

Description

The invention relates to a method of mounting a lift and the lift obtained, which makes it possible, particularly, to assemble in one go the fittings supporting the traction cable pulleys as well as the counterweight guide rails, a cabin guide rail, the traction cables placed in their final position and the balancing counterweight.

In existing methods of fitting lifts with machinery at the bottom of the shaft, a criss-cross arrangement of beams is mounted at the top of the shaft for supporting the traction cables, the cabin guide rails and the counterweight. Such a method requires assembly on the site of beams of fixed length which must be adapted in size to the shaft of the lift. Handling the beams in the shaft is a delicate operation and not without danger. Stopping up with mortar the positions reserved for the beams makes their isolating supports inoperative. Unwinding of the cables must take place one by one. The cables risk being crossed during assembly and being damaged while dragging on the ground.

US-A-3 851 736 discloses a method for the sequential assembly of the guide rails of a lift, carried out from the top of the lift cabin. This technique still requires the assembly of the beams at the top of the shaft and mounting of the cables over the whole length of the shaft, thus encountering the problems discussed above.

The mounting method of the invention overcomes these drawbacks by using a single beam with telescopic arms such as described in our European Patent Application No. 89312489.1.

This beam comprises the guide pulleys for the traction cables, the fixed point plate for the cables on the counterweight side and the tools for suspending the guide rails from their final position (the two strings of counterweight guides and a cabin guide string).

The method of the invention comprises the following successive operating phases:

- positioning an instrument for lifting the telescopic arm beam to a suitable position at the top of the shaft,
- introduction at the bottom of the shaft of the elements equipping the lift such as counterweight guide rails and cabin guide rails, the balancing counterweight, the beam with telescopic arms in a retracted position and the cable drums;
- introduction of the cabin into the shaft, positioned on a support adjoining the machinery premises;
- lifting the beam by means of said lifting instrument to a suitable horizontal position above the cabin roof, secure with the shaft, so as to suspend the balancing counterweight, the first counterweight guide rails and cabin guide rail from the beam above said roof;

- positioning of the lift drive machine and fitting of the cables over the pulleys of the beam and over the pulley of the driving machine, these cables being fixed by their counterweight side end to the fixed point plate on the beam and unwound directly from cable drums at the bottom of the shaft;
- raising the beam thus equipped by means of the lifting instrument while continuously fish-plating the guide rails during lifting, until it reaches its final position at the top of the shaft;
- laying the beam on its shaft supports by opening out the arms on to said supports;
- recovery of the ends of the cables on the cabin side while lowering the counterweight by an appropriate length, e.g. half way, these ends being passed under the lower cabin pulleys and fixed to its roof, and
- raising the cabin, the counterweight moving down simultaneously, up to its top position for fastening of the cables on the cabin side to the fixed point plate at the top of the shaft.

The result of this arrangement is that the bars at the top of the shaft, as well as the guide pulleys, the balancing counterweight, the two counterweight guide rails, a cabin guide rail and suitably coupled drive cables may be raised in a single operation for mounting in their final position. It only remains at this stage to complete the mounting of the lift by fitting in a conventional way the second cabin guide rail and the movement control and check elements.

Compared with the conventional technique which consists essentially in mounting the equipment elements one after the other, this method of raising the major part of the equipment elements of the lift as well as suitably coupled cables in a single operation provides appreciable savings in time in fitting the lift.

The method of the invention is illustrated hereafter by means of one embodiment given by way of example only with reference to the accompanying drawings, in which:

Figure 1 shows schematically the introduction of the equipment elements of the lift at the bottom of the drive shaft, these elements being assembled in accordance with the method of the invention;

Figure 2 shows the lift cabin positioned on a temporary support in front of the machinery premises and before coupling of the cables;

Figure 3 shows the beam positioned in the shaft with its different equipment elements assembled and ready to be lifted for fitting;

Figure 4 shows the phase of laying the beam in position;

Figure 5 shows the phase of lifting the cabin with the coupled cables fixed to its roof; and

Figure 6 shows the phase for fixing the end of the coupled cables on the cabin side.

The method of the invention relates to the essen-

tial structural and equipment elements of the lift such as shown mounted in Figure 6, namely, in addition to the cabin 1, and its balancing counterweight 3, the cabin guide rails 5 and the counterweight guide rails 7, the beam 9 supporting the guide pulleys 11 and finally the drive cables 13.

Having traced the positioning axes for the elements using the known technique and after installing the beam slinging tool 15 as well as the lifting winch 17 (shown in Figure 3), the above mentioned equipment elements are introduced at the bottom of the shaft (Figure 1), namely the cable drums 19, the beam 9 with telescopic arms 21 (in the retracted position), the counterweight guide rails 7 and cabin guide rails 5 and the balancing counterweight 3. Planks 23 are set up in the shaft for temporarily supporting the cabin (Figure 2) in a position adjoining the machinery premises 25.

Then, the beam with its retracted arms is raised with the lifting winch 17 above the cabin roof and positioned secure with the shaft, e.g. on brackets 27. It is then disposed horizontally at a short distance from the roof, which makes it possible for an operator positioned on the cabin roof to work in all safety and under good conditions. He may later, with the help of a second operator, raise the beam on the slinging tool 15 by its central pulley 11, the lifting cable being driven by the winch 17 conveniently fixed within reach of the operator on the roof. It is then a question of temporarily fastening the counterweight to the beam by means of slings 51 suspended from the beam 9 and supporting the ends of the shaft 52 of the counterweight pulley 50, as shown in Figure 4. The counterweight is thus suspended from the beam 9 without weight elements and on its movement axis.

Then, the machine 29 is positioned with its pulley brake released. The cables are then drawn from drums 19, which are disposed in juxtaposition and with the same axis of rotation, and passed in an orderly way in the grooves of machine pulleys 31 and the pulleys 11 of beam 9. One of the cables passes over a diverting piece 33 above the central beam pulley, to allow a groove of the latter to be occupied by the beam lifting cable 35. The ends of the cables are connected to the fixed point plate 37 of the beam on the counterweight side by means of eyelet rods. Finally, once the cables are correctly fitted in the grooves of the pulley, by two operators, one at the bottom of the shaft and the other on the cabin roof (so at a short distance from each other, which confers ideal conditions for mounting the cables making it possible to check that they do not become mingled, contrary to the conventional techniques where the cables are unwound one by one over practically the length of the shaft), cable guards 39 are mounted on the pulleys for preventing the cables from escaping and particularly on the beam pulleys 11, the machine pulley 31 and one of the lower pulleys 41 close to the cabin. Thus we arrive at

the intermediate situation such as shown in Figure 3 where the cabin is not shown, except its lower pulleys 41, for the sake of clarity of the drawings.

The first counterweight 7 and cabin 5 guide rails (two for the counterweight and one for the cabin) may then be fixed on the corresponding suspension tools fixed to the beam. When this is done, the beam may be raised from the brackets 27. Such raising is carried out using the winch 17 whose cable 35 carries the central pulley 11. The assembly of elements on the beam is in practice balanced relatively to the axis of this central pulley, so that the beam is raised horizontally and in a stable manner.

Correction ballasting of the counterweight may be provided if required (by adding weights). As the beam is raised, the guide rails are fish-plated, from the roof of the cabin, so as to ensure the continuity of lifting of the two counterweight guide rails and of the cabin guide rail fixed to the beam. The cables are also unwound simultaneously from the drum. We finally arrive at the top of the shaft (Figure 4) where the arms 21 of the beam may be opened out to the desired length on their support 43 at the top of the shaft. The beam is now laid in position and correctly applied on its isolating cushions.

As shown in Figure 5, a second lift cable 35' is then fixed at one end to an anchor 61 in the shaft roof, passed through pulleys 60 on the cabin roof, passed through pulley 62 on the shaft roof and connected to the winch 17. The top slinging tool 15 and cable 35 are thus withdrawn and the drive cable 13 which was passed over the diverting piece 33 is positioned in its respective groove of the central pulley 11.

It is now a question of recovering the ends of the cables on the drums for fixing them to the fixed point plate 45. This is carried out manually by unwinding the cables from their drums and correspondingly lowering the counterweight to about mid-way of its travel. At this moment, the remaining cable length is passed over the second lower pulley 41 of the cabin and their ends are fixed to the roof 3. The cabin is then raised by winching up to the top position, the counterweight moving down simultaneously, in which position the cable ends are fixed to the fixed point plate 45 on the shaft (Figure 6) from the car roof. The second car guide rails 5 are mounted in the shaft from the top of the car as the latter is winched up to the shaft roof.

The structural elements of the lift are thus placed in position, essentially by simply raising the beam with its arms folded back in the lift shaft.

A man skilled in the art may find all the technical equivalents of the method or process described and claimed hereafter.

Claims

1. Method of mounting a lift and particularly a lift

tial structural and equipment elements of the lift such as shown mounted in Figure 6, namely, in addition to the cabin 1, and its balancing counterweight 3, the cabin guide rails 5 and the counterweight guide rails 7, the beam 9 supporting the guide pulleys 11 and finally the drive cables 13.

Having traced the positioning axes for the elements using the known technique and after installing the beam slinging tool 15 as well as the lifting winch 17 (shown in Figure 3), the above mentioned equipment elements are introduced at the bottom of the shaft (Figure 1), namely the cable drums 19, the beam 9 with telescopic arms 21 (in the retracted position), the counterweight guide rails 7 and cabin guide rails 5 and the balancing counterweight 3. Planks 23 are set up in the shaft for temporarily supporting the cabin (Figure 2) in a position adjoining the machinery premises 25.

Then, the beam with its retracted arms is raised with the lifting winch 17 above the cabin roof and positioned secure with the shaft, e.g. on brackets 27. It is then disposed horizontally at a short distance from the roof, which makes it possible for an operator positioned on the cabin roof to work in all safety and under good conditions. He may later, with the help of a second operator, raise the beam on the slinging tool 15 by its central pulley 11, the lifting cable being driven by the winch 17 conveniently fixed within reach of the operator on the roof. It is then a question of temporarily fastening the counterweight to the beam by means of slings 51 suspended from the beam 9 and supporting the ends of the shaft 52 of the counterweight pulley 50, as shown in Figure 4. The counterweight is thus suspended from the beam 9 without weight elements and on its movement axis.

Then, the machine 29 is positioned with its pulley brake released. The cables are then drawn from drums 19, which are disposed in juxtaposition and with the same axis of rotation, and passed in an orderly way in the grooves of machine pulleys 31 and the pulleys 11 of beam 9. One of the cables passes over a diverting piece 33 above the central beam pulley, to allow a groove of the latter to be occupied by the beam lifting cable 35. The ends of the cables are connected to the fixed point plate 37 of the beam on the counterweight side by means of eyelet rods. Finally, once the cables are correctly fitted in the grooves of the pulley, by two operators, one at the bottom of the shaft and the other on the cabin roof (so at a short distance from each other, which confers ideal conditions for mounting the cables making it possible to check that they do not become mingled, contrary to the conventional techniques where the cables are unwound one by one over practically the length of the shaft), cable guards 39 are mounted on the pulleys for preventing the cables from escaping and particularly on the beam pulleys 11, the machine pulley 31 and one of the lower pulleys 41 close to the cabin. Thus we arrive at

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The first counterweight 7 and cabin 5 guide rails (two for the counterweight and one for the cabin) may then be fixed on the corresponding suspension tools fixed to the beam. When this is done, the beam may be raised from the brackets 27. Such raising is carried out using the winch 17 whose cable 35 carries the central pulley 11. The assembly of elements on the beam is in practice balanced relatively to the axis of this central pulley, so that the beam is raised horizontally and in a stable manner.

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As shown in Figure 5, a second lift cable 35' is then fixed at one end to an anchor 61 in the shaft roof, passed through pulleys 60 on the cabin roof, passed through pulley 62 on the shaft roof and connected to the winch 17. The top slinging tool 15 and cable 35 are thus withdrawn and the drive cable 13 which was passed over the diverting piece 33 is positioned in its respective groove of the central pulley 11.

It is now a question of recovering the ends of the cables on the drums for fixing them to the fixed point plate 45. This is carried out manually by unwinding the cables from their drums and correspondingly lowering the counterweight to about mid-way of its travel. At this moment, the remaining cable length is passed over the second lower pulley 41 of the cabin and their ends are fixed to the roof 3. The cabin is then raised by winching up to the top position, the counterweight moving down simultaneously, in which position the cable ends are fixed to the fixed point plate 45 on the shaft (Figure 6) from the car roof. The second car guide rails 5 are mounted in the shaft from the top of the car as the latter is winched up to the shaft roof.

The structural elements of the lift are thus placed in position, essentially by simply raising the beam with its arms folded back in the lift shaft.

A man skilled in the art may find all the technical equivalents of the method or process described and claimed hereafter.

Claims

1. Method of mounting a lift and particularly a lift



with machinery at the bottom of the shaft; comprising a beam (9) with end telescopic arms (21) to be opened out when laid at the top of the shaft, said method comprising the following successive operating phases:

- positioning an instrument (15, 17) for lifting the beam (9) with telescopic arms (21) to a suitable position at the top of the shaft,
- introduction at the bottom of the shaft of the elements equipping the lift such as counterweight guide rails (7) and cabin guide rails (5), the balancing counterweight (3), the beam (9) with telescopic arms (21) in a retracted position and cable drums (19);
- introduction of the cabin (1) into the shaft, positioned on a support adjoining the machinery premises (25);
- lifting the beam (9) by means of said lifting instrument (15, 17) to a suitable horizontal position above the cabin roof, secure with the shaft, so as to suspend the balancing counterweight (3), the first counterweight guide rails (7) and cabin guide rail (5) from the beam above said roof;
- positioning of the lift drive machine (29) and fitting of the cables (13) over the pulleys of the beam (11) and over the pulley of the driving machine (31), these cables being fixed by their counterweight side end to the fixed point plate (37) on the beam and unwound directly from cable drums (19) at the bottom of the shaft;
- raising the beam thus equipped by means of the lifting instrument (15, 17) while continuously fish-plating the guide rails (5, 7) during lifting, until it reaches its set position at the top of the shaft;
- laying the beam on its shaft supports (43) by opening out the arms (21) on to said supports (43);
- recovery of the ends of the cables (13) on the cabin side by lowering the counterweight by an appropriate length, e.g. half way, these ends being passed under the lower cabin pulleys (41) and fixed to its roof, and
- raising the cabin, the counterweight moving down simultaneously, up to its top position for fastening of the cables on the cabin side to the fixed point plate at the top of the shaft.

2. Method of mounting a lift according to claim 1, characterized in that the beam (9) is raised horizontally with its equipment while the balancing counterweight (3) is variably ballasted as required.
3. Method of mounting a lift according to claim 1 or 2, characterized in that, with the beam (9) slung

by its central pulley (11), one of the cables (13) is passed during positioning thereof over the pulleys on a diverting piece (33) disposed above the central pulley (11).

4. Method of mounting a lift according to claim 3, characterized in that, at the end of raising of the beam (9) and after it has been laid in position, the beam slinging element (15) is removed and the corresponding cable (35) is replaced by the cable (13) diverted above the central pulley (11).
5. Method of mounting a lift according to one of the preceding claims, characterized in that the cable drums (19) are disposed in juxtaposition with the same axis of rotation.
6. Method of mounting a lift according to one of the preceding claims, characterized in that cable guards (39) are disposed on the coupled pulleys so as to prevent the cables from escaping from the pulley grooves during raising of the beam (9).

Patentansprüche

1. Verfahren zur Montage eines Aufzugs und insbesondere eines mit einer am unteren Ende des Schachts angeordneten Maschinenausrüstung versehenen Aufzugs; mit einem Träger (9) mit an den Enden angeordneten Teleskopauslegern (21), die ausgefahren werden, wenn der Träger am oberen Ende des Schachts gelagert wird, wobei das Verfahren die folgenden nacheinander abfolgenden Arbeitsschritte aufweist:
 - Positionierung einer Einrichtung (15,17) zum Heben des mit Teleskopauslegern (21) versehenen Trägers (9) in eine geeignete Position am oberen Ende des Schachts;
 - Einbringung der Ausrüstungselemente des Aufzugs, wie von Gegengewichtführungsschienen (7) und Kabinenführungsschienen (5), des Ausgleichsgegengewichts (3), des Trägers (9) mit den Teleskopauslegern (21) in zurückgezogener Position und von Seiltrommeln (19), am unteren Ende des Schachts;
 - Einbringung der Kabine (1) in den Schacht, angeordnet auf einer Abstützung neben dem Unterbringungsort (25) der Maschinenausrüstung;
 - Heben des Trägers (9) mittels der Hebeeinrichtung (15,17) in eine geeignete, horizontale Position oberhalb des Kabinendachs, im Schacht gesichert, derart, daß das Ausgleichsgegengewicht (3), die ersten Gegengewichtsführungsschienen (7) und Kabinenführungsschiene (5) vom Träger oberhalb des



Dachs herabhängen;

- Positionierung der Aufzugs-Antriebsmaschine (29) und Passen der Seile (13) auf die Seilscheiben (11) des Trägers und die Seilscheibe (31) der Antriebsmaschine, wobei diese Seile an ihren Gegengewichtsseitenende an der Festpunktplatte (37) des Trägers befestigt und direkt von den Seiltrommeln (19) am unteren Ende des Schachts abgerollt werden;

- Heben des derart ausgerüsteten Trägers mittels der Hebeeinrichtung (15,17), während fortlaufend eine Verlaschung der Führungsschienen (5,7) während des Hebens erfolgt, bis der Träger seine Bestimmungsposition am oberen Ende des Schachts erreicht;

- Ablegen des Trägers auf seine Schachtabstützungen (43) durch Ausfahren der Ausleger (21) auf die Abstützungen (43);

- Beibringen der Enden der Seile (13) auf der Kabinenseite durch Absenken des Gegengewichts um eine geeignete Strecke, beispielsweise die halbe Bewegungsstrecke, wobei diese Enden unter den unteren Kabinenseilscheiben (41) hindurchgeführt und am Kabinendach befestigt werden; und

- Heben der Kabine, wobei sich gleichzeitig das Gegengewicht nach unten bewegt, bis in ihre oberste Position zur Befestigung der Seile an der Kabinenseite an der Festpunktplatte am oberen Ende des Schachts.

2. Verfahren zur Montage eines Aufzugs nach Anspruch 1,

dadurch gekennzeichnet,

daß der Träger (9) horizontal ausgerichtet zusammen mit seiner Ausrüstung hochgehoben wird, während das Ausgleichsgegengewicht (3) im erforderlichen Maß variabel mit Ballast versehen wird.

3. Verfahren zur Montage eines Aufzugs nach Anspruch 1 oder 2,

dadurch gekennzeichnet,

daß bei an seiner zentralen Seilscheibe (11) aufgehängtem Träger (9) eines der Seile (13) während seiner Positionierung auf den Seilscheiben über ein Ablenkstück (33), das oberhalb der zentralen Seilscheibe (11) angeordnet ist, geführt wird.

4. Verfahren zur Montage eines Aufzugs nach Anspruch 3,

dadurch gekennzeichnet,

daß am Ende des Hebevorgangs des Trägers (9) und nach Ablegung des Trägers in seiner Position das Träger-Aufhängelement (15) entfernt und das korrespondierende Seil (35) durch das Seil

(13), das oberhalb der zentralen Seilscheibe (11) abgelenkt ist, ersetzt wird.

5. Verfahren zur Montage eines Aufzugs nach einem der vorhergehenden Ansprüche,

dadurch gekennzeichnet,

daß die Seiltrommeln (19) nebeneinander mit übereinstimmender Drehachse angeordnet sind.

6. Verfahren zur Montage eines Aufzugs nach einem der vorhergehenden Ansprüche,

dadurch gekennzeichnet,

daß an den gekoppelten Seilscheiben Seilsicherungen (39) angeordnet sind, um ein Herauspringen der Seile aus den Seilscheibenrillen während des Anhebens des Trägers (9) zu verhindern.

Revendications

1. Procédé de montage d'un ascenseur et notamment d'un ascenseur avec machinerie en fond de gaine; comportant une poutre (9) à bras télescopiques d'extrémité (21) à déployer lors de la pose en haut de gaine, ladite méthode comportant les phases opératoires successives suivantes:

- pose d'un appareil (15,17) de levage de la poutre (9) à bras télescopiques (21) en position appropriée en haut de gaine,

- introduction en fond de gaine des éléments équipant l'ascenseur tels que les rails-guides de contrepoids (7) et les rails-guides de cabine (5), le contrepoids d'équilibrage (3), la poutre (9) à bras télescopiques (21) à l'état rétractés et les tourets de câble (19);

- introduction de la cabine (1) dans la gaine, posée sur un support attendant au local de machinerie (25);

- levage de la poutre (9) au moyen dudit appareil de levage (15,17) en position horizontale appropriée au-dessus du toit de cabine, solidaire avec la gaine, de manière à suspendre le contrepoids d'équilibrage (3), les premiers rails-guides de contrepoids (7) et le rail-guide de cabine (5) à partir de la poutre au-dessus dudit toit;

- manutention du matériel de commande d'ascenseur (29) et pose des câbles (13) sur les poulies de poutre (11) et sur les poulies de matériel de commande (31), les câbles étant fixés à la poutre depuis leur extrémité contrepoids à la platine de point fixe (37) et étant déroulés directement depuis les tourets de câble (19 en fond de gaine);

- levage de la poutre ainsi équipée au moyen de l'appareil de levage (15,17) et réalisation au fur et à mesure de la pose en continu



- d'éclisses de rails-guides (5,7) lors du levage, jusqu'à son niveau prédéterminé;
- pose de la poutre sur ses supports de gaine (43) en déployant les bras (21) sur lesdits support (43); 5
 - récupération des extrémités de câbles (13) sur le côté de cabine le contrepoids étant descendu d'une longueur appropriée, c'est à dire jusqu'à mi-chemin, les extrémités étant passées sous les poulies inférieures (41) et fixées au toit, et 10
 - alors que le contrepoids descend simultanément, levage de la cabine à son niveau supérieur pour attacher les câbles du côté de cabine à la platine de point fixe en haut de gaine. 15
2. Méthode de montage d'ascenseur selon la revendication 1, caractérisée en ce que la poutre (9) est relevée à l'horizontale avec son équipement alors que le contrepoids d'équilibrage est lesté selon les exigences. 20
 3. Méthode de montage d'ascenseur selon la revendication 1 ou 2, caractérisée en ce que, la poutre (9) étant élinguée depuis sa poulie centrale (11), l'un des câbles (13) est passé lors de la sa pose sur les poulies d'un élément dévoyeur (33) disposé au dessus de la poulie centrale (11). 25
 4. Méthode de montage d'ascenseur selon la revendication 3, caractérisée en ce que, la poutre (9) ayant été levée puis mise en place, l'élingue de poutre (15) est retirée et le câble correspondant (35) est remplacé par le câble (13 dévoyé au dessus de la poulie centrale (11). 30 35
 5. Méthode de montage d'ascenseur selon l'une ou l'autre des revendications précédentes, caractérisée en ce que les tambours à câbles (19) sont juxtaposés selon le même axe de rotation. 40
 6. Méthode de montage d'ascenseur selon l'une ou l'autre des revendications précédentes, caractérisée en ce que des protège-câbles (39) sont posés sur les poulies accouplées de manière à condamner l'échappement des câbles des rainures de poulie lors du levage de la poutre (9). 45

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