the bearing part being an axial body;

the safety device being arranged for monitoring a positional deviation of the bearing part from the desired position with respect to the counterweight, wherein the positional deviation is a rotation of the bearing part about an axis of rotation of the bearing part; and

the safety device generating an alarm signal if the monitored positional deviation exceeds a predeterminable positional deviation, wherein the safety device includes a detection element for detecting the positional deviation of the bearing part from the desired position and a trigger element for triggering the alarm signal, wherein the detection element and the trigger element are configured and arranged for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part from the desired positon, and wherein the trigger element is of elongate construction and extends longitudinally in an elevator shaft of the elevator installation and parallel to a direction of movement of the counterweight in the elevator shaft.

7. The elevator installation according to claim 6, wherein the trigger element extends substantially at least over a length of a range of movement of the counterweight in the elevator shaft.

8. An elevator installation including an elevator car, a counterweight, a support device supporting the elevator and the counterweight, wherein the counterweight is connected with the support device by at least one deflecting roller mounted to be rotatable about a rotary bearing and wherein the support device at least partly loops around the deflecting roller, wherein the rotary bearing has a bearing part stationary relative to the counterweight, wherein the bearing part is fixed to the counterweight in a desired position, and a safety device for positional monitoring of the bearing part in the elevator installation, wherein further:

the bearing part being an axial body;

the safety device being arranged for monitoring a positional deviation of the bearing part from the desired position with respect to the counterweight, wherein the positional deviation is a rotation of the bearing part about an axis of rotation of the bearing part; and

the safety device generating an alarm signal if the monitored positional deviation exceeds a predeterminable positional deviation, wherein the safety device includes a detection element for detecting the positional deviation of the bearing part from the desired position and a trigger element for triggering the alarm signal, wherein the detection element and the trigger element are configured and arranged for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part from the desired position, and wherein the trigger element is a wire or a cable.

9. The elevator installation according to claim 8, wherein the trigger element is suspended at one end at an attachment in an elevator shaft of the elevator installation and is tensioned by a weight or is stretched between the attachment and another attachment in the elevator shaft.

10. The elevator installation according to claim 9, including a frangible location present in a region of at

least one of the attachment and the another attachment.

11. An elevator installation including an elevator car, a counterweight, a support device supporting the elevator and the counterweight, wherein the counterweight is connected with the support device by at least one deflecting roller mounted to be rotatable about a rotary bearing and wherein the support device at least partly loops around the deflecting roller, wherein the rotary bearing has a bearing part stationary relative to the counterweight, wherein the bearing part is fixed to the counterweight in a desired position, and a safety device for positional monitoring of the bearing part in the elevator installation, wherein further:

the bearing part being an axial body;

the safety device being arranged for monitoring a positional deviation of the bearing part from the desired position with respect to the counterweight, wherein the positional deviation is a rotation of the bearing part about an axis of rotation of the bearing part; and

the safety device generating an alarm signal if the monitored positional deviation exceeds a predeterminable positional deviation, wherein the safety device includes a detection element for detecting the positional deviation of the bearing part from the desired position and a trigger element for triggering the alarm signal, wherein the detection element and the trigger element are configured and arranged for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part from the desired position, and wherein the detection element is mechanically directly and rigidly connected with the bearing part.

12. An elevator installation including an elevator car, a counterweight, a support device supporting the elevator and the counterweight, wherein the counterweight is connected with the support device by at least one deflecting roller mounted to be rotatable about a rotary bearing and wherein the support device at least partly loops around the deflecting roller, wherein the rotary bearing has a bearing part stationary relative to the counterweight, wherein the bearing part is fixed to the counterweight in a desired position, and a safety device for positional monitoring of the bearing part in an elevator installation, wherein further:

the bearing part being an axial body;

the safety device being arranged for monitoring a positional deviation of the bearing part from the desired position with respect to the counterweight, wherein the positional deviation is a rotation of the bearing part about an axis of rotation of the bearing part; and

the safety device generating an alarm signal if the monitored positional deviation exceeds a predeterminable positional deviation, wherein the safety device includes a detection element for detecting the positional deviation of the bearing part from the desired position and a trigger element for triggering the alarm signal, wherein the detection element and the trigger element are configured and arranged for triggering the alarm signal at least on attainment of the predeterminable positional deviation of the bearing part from the desired position, and wherein the detection element includes an entrainer that is movable towards the trigger element in response to the positional deviation from the desired position.

13. The elevator installation according to claim 12, wherein the entrainer has lateral, elongate limiters between which the trigger element is arranged contactlessly when the bearing part is in the desired position.

14. A method for positional monitoring of components in an elevator installation with a safety device, wherein the elevator installation includes a counterweight, which is displaceable in an opposite sense to an elevator car and to which a bearing part, which is stationary with respect to the counterweight in a desired position, of a rotary bearing of a deflecting roller mounted on the counterweight is attached, comprising the steps of:

monitoring a rotational positional deviation of the bearing part from the desired position about an axis of rotation of the bearing part by the safety device; and

generating an alarm signal from the safety device if a predeterminable positional deviation of the bearing part is exceeded, wherein the generation of the alarm signal is effected by mechanical co-operation of a detection element, which is connected with the bearing part, with a trigger element, which is arranged in the elevator installation in a stationary location, wherein the mechanical co-operation produces a force action on the trigger element.

15. The method according to claim 14, wherein the force action is a tension force on the trigger element.