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Description



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Emergency drive for an elevator

The invention concerns an emergency drive for an elevator with an elevator car and a counterweight moving drive unit consisting of engine and traction sheave, through which cables are driven and such cables are connected with the elevator car and the counterweight, whereby during the emergency operation, the emergency drive affects the drive unit.

- 10 A gearless drive machine for elevators became known from the patent document EP 0,468,168 B1. With this gearless drive machine for elevators, a machine frame carries a bearing block and a shield block. A main shaft is mounted at two points on the output side, by means of a free bearing arranged on the bearing block and by means of a fixed bearing arranged on the shield block. A traction sheave with brake disc is provided between the bearing points. The traction sheave is firmly connected to the main shaft, by means of a first clamping unit. The bearing arrangement of the traction sheave on both sides permits large radial loads during small deformations of the main shaft. A hoist motor fed with alternating-current voltage essentially consists of a stator and of a rotor with a rotor hub, which can be pushed onto the main shaft. At the drive-side end of the main shaft, a second clamping unit provides a fixed connection between the main shaft and the rotor hub. At the machine frame, which carries a bearing block and a shield block, is also a counter-roller support with a counter-roller arranged, which thereto serves to keep the given cable-line spacing, through the dimensions

of the elevator car and of the counterweight as well as the cable guide.

A hand drive with a worm gear unit, affecting the main shaft, makes possible, in case of voltage loss, a manual moving of
5 the main shaft.

A disadvantage of the well-known installation lies in the fact that a large expenditure of energy is necessary for moving the main shaft. In addition, such types of emergency drives are very expensive.

10 Here the invention wants to create remedy. The invention, as characterised in claim 1, responds to the objective of avoiding the disadvantages of the well-known installation and to suggest a more simply built emergency drive.

The advantages reached by the invention are to be seen
15 essentially in the fact that the heavy and expensive gear units used so far for each drive unit are replaced by a compact drive, which must be only once available for each machine room. The drive is employed only when a drive unit occurs to be in the emergency operation. After the emergency
20 operation, the drive is removed again from the drive unit. Further favourable is the economical production of the gear rim, arranged on the traction sheave, whereby the toothed quadrants are constructed from laminated, interlocked sheet metal segments, which are cheaply producible by means of
25 punching or cutting procedure.

With the help of the enclosed figures, the invention will be described more in detail.

They show:

Fig. 1

a drive unit with a traction sheave,

Fig. 2a and 2b

the traction sheave with a gear rim,

5 Fig. 3

details of the gear rim,

Fig. 4

an exploded view of the Fig. 2a and 2b and

Fig. 5

an auxiliary installation for the emergency drive.

5 Fig. 1 shows the finished assembled drive unit, essentially consisting of an engine 1, an engine stand 2 serving as end shield, a bearing block 5 serving as end shield, a traction sheave 15 and a machine frame 7 with counter-roller support 9. Not represented cables are guided over the traction sheave 15;
10 such cables are connected to an end with an elevator car and to the other end with a counterweight. The stator of the electric drive 1 is bolted, by means of a flange, with the engine stand 2. The rotor of the electric drive 1 is mounted on a free end of a shaft, bearing the traction sheave 15; the
15 shaft is mounted on the bearing block 5 and on the engine stand 2. The free shaft end rises above the engine stand 2. The traction sheave 15, which is visible through an open space in a cable protection casing 3, is mounted on the stator 2 and on the bearing block 5, by means of the shaft. A brake 6 is
20 arranged onto the inside range of the engine stand 2 and protected with the casing 3. Depending upon the structure of the drive unit, the brake 6 can be arranged also onto the inside range of the bearing block 5.

The engine stand 2 and the bearing block 5 are arranged on the
25 machine frame 7, which exhibits at each of its corners an adjustable supporting element 8. The counter-roller support 9 is arranged on the lower side of the machine frame 7. All electrical connections of the drive unit are in a terminal box 10. The traction sheave 15 is accessible from the outside,
30 after opening a side plate 47.

The constructive structure of the emergency drive is more in detail described in the Fig. 2a to 4b, whereby in Fig. 2a and 2b is to be seen an assembled view of the building group and in Fig. 4a and 4b, an exploded view of the building group.

5 Fig. 3 shows details of a gear rim 39 arranged on the traction sheave 15 and Fig. 5a and 5b show an auxiliary facility for the emergency drive.

In the emergency operation, the traction sheave 15 is pushed over the gear rim 39. The gear rim 39 is composed of
10 interlocked segments 39.1, which sit on the traction sheave 15, by means of tension pins 40 entering upon the holes 39.2 and in the appropriate drilled holes 15.1. The screws 41, which are passed through the gear rim 39 and screwed into the traction sheave 15, hold together the segments 39.1 in the
15 axial direction. A segment 39.1 is composed of laminated, interlocked sheet metal segments, which are cheaply producible by means of punching or cutting procedure. The gear rim 39 is composed of several layers of interlocked segments 39.1, which are mutually shifted in the circumferential direction, whereby
20 each segment 39.1 exhibits at least two holes 39.2 for the tension pins 40, which are pressed into the holes 15.1 of the traction sheave 15.

The gear rim 39 is driven by means of a pinion 42, installed on the shaft of a hydraulic engine 43. The engine 43 is
25 inserted, on that purpose, into an entrance hole 5.1 of the bearing block 5 and fastened with screws. The entrance hole 5.1 is located in the range being covered with an end cover 45. A mains alternating fed or battery powered electric drive can be foreseen, for example, instead of the hydraulic engine
30 43. Instead of the direct toothed coupling between the gear rim 39 and the pinion 42, a motor driven toothed belt transferring the motor power to a planned toothed belt wheel instead of the gear rim 39, can be foreseen for example,

whereby the toothed belt wheel is arranged, like the gear rim 39, on the circumference of the traction sheave 15.

The end cover 45 has an opening 45.1, which is lockable with a sliding cover 47 guided into the guides 45.2, 48 and 49.

5 Before the introduction of the hydraulic engine 43, the sliding cover 47 must be brought into the opening position. In so doing, a safety switch 50, whose ram 50.1 protrudes through the hole 45.3 in the end cover 45, is back-pressed by the operating circle 47.1, whereby a safety circuit is
10 interrupted, so that operating the electric drive 1 is not possible during the emergency operation.

Fig. 5a and Fig. 5b shows a mobile hydraulic aggregate, which consists of a car 51 with a carrier 51.1 for the hydraulic engine 43, a carrier 51.2 for the acceptance of a hydraulic
15 aggregate 52, wheels 51.3, a handle 51.4 for placing the hydraulic tubes as well as two further handles 51.5 for coiling the electrical cable for the supply of a pump engine 53.

20 The hydraulic aggregate 52 consists of a pump with pump engine 53, which can be switched on through an engine switch 54 as well as a distributing valve 55 for controlling the hydraulic engine 43. Further elements of the hydraulic aggregate 52 are an adjustable safety valve 56 and an oil filter 57. In the
25 machine room without emergency power supply, a hand pump with hydraulic accumulator can be foreseen instead of the pump motor 53.

Patent claims

1. Emergency drive for an elevator with an elevator car and a counterweight moving drive unit consisting of engine and traction sheave, through which cable are driven and such
5 cables are connected with the elevator car and the counterweight, whereby with the emergency operation, the emergency drive affects the drive unit, characterised by the fact that, with the emergency operation, the emergency drive is directly connected with the traction sheave (15)
10 and drives this one.
2. Emergency drive according to claim 1, characterised by the fact that the emergency drive affects the circumference of the traction sheave (15).
3. Emergency drive according to claims 1 or 2, characterised
15 by the fact that a toothed belt wheel is foreseen at the traction sheave (15), and such toothed belt is movable by means of a motor driven toothed belt.
4. Emergency drive according to claims 1 or 2, characterised
20 by the fact that a gear rim (39) is foreseen at the traction sheave (15), and such gear rim (39) stands in connection with a pinion (42) of an engine (43).
5. Emergency drive according to claim 4, characterised by the fact that the gear rim (39) is stacked.
6. Emergency drive according to claims 4 or 5, characterised
25 by the fact that the gear rim (39) is formed from several layers of interlocked segments (39.1), which are mutually shifted in the circumferential direction, whereby each segment (39.1) is developed from laminated, interlocked sheet metal segments.

7. Emergency drive according to claims 4 to 6, characterised by the fact that each segment (39.1) exhibits at least two holes (39.2) for the acceptance of tension pins (40), which are pressed in the holes (15.1) of the traction sheave (15).