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(54) **ELEVATOR SPEED LIMITER**

AUFZUGSGESCHWINDIGKEITSBEGRENZER

LIMITEUR DE VITESSE POUR ASCENSEUR

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Description

[0001] The present invention relates to an elevator as defined in the preamble of claim 1.

[0002] According to safety regulations, elevators are required to be provided with equipment for monitoring the speed of the elevator car and for stopping the movement of the elevator car if a predetermined maximum speed is exceeded. Such equipment generally comprises at least a speed limiter, which monitors the speed to ensure that the maximum speed will not be exceeded, and a safety gear, which is connected to the speed limiter and attached to the elevator car or car frame and which stops the elevator car in the event of overspeed upon being activated by the speed limiter. Elevator speed limiters are generally mechanical rope systems comprising a speed limiter pulley mounted in the upper part of the elevator shaft, a diverting pulley in the lower part of the elevator shaft and a speed limiter rope fitted to run in a closed loop around these pulleys. The speed limiter is connected to the safety gear by this rope, which, when the elevator car is moving, runs around the speed limiter pulley and the diverting pulley. If the elevator car moves at an excessive speed, then the motion of the speed limiter pulley in the upper part of the elevator shaft is stopped e.g. due to centrifugal force and at the same time the speed limiter rope also stops moving, with the result that the speed limiter rope draws the wedges in the safety gear into contact with the guide rails guiding the elevator car and the movement of the elevator car is stopped.

[0003] More specifically, the present invention relates to minimization of space utilization in an elevator shaft, particularly in the lower part of the shaft, by reducing the space requirement of the structures needed to maintain the tension of the speed limiter rope. At the same time, the invention relates at least to maintaining rope tension and to rope adjustment. The speed limiter rope must be kept sufficiently tight around the speed limiter pulley and the diverting pulley for the speed limiter to work reliably. If the rope is too loose, it will slide on the speed limiter pulley, so when the speed limiter pulley stops, the rope will go on running with the elevator car and thus fail to activate the safety gear in an overspeed situation. In a prior-art solution, the diverting pulley of the speed limiter rope hangs freely in the lower part of the elevator shaft and a tensioning weight is attached to the diverting pulley to keep the rope tight. A prior-art solution of this type is illustrated in Fig. 1 of prior art document US patent no. US6752246. The tensioning weight is secured by a fastening element to the center axle of the lower diverting pulley and hangs below the diverting pulley, thus tensioning the speed limiter rope. The problem is that in a solution like this it is necessary to leave a sufficient space between the bottom of the elevator shaft and the tensioning weight, because during installation, instead of hanging freely, the tensioning weight has to be rested on a support, and it is generally very difficult to estimate the distance remaining between the tensioning weight and the bottom of the

elevator shaft after the weight has been allowed to hang freely to tighten the rope. For this reason, valuable space has to be wasted at the bottom of the elevator shaft. In some cases, due to strict space requirements, it may be extremely difficult to use a tensioning weight. Also, due to wear of the speed limiter rope and pulleys, the rope is elongated with time, and if there is not enough space between the tensioning weight and the bottom of the elevator shaft, the tensioning weight will meet the bottom of the elevator shaft before long, with the result that the speed limiter rope no longer remains sufficiently tight, thus causing a safety hazard. In a prior-art case like this, tightening the rope afterwards to its working tension is a difficult and time-consuming operation. The tensioning weight needs to be placed on a support and at least one end of the rope has to be released and the rope shortened.

[0004] As is well known, there are also solutions in which the tensioning weight is attached to the speed limiter diverting pulley hanging in the lower part of the elevator shaft by providing a rod or equivalent extending from the axle of the diverting pulley to one side or both sides, to which rod the tensioning weight or weights is/are connected. This solution saves space in the vertical direction, but it still involves the problem that the structure according to this solution occupies valuable space in the lateral direction. An additional problem in these solutions, too, is that when the speed limiter rope becomes sufficiently elongated, the tensioning weight or the lower diverting pulley may meet the bottom of the elevator shaft, with the result that the rope no longer remains tight enough. In this solution, too, re-tensioning the rope is just as difficult and time-consuming as in the prior-art solution described above.

[0005] According to document GB 2 114 092 A another solution for the speed governor is shown, in that the governor rope is fixed with its ends to a tensioning means, i.e. spring, that takes care of a convenient tensioning of the rope.

[0006] The object of the present invention is to overcome the above-mentioned drawbacks and to produce an economical and reliable arrangement in an elevator that will save as much shaft space as possible, especially shaft space in the lower part of the elevator shaft, thus achieving a maximum degree of capacity utilization of shaft space, which is very important particularly in old buildings. The aim is to achieve a small and compact structure that will fit as well as possible in both vertical and transverse directions of the shaft into the space required by the elevator car on its path and defined by the placement of the guide line. This includes the objective of enabling, via selection and disposal of components, the elevator car to be driven at the lower end of the shaft to a position as low as possible beside the diverting pulley of the speed limiter and correspondingly at the upper end of the shaft to a position as high as possible beside the speed limiter. It is thus an object of the invention to achieve e.g. a reliable arrangement in an elevator speed

limiter wherein no tensioning weight is needed to tension the speed limiter rope. A further object of the invention is to achieve an arrangement wherein the tightness and length of the speed limiter rope can be quickly and easily adjusted afterwards. The arrangement of the invention is characterized by what is disclosed in the characterizing part of claim 1. Other embodiments of the invention are characterized by what is disclosed in the other claims.

[0007] Inventive embodiments are also presented in the description part and drawings of the present application.

[0008] The arrangement of the invention has the advantage that no tensioning weight is needed in the speed limiter, which is why it is not necessary to have as much space at the bottom of the elevator shaft as in prior-art solutions using a tensioning weight. Therefore, more shaft space is available in the vertical direction of the shaft over the whole transverse surface of the shaft. Thus, the invention provides the advantage of saving valuable space in the elevator shaft and particularly in the lower part of the shaft. A need for such space-saving is manifest especially in old buildings, where the invention provides a definite advantage. A further advantage is that, if the speed limiter rope has slackened, its length can be easily adjusted and it can be easily tightened afterwards to the correct working tension in connection with servicing, and thus reliable operation of the speed limiter is maintained. Yet another advantage is that the arrangement is reliable, simple and economical to implement.

[0009] A simple structure is e.g. a tensioning device mounted on the elevator car or car frame and comprising a spring-operated rope tensioner, to which one end of the speed limiter rope is fastened, and a winding wheel, to which the opposite end of the speed limiter rope is fastened. The rope tensioner and the winding wheel may be secured in place with separate fastening structures or they may have a common continuous frame structure supporting them and holding the rope tensioner and the winding wheel secured in place.

[0010] In the following, the invention will be described in detail by referring to an example and the attached drawings, wherein

- Fig. 1 presents an oblique hind view of a rucksack-type elevator in which an arrangement according to the invention is used,
- Fig. 2 presents an oblique front view of the elevator in Fig. 1,
- Fig. 3 presents a simplified diagram of a roping solution in the elevator according to Figs. 1 and 2,
- Fig. 4 presents a simplified diagram of the elevator according to Figs. 1 and 2 in hind view
- Fig. 5 presents an oblique hind view of the car frame of the elevator according to Figs. 1 and 2, the arrangement of the invention being connected to the car frame, and
- Fig. 6 presents an oblique hind view of a rope tensioning device comprised in the arrangement of the

invention.

[0011] Figs. 1 and 2 present oblique hind and front views of a traction sheave elevator without counterweight in which the arrangement of the invention is applied. The elevator comprises at least an elevator hoisting machine 5 with a hoisting motor, an elevator control system 6 and an elevator car 2 fixedly fitted in a car frame 1. The car 2 moves along guide rails 4 in a substantially vertical direction and is suspended on a set of hoisting ropes 3 using diverting pulleys provided in diverting pulley blocks 32 and 33 placed at least in the car frame 1 substantially inside the guide line of the guide rails 4. The elevator is supplied with elevating power from the hoisting machine 5 via friction between the traction sheave comprised in it and the hoisting ropes 3. The elevator suspension further comprises at least diverting pulley blocks 34 and 35 placed at the upper end of the elevator shaft as shown in Fig. 2 and a diverting pulley block 36 at the lower end of the shaft, the set of hoisting ropes 3 being passed around the diverting pulleys in these blocks. Both ends of the hoisting ropes 3 are secured to a rope compensating device 37 provided e.g. in the lower part of the elevator shaft.

[0012] An essential feature of the arrangement of the invention is minimal space utilization adapted to the space reserved for the elevator shaft. In this arrangement, as many elevator components as possible are fitted within the rucksack-type car frame 1 and the guide line of the rope guide rails 4, so that the elevator car 2 with its doors and other components and the elevator guide line occupy laterally as little shaft space as possible through the entire height of the shaft. For example, all the aforesaid diverting pulleys in the diverting pulley blocks 32 - 36 are disposed substantially within the guide line of the guide rails 4 of the elevator car 2. The elevator components are preferably divided into modules which can be delivered separately to the installation site. Thus, e.g. an upper module comprises at least the hoisting machine 5 and the traction sheave, diverting pulley blocks 34 and 35 and part of the speed limiter, e.g. the upper rope pulley 8 of the speed limiter. Correspondingly, a car module comprises at least diverting pulley blocks 32 and 33, a mechanism for securing and tensioning the speed limiter rope, a safety gear structure and other appropriate structural components moving with the elevator car. A lower module further comprises at least a diverting pulley block 36, a rope compensating mechanism 37, the lower diverting pulley 9 of the speed limiter and other appropriate structural components.

[0013] Fig. 3 presents a simplified and diagrammatic illustration of a suspension solution applicable in the elevator according to Figs. 1 and 2. To provide a more visual illustration of the roping, the mutual positions and dimensions of the rope pulleys are not in correct proportion. In addition, to allow a better understanding of the suspension, the figure shows for each rope pulley, i.e. for the traction sheave and diverting pulleys, a circle rep-

representing the rope pulley, depicted in dotted broken line and provided with a current number 1.-15., said circle being placed beside the rope pulley in question at the same height with the pulley. The current number represents the sequential order of the rope diversion taking place on the rope pulley and having an effect on the suspension ratio, starting from the first end 3a of the rope 3. Diverting pulley blocks 32, 33 and 36 contain three parallel diverting pulleys, diverting pulley block 34 contains two parallel diverting pulleys and diverting pulley block 35 contains only one diverting pulley.

[0014] The first end of the hoisting ropes 3 is secured to a fixed point in the lower part of the elevator shaft. From the point of anchorage of its first end 3a, the set of hoisting ropes 3 is passed e.g. over diverting pulleys 39a-c to the lower diverting pulley block 33, which contains e.g. three parallel diverting pulleys. At least one of diverting pulleys 39a-c forms part of the rope compensating device 37 and serves on its part as an element equipped to compensate the hoisting ropes 3. In diverting pulley block 33, the hoisting ropes 3 are reeved so that they run over the first diverting pulley of the diverting pulley block and go down to the first diverting pulley of the diverting pulley block 36 in the lower part of the elevator shaft, on which pulley the ropes undergo a second deflection, and having passed around this pulley by its lower side the hoisting ropes again go upwards to the second diverting pulley of diverting pulley block 33, where they undergo a third deflection over the diverting pulley, whereupon the hoisting ropes are again passed down to the second diverting pulley of diverting pulley block 36 and, after this fourth deflection performed by passing the ropes by the lower side of the pulley, back up again to the third diverting pulley of diverting pulley block 33, undergoing a fifth deflection over the upper side of the pulley, after which the hoisting ropes again go downwards to the third diverting pulley of diverting pulley block 36, undergoing a sixth deflection by the lower side of the pulley. After this, the hoisting ropes are passed to the traction sheave of the hoisting machine 5 at the upper end of the elevator shaft, where a seventh deflection takes place over the sheave, after which the hoisting ropes are passed to the diverting pulley 38 below the traction sheave, and the hoisting ropes are deflected for an eighth time by the lower side of this pulley 38 and reeved again to the traction sheave of the hoisting machine 5. After a ninth deflection over the traction sheave, the hoisting ropes 3 are passed to the upper diverting pulley block 32 which moves together with the elevator car 2 and also contains e.g. three diverting pulleys side by side. A tenth deflection occurs over the first diverting pulley of diverting pulley block 32, after which the hoisting ropes are passed to the first diverting pulley of the diverting pulley block 34 in the upper part of the shaft. Having undergone an eleventh deflection over this diverting pulley, the hoisting ropes 3 again go downwards and are passed around the second diverting pulley of diverting pulley block 32 by its lower side. Having thus undergone a twelfth deflection,

the hoisting ropes are again passed upwards to the second diverting pulley of diverting pulley block 34 and further over it after a thirteenth deflection back downwards again and around the third diverting pulley of diverting pulley block 32 by its lower side, thus undergoing a fourteenth deflection, after which the hoisting ropes are again reeved upwards to a diverting pulley in diverting pulley block 35 in the upper part of the shaft. The ropes undergo a last or fifteenth deflection over this pulley, whereupon the hoisting ropes are passed downwards to the point of anchorage of their second end 3b in the rope compensating device 37.

[0015] Fig. 4 presents a hind view of a rucksack-type elevator according to Figs. 1 and 2 in a simplified diagrammatic form. For the sake of clarity, some parts of the elevator, such as the hoisting machine and hoisting ropes and the associated components, have been omitted from the figure. The elevator car 2 fitted in a car frame 1 is adapted to move in an elevator shaft 11 along guide rails 4 in a substantially vertical direction. The speed limiter pulley 8 of the speed limiter is mounted in the upper part of the elevator shaft 11 and the diverting pulley 9 comprised in the speed limiter 7 is mounted in the lower part. Fitted as a loop around these pulleys is the speed limiter rope 10 in such manner that the first end of the rope 10 is secured to the upper part of the tensioning device 12 comprised in the arrangement of the invention, from where it goes upwards to loop over the speed limiter pulley 8 and then around the diverting pulley 9 in the lower part of the elevator shaft 11 and from there further to the lower part of the tensioning device 12, to which the second end of the rope 10 is secured. The tensioning device 12 is fastened to the synchronizing bar 14 of the safety gears 13 near the first guide rail 4, said bar being secured to the lower part of the car frame 1. The tensioning device 12 is placed substantially within the guide line of the guide rails 4, so the tensioning device 12 does not require any lateral space in the shaft. The safety gears 13 encircle the guide rails 4 and are secured to the outer edges of the car frame 1. The speed limiter 7 is arranged to function in such a way that, when the elevator car 2 moves downwards at an excessive speed, the speed limiter pulley 8 stops e.g. due to centrifugal force and at the same time stops the motion of the speed limiter rope 10, with the result that, while the elevator car 2 continues moving downwards, the arrested rope 10 pulls by means of the synchronizing bar 14 the wedges comprised in the safety gears 13 into contact with the guide rails 4, thereby stopping the movement of the elevator car 2, too. The operation of the safety gears 13 is described in greater detail in the description of Fig. 5.

[0016] Fig. 5 presents an oblique hind view of the car frame 1 of the elevator according to Figs. 1 and 2. The synchronizing bar 14 of the safety gears 13 is hingedly mounted in the lower part of the car frame so that the bar can turn about its own longitudinal axis. Provided at either end of the synchronizing bar is a lever element 19 turnable with the turning motion of the synchronizing bar 14,

the first end of each lever element being fastened to the synchronizing bar 14 and the other end being connected to a safety gear wedge 15 via a suitable fastening arm. The tensioning device 12 is secured by its upper end to the synchronizing bar 14 at a point near the first end of the synchronizing bar 14 via a lever-like fastening arm 20, the first end of the fastening arm 20 being fixedly secured to the synchronizing bar 14 while its second end is connected via a hinge 16 to the tensioning device 12.

[0017] Fitted in the upper part of the tensioning device 12 is a ratchet wheel 18 (see also Fig.6), which functions as a fastening and length adjusting element and tensioner of the speed limiter rope 10, the first end of the speed limiter rope 10 being secured to the ratchet wheel. The second end of the speed limiter rope 10 is secured to the wedge socket 21 of a fastening element 29 in the lower part of the tensioning device 12. The ratchet wheel 18 and the speed limiter rope 10 are fitted relative to each other in such a way that, due to the toothing of the ratchet wheel 18, the wheel can only be turned in one direction, i.e. in a direction reducing the length of the speed limiter rope 10 while increasing its tension. When the elevator car 2 with the car frame 1 is moving at an excessive speed downwards, the speed limiter 7 stops the speed limiter rope 10, thereby also stopping the downward movement of the tensioning device 12. However, the elevator car 2 and the car frame 1 as well as the synchronizing bar 14 still continue moving downwards, and since the tensioning device 12 remains stationary, the synchronizing bar 14 is forced by the fastening arm 20 of the tensioning device 12 to turn about its longitudinal axis while the lever elements 19 at the ends of the synchronizing bar 14 raise the safety gear wedges 15 connected to them. As the wedges 15 of the safety gears 13 rise up, they engage the guide rails 4, thereby stopping the movement of the elevator car.

[0018] Fig. 6 presents an oblique hind view of the speed-limiter-rope tensioning device 12 comprised in the arrangement of the invention and consisting of a frame structure 25 and other parts connected to it. The frame structure 25 comprises at least two substantially mutually symmetrical frame pieces 26 cut from metal plate, which are fitted side by side with a suitable horizontal distance left between them for the parts comprised in the tensioning device 12. The frame pieces 26 are connected together in their upper parts by means of a hinge 16 and possibly some other fastening elements and in their lower parts by means of bolts, with a support block 17 placed between the frame pieces 26 at the lower end of the frame structure 25, said support block being provided with an upper surface forming a substantially smooth stop surface and with a substantially vertical central hole. Fitted inside the upper part of the frame structure 25 is a ratchet wheel 18, to which the speed limiter rope 10 is fastened by its first end so that, when the ratchet wheel 18 is rotating, a portion of the speed limiter rope 10 corresponding to the rotation is coiled on the rim of the ratchet wheel 18.

[0019] The second end of the speed limiter rope 10 going downwards is secured by means of a wedge 28 to the wedge socket 21, and a vertical supporting rod 24 is fastened to the upper end of the wedge socket by a hinge 27. The supporting rod 24 is inserted from below through the central hole of the support block 17 into the frame structure 25 of the tensioning device 12 and a compression spring 22 serving as a rope tensioner is fitted around the upper part of the supporting rod so that the compression spring 22 is strained between a support plate 30 at the upper end of the supporting rod 24 and the upper surface of the support block 17. The support plate 30 is fitted in position e.g. by means of tightening nuts. The compression spring 22 is adapted to push the upper end of the supporting rod 24 in a direction away from the support block 17 and thus to increase the tension of the rope 10 so that the speed limiter rope 10 is subjected to a tensioning force required for reliable operation of the speed limiter 7.

[0020] However, the speed limiter rope 10 slackens with time due to rope elongation and wear of the pulleys and rope. If the rope 10 slackens enough for the compression spring 22 to reach a state where it is no longer sufficiently taut, the compression spring 22 can no longer keep the rope 10 sufficiently tensioned. To avoid such a situation, the tensioning device 12 is provided with a monitoring element 31 arranged to monitor the tightness of the spring 22. If the tightness is too low to keep the speed limiter rope 10 taut enough, the monitoring element 31 is adapted to provide corresponding information to the elevator control system 6, which will stop the elevator to avoid a safety hazard. Normally, such a situation should not arise, because the speed limiter rope 10 is tightened to the correct operating tension by means of the tensioning device 12 in connection with regular elevator maintenance. If such a situation nevertheless occurs, the speed limiter rope 10 can in this case too be tightened in the same way afterwards by means of the tensioning device 12. According to the inventive concept, the speed limiter rope 10 can be tightened and its length adjusted by turning the ratchet wheel 18 with a suitable tool. For this purpose, the ratchet wheel 18 is provided with an engaging element 23 into which a turning tool can be fitted. In the situation illustrated in the figure, the ratchet wheel 18 is turned counter-clockwise to tighten the rope 10. When the ratchet wheel 18 is being rotated, the second end of the speed limiter rope 10 moves downwards and the supporting rod 24 pulls by means of the support plate 30 the upper end of the spring 22 downwards, thereby tightening the spring 22 and causing the spring 22 to be strained again to the correct tightness. In this way, the length and tightness of the rope 10 can be easily adjusted without releasing the rope ends.

[0021] It is obvious to the person skilled in the art that the invention is not exclusively limited to the example described above, but that it can be varied within the scope of the claims presented below. Thus, for example, the arrangement of the invention can be as well used in other

types of elevators besides a rucksack-type elevator as described above.

[0022] It is also obvious to a person skilled in the art that the arrangement of the invention can also be used in elevators having only one safety gear and no safety gear synchronizing element. In such solutions, the tensioning device can be connected e.g. directly to the safety gear.

[0023] It is also obvious to a person skilled in the art that, instead of being used in an elevator without counterweight, the equipment of the invention can as well be used in an elevator with counterweight.

[0024] It is further obvious to a skilled person that the structure of the tensioning device of the invention may differ from that described above. For example, instead of a compression spring, the tension of the speed limiter rope can as well be maintained by a draw spring or some other corresponding tensioning element producing a constant force.

[0025] It is additionally obvious to a person skilled in the art that the suspension ratio of the elevator car may vary. Thus, depending on the suspension ratio, the arrangement may also comprise a larger or smaller number of diverting pulleys than in the above description, so that at a given position e.g. within the guide rail line there may be only one diverting pulley, two parallel diverting pulleys or more than three diverting pulleys in parallel. In addition, depending on the suspension ratio, the rope compensating device and the ends of the hoisting ropes may also be secured to the elevator car instead of a fixed point in the shaft.

Claims

1. Elevator comprising a speed limiter and at least an elevator control system (6), an elevator car (2) suspended on a set of hoisting ropes (3) and arranged to move back and forth along substantially vertical guide rails (4), at least one safety gear (13) disposed in conjunction with the elevator car (2), wherein the speed limiter (7) comprises at least a speed limiter pulley (8), a diverting pulley (9) and a speed limiter rope (10) fitted as a loop around at least the speed limiter pulley (8) and the diverting pulley (9), said speed limiter rope (10) being connected directly or indirectly to the at least one safety gear (13), and a tensioning device (12) comprising a spring operated rope tensioner (22) to which one end of the speed limiter rope is fastened, **characterized in that** the tensioning device comprises a winding wheel, to which the opposite end of the speed limiter rope is fastened, to keep the speed limiter rope (10) under a desired tension.
2. Elevator according to claim 1, **characterized in that** the tensioning device (12) is fitted to move with the elevator car (2).

3. Elevator according to any one of the preceding claims, **characterized in that** the tensioning device (12) is provided with a monitoring element (31) arranged to monitor the tightness of the rope tensioner (22).
4. Elevator according to any one of the preceding claims, **characterized in that** the winding wheel is a ratchet wheel (18) provided with a toothwork and being adapted for securing the first end of the rope (10), said ratchet wheel being rotatable in the tensioning direction of the rope (10), and **in that** the tensioning device (12) comprises a frame structure having at its upper end said ratchet wheel (18) and at its lower end a fastening element (29) for securing the second end of the rope (10).
5. Elevator according to any one of the preceding claims, **characterized in that** the tensioning device (12) is secured by its upper end to the synchronizing bar (14) of the safety gear(s) (13) via a lever-like fastening arm (20).
6. Elevator according to any one of the preceding claims 4 or 5, **characterized in that** the frame structure (25) is continuous and supports the compression spring (22) and the wheel.

Patentansprüche

1. Aufzug, aufweisend einen Geschwindigkeitsbegrenzer und mindestens ein Aufzugs-Steuersystem (6), eine an einem Satz Hebeseile (3) aufgehängte Aufzugskabine (2), die für eine Vor- und Rückbewegung entlang von im Wesentlichen vertikalen Führungsschienen (4) angeordnet ist, mindestens eine Fangvorrichtung (13), die in Verbindung mit der Aufzugskabine (2) vorgesehen ist, wobei der Geschwindigkeitsbegrenzer (7) mindestens eine Geschwindigkeitsbegrenzer-Rolle (8), eine Umlenkrolle (9) und ein Geschwindigkeitsbegrenzerseil (10) aufweist, das als eine Schlinge um zumindest die Geschwindigkeitsbegrenzer-Rolle (8) und die Umlenkrolle (9) geführt ist, wobei das Geschwindigkeitsbegrenzerseil (10) direkt oder indirekt an der mindestens einen Fangvorrichtung (13) angeschlossen ist, sowie eine Spannvorrichtung (12), die einen federbetriebenen Seil-Straffer (22) aufweist, an dem ein Ende des Geschwindigkeitsbegrenzerseiles befestigt ist, **dadurch gekennzeichnet, dass** die Spannvorrichtung ein Wickel-Rad aufweist, an dem das gegenüberliegende Ende des Geschwindigkeitsbegrenzerseiles befestigt ist, um das Geschwindigkeitsbegrenzerseil (10) unter einer gewünschten Spannung zu halten.
2. Aufzug nach Anspruch 1, **dadurch gekennzeichnet**

net, dass die Spannvorrichtung (12) angeordnet ist, mit der Aufzugskabine (2) bewegt zu werden.

3. Aufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Spannvorrichtung (12) mit einem Überwachungselement (31) versehen ist, das zum Überwachen der Spannung des Seil-Straffers (22) angeordnet ist.
4. Aufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Wickelrad ein mit einem Zahnwerk versehenes Klinkenrad (18) ist und zum Sichern des ersten Endes des Seiles (10) adaptiert ist, wobei das Klinkenrad in der Zugrichtung des Seiles (10) rotierbar ist, und dass die Spannvorrichtung (12) eine Rahmenstruktur aufweist, an deren oberem Ende sich das Klinkenrad (18) befindet und an deren unterem Ende ein Feststellelement (29) zum Festlegen des zweiten Endes des Seiles (10) ist.
5. Aufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Spannvorrichtung (12) mittels ihrem oberen Ende an dem Synchronisationsriegel (14) der Fangvorrichtung(en) (13) über einen hebelähnlichen Befestigungsarm (20) festgelegt ist.
6. Aufzug nach einem der vorangehenden Ansprüche 4 oder 5, **dadurch gekennzeichnet, dass** die Rahmenstruktur (25) durchgehend ist und die Kompressionsfeder (22) und das Rad trägt.

Revendications

1. Ascenseur comprenant un limiteur de vitesse et au moins un système de commande d'ascenseur (6), une cabine d'ascenseur (2) suspendue à un ensemble de câbles de levage (3) et agencée pour monter et descendre le long de rails de guidage (4) sensiblement verticaux, au moins un engrenage de sécurité (13) disposé conjointement avec la cabine d'ascenseur (2), dans lequel le limiteur de vitesse (7) comprend au moins une poulie de limiteur de vitesse (8), une poulie de détour (9) et un câble de limiteur de vitesse (10) monté en boucle autour d'au moins la poulie de limiteur de vitesse (8) et la poulie de détour (9), ledit câble de limiteur de vitesse (10) étant connecté directement ou indirectement à l'au moins un engrenage de sécurité (13), et un dispositif de tension (12) comprenant un tendeur de câble (22) actionné par ressort auquel une extrémité du câble de limiteur de vitesse est attachée, **caractérisé par le fait que** le dispositif de tension comprend une roue d'enroulement, à laquelle l'extrémité opposée du câble de limiteur de vitesse est attachée, pour maintenir le limiteur de vitesse (10) en dessous d'une

tension souhaitée.

2. Ascenseur selon la revendication 1, **caractérisé par le fait que** le dispositif de tension (12) est adapté pour se déplacer avec la cabine d'ascenseur (2).
3. Ascenseur selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** le dispositif de tension (12) est pourvu d'un élément de surveillance (31) agencé pour surveiller la raideur du tendeur de câble (22).
4. Ascenseur selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** la roue d'enroulement est une roue à rochet (18) pourvue d'une denture et étant prévue pour fixer la première extrémité du câble (10), ladite roue à rochet étant rotative dans la direction de tension du câble (10), et que le dispositif de tension (12) comprend une structure de châssis ayant à son extrémité supérieure ladite roue à rochet (18) et à son extrémité inférieure un élément d'attache (29) pour fixer la seconde extrémité du câble (10).
5. Ascenseur selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** le dispositif de tension (12) est fixé par son extrémité supérieure à la barre de synchronisation (14) de l'/des engrenage(s) de sécurité (13) par l'intermédiaire d'un bras d'attache de type levier (20).
6. Ascenseur selon l'une quelconque des revendications précédentes 4 ou 5, **caractérisé par le fait que** la structure de châssis (25) est continue et supporte le ressort de compression (22) et la roue.

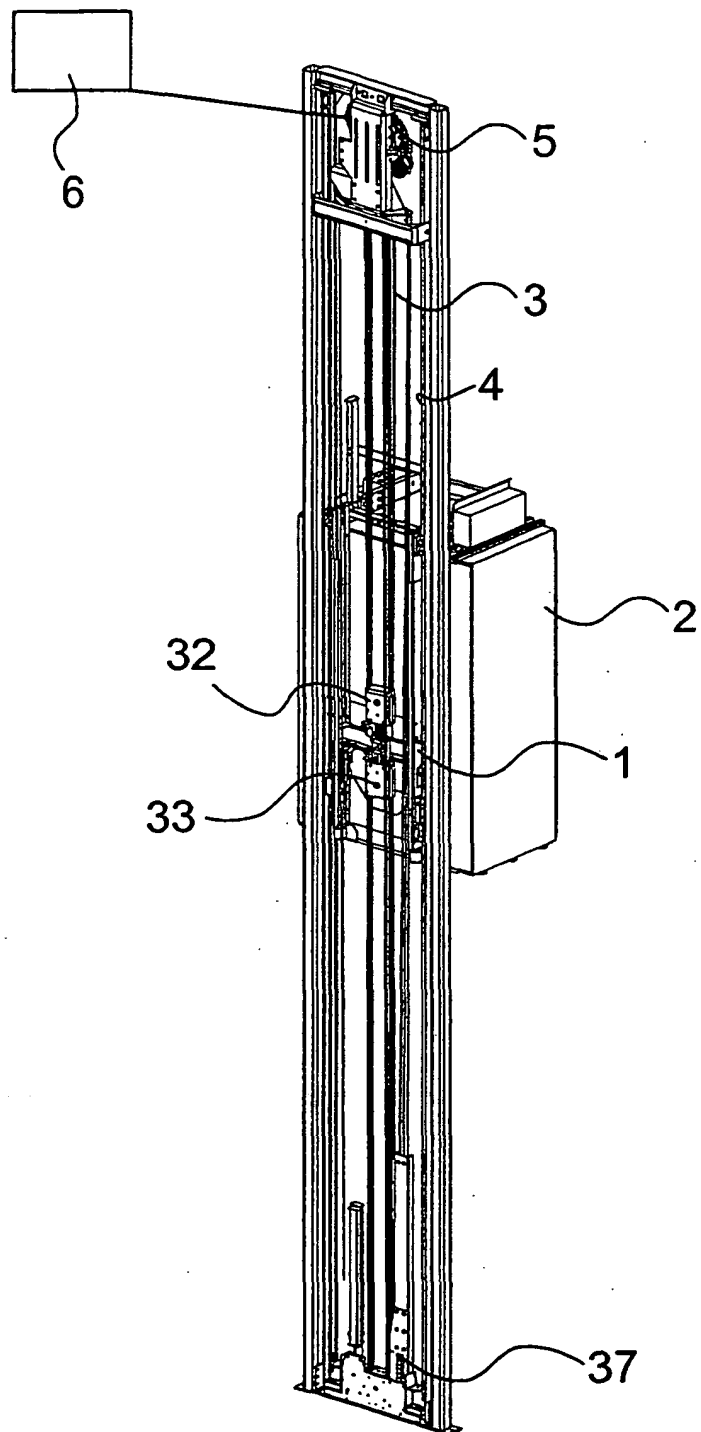


Fig. 1

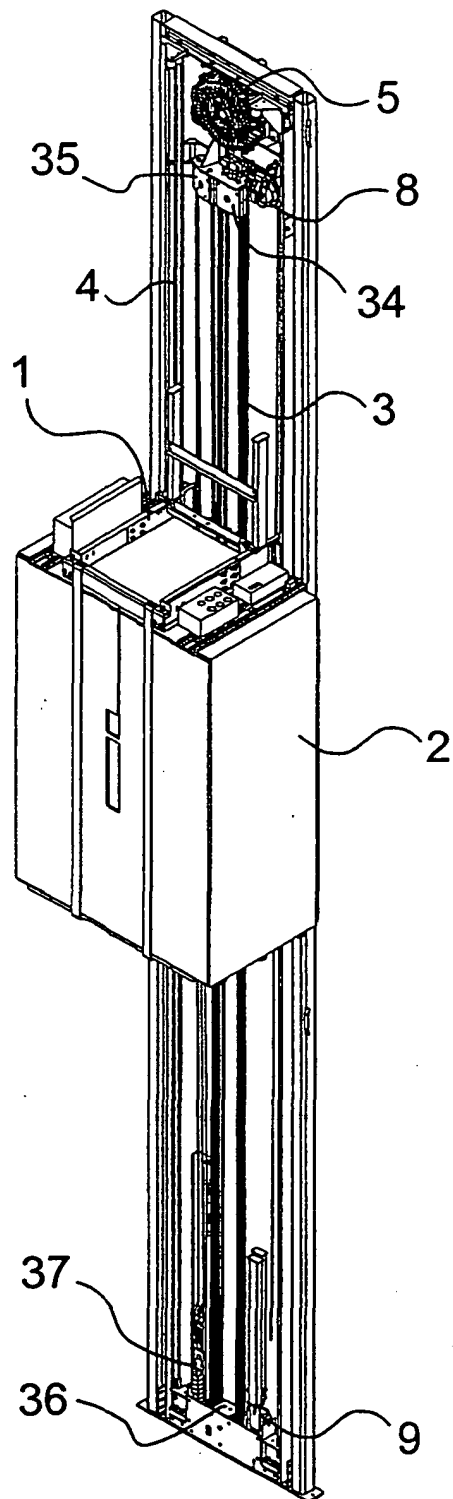


Fig. 2

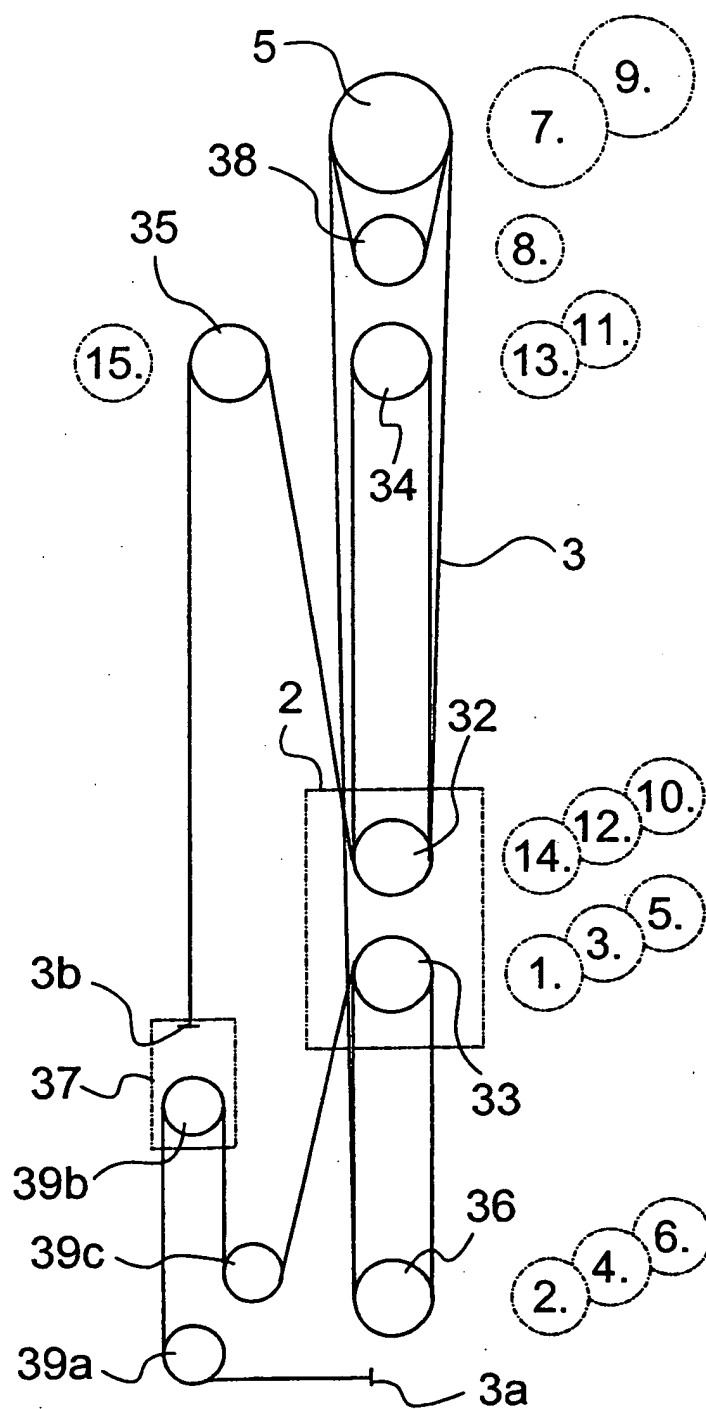


Fig. 3

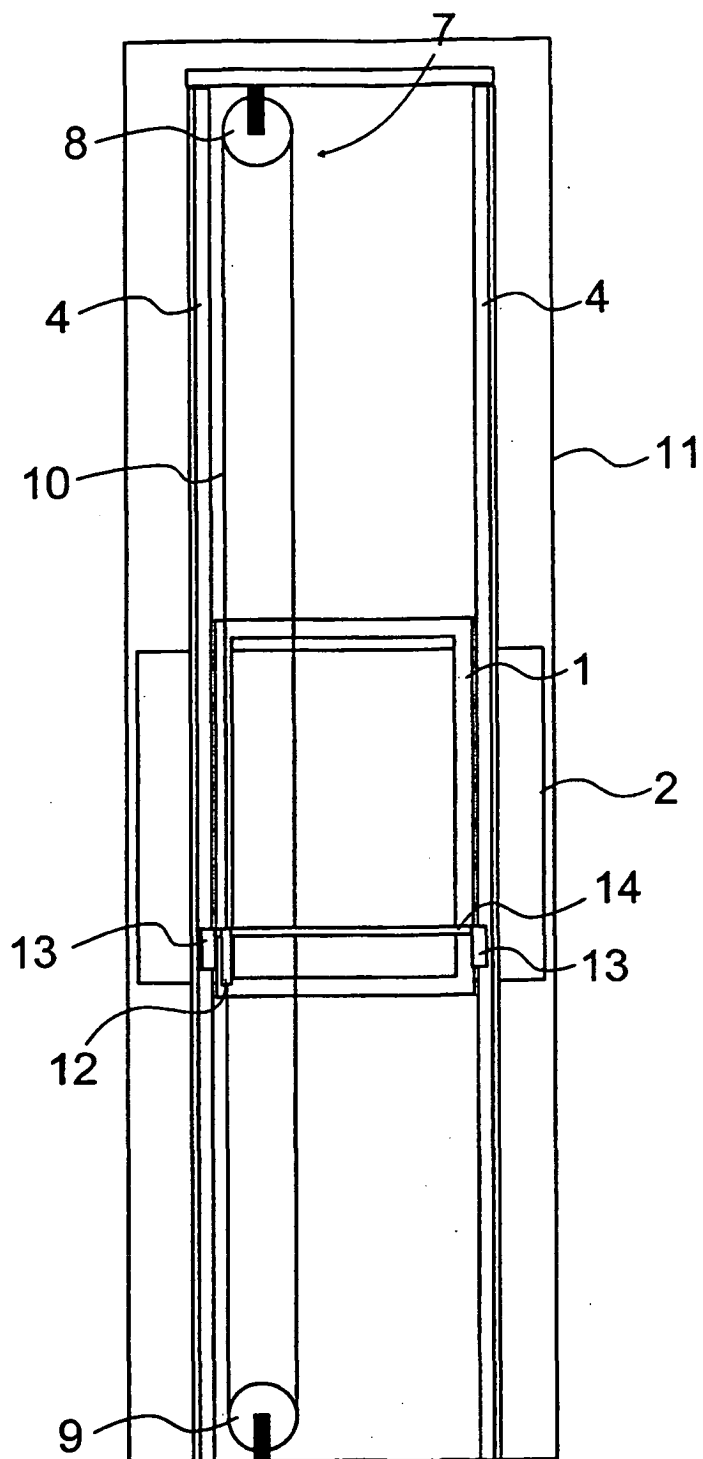


Fig. 4

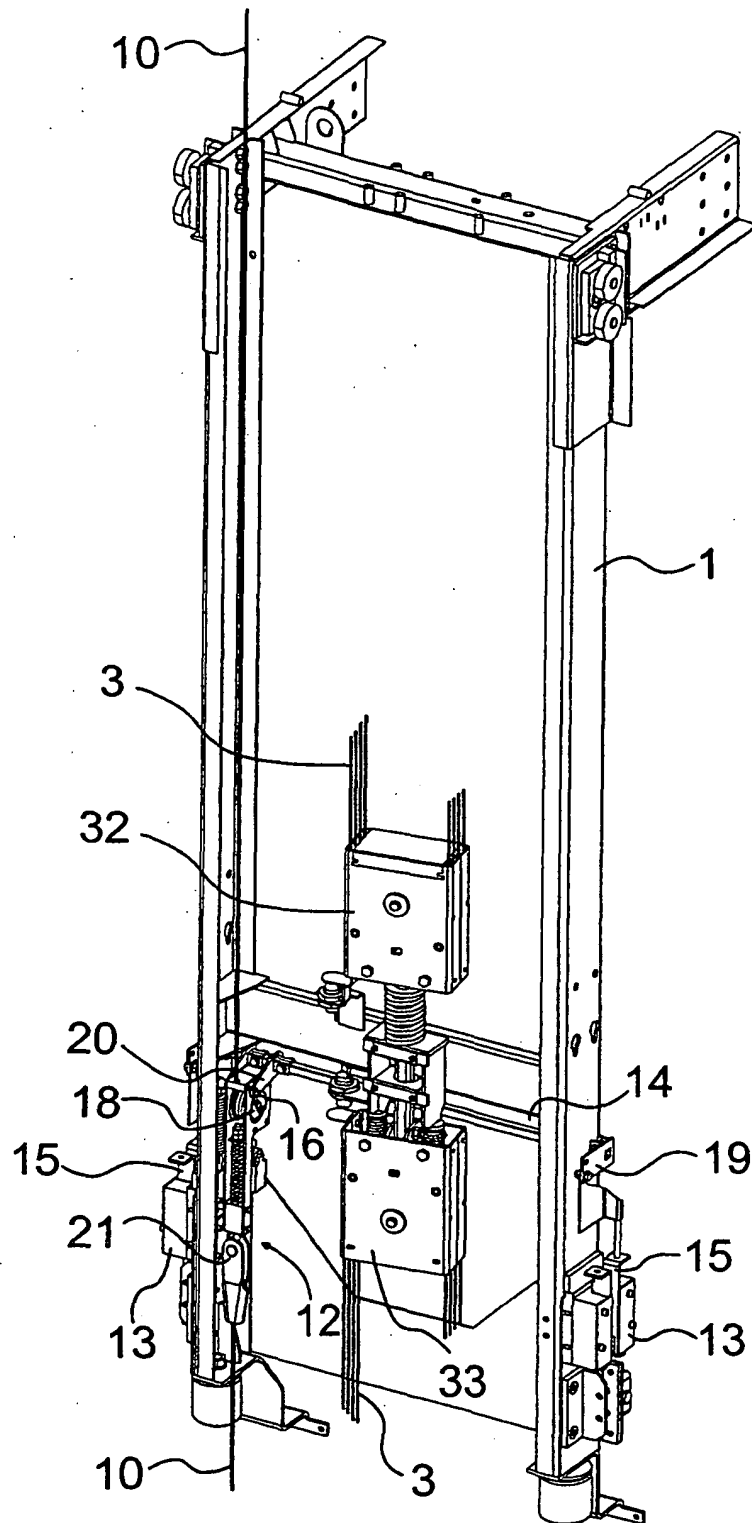


Fig. 5

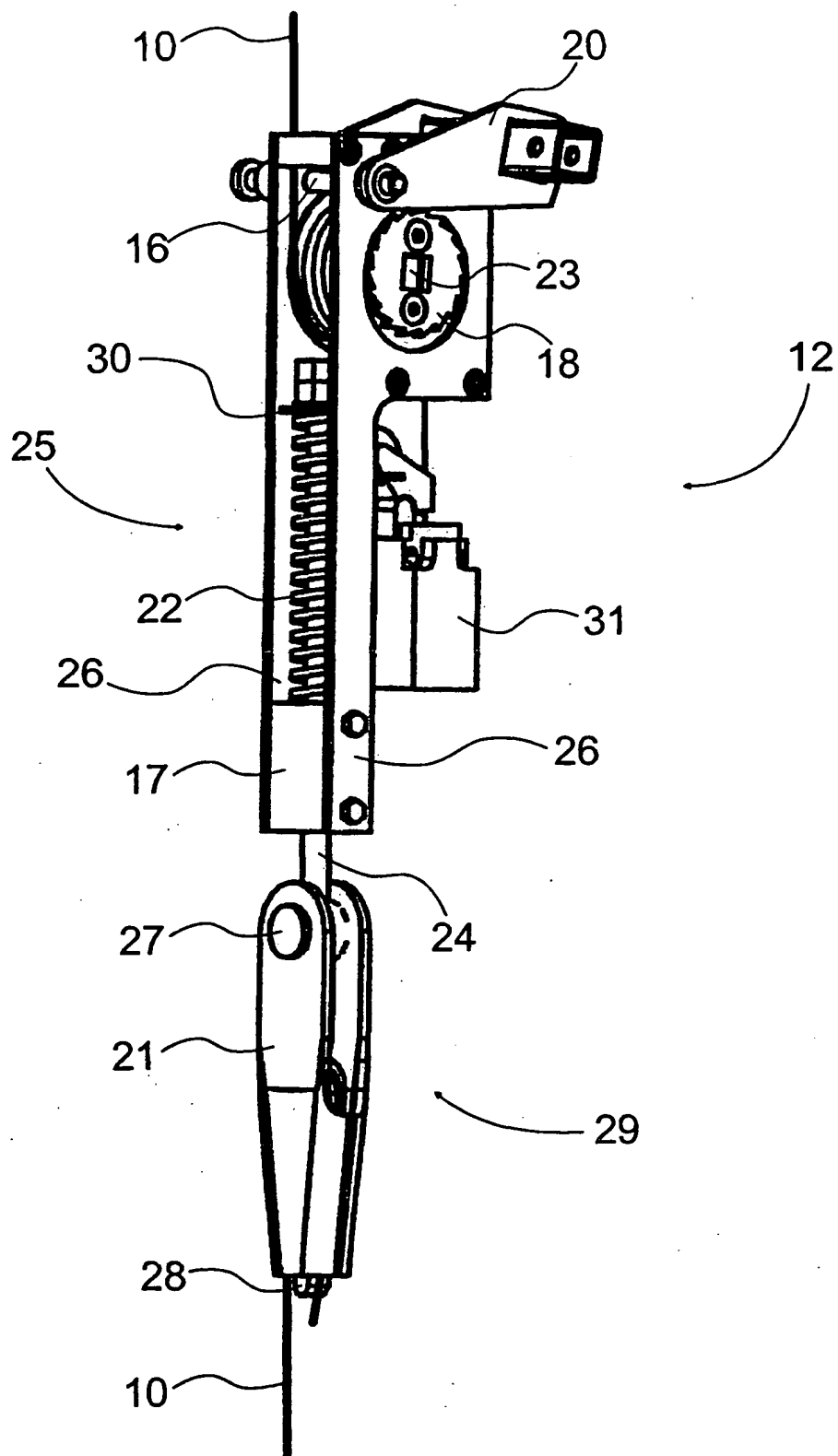


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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