

Automotive Lift

DESCRIPTION

The invention concerns a lift with automotive cage which displays a friction wheel drive with at least one friction wheel which is urgeable against a travel track and urged on more or less strongly by means of a guide link articulatedly mounted at the cage which is connected by way of a transmission organ with a counterweight.

It is known in lifts to balance out the cage weight and a part of the conveyed load by a counterweight. The reduction, which is achieved thereby, in the driving power is of significance in particular for automotive lifts because in these, in addition to the cage weight, the weight of the entire drive equipment still comes in addition.

The German published specification DE 35 23 187 describes a building lift of the initially mentioned kind, the drive of which is arranged on the upper side of a cage. The driven friction wheel and a counter wheel are pressed on the clamping principle by means of spring force against a travel track. For the balancing-out of the cage and drive weight as well as a part of the conveying load, the automotive cage is connected with a counterweight by means of transmission organs guided in the lift shaft by way of a deflecting roller. The transmission organs are fastened underneath the cage.

The German laid-open specification 1 251 925 describes an automotive lift with friction wheel drive which is designed on the splaying principle. Guide wheels and drive wheels are arranged on the upper side of the cage, wherein the drive wheels are pressed against the travel track by a spring force. The transmission organ, which is connected with the counterweight by way of deflecting rollers arranged in the shaft head, is fastened in the centre of the upper side of the cage. The manner of the transmission organ fastening on a fracture of the same causes a triggering of the catching device.

Both these solutions displays as a common feature that the contact pressure force of the friction wheels on the travel track is exerted actively by means of an appropriately arranged compression spring. On a reduction in the friction wheel diameter due to wear, a reduction in the contact pressure force of the driven friction wheel against the travel track is the consequence.

The present invention is based on the object of creating an equipment, by which the contact pressure force of the friction wheels against the travel track in the case of automotive lifts with counterweight is exerted in dependence on the weight. This problem is solved by the invention characterised in the claims.

The advantages achieved by the invention are to be seen substantially in that no special contact pressure constructions are needed and that the necessary contact pressure against the travel track is always present independently on the degree of wear of the driven friction wheels.

A few examples of embodiment are illustrated in the drawings and there show:

Figure 1 a manner of fastening and guidance of the transmission organ at a cage with splayed friction wheel drive at the bottom with two movable guide links,

Figure 2 a further manner of fastening and guidance of the transmission organ at a cage with splayed friction wheel drive at the bottom with two movable guide links,

Figure 3 a manner of fastening and guidance of the transmission organ at a cage with splayed friction wheel drive at the bottom with one movable guide link and one fixed guide link,

Figure 4 a manner of fastening and guidance of the transmission organ at a cage with clamping friction wheel drive at the bottom with two movable guide links,

Figure 5 a manner of fastening and guidance of the transmission organ at a cage arranged in rucksack suspension with clamping friction wheel drive at the bottom and movable single guide link,

Figure 6 a manner of fastening and guidance of the transmission organ at a cage arranged in rucksack suspension with clamping friction wheel drive at the top and movable single guide link,

Figure 7 a manner of fastening and guidance of the transmission organ at a cage with rigid clamping friction wheel drive and movable single guide link with counter roller above the cage and

Figure 8 a manner of fastening and guidance of the transmission organ at the triangular guide link of a clamping friction wheel drive underneath the cage.

A cage, which at its underside displays a splaying friction wheel drive with friction wheels 5 on friction wheel axles 23 arranged each at the outer end of movable guide links 6, is denoted by 1 in the Figure 1. The movable guide links 6 are borne at the inner end to be pivotable in a central fulcrum 7 firmly connected with the cage 1. Of the friction wheels 5, at least one thereof displays a not illustrated drive. In the present schematic illustration, only two friction wheels 5 are visible. An automotive cage 1 can according to need however display more than two friction wheels 5. The friction wheels 5 run on lateral travel tracks 4. The frictional locking necessary for the drive of the cage 1 is produced by a defined contact pressure force of the friction wheels 5 on the travel track 4. For the purpose of balancing-out of the cage weight with the drive and a part of the conveyed load, the cage 1 is connected with a counterweight 2 by means of a transmission organ 3, which is guided over a deflecting roller 10 for example in the shaft head. The transmission organ 3 is fastened at the cage to the left-hand friction wheel axle 23, is guided vertically upwards over a deflection 8 fastened at the underside of the cage and after this deflection extends obliquely downwards to the right over a deflection 9 arranged on the right-hand friction wheel axle 23 and from this vertically upwards to the deflecting roller 10 and then finally to the counterweight 2. The transmission organ 3 preferably consists of at least one wire cable. It can however also be chains or belts and any metals or alloys or synthetic fibres can find use as material.

Due to the illustrated manner of the guidance of the transmission organ 3, an urging of the friction wheels 5 against the travel track 4 takes place through the tension force in the direction of extent of the transmission organs 3. This urging-on is increased by the useful load, whereby still a weight-dependent component of the contact pressure force is achieved.

It is evident from the Figure 2 that the transmission organ 3 consists of at least two parts. One part is again fastened at the left-hand friction wheel axle 23, leads by way of the deflection 8 then horizontally to the right by way of a deflection 11 mounted at the lower right-hand cage corner and then vertically upwards from this. The second part of the transmission organ 3 is fastened at the right-hand friction wheel axle 23 and guided somewhat obliquely upwards likewise by way of the deflection 11, from where both parts are, as already mentioned, connected by way of the deflecting roller 10 with the counterweight 2. Due to the illustrated manner of the guidance of the transmission organ 3, an urging of the friction wheels 5 against the travel track 4 takes place in dependence on the cage weight. The balancing-out of forces between the at least two parts of the transmission organ 3 is given by the usual resilient fastening of their ends.

In the Figure 3, only one movable guide link 6 is present for basically the same drive. A rigid guide link 12 is provided at the left-hand side. The transmission organ 3 is led from a fastening point 14 at the underside of the cage 1 by way of a deflection 9 on the right-hand friction wheel axle 23 and goes from there directly upwards by way of the deflecting roller 10 to the counterweight 2. Due to the illustrated manner of the guidance of the transmission organ 3, an urging of the friction wheels 5 against the travel track 4 takes place in dependence on the cage weight.

In the case of the Figure 4, a clamping friction wheel drive is concerned. Both the friction wheels 5 are urged against the travel track 4, which is constructed as hollow profile with counterweight 2 running internally, in dependence on the weight of the cage by means of guide links 6 borne to be pivotable at fulcra 13 by way of the transmission organ 3, which is led over the two deflections 9 on the friction wheel axles 23, goes off from the fastening point 14 and is led by way of the upper deflecting roller 10 and fastened at the counterweight 2.

In the case of the Figure 5, an automotive cage 1 in so-called rucksack arrangement is concerned. The friction wheel drive mounted underneath the cage 1 likewise operates on the clamping principle, however with the difference from the preceding Figure 4 that a triangular guide

link 15, which is borne in the central fulcrum 7, displays the friction wheel 5 in the angle and the counterpressure roller 16 at the end of the shorter limb 24. The cage 1 is guided at the upper side by guide rollers 17 running in the front of and to the rear of the travel track 4. The travel track 4 can for example be constructed as double-T profile. The transmission organ 3 is here fastened directly in about the centre of the shorter limb 24 of the triangular guide link 15 and leads from there by way of the upper deflecting roller 10 to the counterweight 2. The fastening position of the transmission organ 3 here likewise results in an urging of the friction wheel 5 against the travel track 4 in dependence on the weight of the cage.

The Figure 6 basically shows the same drive disposition as Figure 5, however with the difference that the drive is disposed above the cage 1. A prolonged guide link lever 18 is borne in the central fulcrum 7, displays the friction wheel 5 after about two thirds of its length to the right and counterpressure roller 16 at the right-hand end. An additional guide roller 19 is mounted at the underside of the cage 1. The transmission organ 3 is fastened directly at the friction wheel axle 23. In respect of contact pressure force against the travel track 4, the same effect is achieved here as in the case of Figure 5.

In the case of the Figure 7, the friction wheel 5 and the counterpressure roller 16 are arranged separately. The friction wheel 5 is borne in a fixedly mounted bearing support 22. The counterpressure roller 16 is disposed at the left-hand end of a guide link lever 21 borne about centrally in a guide link fulcrum 20. The transmission organ 3 engages at the right-hand end of the guide link lever 21 and causes an urging of the friction wheel 5 and the counterpressure roller 16 in dependence on the weight and the lever ratio against the travel track 4, which is constructed as hollow profile with the internally running counterweight 2.

A further drive disposition on the clamping principle is illustrated in Figure 8, wherein the movable triangular guide link 15 is borne laterally at the bottom in the guide link fulcrum 13 at the end of the short limb 24 and the end of the long limb of the triangular guide link 15 is connected with the transmission organ 3. The right-hand friction wheel 5, which is borne in the angle of the triangular guide link 15, is urged

onto the travel track 4 by the tension of the transmission organ 3, wherein its pressure is absorbed by the second friction wheel 5, which is at the left-hand side, operates as counterpressure roller and is rigidly borne in a bearing support 22, from the oppositely disposed travel track 4. Both friction wheels 5 or only one of both of them can be driven.

The function of the equipment according to the invention is evident to a large extent from the preceding description of the figures. The location of the fastening and the manner of the guidance of the transmission organ 3 at the cage 1 and at the drive results in the desired weight-dependent urging of the friction wheels 5 against the travel track 4. The weight-dependent contact pressure corresponds to the physical constraint to improve the frictional locking for higher conveyed loads.

As partially already mentioned, cables, chains or belts of any desired materials can be used for the transmission organ 3. The deflections 8, 9 and 11 need be rotatable only conditionally, because it can be assumed with some certainty that the sliding movements for the force balance can take place at the deflections also by corresponding construction and possibly lubrication.

The angles of the guide link levers 9 to the horizontal can be so chosen that the splaying force components or the contact pressure force components, which act horizontally on the travel track 4 and are given solely by the weight of the cage, of the friction wheels 5 is sufficiently great in order to hold the cage securely in every position even without supporting contact pressure by the transmission organ 3 with the counterweight 2.

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CLAIMS

1. Lift with automotive cage (1), which comprises a friction wheel drive with at least one friction wheel (5), which is urgeable against a travel track (4) and urgeable more or less strongly by means of a guide link (6, 15, 18, 22) articulatedly mounted at the cage (1), which is connected by way of a transmission organ (3) with a counterweight (2), characterised thereby, that the transmission organ (3) is so connected with the guide link (6, 15, 18, 21), which carries the friction wheel (5) or its counterpressure roller, or is deflected (9) to influence this that the tension force in the transmission organ (3) acts on the travel track (4) in the sense of an about horizontally directed contact pressure force of the friction wheel (5) or its counterpressure roller (16).
2. Lift according to claim 1, characterised thereby, that the angle between the direction of extent of the transmission organ (3) and the direction of either the guide link (6, 21) articulatedly mounted at the cage (1) or of that part of the guide link (15, 18), which is between the contact pressure roller (16) and the connection of the transmission organ (3) with either the guide link (18) or the limb (24), amounts to less than 90°.
3. Lift according to claim 1 or 2, characterised thereby, that the guide link (6, 15, 18, 21) is articulated at the cage (1) to be pivotable about a fulcrum (7, 13, 20).
4. Lift according to claim 1 or 2, characterised thereby, that the transmission organ (3) acts on the rotational axle (23) of the or each friction wheel (5).
5. Lift according to claim 1 or 2, characterised thereby, that the guide link (18, 21) is constructed as lever and the transmission organ (3) is fastened directly at the guide link (21).

6. Lift according to claim 1 or 2, characterised thereby, that the transmission organ (3) is fastened at a limb (24) rigidly connected with the triangular guide link (15).

7. Lift according to claim 1 or 2, characterised thereby, that the transmission organ (3) is fastened at the longer limb of the triangular guide link (15).