July 27, 1965 E. SENN 3,196,808

CABLE-LIFTING DEVICE, PARTICULARLY CHAIR-LIFT OR TOW-LIFT

Filed Aug. 6, 1963

FIG. 1

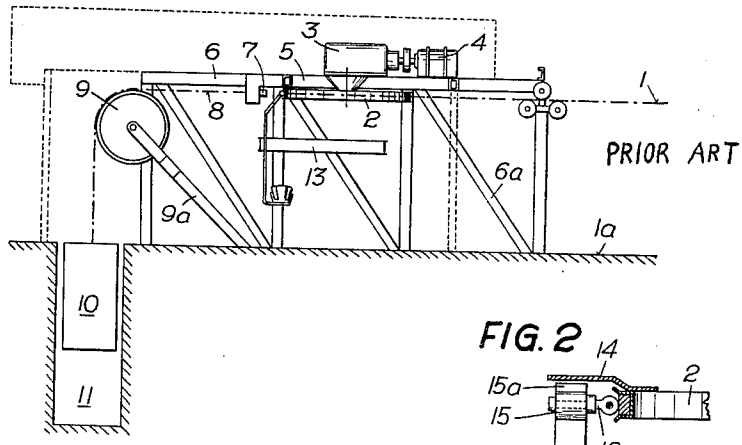


FIG. 2

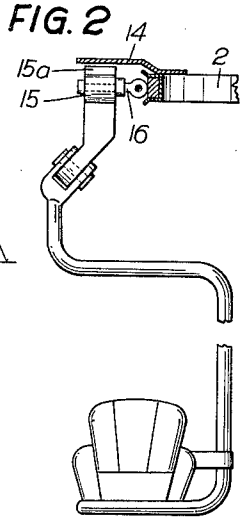


FIG. 3

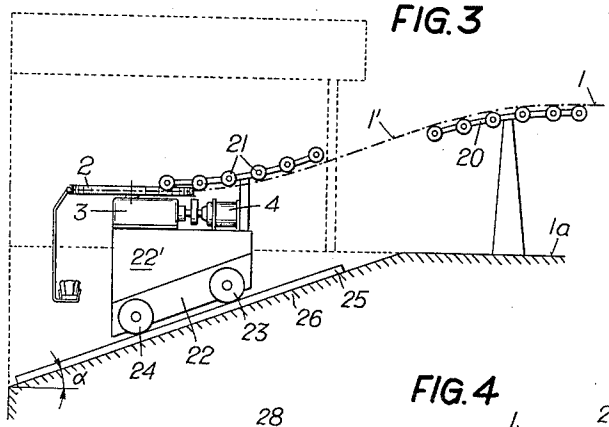
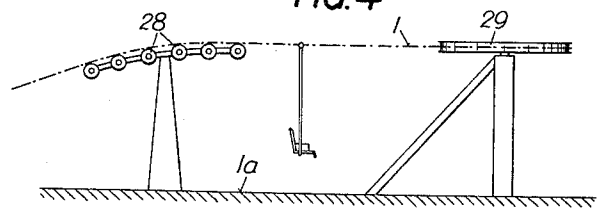


FIG. 4



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CABLE-LIFTING DEVICE, PARTICULARLY CHAIR-LIFT OR TOW-LIFT

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The present invention relates to a cable-lifting device, particularly for chair-lifts or tow-lifts, and the cable-lifting device constituting either the driving station or a station in which the rope pulley serves only as a return pulley.

Cable lifting devices have been proposed before which created the problem of avoiding the swinging movements of the chairs or suspensions upon leaving a return rope pulley by simple means. The structures proposed before did not lend themselves, however, to solve this cumbersome problem, the known structures being described in greater detail below.

It is, therefore, one object of the present invention to provide a cable-lifting device, particularly a chair-lift or tow-lift, wherein the oscillations of the suspensions are prevented upon leaving the rope pulley, in an arrangement providing a frame rollable on an inclined track and constituting the tensioning weight as well as carrying the rope pulley and, preferably, also the driving mechanism.

It is another object of the present invention to provide a cable-lifting device, wherein the suspensions are connected to rope clamps for a swinging movement only in the vertical plane extending through the rope and parallel to the rope and are prevented from a pendulum movement in longitudinal direction prior to leaving the rope pulley, and providing guiding devices in the shape of rolls, abutments, slide guides or the like, which bring about that the suspensions, upon leaving the rope pulley, are at least approximately in a stable equilibrium position, namely a vertically suspended position.

It is still another object of the present invention to provide a cable-lifting device, in which the plane of the rope pulley is disposed at an angle to the plane of the track of the rollable frame, namely horizontally or approximately horizontally, and the incoming and outgoing rope is bent into the horizontal or approximately horizontal position and vice versa, by means of guide rollers carried by the rollable frame.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIGURE 1 is a schematic elevation of a cable lifting station including a cable lifting device, as known in the prior art;

FIG. 2 is a fragmentary elevation of a conventional chair-lift;

FIG. 3 is a schematic elevation of a valley station of a chair-lift, designed in accordance with the present invention; and

FIG. 4 is a schematic elevation of a corresponding mountain station of a chair-lift.

Referring now to the drawing, and in particular to FIGS. 1 and 2, in order to make clear the problem solved by the present invention, at first, a typical arrangement known for such stations is described. A towing rope 1 enters in slightly inclined position a ramp 1*a* of the station for receiving and discharging passengers, respectively, runs along a driving pulley 2 and leaves the station again on the other side.

The driving mechanism comprises substantially a driving device 3 and a motor 4 and is disposed on a bridge 5, which rests on the longitudinal sides of the station on steel and concrete supports 6 and steel structures 6*a*, respectively, and is displaceably mounted thereon if the

driving station serves simultaneously as a tensioning device. The driving mechanism may be in the mountain station or in the valley station.

The tensioning device comprises substantially an end sleeve 7 for the tensioning rope 8, a deflection pulley 9, which is mounted on a steel structure 9*a* or on a steel and concrete wall, and a tensioning weight 10, which moves upwardly and downwardly in a pit 11. The tensioning weight can be arranged rollable on an inclined plane.

In this case the chairs or suspensions have a device, which prevents an oscillation during their travel about the pulley. Often a guide rail 13 is provided, which prevents the chairs from oscillating in crosswise direction. Under circumstances, also the head 15 of the chairs or suspensions is designed such, that it can be supported by an annular surface 14 secured above the rope pulley 2 and moving with the latter (FIG. 2). The substantially cylindrical head 15 is equipped for this purpose with a portion 15*a* having a plane surface on its upper side which portion engages below the annular surface 14 of the rope pulley 2. Due to the centrifugal force of the suspensions both surfaces are pressed together during the travel about the pulley 2, whereby an oscillating movement in longitudinal direction is prevented.

By these arrangements the suspensions are retained in vertical position and are guided substantially suspended vertically, about the drive pulley or the return pulley. Upon leaving the drive or return pulley on the other side the suspensions are suspended still vertically and leave the pulley nearly without any oscillations.

It also has been proposed already, to make rollable the previously mentioned heavy members 2, 3, 4, 5, 8, 9, 9*a* as one unit on an inclined track and thus to make useable the masses of the heavy members for the tensioning of the rope, whereupon the tensioning weight can be of a substantially smaller value. In view of the oscillating movements of the suspensions, which arise during the travel of the suspensions from the then likewise inclined rope pulley, the angle α of inclination of the inclined track could be chosen very small only and thus a small portion only of the total weight could be used for the tensioning of the rope. To move the chairs or suspensions without oscillations about the pulley and to lead them off the pulley, the guide rail 13 (FIG. 1) referred to above, is, for instance, completely insufficient.

The second mentioned method, applying the two surfaces 14 and 15*a*, is applicable to a certain extent if small inclinations are used. The two surfaces engage each other in the manner described above, urge the suspensions perpendicularly to the pulley and guide them perpendicularly to the pulley, about the periphery of the pulley. Upon leaving the pulley, the chairs or suspensions are, however, inclined forwardly for the angle of inclination of the inclined track and, therefore, they start oscillating movements. The greater the inclination of the pulley, the greater is the pendulum stroke of the suspensions after leaving the pulley, which makes it extremely difficult for the passengers to mount the chairs.

Referring now again to the drawing, and in particular to the embodiment shown in FIGS. 3 and 4, the rope 1 which extends in most instances nearly horizontally above the mounting ramp 1*a*, is deviated by means of the support 20 such, that thereafter it continues along the length 1′ at the angle α of inclination of the track of the frame of the rope pulley or nearly at this angle. The rope is then fed below the holding down device 21, which is connected to the rollable frame 22 of the rope pulley, which frame 22 carries in the shown embodiment also the driving mechanism 3 and 4. The rope reaches then the rope pulley 2 in a horizontal or nearly horizontal position and leaves the rope pulley 2 on the other side

again in horizontal position. The two runs of the endless rope 1 run from the valley station (FIG. 3) over the inclined path to the mountain station (FIG. 4), where they are transferred into horizontal position by means of the supporting rollers 28 and to the pulley 29 of the mountain station.

The carriage 22, carrying the rope pulley 2 and the driving mechanism 3 and 4, includes a mass 22' required additionally as tensioning weight and rolls by means of wheels 23 and 24 or by rollers on rails 25, which are secured to an immovable base 26, which rails 25 are inclined at the angle α. In order to correct automatically smaller oscillations in longitudinal direction during the engagement of the chairs or suspensions with the rope pulley, an arrangement as described above in connection with FIG. 2 and known, may be provided.

Though the frame of the rope pulley including the rope pulley and the driving mechanism is arranged rollably on an inclined plane of greater inclination, for instance, 20° to 30°, and is thus applied as a tensioning weight, a quieter running off of the suspensions from the rope pulleys is brought about with this arrangement, since the suspensions are suspended vertically upon leaving the rope pulley and, therefore, neither oscillations in longitudinal direction, nor in crosswise direction can occur.

These arrangements bring about a substantial simplification of the device, particularly in case the station has been erected on a location which is naturally inclined. As far as the prevailing climate conditions permit, the buildings may be omitted completely or may be designed as simple roof structures only, because the inclined plane of the location favors the run off of any precipitation and no carrying structure elements are required in addition to the guide rails supported by the inclined plane. The roof structure can also be erected from the rollable frame itself, so that its weight is actively contributing to the tensioning of the ropes.

As further advantages, it is obtained that there is much space for placing additional tensioning weights, the mountain side wheels 23 are balanced by the rope forces, and the rope forces contribute to the tensioning of the ropes. Moreover, gear drives, combustion engines and electrical machines are more suitable in most instances for a horizontal than for an oblique mounting.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claim.

I claim:

In a cable-lifting device, particularly chair-lifts or tow-lifts,

two cable lifting stations,

a rope extending between said stations,

each of said cable lifting stations including a rope pulley,

a frame having an inclined rolling gear included in one of said stations,

said frame constituting a tensioning weight for said rope and adapted to roll on an inclined track,

said rope pulley coordinated to said one of said stations and mounted on said frame for rotation about a substantially vertical axis,

said rope being continuous, and leading over said respective rope pulleys,

a plurality of clamping members secured to said rope,

a plurality of suspensions secured to said clamping members for permitting an oscillating movement within a vertical plane extending through and disposed parallel to said rope,

means preventing an oscillating movement of said suspensions in longitudinal direction prior to leaving said rope pulley mounted on said frame, and

guide rollers for said rope mounted on said frame for directing a portion of said rope approaching the corresponding of said rope pulley into substantially horizontal position and for directing a portion of said rope emerging from said rope pulley from a substantially horizontal position into an inclined position.

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