



US 20230057771A1

(19) **United States**

(12) **Patent Application Publication**
Schmid et al.

(10) **Pub. No.: US 2023/0057771 A1**

(43) **Pub. Date: Feb. 23, 2023**

(54) **CABLE-CAR SUPPORT COMPRISING A CLIMB-OVER APPARATUS**

B61B 12/02 (2006.01)

E04H 12/00 (2006.01)

(71) Applicant: **Innova Patent GmbH**, Wolfurt (AT)

(52) **U.S. Cl.**

CPC *B61B 12/06* (2013.01); *B61B 12/002* (2013.01); *B61B 12/02* (2013.01); *E04H 12/00* (2013.01)

(72) Inventors: **Oliver Schmid**, Lochau (AT); **Josef Sutter**, Bregenz (AT); **Gernot Ilg**, Dornbirn (AT); **Martin Schönenberger**, Diepoldsau (CH)

(21) Appl. No.: **17/594,013**

(57) **ABSTRACT**

(22) PCT Filed: **Mar. 31, 2020**

(86) PCT No.: **PCT/EP2020/059051**

§ 371 (c)(1),

(2) Date: **Mar. 15, 2022**

(30) **Foreign Application Priority Data**

Apr. 2, 2019 (AT) A 50283/2019

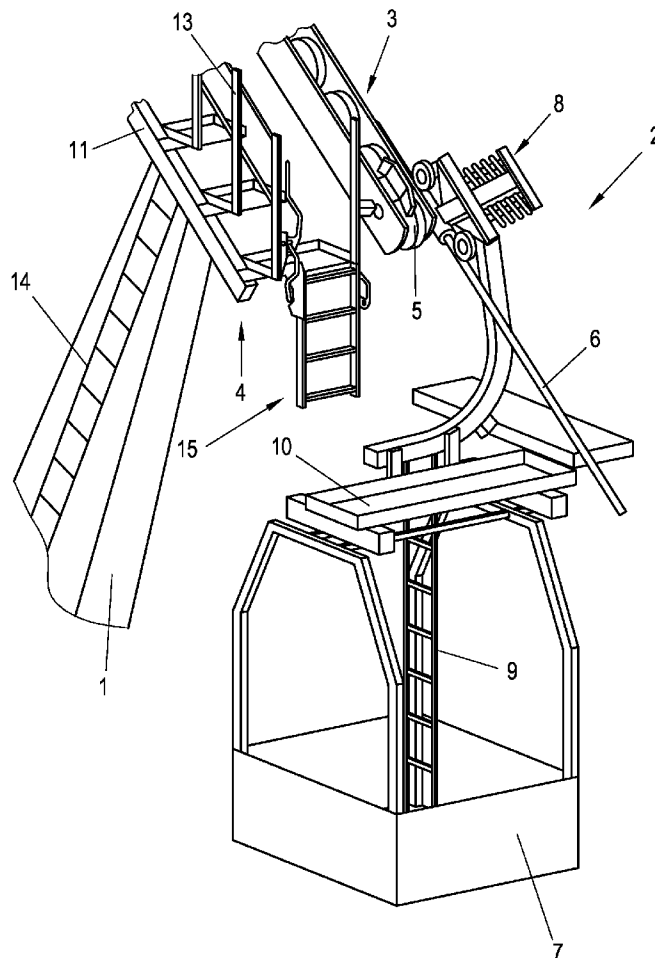
Publication Classification

(51) **Int. Cl.**

B61B 12/06 (2006.01)

B61B 12/00 (2006.01)

In order to make it easier to access an access unit (4) of a cableway support (1) of a cableway (2), according to the invention a climb-over apparatus (15) for persons to climb over from a cable car (7) of the cableway (2) onto the access unit (4) or vice versa is provided on the cableway support (1), wherein the climb-over apparatus (15) is positioned on the cableway support (1) by means of a fastening unit (21) so as to be movable relative to the access unit (4), wherein the climb-over apparatus (15) can be displaced relative to the access unit (4) from a rest position (RP), in which the climb-over apparatus (15) is stowed on the access unit (4), into a standby position (BP), which is provided for performing the climb-over action.



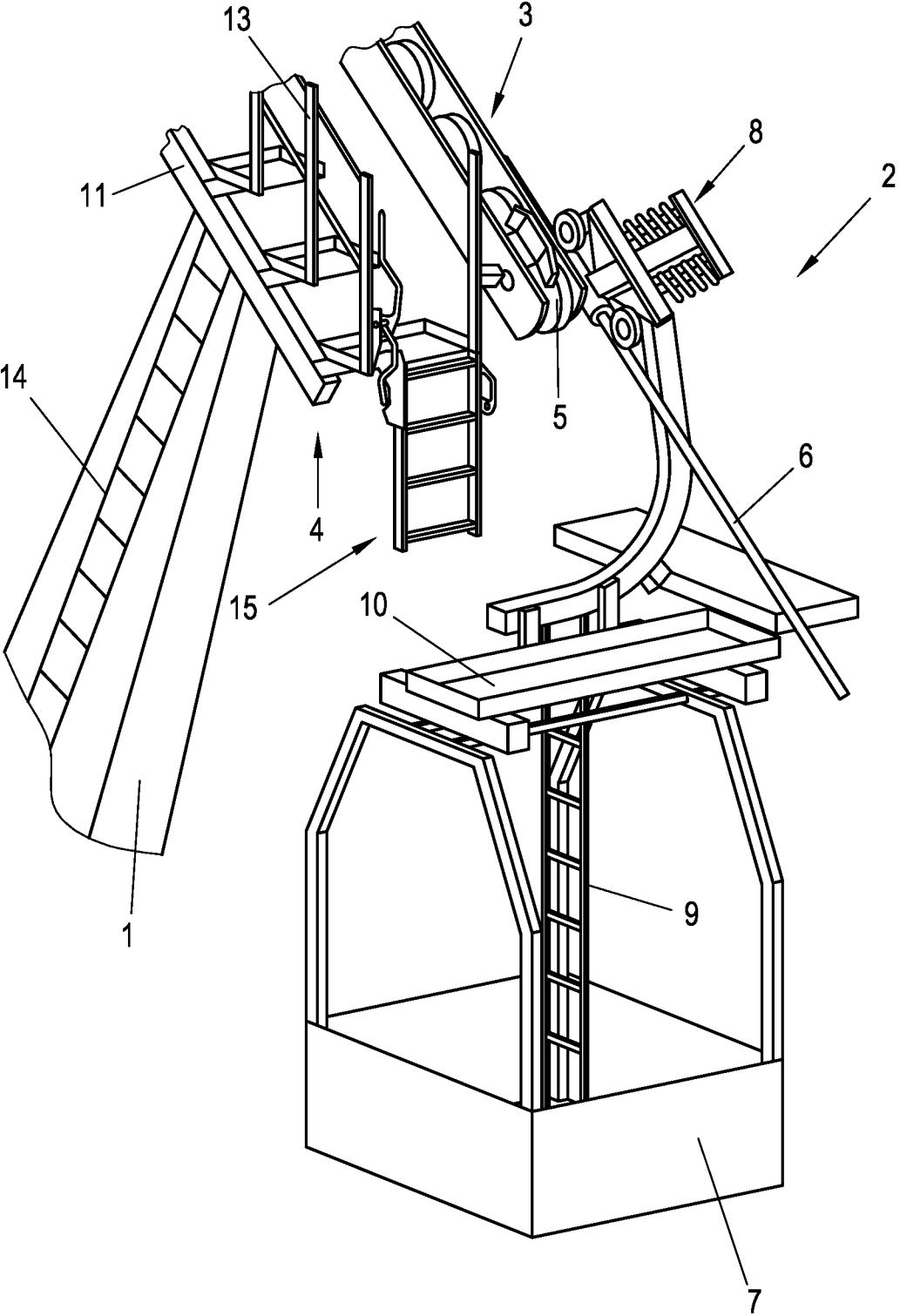


Fig. 1

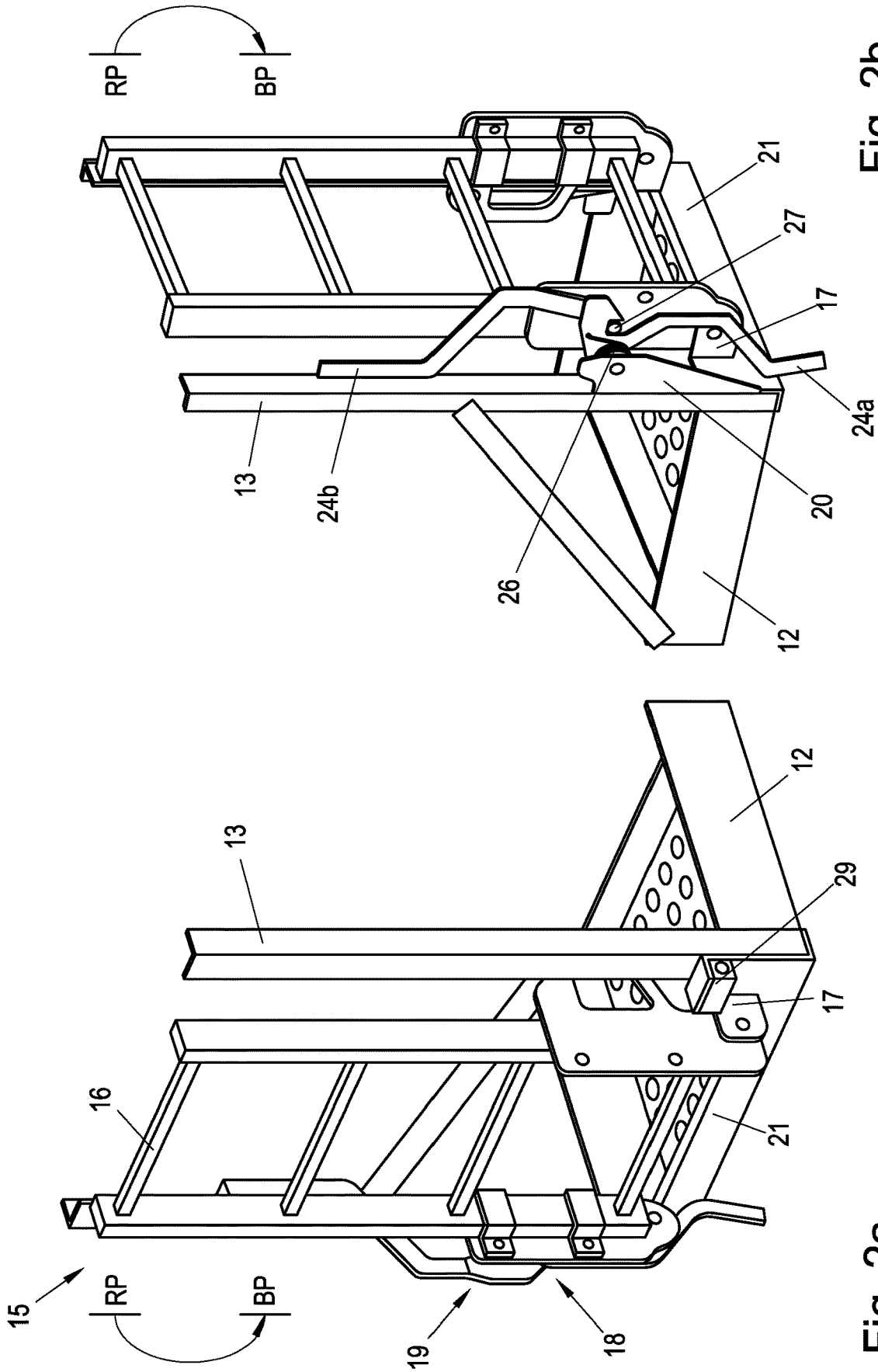


Fig. 2b

Fig. 2a

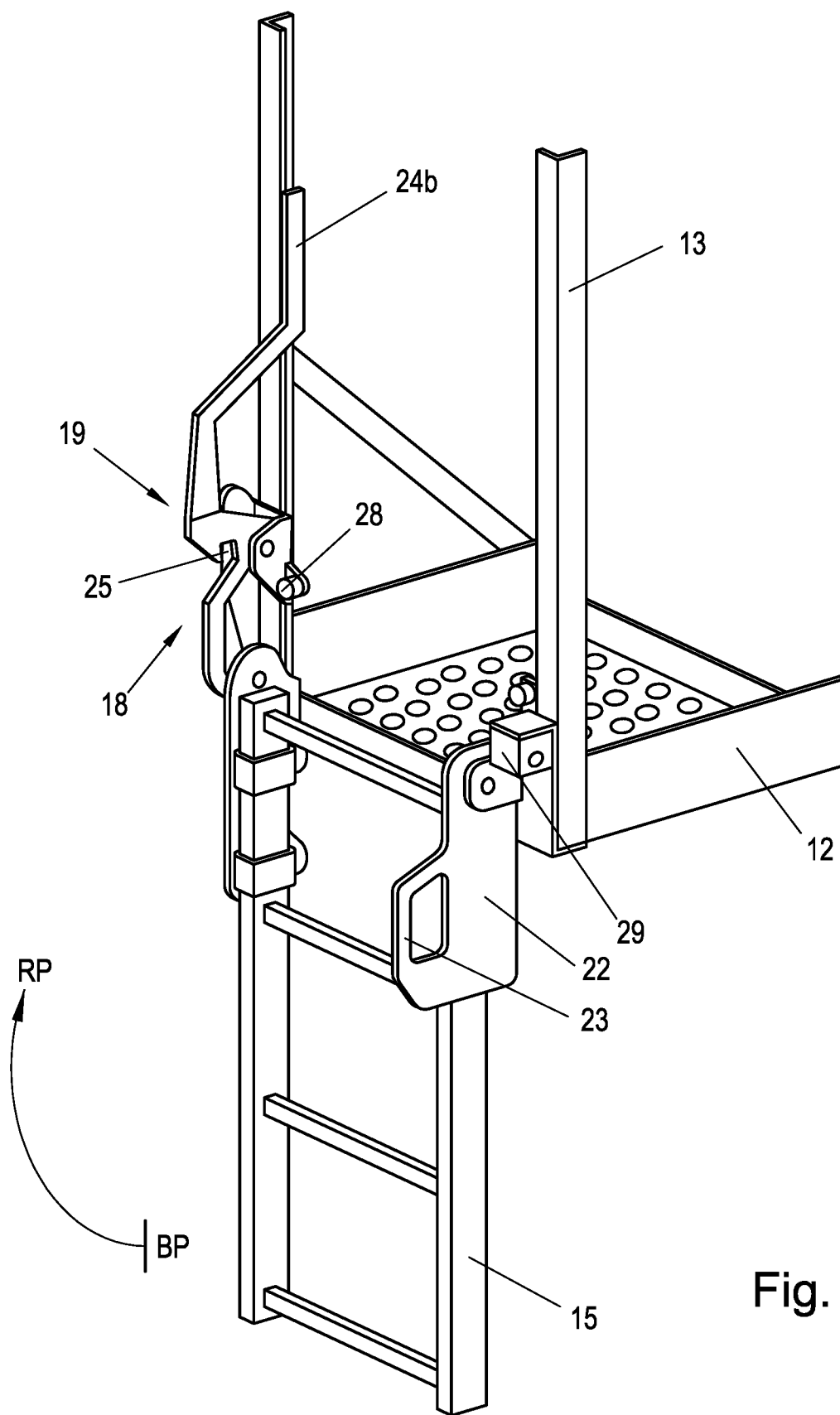
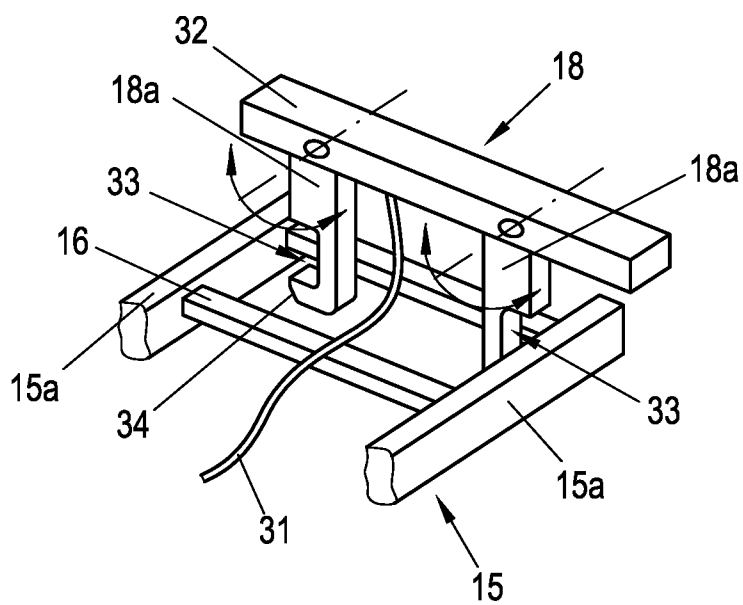
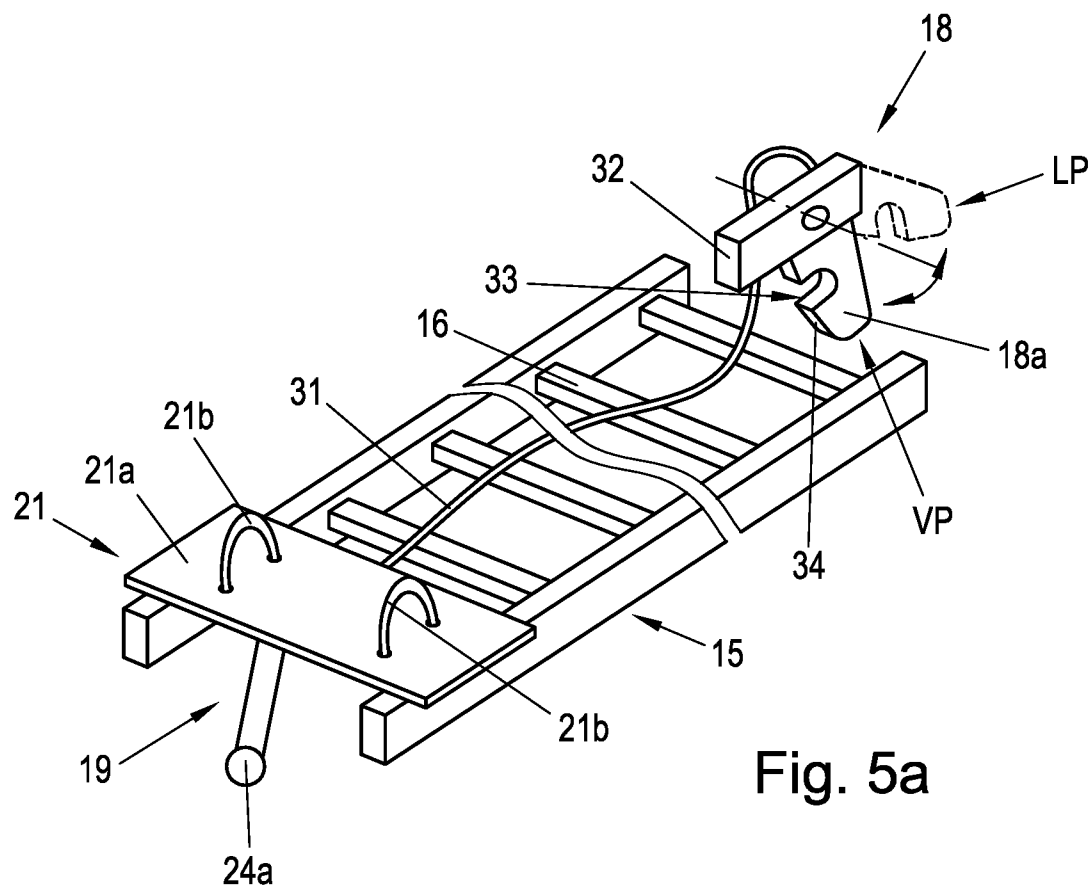


Fig. 3



CABLE-CAR SUPPORT COMPRISING A CLIMB-OVER APPARATUS

TECHNICAL FIELD

[0001] The present teaching relates to a cableway support of a cableway with an access unit for people to gain access. The present teaching also relates to a cableway with a number of cableway supports for guiding a conveyor cable of the cableway and with at least one cable car arranged on the conveyor cable, as well as a method for carrying out a climb-over from a cable car to the access unit or vice versa.

BACKGROUND

[0002] Cableways are available in a wide variety of designs, mostly for transporting people and/or goods, for example as urban means of transport or for transporting people in ski areas. Funiculars are known in which mostly rail-bound vehicles are fastened to a wire cable in order to be pulled by the wire cable. The movement takes place on the ground, with funiculars mostly used on mountain routes. In the case of aerial cableways, on the other hand, cable cars such as gondolas, cabins or chairs are carried by one or more (wire) cables without fixed guides and moved while hanging in the air. The cable cars therefore have no contact with the ground. Aerial cableways are usually used in rough terrain, mostly for mountain routes, for example in ski areas, to transport people from the valley to a mountain. As a rule, cableways have two stations between which the cable cars are moved.

[0003] A distinction must be made between circulating cableways and aerial cableways. In the case of aerial cableways, one or two cable cars pulled by a traction cable commute back and forth on a conveyor cable on a route between two stations. The circulating cable car, on the other hand, has an endless conveyor cable which is constantly circulating between the stations and on which a large number of cable cars such as gondolas, cabins or chairs are suspended. The cable cars are moved from one station to the other on one side and back again on the opposite side. The movement of the cable cars is therefore always substantially continuous in one direction, analogous to a continuous conveyor.

[0004] In order to be able to bridge greater distances, one or more cableway supports for guiding the (carrying/traction) cable(s) are usually arranged between the two stations. Cableway supports can be designed as a steel framework construction, but also as a steel tube or sheet metal box construction. A plurality of rollers, for example in the form of a so-called roller set, are usually arranged on a cableway support in order to carry and guide the cable. In order to be able to carry out maintenance and repairs on the cableway supports, in particular on the rollers, access units are often provided on the cableway supports. Such access units can be designed, for example, in the form of (maintenance) platforms and/or steps and can be accessed by maintenance personnel. In addition, safety devices, for example railings, can also be provided in order to increase the safety for the maintenance personnel.

[0005] Depending on the purpose and terrain, cableway supports can have a height that is between a few meters and more than 150 m. Until now, entry to the access units for the cableway supports was only possible via ladders from the ground. However, due to the often impassable terrain and

especially because of the sometimes great heights of the cableway supports, such entry is very difficult and time-consuming.

SUMMARY

[0006] It is therefore an object of the present teaching to enable easier entry to an access unit of a cableway support of a cable car.

[0007] The object is achieved according to the present teaching in that a climb-over apparatus is provided on the cableway support for people to climb over from a cable car of the cableway to the access unit or vice versa, wherein the climb-over apparatus is arranged on the cableway support by means of a fastening unit so as to be movable relative to the access unit, wherein the climb-over apparatus can be moved relative to the access unit from a rest position in which the climb-over apparatus is stowed on the access unit into a standby position which is provided for performing the climb-over. This enables entry to the access unit directly from a cable car, which entry is significantly less strenuous and less time-consuming for maintenance personnel than via a ladder from the ground.

[0008] A locking unit for locking the climb-over apparatus in the rest position is preferably provided on the cableway support. This makes it possible to reduce the risk of the climb-over apparatus coming loose in an undesirable manner, for example during operation of the cable car.

[0009] A mechanically, hydraulically or electrically actuable locking unit enables flexible options for actuating the locking unit.

[0010] Advantageously, an actuating unit for actuating the locking unit is provided on the cableway support in order to release the locking of the climb-over apparatus in the rest position, in order to move the climb-over apparatus from the rest position into the standby position, wherein the actuating unit preferably has at least one first lever element in order to actuate the locking unit from a cable car, wherein the actuating unit particularly preferably also has a second lever element in order to actuate the locking unit from the access unit. According to a further advantageous embodiment, the actuating unit can also have an actuating means in the form of a cable pull or a flexible shaft. This creates flexible options for simple actuation of the locking unit.

[0011] It is advantageous if the climb-over apparatus has a braking device in order to brake a movement of the climb-over apparatus from the rest position into the standby position caused by gravity, wherein the braking device is preferably mechanical, hydraulic or pneumatic. This can increase safety and can reduce the risk of injury to people.

[0012] The cableway support preferably has at least one sensor element which is provided to detect a position of the climb-over apparatus, in particular to detect whether the climb-over apparatus is in the rest position, wherein the sensor element generates a sensor value that can be transmitted to a system control unit of the cableway. The sensor element can also be provided to detect a locked state of the locking unit, in particular whether the climb-over apparatus is locked in the rest position by means of the locking unit. This further increases safety, since it enables reliable detection of the position and/or the locked state of the climb-over apparatus.

[0013] The climb-over apparatus preferably has at least one step element and/or holding element for a person to step

onto and/or to hold onto. This makes it easier for people to cross over and increases safety.

[0014] It is also advantageous if a length of the climb-over apparatus can be changed in order to adapt the length of the climb-over apparatus to a variable distance between the access unit and the cable car, wherein the climb-over apparatus is particularly preferably designed as a ladder, preferably as a telescopic ladder, wherein the at least one step element and/or holding element is a rung of the ladder.

[0015] A railing is preferably provided on the access unit and the climb-over apparatus in the rest position forms part of the railing, whereby safety can be increased.

[0016] The object is further achieved in that the climb-over apparatus is arranged on at least one cableway support of a cableway, wherein a climb-over apparatus is preferably arranged on each of a plurality of cableway supports.

[0017] The cableway advantageously has a system control unit for controlling the cableway, wherein the system control unit is provided to process the sensor value of the sensor element in order to switch off the cableway or to generate a warning signal and to output it via a signaling device when the sensor element detects a position of the climb-over apparatus which deviates from the rest position and/or when the sensor element detects an unlocked state of the climb-over apparatus in the locking unit. By communication of the sensor of the climb-over apparatus with the system control unit it is possible to switch off the cableway depending on the position and/or the locked state of the climb-over apparatus or to at least to emit a warning signal.

[0018] The object is also achieved by the method referred to at the beginning, wherein the cable car is moved into a climb-over position, from the cable car or from the access unit the climb-over apparatus of the cableway support is moved from the rest position into the standby position, a person climbs over from the cable car via the climb-over apparatus to the access unit or vice versa, and from the access unit or from the cable car the climb-over apparatus is preferably moved from the standby position BP back into the rest position after the climb-over.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The present teaching is described in greater detail below with reference to FIGS. 1 to 5b which show, by way of example, advantageous embodiments of the present teaching in a schematic and non-limiting manner. In the drawings:

[0020] FIG. 1 shows a cableway support with a climb-over apparatus according to a first embodiment of the present teaching,

[0021] FIGS. 2a and 2b each show a detailed view of a climb-over apparatus in the rest position,

[0022] FIG. 3 shows a detailed view of a climb-over apparatus in the standby position,

[0023] FIG. 4 shows a cableway support with a climb-over apparatus according to a second embodiment of the present teaching,

[0024] FIGS. 5a and 5b each show a locking device for a climb-over apparatus.

DETAILED DESCRIPTION

[0025] FIG. 1 shows a cableway support 1 of a cableway 2 with a roller set 3 and an access unit 4. The structure of a cableway 2 is known in principle, which is why only the

components essential for the present teaching are described here. The roller set 3 has a number of rollers 5 arranged one behind the other, on which a conveyor cable 6 of the cableway 2 is guided. The roller set 3 is attached to the cableway support 1 in order to support the load on the conveyor cable 6, and in particular the cable car 7 arranged thereon, on the ground via the cableway support 1. A plurality of cable cars 7 are usually suspended at a certain distance from one another on the conveyor cable 6. A cable car 7 can be fastened to the conveyor cable 6, for example, as shown, by means of a releasable clamping mechanism 8 in order to be able to decouple the cable car from the conveyor cable 6 in a station. The decoupling can take place, for example, in order to reduce the speed while travelling through the station in order to enable easier entry and exit of people. However, decoupling can also take place after a cableway has closed, for example, in order to park the cable car outside the operating hours, for example in a suitable garage. Of course, a non-decouplable connection of the cable car 7 to the conveyor cable 6 would also be possible. In the example shown, the cable car 7 is designed as a maintenance gondola. The maintenance gondola has a ladder 9 via which a person can climb from the maintenance gondola onto a platform 10 at the upper end of the maintenance gondola, for example in order to carry out certain maintenance activities.

[0026] The access unit 4 of the cableway support 1 is designed here as a staircase which has a longitudinal beam 11 and a plurality of steps 12. The access unit 4 can be fastened to the roller set 3 and/or to the cableway support 1 itself. In the example shown, a railing 13 is additionally provided on the steps 12 in order to increase the safety for people when using the access unit 4. Of course, this is only an example, and the access unit 4 could also be constructed in any other way and, for example, could have only one platform with or without a railing 13. If the cableway support 1 is designed as a framework construction, the access unit 4 could for example also be directly a part of the cableway support 1.

[0027] A maintenance ladder 14 is indicated schematically on the cableway support 1, and persons, in particular maintenance personnel, can climb up from the ground to the access unit 4 via this ladder. Of course, such a maintenance ladder 14 can also have additional safety elements, for example a type of cage, in order to secure people from falling down. Until now, entry to the access unit 4 has essentially only taken place via such maintenance ladders 14. It can be seen immediately that entry via the maintenance ladder 14 is very strenuous and time-consuming, in particular in the case of very high cableway supports 1, which is of course disadvantageous. In addition, there is the additional difficulty that cableway supports 1 are often arranged in impassable, for example steep, rocky terrain, whereby even reaching the cableway support 1 on the ground is very difficult. In addition, when using a maintenance ladder 14 a person is restricted with regard to baggage such as tools.

[0028] In order to make entry to the access unit 4 easier for people, the present teaching therefore provides that a climb-over apparatus 15 is arranged on the cableway support 1 for a person to climb over from a cable car 7 of the cableway 2 onto the access unit 4. The climb-over apparatus 15 is arranged pivotably on the access unit 4 by means of a fastening unit 21 and is movable relative to the access unit

4 from a rest position RP, in which the climb-over apparatus **15** is stowed on the access unit **4**, into a standby position BP, which is provided for carrying out the climb-over. In FIG. 1, the climb-over apparatus **15** is shown in a first embodiment, the structure and mode of operation of which is explained in more detail below with reference to FIGS. *2a*, *2b* and FIG. 3.

[0029] In FIG. 1 the climb-over apparatus **15** is located in the standby position BP, in which the climb-over from the cable car **7**, for example from the platform **10** of the maintenance gondola, to the access unit **4** is made possible. Here the climb-over apparatus **15** is fastened pivotably to the lowest step **12** of the access unit **4**, and from the cable car **7** the apparatus can be moved, in particular pivoted, out of the rest position RP (not shown) into the illustrated standby position BP for use by a person. For this purpose, the cable car **7** is moved into a climb-over position sufficiently close to the access unit **4** and is stopped. A person can then climb onto the platform **10** via the ladder **9** of the cable car **7**, and from the platform **10** the climb-over apparatus **15** can be hinged from the rest position RP into the standby position BP in order to reach the access unit **4**, in this case on the staircase. Of course, the climb-over can also take place the other way around, in that from the access unit **4** a person (who is located on the access unit **4**) moves the climb-over apparatus **15** from the rest position RP into the standby position BP in order to reach the cable car **7** from the access unit **4**.

[0030] The climb-over apparatus **15** preferably has at least one step element and/or holding element **16** which is suitable for being held or stepped on by a person in order to facilitate the climb-over. In an advantageous manner, the climb-over apparatus **15** can be designed, for example, as a ladder, as shown, wherein the ladder has a plurality of rungs as step elements and/or holding elements **16**. According to a further advantageous embodiment, a length of the climb-over apparatus **15** can be changed in order to be able to adapt the climb-over apparatus **15** to a variable distance between the access unit **4** and the cable car **7**. This also makes the climb-over easier for people of different sizes and the positioning of the cable car **7** in the climb-over position can be less precise. If the climb-over apparatus **15** is designed as a ladder, the variable length can be implemented, for example, by a telescopic ladder, the structure and function of which are known.

[0031] FIGS. *2a* and *2b* show the climb-over apparatus **15** from FIG. 1 in detail in different perspectives in the rest position RP. For reasons of greater clarity, only part of the access unit **4**, for example the lowest step **12**, and part of the railing **13** are shown. The climb-over apparatus **15** is connected in an articulated manner to the fastening unit **21** and the fastening unit **21** is permanently connected, for example screwed, to the access unit **4**, as shown. In the example shown, the fastening unit **21** has a left and right plate **17**, between which the climb-over apparatus **15** is fastened in a pivotable manner.

[0032] A locking unit **18** is preferably provided on the cableway support **1**, in particular on the access unit **4** or the fastening unit **21**, in order to releasably lock the climb-over apparatus **15** in the rest position RP. The locking unit **18** can preferably be actuated mechanically, hydraulically or electrically. This can increase safety, since it is ensured that the climb-over apparatus **15** is not moved in an undesired manner from the rest position RP partially in the direction of

the standby position BP or completely into the standby position. The cableway support **1** preferably also has an actuating unit **19** for actuating the locking unit **18** in order to release the locking of the climb-over apparatus **15** on the access unit **4** or the fastening unit **21**, in order to be able to move the climb-over apparatus **15** from the rest position RP to the standby position BP, as symbolized by the arrow in FIG. *2a* and FIG. *2b*.

[0033] In the example shown, the locking unit **18** and actuating unit **19** are arranged on a plate **20**, but they could of course also be arranged on the access unit **4**, for example on the railing **13**. The plate **20** is here connected to the plates **17** via a transverse strut (FIG. *2a*), which results in an essentially one-piece fastening unit **21**, which at the same time includes the locking unit **18** and the actuating unit **19**, for pivotable fastening of the climb-over apparatus **15** to the access unit **4**. The one-piece design of the fastening unit **21** can improve the structural rigidity, and the assembly of the climb-over apparatus **15** on the access unit **4** can be made easier, since the entire climb-over apparatus **15**, including the fastening unit **21** and the locking unit **18** and actuating unit **19** provided thereon, is designed as a module. In addition, the plate **20** can, for example, also be fastened to the access unit **4**, in this case to the railing **13**, in order to further improve the structural rigidity. This is particularly advantageous in order to reduce vibrations during the climb-over, as a result of which the feeling of safety for the person is increased.

[0034] In FIG. 3, the climb-over apparatus **15** is shown in the standby position BP, in which the climb-over from the cable car **7** can take place (see FIG. 1). The climb-over apparatus **15** is designed here as a ladder which is connected in an articulated manner to the plates **17** of the fastening device **21** by means of lateral brackets **22**. As a result, for example, a conventional, commercially available ladder can be used as the climb-over apparatus **15**, wherein the ladder is preferably made of a light, weather-resistant material with sufficient strength, for example aluminum. Of course, the climb-over apparatus **15** could also be connected in an articulated manner to the fastening unit **21** directly, that is to say without brackets **22**. The use of a ladder and brackets **22**, however, has the advantage that the ladder can easily be replaced, for example in the event of damage, and/or that ladders of different lengths can be used.

[0035] The actuating unit **19** advantageously has at least one first lever element **24a** in order to actuate the locking unit **18** from the cable car **7**. Particularly preferably, however, the actuating unit **19** also has a second lever element **24b** in order to be able to actuate the locking unit **18** also from the access unit **4** (FIG. *2b*). In the example shown, the lever elements **24a**, **24b** are designed in one piece with the actuating unit **19**, wherein the first lever element **24a** extends in the direction of the standby position BP (in this case essentially vertically downwards) and the second lever element **24b** extends in the direction of the rest position RP (in this case essentially vertically upwards). The actuating unit **19** is here rotatably attached to the plate **20** and is movable between a locking position and a release position. A preloading element **26**, such as a suitable spring, is advantageously also provided in order to preload the actuating unit **19** into the locking position in which the climb-over apparatus **15** is locked on the access unit **4**. To release the lock, the actuating unit **19** can be moved into the release position against a preloading force of the preloading element **26**,

wherein in the release position the climb-over apparatus 15 can be pivoted from the rest position into the standby position.

[0036] In the example shown, the locking unit 18 is designed as an opening 25 in the actuating unit 19 which cooperates with a pin 27 (FIG. 2b) of the climb-over apparatus 15 in order to lock the climb-over apparatus 15 in the rest position RP on the access unit 4. In the example shown, the pin 27 is arranged on the outside of the left bracket 22 of the ladder and in the rest position RP in engagement with the opening 25. If the climb-over apparatus 15 is made in one piece (without the bracket 22), the pin 27 is preferably provided directly on the side of the climb-over apparatus 15. If the actuation unit 19 is actuated by one of the two lever elements 24a, 24b, i.e. pivoted from the locking position into the release position against the preloading force of the preloading element 26, the opening 25 releases the pin 27 and the climb-over apparatus 15 can be moved, in particular pivoted, from the rest position RP into the standby position BP.

[0037] Of course, the actuating unit 19 can be designed in any other way in order to lock and hold the climb-over apparatus 15 in the rest position RP and to release the climb-over apparatus 15 when actuated.

[0038] When the climb-over apparatus 15 is no longer required, for example after the maintenance work on the roller set 3 has been completed, the climb-over apparatus 15 is preferably moved back into the rest position RP in order not to endanger the operation of the cableway 2. This can in turn take place from the cable car 7 by manual folding of the climb-over apparatus 15 from the standby position BP back into the rest position RP. From the access unit 4 the climb-over apparatus 15 can also be moved back into the rest position RP, for example if a person remains on the access unit 4, for example in order to check or monitor certain functions of the roller set 3 during the operation of the cableway 2. In order to facilitate the folding up of the climb-over apparatus 15 from the access unit 4, a grip element 23 can be provided on the climb-over apparatus 15. In the example shown, the grip element 23 is designed as part of the right bracket 22, but of course other variants would also be conceivable, for example a separate grip element 23.

[0039] If a railing 13 is provided on the access unit 4, the climb-over apparatus 15 advantageously forms part of the railing 13 of the access unit 4 in the rest position RP.

[0040] The climb-over apparatus 15 can preferably be moved by gravity from the rest position RP into the standby position BP as soon as the locking of the locking unit 18 is released by means of the actuating element 19. However, it can be advantageous if the climb-over apparatus 15 has a braking device (not shown) in order to brake a movement of the climb-over apparatus 15 from the rest position RP into the standby position BP caused by gravity. This can increase safety, since the climb-over apparatus 15 cannot move downwards in an uncontrolled manner and can potentially injure a person. The braking device can also be advantageous in order to avoid damage to the climb-over apparatus 15. For example, an inadmissibly high load on the articulated connection (here between the bracket 22 and plates 17) and/or damage or deformation of the climb-over apparatus 15, for example the (aluminum) ladder shown, can be prevented. The braking device is preferably designed mechanically, hydraulically or pneumatically, for example

as a gas pressure spring. The braking device could, however, be implemented, for example, by a targeted increase in the friction in the joints.

[0041] Furthermore, it is advantageous if at least one limiting element 28 is provided which limits a movement of the climb-over apparatus 15 beyond the rest position RP. In the example shown, a limiting element 28 is arranged on the left and right, and essentially serves as an end stop for the climb-over apparatus 15. The limiting elements 28 are here fastened to the plate 20 (left) and the plate 17 (right) of the one-piece fastening device 21. Of course, another arrangement would also be conceivable, for example on the access unit 4, for example on the railing 13. If the limiting elements 28, as shown, each have an elastic damping element, such as a rubber element, striking of the climb-over apparatus 15 against the limiting element(s) 28 in the rest position RP can be damped. As a result, abrupt striking of the pin 27 in the opening 25 on the actuating unit 19 can be avoided, so that damage can be avoided. In addition, the damping element(s) can be used for preloading in order to preload the pin 27 in the rest position RP against a limitation of the opening 25. In this way the climb-over apparatus 15 can be prevented from moving within an existing clearance between the pin 27 and the opening 25, which could potentially lead to vibrations and rattling noises, for example caused by wind.

[0042] Furthermore, it can be advantageous if the access unit 15 has at least one sensor element 29 which is provided to detect a position of the climb-over apparatus 15, in particular to detect whether the climb-over apparatus 15 is located in the rest position RP. The sensor element 29 generates a sensor value which can be transmitted to a system control unit (not shown) of the cableway 2. The sensor element 29 is particularly preferably provided to detect whether the climb-over apparatus 15 in the rest position RP is locked by means of the locking unit 18 on the access unit 4. In the example shown, the sensor element 29 is designed as a so-called limit switch, which is actuated by the climb-over apparatus 15 when the climb-over apparatus 15 is in the rest position RP and generates a corresponding sensor value. The system control unit of the cableway 2 can process the sensor value and can switch off the cableway or output an alarm signal when the sensor 29 detects that the climb-over apparatus 15 is located in a position which deviates from the rest position RP. If a suitable sensor 29 is provided for detecting the locked state of the locking unit 18, the system control unit can switch off the cableway if the sensor detects an unlocked state of the climb-over apparatus 15 in the locking unit 18.

[0043] FIG. 4 shows a further embodiment of a cableway support 1 with a roller set 3 and a conveyor cable 6 on which a cable car 7 is suspended. Analogously to FIG. 1, the cableway support 1 has an access unit 4. The section of the roller set 3 to the left of the cableway support 1 is cut away in FIG. 4 for better visibility of the access unit 4. The access unit 4 has a longitudinal beam 11 and a plurality of steps 12. The steps are each arranged on a transverse beam 30, here in the form of a tube, wherein the transverse beams 30 are permanently connected to the longitudinal beam 11. The climb-over apparatus 15 is also designed here as a ladder and is pivotably arranged on the access unit 4 by means of a fastening unit 21.

[0044] The fastening unit 21 here has two eyelets, which are arranged on the transverse beam 30 of the lowest step 12, so that the transverse beam 30 or the tube extends through

the eyelets. As a result, the transverse beam **30** is used essentially as an axis of rotation for pivoting the climb-over apparatus **15**. Of course, in principle it would also be sufficient for the fastening unit **21** to have only one eyelet, but two or more eyelets are advantageous in order to produce greater stability of the connection of the climb-over apparatus **15**. In particular, a lateral tilting or wobbling of the climb-over apparatus **15** during the climb-over is reduced, resulting in an increased feeling of safety. The at least one eyelet can be designed to be rigid, made for example from a suitable metal material or from a flexible material of suitable strength, such as plastics material or a textile fabric.

[0045] In the rest position RP, the climb-over apparatus **15** is located below the access unit **4** and extends essentially parallel to the longitudinal beam **11**, as can be seen in FIG. **4**. The locking unit **18** is arranged here on the access unit **4** and has a locking element **18a** which is rotatably mounted on the access unit **4**, for example on the longitudinal member **11**. The axis of rotation in the locking element **18a** runs essentially parallel to the transverse beams **30** or tubes on which the steps **12** are arranged. In the rest position RP, the locking element **18a** is in engagement with the climb-over apparatus **15** in order to lock the climb-over apparatus **15**. In the example shown, the locking element **18a** has an opening which, in the rest position RP, engages with a rung of the ladder in order to fix the ladder in the rest position.

[0046] The actuating unit **19** for actuation of the locking unit **18** has a first lever element **24a** in order to be able to actuate the locking unit **18** from a cable car **7** when the cable car **7** is in a suitable climb-over position (not shown). The first lever element **24a** can for example be connected to the locking unit **18** by means of a cable pull or a flexible shaft of a corresponding length in order to release the lock, for example in order to pivot the locking element **18a** in the example shown. After the lock has been released, the climb-over apparatus **15** can be moved from the rest position RP to the standby position BP, in this case in particular pivoted about the axis of rotation of the lowest transverse beam **30**.

[0047] If the locking unit **18** can be actuated electrically, the actuating unit **19** could, for example, also be an electrical switch which is connected to the locking unit **18** via an electrical line (this of course also applies to other embodiments of the present teaching). Wireless actuation of the electrically actuatable locking unit **18** would also be conceivable, for example. In this case, the actuating unit **19** could be, for example, a radio switch which, for example, can be arranged in a stationary manner at a suitable point on the cableway support **1**, such as, for example, on the access unit **4**. However, it would also be conceivable that several radio switches are provided in order to actuate the locking unit **18** from different positions. Of course, a portable radio switch could also be used, for example to enable actuation or unlocking of the climb-over apparatus **15** from the cable car **7**.

[0048] In the standby position BP, the climb-over apparatus **15** or ladder extends essentially vertically downward from the access unit **4**, as indicated by dashed lines in FIG. **3**. The movement preferably takes place simply by gravity, wherein it can be particularly advantageous in this embodiment if a braking device (not shown) is provided in order to brake the movement of the climb-over apparatus **15** from the rest position RP into the standby position BP. As already mentioned with reference to the first embodiment, the brak-

ing device can be designed, for example, as a gas pressure spring. However, it would also be conceivable, for example, to provide a mechanical spring which counteracts the movement of the climb-over apparatus **15**, which essentially corresponds to a free fall. For example, a torsion spring could be provided on the lowest transverse beam **30**, which serves as a pivot axis for the climb-over apparatus **15**. Of course, this is only to be understood as an example and a person skilled in the art could also provide other suitable braking devices.

[0049] Optionally, a second lever element **24b** could of course also be provided in order to actuate the locking unit **18** from the access unit **4**. For example, as indicated in FIG. **4** the second lever element **24b** could be arranged directly on the locking element **18a** and could extend laterally or upward between two steps **12**. Furthermore, one or more stop elements (not shown) could be provided on the climb-over apparatus **15** or on the access unit **4** in order to limit a movement of the climb-over apparatus **15** beyond the standby position BP (in this case from the vertical to the left). As a result, swinging of the climb-over apparatus **15** in the standby position BP can be reduced, whereby the climb-over can be made easier and safety can be increased. For example, one or more stop elements in the form of rubber buffers could be provided on the climb-over apparatus **15** or, in this case, the ladder (at the upper end in the standby position BP), and in the standby position BP these elements are in contact with the lower end of the longitudinal beam **11** or with the lowest transverse beam **30**. Of course, alternatively or additionally the stop elements could also be provided on the longitudinal beam **11** or on the lowest transverse beam **30** in order to limit the movement of the ladder.

[0050] In order to further restrict swinging of the climb-over apparatus **15** in the standby position BP, a separate locking device (not shown) can also be provided which fixes the climb-over apparatus **15** in the standby position BP. As a result, the movement of the climb-over apparatus **15** can be minimized, for example to the left and right from the vertical in FIG. **4**, as a result of which the safety can be further increased during the climb-over. For example, the locking device can be designed similarly to the locking unit **18**. An advantage of the second embodiment (FIG. **4**) of the climb-over apparatus **15** compared to the first embodiment (FIG. **1-3b**) is, for example, that due to the arrangement of the climb-over apparatus **15** along the longitudinal beam **11** in the rest position RP, a longer climb-over apparatus **15** can be used, so that the climb-over from/to the cable car **7** can be simplified.

[0051] In FIG. **5a**, the climb-over apparatus **15** and the locking unit **18** from FIG. **3** are shown in detail. The climb-over apparatus **15** is designed in the form of a ladder and has the fastening unit **21** at one end for pivotable fastening to the access unit **4**. The fastening unit **21** here has a plate **21a**, which is permanently connected to the ladder, for example screwed, welded, riveted, etc. On the upper surface of the plate **21a** facing away from the ladder, two eyelets **21b** are arranged, which are provided for pivotable fastening to the transverse beam **30**, which is formed as a tube, of the lowest step **12**, as has already been explained with reference to FIG. **4**. The eyelets **21b** can be fastened, for example, in that the ends of the eyelets **21b** are passed through suitable openings in the plate **21a** and, for example, are screwed to the lower surface of the plate **21a** facing the ladder. This provides a simple way of assembling the

climb-over apparatus 15 by first arranging the eyelets 21b on the transverse beam 30 and then guiding the ends of the eyelets through the openings in the plate 21a and screwing them thereto. Of course, this specific embodiment of the fastening unit 21 is only to be understood as an example and other fastening options would also be conceivable, for example a fastening unit 21 in the form of a plate, similar to that shown in the first embodiment. The fastening unit 21 could, for example, also have only two bolts or screws on the side of the climb-over apparatus 15, via which the climb-over apparatus 15 is connected in an articulated manner to the access unit 4.

[0052] On the lower surface of the plate 21a (opposite the eyelets 21b) a first lever element 24a is provided as part of the actuating unit 19. The first lever element 24a interacts with the locking unit 18 via an actuating means 31 such as a cable pull or a flexible shaft in order to actuate the locking unit 18 to release the locking of the climb-over apparatus 15. The locking unit 18 is arranged on the access unit 4 (see FIG. 3) and has a locking element 18a which can be pivoted relative to the access unit 4 in order to release the locking of the climb-over apparatus 15. The locking element 18a can be directly articulated on the access unit 4 or a part thereof (e.g. a transverse beam 30) or, as shown, on a suitable support element 32, which in turn is firmly connected to the access unit 4. The locking element 18a has an opening 33 which, in the rest position RP, engages with the climb-over apparatus 15 in order to lock the climb-over apparatus 15 on the access unit 4. In the case of a ladder, for example, a rung 16 of the ladder can be brought into engagement with the opening 33.

[0053] To release the lock, the locking unit 18 can be actuated from the cable car 7 via the first lever element 24a. As a result, the locking element 18a is pivoted by means of the actuating means 31 from a locking position VP into a release position LP, whereby the climb-over apparatus 15 is released and can be moved from the rest position RP into the standby position BP. Here the axis of rotation of the locking element 18a runs in the transverse direction, essentially parallel to the transverse beams 30. The movement preferably takes place automatically by gravity, wherein the movement can possibly be braked by an optional braking device.

[0054] The locking unit 18 preferably has at least one suitable preloading element 26 (not shown) in order to preload the locking element 18a into the locking position VP. A suitable mechanical spring is preferably used as the preloading element 26. For example, a torsion spring can be provided in the axis of rotation of the locking element 18a. In addition, in the example shown, it can be advantageous if the first lever element 24a also has a suitable preloading element 26 in order to enable the first lever element 24a, including the actuating means 31, to be returned to the starting position. If the preloading force is sufficiently large, the resetting of the first lever element 24a and of the actuating means 31 can, for example, also take place only by the preloading element 26, in particular the spring on the locking element 18a. In the case of an electrically actuatable locking unit 18, instead of the lever element 24a, for example, a switch could be provided or the switch could be actuatable by means of the lever element 24a. The switch could then be connected to the locking unit 18, for example via an electrical line.

[0055] The movement of the climb-over apparatus 15 from the standby position BP (FIG. 4) into the rest position

RP is preferably carried out manually, wherein suitable aids such as a cable pull, one or more straps, handles, etc. can be provided if necessary. In order to enable the climb-over apparatus 15 to be easily moved back and locked in the rest position RP, the locking element 18a in the example shown has a wedge-shaped section to form an inclined surface 34. When the climb-over apparatus 15 is moved back from the standby position BP into the rest position RP, the climb-over apparatus 15, in this case the last rung 16 of the ladder, comes into contact with the inclined surface 34 of the locking element 18a (located in the locking position VP). Due to the known wedge effect, the locking element 18a is partially pivoted by the rung 16 in the direction of the release position LP until the rung 16 comes into engagement with the opening 33. The locking element 18a is moved back into the locking position VP by the preloading element 26 (such as a torsion spring in the axis of rotation of the locking element 18a), whereby the climb-over apparatus 15 is locked.

[0056] As already shown with reference to the first embodiment, one or more limiting elements 28 (not shown) can also be provided on the climb-over apparatus 15 and/or the access unit 4 in order to limit a movement of the climb-over apparatus 15 beyond the rest position RP. In addition, in this way a given play between the rung 16 and the opening 33 can be minimized in order to reduce any rattling noises due to the movement of the climb-over apparatus 15 within the opening 33. Of course, a sensor element 29 can also be provided in the second exemplary embodiment in order to detect the position of the climb-over apparatus 15. The function is analogous to that of the first exemplary embodiment, and for this reason it will not be discussed in more detail at this point.

[0057] FIG. 5b shows an alternative embodiment of a locking unit 18. The locking unit has a support element 32 which is fastened to the access unit 4 (not shown). Two locking units 18a are provided on the support element 32, which are designed essentially analogously to FIG. 5a. In contrast to the embodiment according to FIG. 5a, the two locking elements 18a in FIG. 5b, which extend essentially parallel to the longitudinal beam 11 of the access unit 4 and not in the transverse direction as before in FIG. 5a, can each be pivoted about an axis of rotation. The locking elements 18a each have an opening 33 which can be brought into engagement with the climb-over apparatus 15 in order to lock the climb-over apparatus 15 in the rest position RP on the access unit 4. However, the openings 33 interact here with the longitudinal members 15a of the climb-over apparatus 15, which is designed as a ladder, and not, as before, with a rung 16 of the ladder. However, the function with regard to the actuation by means of an actuating element 19 (not shown) does not differ from the variant according to FIG. 5a, which is why it is not discussed in further detail. As a result of the double locking, the stability of the climb-over apparatus 15 in the rest position RP can be improved.

[0058] According to a further embodiment (not shown), the climb-over apparatus 15, preferably in the form of a ladder, is arranged laterally on the outside of the railing 13 in the rest position RP, i.e. on the side of the railing 13 that faces away from the steps 12. The fastening unit 21 is, for example, a plate which is fastened pivotably to the access unit 4, wherein the pivot axis runs in the transverse direction, for example parallel to the transverse beams 30. The climb-over apparatus 15 can be moved relative to the fastening unit

21, for example within a suitable recess in the fastening unit **21**. Thus the climb-over apparatus **15** can be moved back and forth within the recess in the fastening unit **21** between two positions in which the two axial ends of the climb-over apparatus **15** bear against the fastening unit **21**. Advantageously, a guide unit is additionally provided on the railing **1** in order to hold the climb-over apparatus **15** securely on the railing **13** in the rest position.

[0059] In order to move into the standby position BP, the climb-over apparatus **15**, starting from the rest position RP, can first be moved, in particular displaced, relative to the railing **13** and essentially parallel to the railing **13**. In this case the climb-over apparatus **15** is also displaced relative to the fastening unit **21**, for example within the recess. The displacement takes place until the first axial end of the climb-over apparatus **15** facing away from the fastening unit **21** in the rest position RP has reached the fastening unit **21** and is preferably in contact therewith. The fastening unit **21** is then pivoted, as a result of which the standby position BP is reached.

[0060] Finally, it should be noted again that the described embodiments are only to be understood as examples and are not restrictive. In addition to the embodiments shown, further variants would of course also be conceivable, which are at the discretion of the person skilled in the art. For example, the person skilled in the art can adapt the present teaching to the specific conditions of a cableway, for example to different forms of access units.

1. Cableway support (1) of a cableway (2) with an access unit (4) for people to climb over, characterized in that a climb-over apparatus (15) is provided on the cableway support (1) for people to climb over from a cable car (7) of the cableway (2) to the access unit (4) or vice versa, wherein the climb-over apparatus (15) is arranged on the cableway support (1) by means of a fastening unit (21) so as to be movable relative to the access unit (4), wherein the climb-over apparatus (15) can be moved relative to the access unit (4) from a rest position (RP) in which the climb-over apparatus (15) is stowed on the access unit (4) into a standby position (BP) which is provided for performing the climb-over.

2. The cableway support (1) according to claim 1, characterized in that a locking unit (18) for locking the climb-over apparatus (15) in the rest position (RP) is provided on the cableway support (1).

3. The cableway support (1) according to claim 2, characterized in that the locking unit (18) can be actuated mechanically, hydraulically or electrically.

4. The cableway support (1) according to claim 2 or 3, characterized in that an actuating unit (19) for actuating the locking unit (18) is provided on the cableway support (1) in order to release the locking of the climb-over apparatus (15) in the rest position (RP), in order to move the climb-over apparatus (15) from the rest position (RP) into the standby position (BP).

5. The cableway support (1) according to claim 4, characterized in that the actuating unit (19) has at least one first lever element (24a) in order to actuate the locking unit (18) from a cable car (7), wherein the actuating unit (19) preferably has a second lever element (24b) in order to actuate the locking unit (18) from the access unit (4).

6. The cableway support (1) according to claim 4 or 5, characterized in that the actuating unit (19) has an actuating means (31) in the form of a cable pull or a flexible shaft.

7. The cableway support (1) according to any of claims 1 to 6, characterized in that the climb-over apparatus (15) has a braking device in order to brake a movement of the climb-over apparatus (15) from the rest position (RP) into the standby position (BP) caused by gravity, wherein the braking device is preferably mechanical, hydraulic or pneumatic.

8. The cableway support (1) according to any of claims 1 to 7, characterized in that the cableway support (1) has at least one sensor element (29) which is provided to detect a position of the climb-over apparatus (15), in particular to detect whether the climb-over apparatus (15) is in the rest position (RP), wherein the sensor element (29) generates a sensor value that can be transmitted to a system control unit of the cableway (2).

9. The cableway support (1) according to claim 8, characterized in that the sensor element (29) is provided to detect a locked state of the locking unit (18), in particular whether the climb-over apparatus (15) is locked in the rest position (RP) by means of the locking unit (18).

10. The cableway support (1) according to any of claims 1 to 9, characterized in that the climb-over apparatus (15) has at least one step element and/or holding element (16) for a person to step on and/or to hold onto.

11. The cableway support (1) according to any of claims 1 to 10, characterized in that a length of the climb-over apparatus (15) can be changed in order to adapt the length of the climb-over apparatus (15) to a variable distance between the access unit (4) and the cable car (7).

12. The cableway support (1) according to any of claims 10 to 11, characterized in that the climb-over apparatus (15) is designed as a ladder, preferably as a telescopic ladder, wherein the at least one step element and/or holding element (16) is a rung of the ladder.

13. The cableway support (1) according to any of claims 1 to 12, characterized in that a railing (13) is provided on the access unit (4) and that the climb-over apparatus (15) forms part of the railing (13) in the rest position (RP).

14. A cableway (2) with a number of cableway supports (1) for guiding a conveyor cable of the cableway (2) and with at least one cable car (7) arranged on the conveyor cable, characterized in that a climb-over apparatus (15) according to any of claims 1 to 13 is provided on at least one cableway support (1).

15. The cableway (2) according to claim 14, characterized in that the cableway (2) has a system control unit for controlling the cableway (2), wherein the system control unit is configured to process the sensor value of the sensor element (29) in order to switch off the cableway (2) or to generate a warning signal via a signaling device when the sensor element (29) detects a position of the climb-over apparatus (15) which deviates from the rest position (RP) and/or when the sensor element (29) detects an unlocked state of the climb-over apparatus (15) in the locking unit (18).

16. A method for performing a climb-over from a cable car (7) of a cableway (2) according to claim 14 or 15 to an access unit (4) of a cableway support (1) of the cableway (2) or vice versa, characterized in that the cable car (7) is moved into a climb-over position, that from the cable car (7) or from the access unit (4) the climb-over apparatus (15) of the cableway support (1) is moved from the rest position (RP) into the standby position (BP), that a person climbs over from the cable car (7) via the climb-over apparatus (15) to

the access unit (4) or vice versa, and that from the access unit (4) or from the cable car (7) the climb-over apparatus (15) is preferably moved from the standby position (BP) back into the rest position (RP) after the climb-over.

* * * * *