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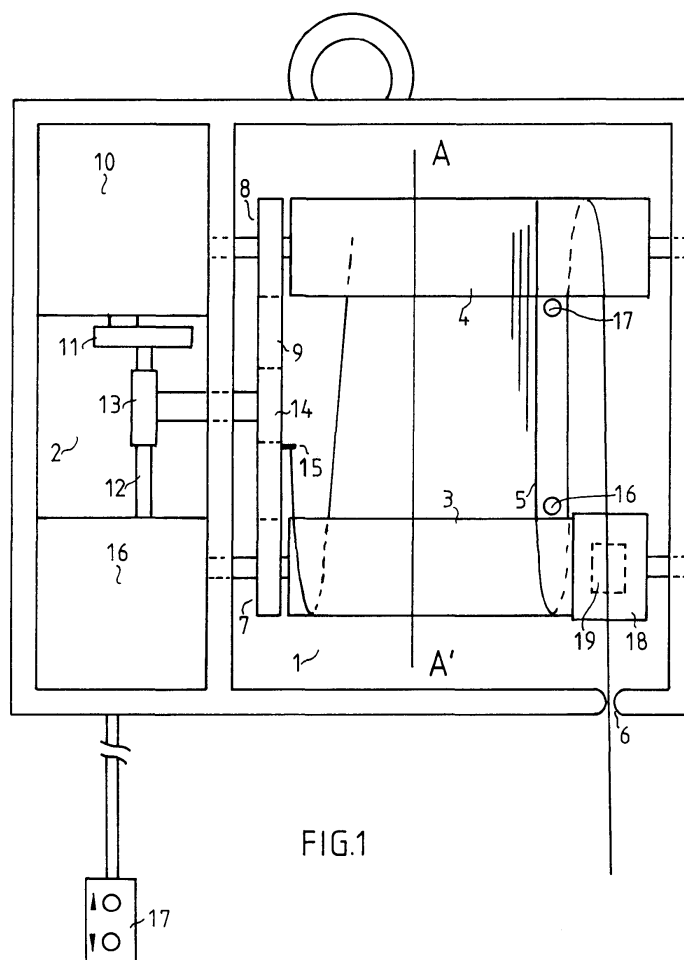
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(54) **Hoisting winch**

(57) Hoisting winch in which a cable or rope (5) is wound up in one layer onto two mutually parallel rolls (3,4) which have a smooth surface. During winding up,

a displacer (16,17) pushes aside the cable or rope, which has been wound up before. The hoisting winch is preferably mounted into a housing, together with an electric motor (10) and a battery (16).



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Description

[0001] The invention relates to a hoisting winch, comprising a combination of at least two mutually at least substantially parallel mounted cylinders, round which combination a cable or rope may be rolled; and drive means and coupling means for operationally rotating the rolls with at least substantially equal peripheral velocities.

[0002] A hoisting winch of this type is known. In the known hoisting winch the cable or rope is transported to a storage drum via a system of grooves made in the rolls, resulting in a force-free storage of the cable or rope. One of the advantages compared with other winches known in the art is that the hoisting takes place with a constant force and a constant speed. The disadvantage of the known type is that it is expensive, because of which it will be bought only by big, professional users.

[0003] The invention aims at realising an affordable hoisting winch, while maintaining the most important advantages, which are hoisting with a constant force and with a constant speed. It is characterized in that the rolls have an at least substantially constant diameter and that between the rolls a displacer is located, for pushing aside the cable or rope during winding-up. Deleting the grooves is a substantial cost saving and cables and ropes with different diameters may be used. A further advantage is that the separate storage drum can be deleted.

[0004] The inventive hoisting winch may be used advantageously as a towing device, like the known hoisting winch, for example for towing vehicles that went off the road back onto the road.

[0005] For the inventive arrangement, it is sufficient to drive at least one roll. A favourable embodiment of the invention, which guarantees a mutual tracking of the rolls, is characterized in that the coupling means comprise gear wheels, mounted to the rolls and a chain or toothed belt.

[0006] A favourable embodiment according to another aspect of the invention is characterized in that a diameter of the gear wheels is selected such that operationally a peripheral velocity of the chain or toothed belt is at least substantially the same as the peripheral velocity of the rolls. It is possible then to connect an end of the cable or rope to the chain or toothed belt, which results in an entirely defined system. Alternatively, one may connect the end with a next winding of the chain or rope.

[0007] A further favourable embodiment which guarantees a fixed working point during a hoisting operation and which moreover optimises the winding-up of the cable or rope, is characterized in that the rolls are mounted in a housing and that the housing is provided with an opening, near a first end of a first roll, for letting in the cable or rope.

[0008] During the unwinding of the cable or rope a sit-

uation may arise in which the tension on the still wound-up part of the cable or rope is insufficient, in which situation looping could occur. A favourable embodiment, which prevents looping, is characterized in that the first end of the first roll has a larger diameter than the other part of the first roll.

[0009] During winding-up, the peripheral velocity of the rolls determines the speed with which the cable or rope is hauled in. The first end of the first roll, having a larger diameter, will introduce additional friction. A favourable embodiment which prevents this from occurring is characterized in that a separate first end of the first roll and the other part of the first roll are coupled with a freewheel clutch. A cheaper alternative is characterized in that the first end of the first roll is covered with a layer of an elastic material, like rubber.

[0010] A still further improved embodiment which guarantees a perfect functioning even when the cable or rope is hauled in substantially without a load being hoisted, such that there is substantially no tensile force is exerted onto the cable or rope, is characterized in that a press-on roll is provided, for pushing the cable or rope against the first end of the first roll or to the separate end of the first roll.

[0011] A further favourable embodiment, which substantially broadens the field of application of the hoisting winch, is characterized in that the drive means comprise an electric motor and a gear box. Especially when combined with a compact, rechargeable battery the inventive hoisting winch then becomes a multi-functional piece of equipment. A further embodiment, which prevents the load from slipping when the supply current fails, is characterized in that the gearbox is of the self-braking type, like a cycloid gearbox. An additional advantage is the compactness of the cycloid gearbox.

[0012] The invention will now be further explained with reference to the following figures, in which:

Fig. 1 represents a possible embodiment of a hoisting winch according to the invention;
 Fig. 2A represents in cross section a possible combination of rolls;
 Fig. 2B represents in cross section a further combination of rolls;
 Fig. 2C represents in cross section a further combination of rolls;
 Fig. 2D represents in cross section a further combination of rolls.

[0013] Fig. 1 represents a possible embodiment of a hoisting winch according to the invention, in which a housing comprises a winch compartment 1 and a drive compartment 2. For clarity reasons, a cover, covering both compartments, has been removed. Winch compartment 1 comprises a first roll 3 and a second roll 4, around which a cable or rope 5 is rolled, which cable or rope leaves the housing via an opening 6. First roll 3 and second roll 4 are coupled by respectively gear

wheels 7 and 8 and by a chain or toothed belt 9, which in turn can be driven by an electric motor 10, which is accommodated in drive compartment 2, via a gear wheel 11, a worm wheel 12, a gear wheel 13, co-operating with worm wheel 12 and a gear wheel 14, co-operating with the chain or toothed belt. An end of cable or rope 5 connected to chain or toothed belt 9 with the aid of a pin 15, such that this end is dragged along and leads cable or rope 5 around rolls 3,4. Once cable or rope 5 has been wound a few times around rolls 3,4, then substantially the entire tensile force on cable or rope 5 is taken by rolls 3,4, which leaves substantially no tensile force to be taken by pin 15. A uniform winding-up of cable or rope 5 is brought about by a displacer, in this embodiment taking the form of two bars 16,17 which are placed vertically in winch compartment 1 and which push cable or rope 5 in a direction of drive compartment 2 during winding-up. Consequently, rolls 3,4 can be substantially completely covered by one layer of cable or rope. The advantage of a single layer is that a constant tensile force and a constant speed is realised and that there is no chance of cable or rope 5 being clamped in a lower situated layer, a problem that is encountered regularly with hoisting winches according to the state of the art.

[0014] In order to maintain a certain tension in winch compartment 1 during an unloaded unwinding of cable or rope 5, for preventing it from getting entangled, an end 18 of roll 3 is covered with a layer of rubber, such that this end has a larger diameter and thus a larger peripheral velocity. In order to push cable or rope 5 against roll 3, the cover, which is not visible in this figure, is provided with a press-on roll 19 which co-operates with end 18. In applications where wear-out of the rubber layer could become a problem, end 18 can be realised as a separate part of the roll, made of metal, having a larger diameter than roll 3 and being coupled to roll 3 via a freewheel clutch, well known in the art, such that during unwinding of cable or rope 5 both parts of the roll are coupled and during hoisting, end 18 spins free.

[0015] Drive compartment 2 further contains a rechargeable battery 16 and connecting means for a control panel 17. Moreover, drive compartment 2 may contain some electronic parts for reasons of safety, for example to prevent cable or rope 5 to become unwound too far or to generate an audible or visible warning signal when the hoisting winch is in use.

[0016] It is possible to combine motor 10 with drive components 11,12,13 by realising the desired reduction with a cycloid gearbox. In such an embodiment, motor 10 and the gearbox may be located between rolls 3,4 which would result in a very compact hoisting winch.

[0017] Fig. 2A shows in a cross section according to line AA' in Fig. 1 a possible combination of rolls, in which both rolls 3,4 have equal, small diameters.

[0018] Fig. 2B shows in a cross section according to line AA' in Fig. 1 a possible combination of rolls, in which both rolls 3,4 have equal, large diameters.

[0019] Fig. 2C shows in a cross section according to line AA' in Fig. 1 a possible combination of rolls, in which combination there is a roll 3 with a large diameter and a roll 4 with a small diameter.

[0020] Fig. 2D shows in a cross section according to line AA' in Fig. 1 a possible combination of rolls, in which there is, apart from the rolls 3,4, a third roll 20.

[0021] The embodiments shown here illustrate that the geometry of the rolls may be chosen substantially free, in order to obtain a technically or aesthetically satisfying design of the hoisting winch.

Claims

1. Hoisting winch, comprising a combination of at least two mutually at least substantially parallel mounted cylinders, round which combination a cable or rope may be rolled; and drive means and coupling means for operationally rotating the rolls with at least substantially equal peripheral velocities, characterized in that the rolls have an at least substantially constant diameter and that between the rolls a displacer is located, for pushing aside the cable or rope during winding-up.
2. Hoisting winch according to claim 1, characterized in that the coupling means comprise gear wheels, mounted to the rolls and a chain or toothed belt.
3. Hoisting winch according to claim 2, characterized in that a diameter of the gear wheels is selected such that operationally a peripheral velocity of the chain or toothed belt is at least substantially the same as the peripheral velocity of the rolls.
4. Hoisting winch according to claim 1, characterized in that the rolls are mounted in a housing and that the housing is provided with an opening, near a first end of a first roll, for letting in the cable or rope.
5. Hoisting winch according to claim 1, characterized in that the first end of the first roll has a larger diameter than the other part of the first roll.
6. Hoisting winch according to claim 1, characterized in that a separate first end of the first roll and the other part of the first roll are coupled with a freewheel clutch.
7. Hoisting winch according to claim 6, characterized in that the first end of the first roll is covered with a layer of an elastic material, like rubber.
8. Hoisting winch according to claim 6 or 7, characterized in that a press-on roll is provided, for pushing the cable or rope against the first end of the first roll or to the separate end of the first roll.

9. Hoisting winch according to claim 1, characterized in that the drive means comprise an electric motor and a gearbox.

10. Hoisting winch according to claim 9, characterized in that the gearbox is of the self-braking type, like a cycloid gearbox.

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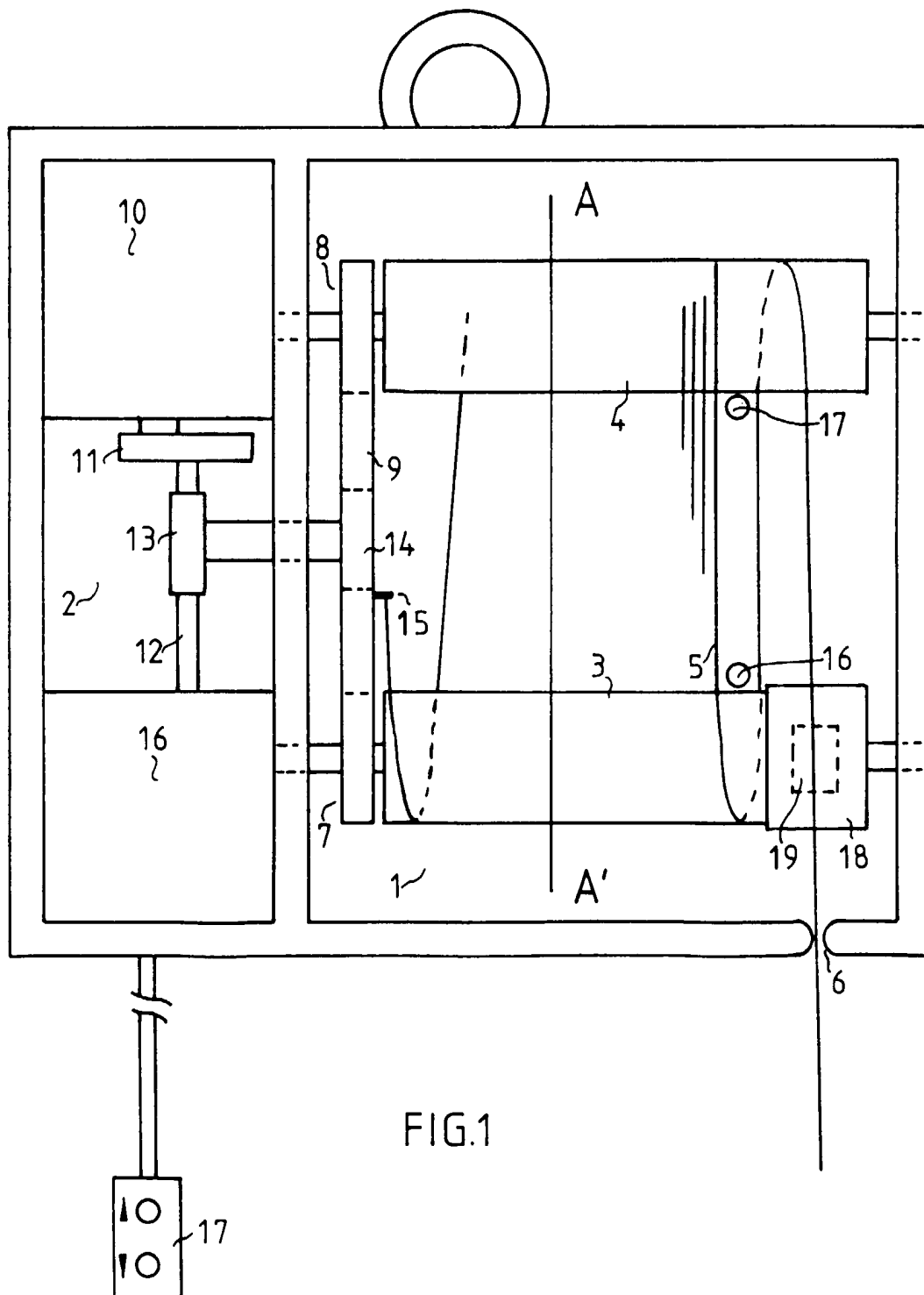




FIG.2A

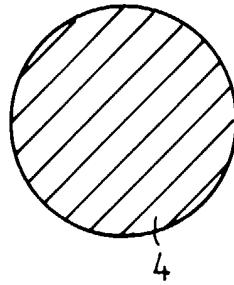
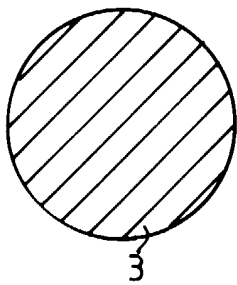


FIG.2B

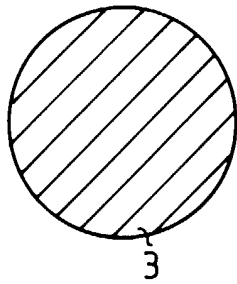


FIG.2C

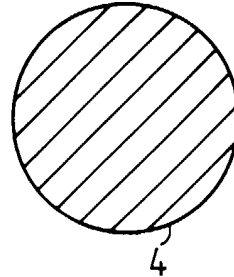
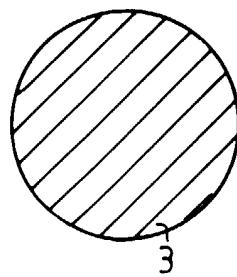


FIG.2D

