



(22) Date de dépôt/Filing Date: 2010/09/10

(41) Mise à la disp. pub./Open to Public Insp.: 2011/03/24

(45) Date de délivrance/Issue Date: 2015/02/24

(30) Priorité/Priority: 2009/09/24 (AT A 1503/2009)

(51) Cl.Int./Int.Cl. *B61B 12/02* (2006.01),  
*B61B 3/00* (2006.01), *E01B 29/32* (2006.01)

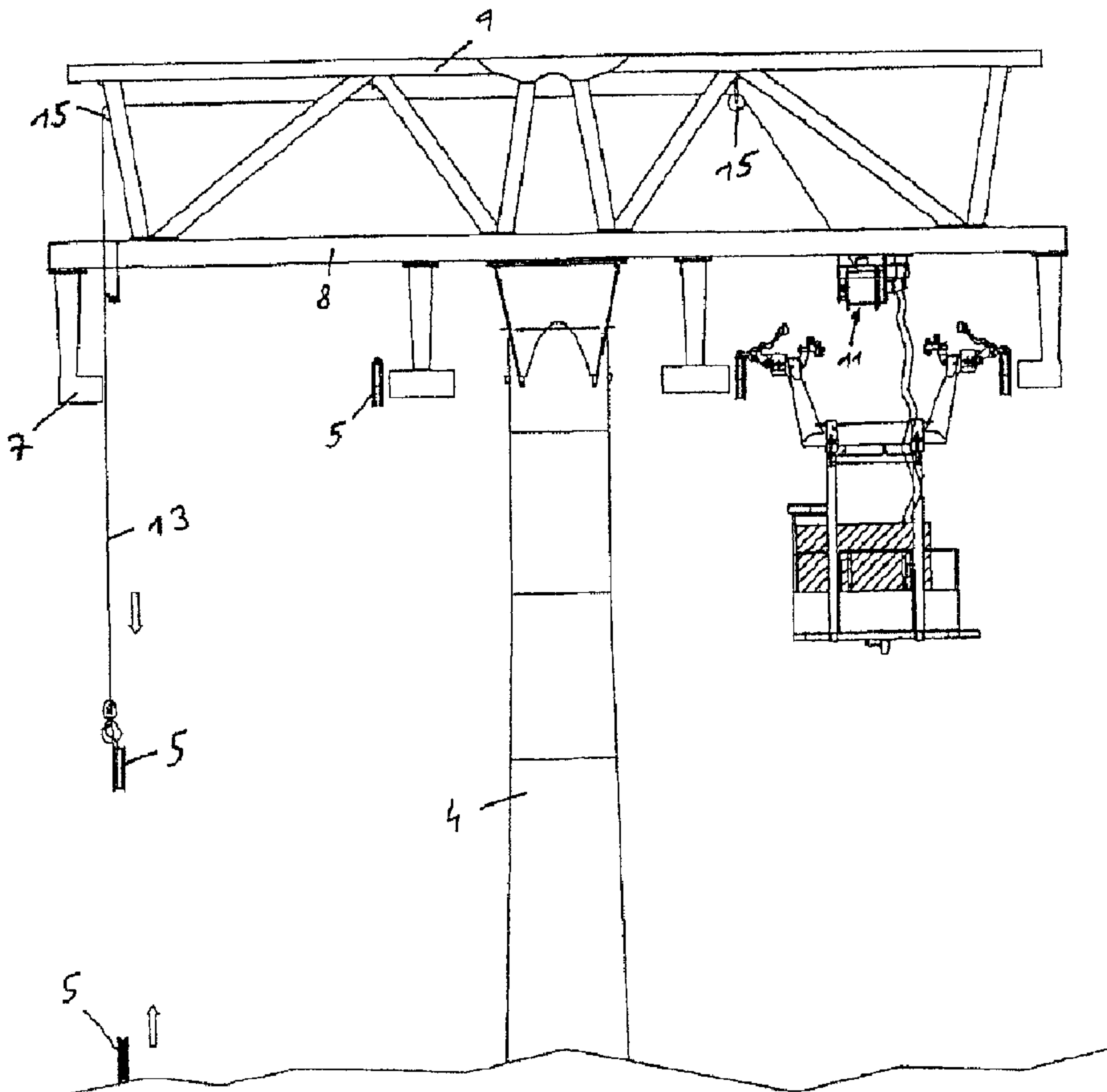
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(54) Titre : METHODE ET SYSTEME D'ECHANGE DE SERIE DE ROULEMENTS

(54) Title: METHOD AND DEVICE FOR EXCHANGING ROLLER BATTERIES



(57) Abrégé/Abstract:

A method for exchanging roller batteries on supports of a cableway installation wherein a service vehicle is driven towards the support on a cable of the cableway installation, a cable which runs on the roller battery is lifted from the roller battery, the roller



(57) **Abrégé(suite)/Abstract(continued):**

battery is then dismounted and a new roller battery installed, and the cable is re-laid on the roller battery. During exchange of the roller battery, the service vehicle is located on the opposite side of the support. This method avoids the need for service personnel to perform service or maintenance on the roller battery while it is on the support. A device for exchanging a roller battery includes a service vehicle comprising a winch with at least one winch cable for lowering the roller battery to the ground and picking up a new roller battery from the ground.

## ABSTRACT

A method for exchanging roller batteries on supports of a cableway installation wherein a service vehicle is driven towards the support on a cable of the cableway installation, a cable which runs on the roller battery is lifted from the roller battery, the roller battery is then dismounted and a new roller battery installed, and the cable is re-laid on the roller battery. During exchange of the roller battery, the service vehicle is located on the opposite side of the support. This method avoids the need for service personnel to perform service or maintenance on the roller battery while it is on the support. A device for exchanging a roller battery includes a service vehicle comprising a winch with at least one winch cable for lowering the roller battery to the ground and picking up a new roller battery from the ground.

## METHOD AND DEVICE FOR EXCHANGING ROLLER BATTERIES

The invention refers to a method for exchanging roller batteries on supports of cableway installations, and also to a device for exchanging roller batteries on supports of cableways with a service vehicle which can travel on the cable of the cableway.

Roller batteries on supports of cableway installations require a regular servicing or maintenance. To date, this has been carried out directly on the support by service personnel. This, however, brings disadvantages along with it, since the working conditions on the support are not optimum.

The invention is therefore based on the object of simplifying the servicing and maintenance of roller batteries.

This object is achieved with a method for exchanging roller batteries on supports of cableway installations, characterized in that a service vehicle is driven towards the support, in that a cable which runs on the roller battery is lifted from the roller battery, in that the roller battery is then dismounted and a new roller battery installed, and in that finally the cable is re-laid on the roller battery. The invention is also achieved with a device for exchanging roller batteries on supports of cableways with a service vehicle which can travel on the cable of the cableway, characterized by a winch with at least one winch cable with which a roller battery which is to be exchanged, after it has been dismounted, can be lowered to the ground and a new roller battery can be picked up from the ground while the service vehicle is located in the region of the support.

With the invention, the roller battery is not serviced on the support, rather the complete roller battery is replaced by a new or serviced roller battery. This is carried out by a new or serviced roller battery first being made available on the ground beneath the support, then by the cable being lifted from the existing roller battery, after which the roller battery can be dismounted and by means of the winch lowered to the ground, the new or serviced roller battery can be hoisted up and reinstalled, and finally the cable can be re-laid upon the roller battery. The old roller battery, preferably by means of the service vehicle, can be brought to a station or to another point of the cableway where it can be loaded onto a lorry. The servicing can then be carried out in a factory building under ideal conditions.



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Two embodiments are basically conceivable with the invention. In the case of a first embodiment, the service vehicle, during the exchanging of the roller battery, is located on the opposite side of the support and in a known manner per se is supported on the roller battery, or roller batteries, which is or are located there. The winch in this case is also located on the side opposite the roller battery which is to be exchanged.

In a second embodiment, the service vehicle is lifted from the cable and is fastened directly on the support before exchanging the roller battery. In the case of this embodiment, the service vehicle can also be located on the side of the support on which the roller battery which is to be exchanged is located since the service vehicle, if necessary with the cable on which the service vehicle is fastened, can be lifted from the roller battery, as a result of which the roller battery can be exchanged. Theoretically, the service vehicle could be lifted from the roller battery, or roller batteries, and fastened on the support in the case of the first embodiment also.

The winch can be fastened on the service vehicle while the roller batteries are being installed and dismounted. A more stable and therefore more reliable embodiment of the invention, however, is characterized in that the roller batteries, by means of a winch cable which is driven by a winch which is arranged on the support, are lowered to the ground and picked up from this. The advantage of the last-named embodiment is that the winch can be fastened more stably on the support than on the service vehicle. If, however, the service vehicle itself is fastened on the support, this disadvantage has little or no effect at all.

In the event that the winch is fastened on the support, this can be carried out in a simple manner by the winch being hoisted up on the support by the winch cable which is fastened on the support, especially on the yoke of the support, and being fastened on the support, especially on the yoke of the support, before installing or dismounting a roller battery.

In a preferred embodiment of the invention, the winch cable is deflected via at least one deflection roller which is arranged on the support, especially on the yoke of the support. This deflection roller is ideally arranged above the roller battery which is to be exchanged so that the roller battery can be installed and dismounted without disturbing lateral forces while it hangs on the winch cable.

The winch cable in the invention, however, can be used not only for hoisting up and lowering the roller batteries and for supporting the roller batteries when being installed and dismounted, but also for lifting the cable from the roller battery which is to be exchanged before this is exchanged and then re-laying it upon the new roller battery.

Furthermore, the winch can be used for bringing a new roller battery to a support on which a roller battery is to be exchanged and for transporting away the exchanged roller battery.

In the case in which the service vehicle is located on the opposite side of the support during exchange of the roller battery, this can be carried out so that a new roller battery can first of all be brought by the service vehicle beneath a roller battery which is to be exchanged and deposited on the ground, so that the service vehicle is then driven to the other side of the support and the roller battery then exchanged, and so that finally the service vehicle is driven back again to the side of the exchanged roller battery and the exchanged roller battery is picked up and transported away.

In order to achieve higher stability during the handling of the roller battery, it is preferred in the invention if two cable drums for winch cables are arranged on the winch and if the cable drums and the winch cables, as seen in the longitudinal direction of the cables, are arranged next to each and at a distance from each other.

Further features and advantages of the invention result from the subsequent description of preferred embodiments of the invention with reference to the attached drawings. In the



drawing:

- Fig. 1 shows in side view, without a support, a first embodiment of the invention with two haulage and load carrying cables during the transporting of a roller battery,
- Fig. 2 shows a view of the arrangement from Fig. 1 from the left with a part of a yoke of a support,
- Fig. 3 shows a side view of the arrangement with a support while a winch is being hoisted up by a service vehicle,
- Fig. 4 shows a view of the arrangement from Fig. 3 from the left,
- Fig. 5 shows a side view of the arrangement while a cable is being lifted from a roller battery,
- Fig. 6 shows a view of the arrangement from Fig. 5 from the left,
- Fig. 7 shows a side view of the arrangement while a roller battery is being lowered from the support,
- Fig. 8 shows a view of the arrangement from Fig. 7 from the left,
- Fig. 9 shows a side view of a second embodiment of the invention with a haulage and load carrying cable while a roller battery is being lowered from the support, and
- Fig. 10 shows a side view of the arrangement from Fig. 9 from the left.

In Figs. 1 to 8, a first embodiment of the invention is shown, in which a service vehicle 1 is connected via releasable clamps 2 to two synchronously running cables 3 and by means of which, via supports 4, the service vehicle can be conveyed from one cableway station to another cableway station. The cables 3 run over roller batteries 5 on which a plurality of rollers 6 are rotatably mounted in a known manner per se. The roller batteries 5 are suspended via struts 7 from a yoke 8 of the supports 4. In the exemplary embodiment which is shown, the yoke 8 comprises an upper boom 9 and a lower boom 10, wherein the struts are fastened on the lower boom 10.

On the service vehicle 1, a winch 11 with two cable drums 12 is arranged, on which a winch cable 13 can be wound on and wound off in each case. The service vehicle 1 has a frame 14 on which the winch 11 is detachably fastened.

Shown in Figs. 1 and 2 is how the winch 11 with the winch cables 13 is used to transport a new or serviced roller battery 5 (represented by checkered rollers 6) beneath a roller battery 5 which is to be exchanged and installed on a strut 7. If the service vehicle with the new roller battery 5 is located in the region beneath the yoke 8, the new roller battery 5 is deposited on the ground and the service vehicle 1 is driven in a known manner to the opposite side of the support 4. This situation is shown in Figs. 3 and 4.

The two winch cables 13 are now attached on the upper boom 9 of the yoke 8 on suitable holders, for example iron rings 17 which are welded or screwed on the upper boom 9, after

which the winch 11 can be released from the frame 14 and hoisted up to the lower boom 10. The winch 12 is then stably fastened on the lower boom 10.

The two winch cables 13 are subsequently laid over deflection rollers 15 which are mounted on the upper boom 9. Ideally, a deflection roller 15, or at least a mounting on which a deflection roller 15 can be fastened in a simple manner, is located over each roller battery 5 of a support. By means of the winch cables 13, the cable 3, which lies upon the roller battery 5 which is to be exchanged, can be lifted up and laid in a holder 16 in which it stays until the roller battery 5 has been exchanged. This situation is shown in Figs. 5 and 6.

The two cable winches 13 are then fastened on the roller battery 5 which is to be exchanged, for example hooked on, and the winch cables 13 are tensioned to the extent that the roller battery 5 can be dismounted from the strut 7 and lowered to the ground, as is shown in Figs. 7 and 8.

After the old roller battery 5 has been deposited on the ground and the new roller battery 5 hoisted up and installed on the strut 7, the cable 3 can be re-laid on the new roller battery 5 by means of the winch cables 13.

After the winch cables 13 have been re-attached in the iron rings 17, the winch 11 can be lowered again to the service vehicle 1 and fastened on this. The exchange of a roller battery 5 is now completely finished and the old roller battery 5 can be transported away by the service vehicle 1, in the same way as described in conjunction with Figs. 1 and 2.

In Figs. 9 and 10, an embodiment of the invention is shown which is very similar to the embodiment according to Figs. 1 to 8. The difference is simply that there is only a single encompassing cable 3 and not two parallel or synchronously encompassing cables 3 or cable loops and that the roller batteries 5 are not fastened on supports 7 but directly on the lower boom 10 of the support 4. The situation which is shown in Figs. 9 and 10 essentially corresponds to the situation which is shown in Figs. 7 and 8, wherein the procedure when exchanging the roller battery and the remaining constructional details are kept largely the same.

The procedure and also the construction of the device according to the invention which are represented in conjunction with Figs. 1 to 10 are characterized in that the service vehicle 1 and the winch 11 are arranged on the side of the support 4 which lies opposite the roller battery 5 which is to be exchanged. Also conceivable is an embodiment which is not shown in the drawings, in which the service vehicle 1 and the winch 11 are located on the same side of the support as the roller battery 5 which is to be exchanged, and therefore in the immediate vicinity of the roller battery 5 which is to be exchanged. The advantage of this embodiment is that the installing and dismounting of the roller battery 5 can be carried out from the service vehicle 1.



Since the cable 3 has to be lifted from the roller battery 5 which is to be exchanged, it is provided in the case of this embodiment that the service vehicle 1, if necessary with the cable 3 which is fastened thereupon via the coupling 2 (with both cables 3 in the case of two synchronously running cables 3), is lifted from the roller battery 5, or from the two roller batteries. This can be carried out for example again by means of the winch 11 with which in this case not only the winch 11 is hoisted up to the yoke 8 or lower boom 10 but also the service vehicle 1 which is connected to it and then fastened on the yoke 8 or on the lower boom 10. The rest of the procedure for installing and dismounting the roller battery 5 can take place as described earlier in conjunction with Figs. 1 to 8.

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Claims:

1. A method for exchanging a roller battery on a support of a cableway installation, wherein:
  - a service vehicle is driven towards the support on a cable of the cableway installation,
  - a cable which runs on the roller battery is lifted from the roller battery,
  - the roller battery is then dismounted and a new roller battery installed, and
  - the cable is re-laid on the roller battery,
  - wherein, during exchange of the roller battery, the service vehicle is located on the opposite side of the support.
2. The method as claimed in claim 1 wherein, during exchange of the roller battery, the service vehicle is supported on the roller battery, or roller batteries, which is or are located on the opposite side of the support.
3. The method as claimed in claim 1 or 2, wherein the roller batteries, by means of at least one winch cable which is driven by a winch which is arranged on the service vehicle, are lowered to the ground and picked up from this.
4. The method as claimed in claim 1 or 2, wherein the roller batteries, by means of a winch cable which is driven by a winch which is arranged on the support, are lowered to the ground and picked up from this.
5. The method as claimed in claim 3 or 4, wherein the winch cable is deflected via at least one deflection roller which is arranged on the support, especially on a yoke of the support.
6. The method as claimed in any one of claims 3 to 5, wherein the roller battery is supported by the winch cable while being dismounted.

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7. The method as claimed in any one of claims 3 to 6, wherein the cable is first lifted from the roller battery and laid in a holder by the winch cable, and the roller battery is then supported while being dismounted.

8. The method as claimed in any one of claims 4 to 7, wherein the winch is attached on the support before being used for lifting off and laying down the cable and/or for lowering and hoisting up the roller battery.

9. The method as claimed in claim 1 wherein, during exchange of the roller battery, the service vehicle is lifted from the roller battery, or roller batteries, which is or are located on the opposite side of the support.

10. The method as claimed in any one of claims 1 to 9, wherein a new roller battery is first brought by the service vehicle beneath a roller battery which is to be exchanged and deposited on the ground, wherein the service vehicle is then driven to the other side of the support and the roller battery then exchanged, and wherein the service vehicle is then driven back again to the side of the exchanged roller battery and the exchanged roller battery is picked up and transported away.

11. The method as claimed in any one of claims 1 to 10, wherein the winch, by the winch cable which is fastened on the support, especially on a yoke of the support, is hoisted on the support and fastened on the support, especially on the yoke of the support, before installing and dismounting a roller battery.

12. A device for exchanging a roller battery on a support of a cableway with a service vehicle which can travel on a cable of the cableway, comprising a winch with at least one winch cable with which a roller battery which is to be exchanged, after it has been dismounted, can be lowered to the ground and a new roller battery can be picked up from the ground while the service vehicle is located in the region of the support,



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wherein, during exchange of the roller battery, the service vehicle is located on the opposite side of the support.

13. The device as claimed in claim 12 wherein, during exchange of the roller battery, the service vehicle is supported on the roller battery, or roller batteries, which is or are located on the opposite side of the support.

14. The device as claimed in claim 12 wherein, during exchange of the roller battery, the service vehicle is lifted from the roller battery, or roller batteries, which is or are located on the opposite side of the support.

15. The device as claimed in any one of claims 12 to 14, wherein the winch in the operating state is fastened on the service vehicle.

16. The device as claimed in any one of claims 12 to 14, wherein the winch in the operating state is fastened on the support, especially on a yoke of the support.

17. The device as claimed in any one of claims 12 to 15, wherein the winch can be fastened on the support, especially on a yoke of the support, in the region above the roller battery which is to be exchanged.

18. The device as claimed in any one of claims 12 to 16, wherein the winch can be fastened on the support, especially on a yoke of the support, on the side of the support opposite the roller battery which is to be exchanged.

19. The device as claimed in any one of claims 12 to 18, wherein the winch cable is guided over at least one deflection roller which is arranged on the support, especially on a yoke of the support.

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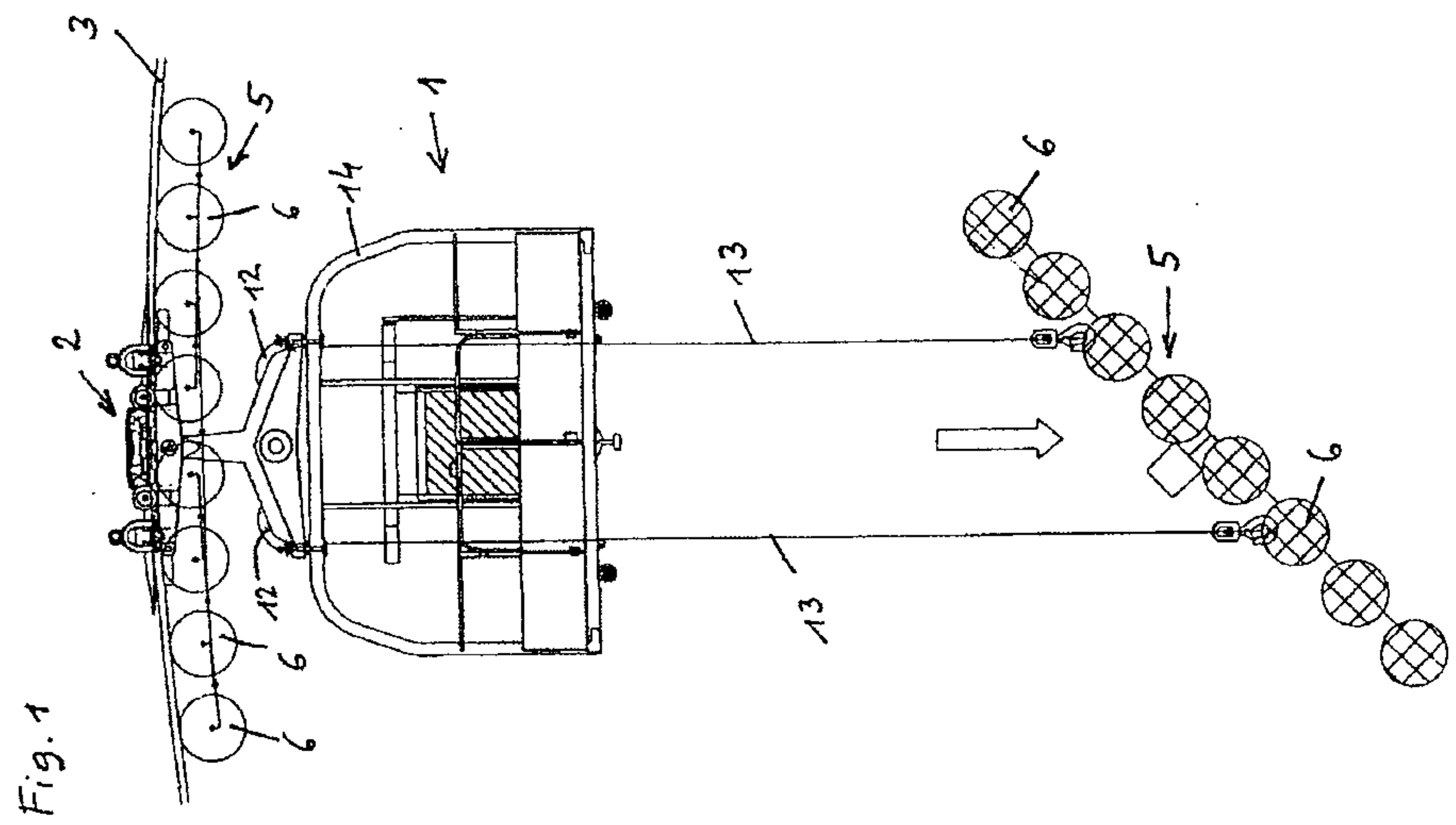
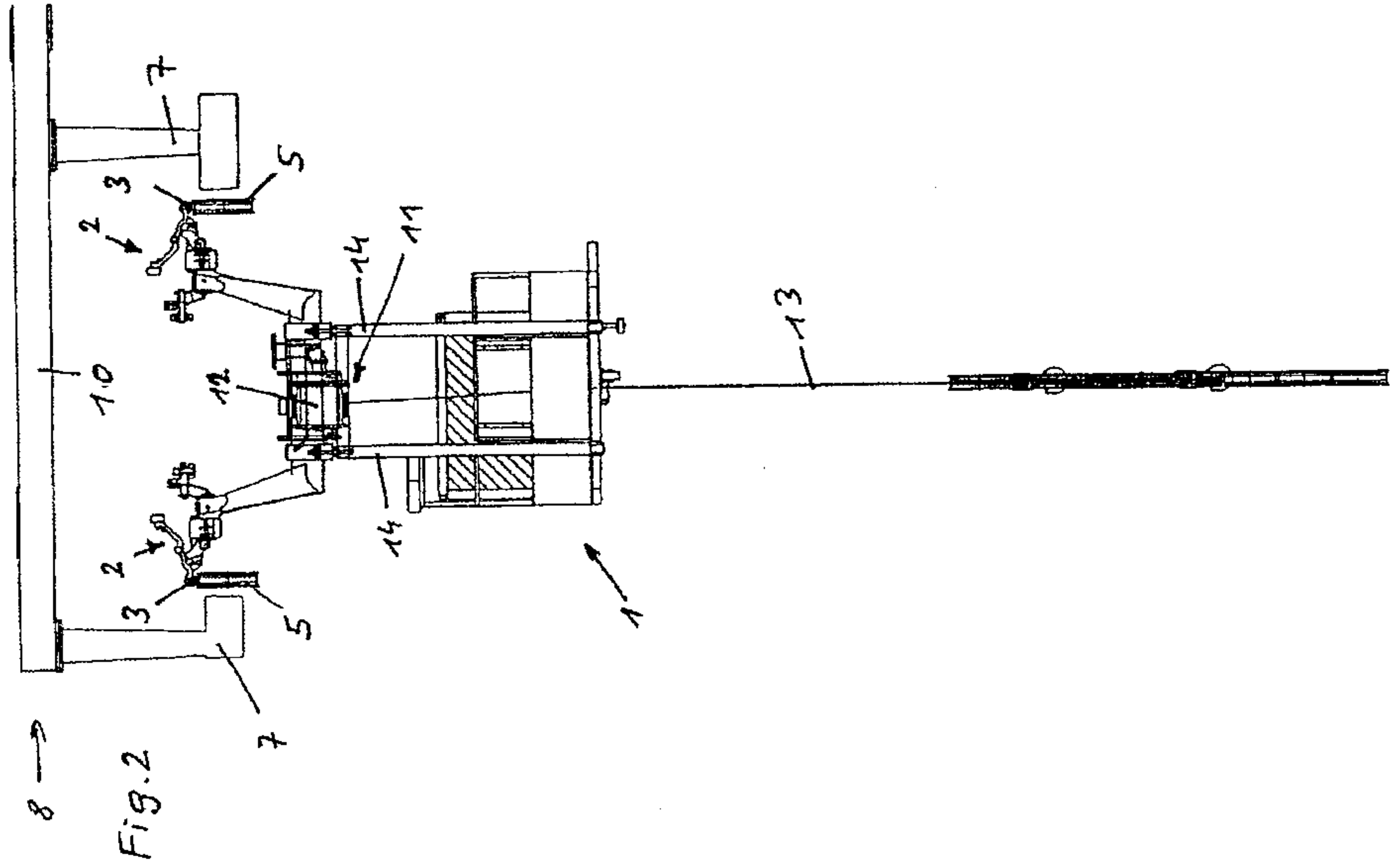
20. The device as claimed in any one of claims 12 to 19, wherein a holder, on which the winch cable can be fastened for hoisting the winch on the support, is arranged on the support, especially on a yoke of the support.

21. The device as claimed in any one of claims 12 to 20, wherein two cable drums for winch cables are arranged on the winch.

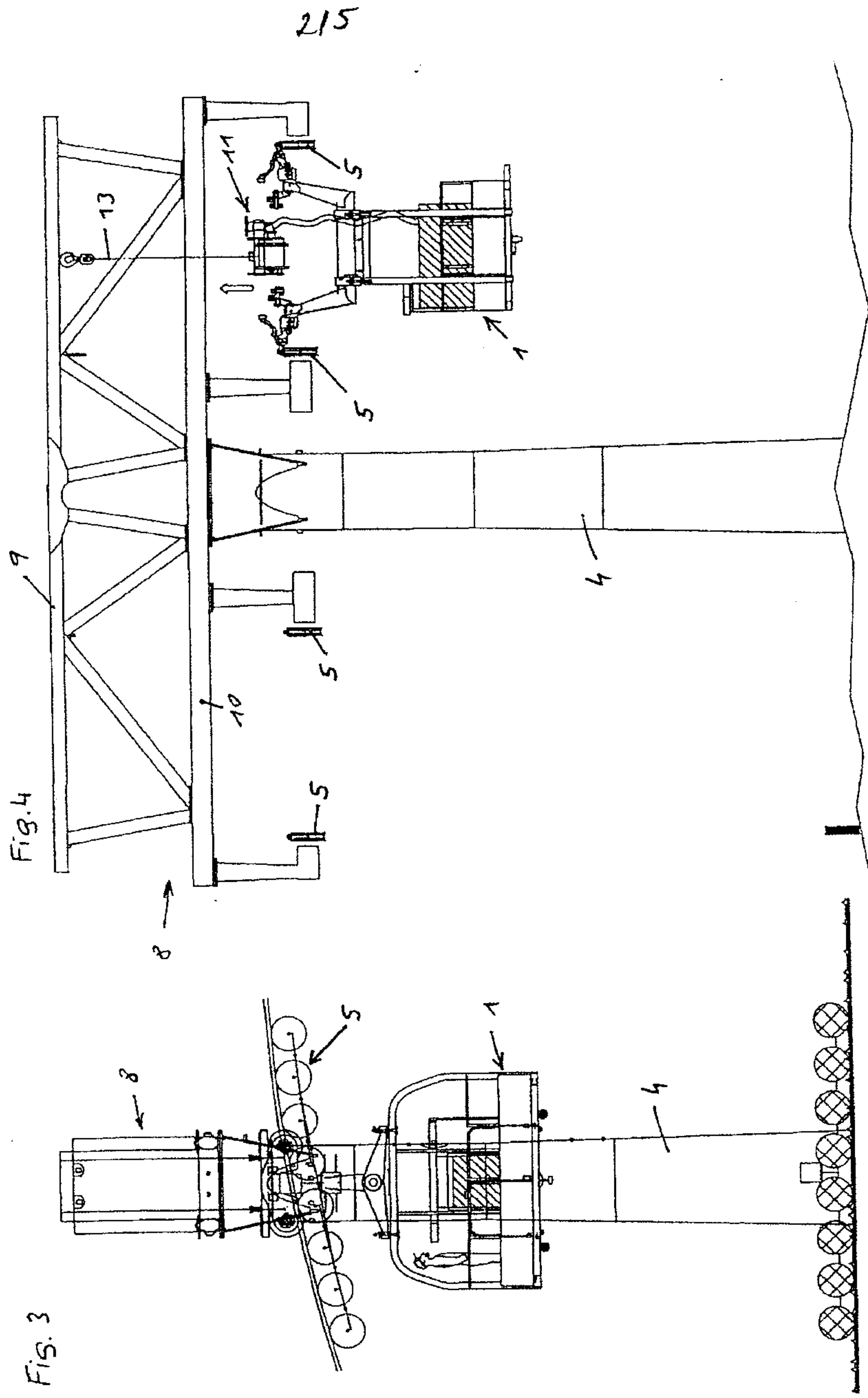
22. The device as claimed in claim 21, wherein the cable drums and the winch cables, as seen in the longitudinal direction of the cable, are arranged next to each other and at a distance from each other.

23. The device as claimed in any one of claims 12 to 22, wherein a holder for the cable is arranged on the support, especially on a yoke of the support, above the roller battery.

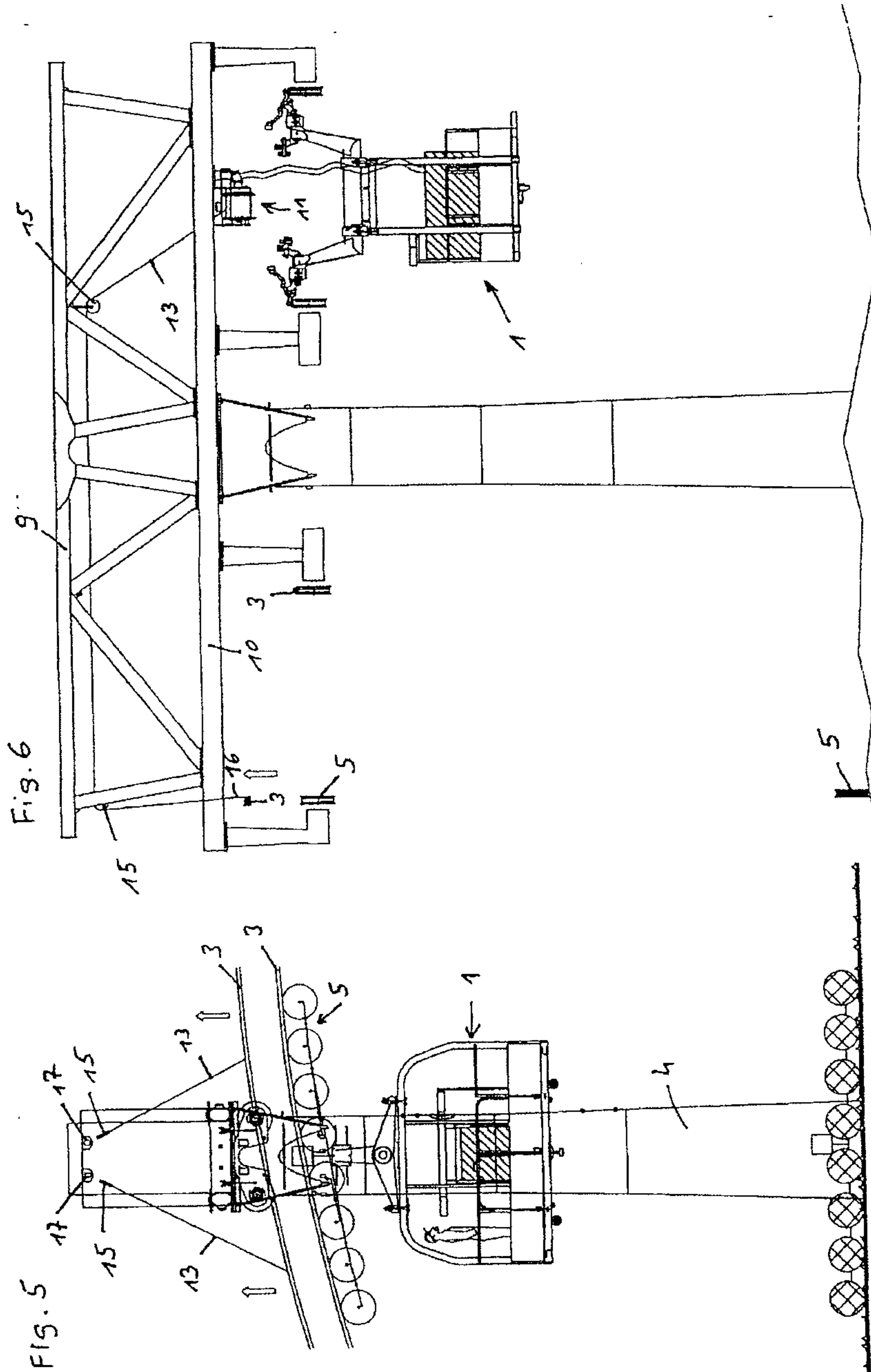
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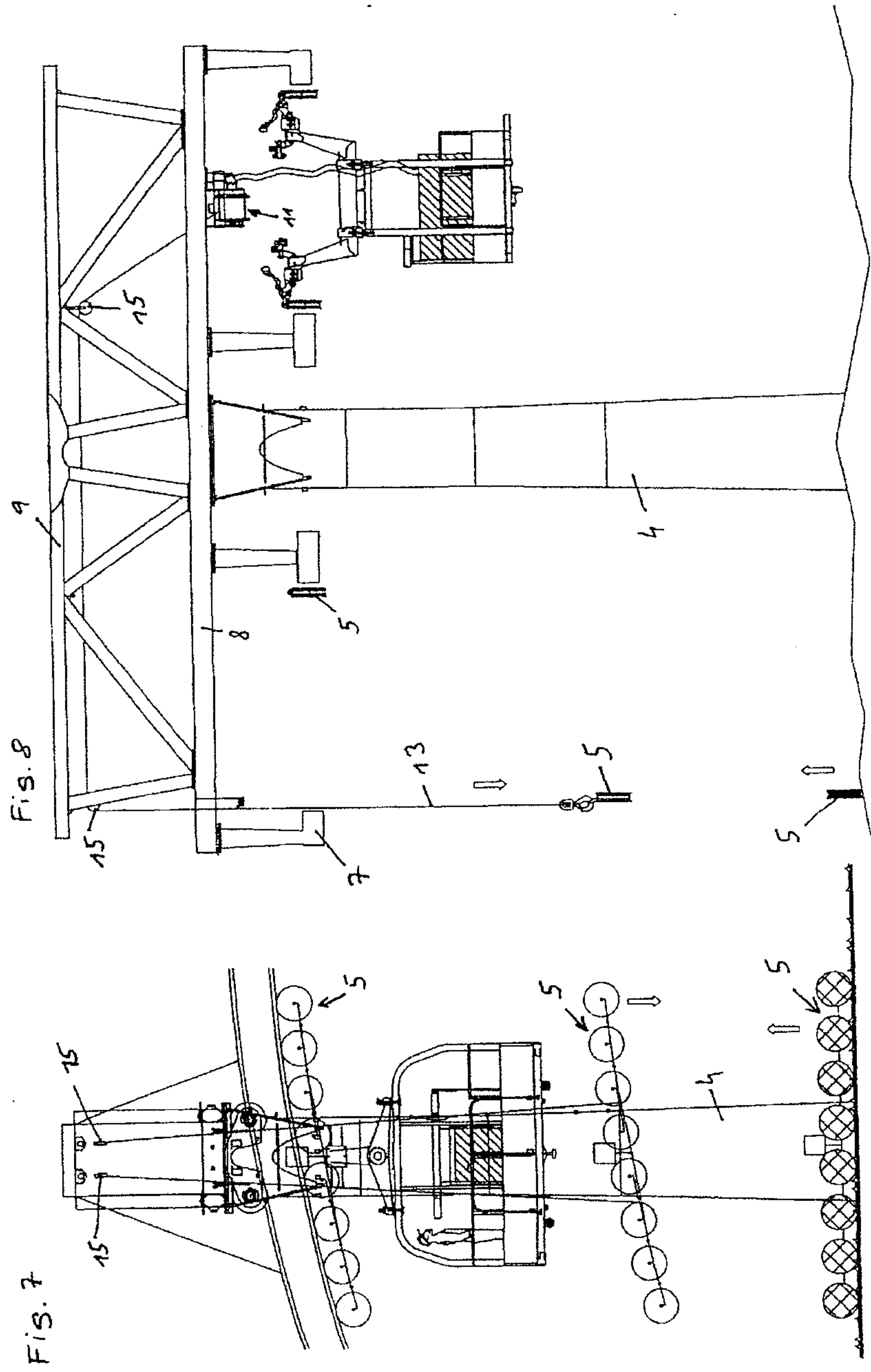




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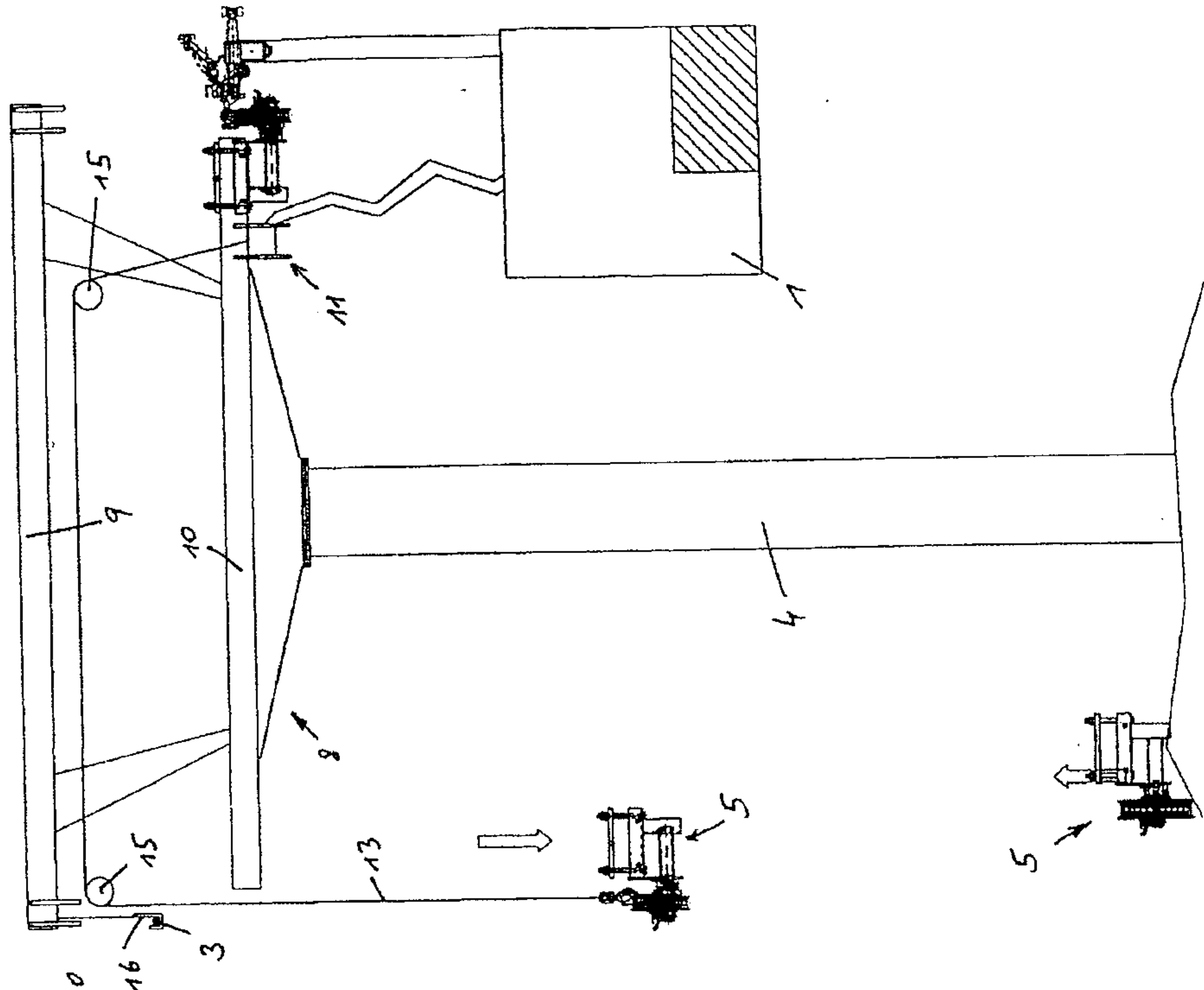


Fig. 10

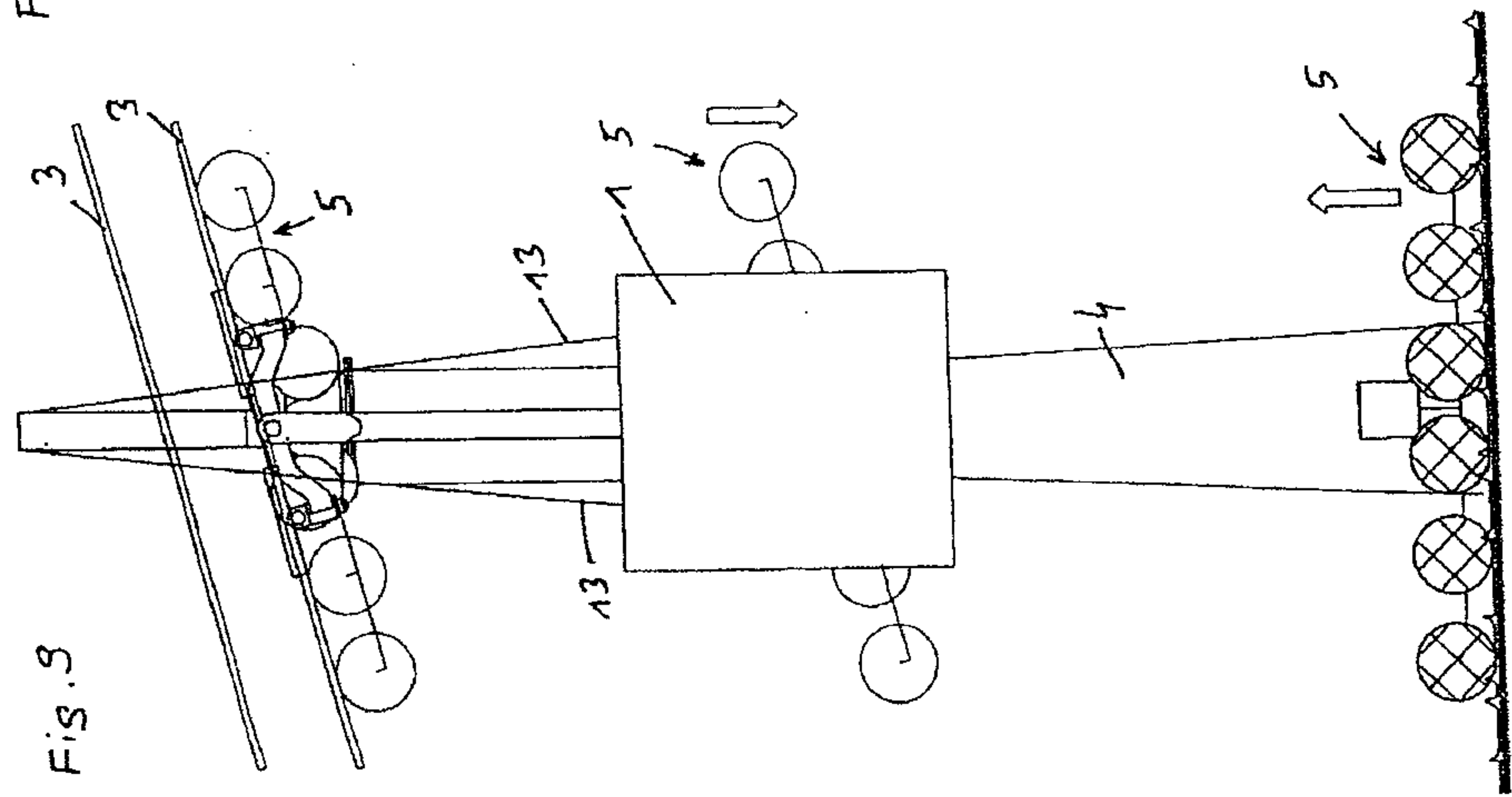


Fig. 9

