

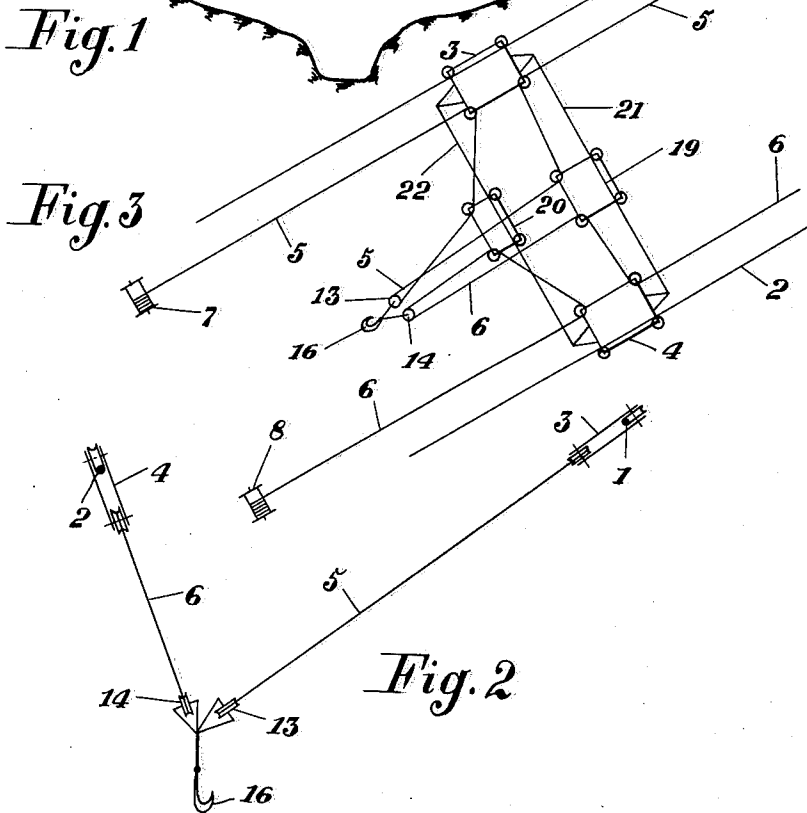
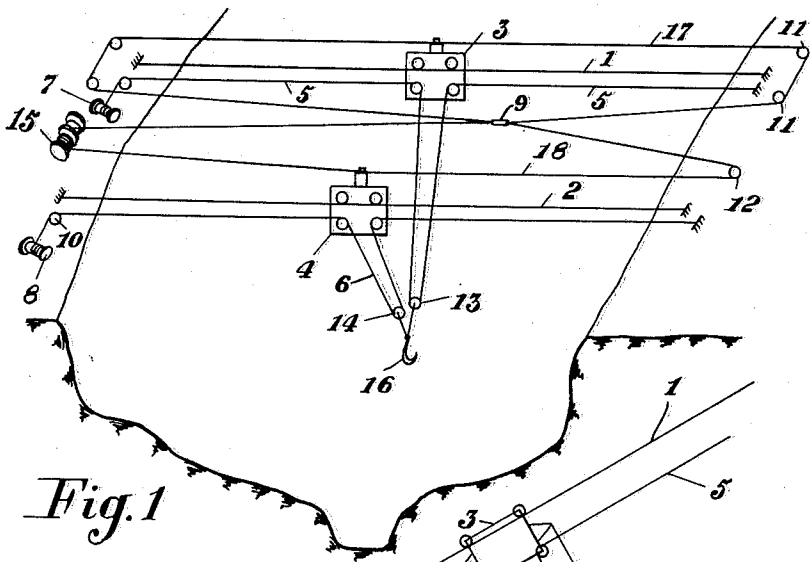
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ROPE CRANE

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2 Sheets-Sheet 1



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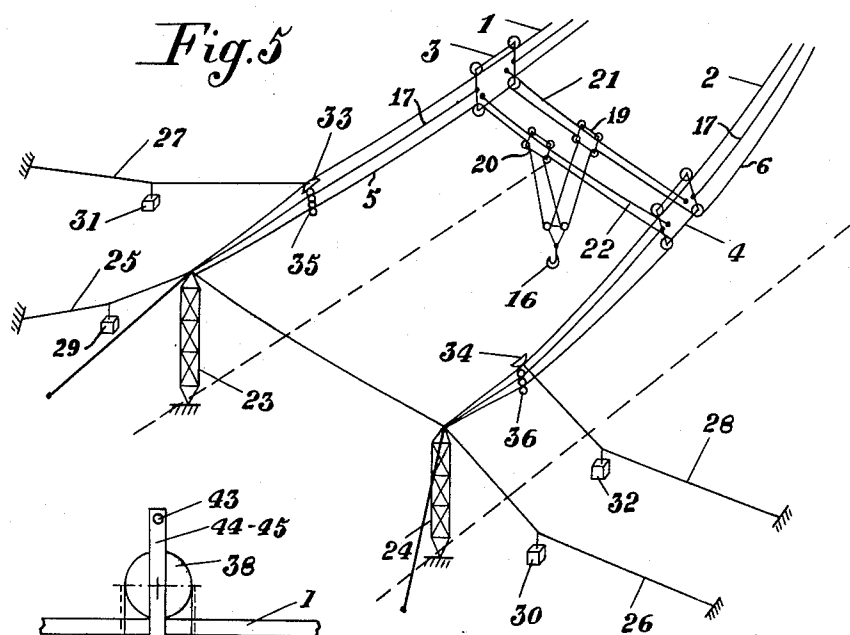


Fig. 5

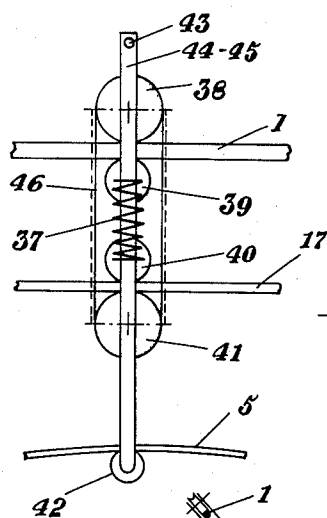


Fig. 6

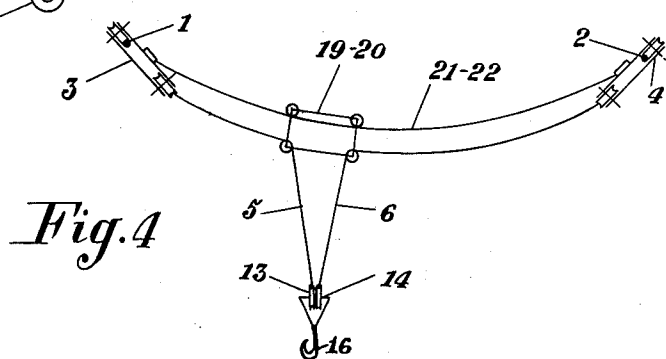


Fig. 4

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ROPE CRANE

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The present invention relates to a rope crane (hereinafter called a "blondin") with two almost parallel carrying ropes with their blocks connected to one another. With such a rope crane it will be possible by hauling the rope on one capstan or winch and paying out the other, to carry the pair of blocks to any desired point located between the two ropes.

The purpose of the present invention is to economically solve the problem of the operation of dam building yards particularly over steep ground, and of all works where the involved width is large.

According to this invention there is provided two taut parallel carrying ropes, located at the summit on either side of the works to be served. Mounted on each of these ropes is a dolly operated by a drawing rope to which a block is suspended by a lifting rope; the two blocks depending from each dolly are connected to one another.

This invention will be now described with reference to the attached drawings showing by way of example some preferred forms of this invention.

In the drawings:

FIG. 1 is a perspective view of a rope crane having its ropes directly anchored to the sides of the mountain;

FIG. 2 is a cross-sectional view taken along the plane of the dollies and the blocks of FIG. 1;

FIG. 3 is a perspective view of a rope crane having a secondary carrying rope;

FIG. 4 is a cross-sectional view taken along the plane of the dollies and of the blocks of FIG. 3;

FIG. 5 is a perspective view of a rope crane with derricks supporting the carrying ropes;

FIG. 6 is a view of a runner.

With reference to FIGS. 1 and 2, the dollies 3 and 4 move on the carrying ropes 1 and 2, said dollies being operated by the drawing ropes 17 and 18 actuated by the hauling capstan 15. Said ropes are connected to one another at 9 and move around the sheaves 11 and 12.

The hook 16 is fixed to the blocks 13 and 14 which through the lifting ropes 5 and 6 are operated by the lifting capstans 7 and 8.

The operation is as follows: by actuating the hauling capstan 15, the dollies 3 and 4 are moved along the ropes 1 and 2. If the lifting capstans 7 and 8 are simultaneously operated, the hook 16 will be vertically lifted; if the lifting capstans 7 and 8 are operated in opposite directions, i.e. hauling for instance the rope 5 by the capstan 7 and paying out the rope 6 by the capstan 8, the hook 16 will be transversely moved with respect to the blondin.

In FIGS. 3 and 4 an expedient is shown for allowing the vertical downwards movement of the lifting ropes. In said figures, the hook 16 is fixed to the blocks 13 and 14 supported by the ropes 5 and 6 which pass first through the secondary dollies 19 and 20, then through the main dollies 3 and 4, to reach the lifting capstans 7 and 8. The secondary dollies are supported by secondary carrying ropes 21 and 22 anchored to the dollies 3 and 4.

The operation is as follows: when the drawing capstan 15 (not shown in FIGURE 3 for sake of simplicity) is operated the ropes 17 and 18 move the dollies 3 and 4 along the carrying ropes 1 and 2. When the lifting capstans 7 and 8 are operated simultaneously and in the same direction the vertical lifting (or lowering) of the hook 16 is obtained. If only one lifting capstan is operated, for instance hauling the rope 5 by the capstan 7,

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the auxiliary dollies 19 and 20 will move towards the dolly 3 and finally a translational and lifting movement of the hook 16 will be obtained.

In FIG. 5 there has been shown a rope crane using the derricks 23 and 24 supporting the carrying ropes, said derricks being braced by the ropes 25 and 26 while the carrying rope is diagonally held by the ropes 27 and 28. To the ropes 25, 26, 27 and 28 are applied the weights 29, 30, 31 and 32.

The operation is as follows: when the hook 16 is near to center line of the secondary ropes 21 and 22, the ropes 1 and 2 will be drawn inwardly, thus raising the weights 29, 30, 31 and 32. When no load acts on the block the weights 29, 30, 31 and 32 will move the ropes 1 and 2 apart and therefore they will tauten the secondary carrying ropes 21 and 22 thus making the translation of the dollies 19 and 20 easy.

Another important function of the weights 29, 30, 31 and 32 is as follows: when the main dollies move along the carrying ropes 1 and 2, the change of disposition of said carrying ropes would tend to increase the tension of the ropes 21 and 22. However since the dollies come closer to the derricks, the ropes 25 and 26 are stressed more and will therefore allow a greater inwards inclination thus compensating the change of the disposition of the carrying ropes 1 and 2. Obviously, not all of the ropes 25, 26, 27 and 28, and not all of the weights 29, 30, 31 and 32 are necessarily needed in the unit.

The ropes 25, 26 and 27 and 28 must be made taut so that the carrying ropes on the derrick are deflected substantially in the plane of said derrick, while the ropes 27 and 28, by the saddles 33 and 34 and the sheaves 35 and 36 applied thereto allow the further deflection of the ropes.

Another important expedient of the embodiment is that of arranging the anchorages of the outside of the line connecting the rest of the derricks, whereby the carrying rope will exert a force tending to move the derricks apart, thus easing the work of the ropes 26.

This displacement of the anchorages might also be carried out by means of other ropes (removable connections on the carrying ropes 1 and 2 between the derricks and the anchorages) engaging and pulling outwards on said ropes.

Both the non-aligned anchorages and the above described ropes will allow the unit of the derricks to move in the direction of the dollies 19 and 20; in fact when the dollies 19 and 20 move, says, towards the rope 2, the latter is more taut than the rope 1 and therefore the derrick 24 will be inclined by a force greater than that of the derrick 23.

In certain particular cases it will be convenient to connect capstans to the derricks allowing their inclinations, as well as to arrange some inwardly extending counter-weighted ropes.

With reference to FIG. 6, the runner consists of two posts 44 and 45, a set of rollers 38, 39, 40, 41, 42, a spring 37, a drive member 46 and a pivot pin 43.

The operation is as follows: when the drawing rope 17 moves with respect to the carrying rope 1, the pulleys 40 and 41 pressed against said drawing rope by the spring 37, will rotate and drive, by the driving member 46, the pulleys 38 and 39, said pulleys in turn moving the runner on the carrying rope.

The speed of movement of the runner depends upon the ratio of the diameters of the pulleys and the drive ratio. It will be easy, therefore to arrange runners having different speeds which starting from a drive ratio of one to one with the dolly, will divide the length into equal portions up to the extremity, avoiding thus the disturbing knot rope, and the runners striking against one another and the dolly. In order to adjust the possible move-

ments which the runners may undergo during the operation of the unit, the dolly is provided with a hook which, if the dolly reaches the runner, will lift the latter, compressing the spring 37 and spacing the pulley away from the carrying rope. The runner is then freely displaceable. A similar apparatus is preferably applied to the ends of the carrying rope whereby in order to re-adjust the runners it will be sufficient to move the dolly towards the end of the carrying rope. Due to the change of the position of the carrying or lifting or drawing ropes, it may prove to be useful to arrange one or more knuckles on the runner.

I claim:

1. A cable hoisting and conveying apparatus comprising in combination two spaced parallel main carrying ropes, the ends of said main ropes being adapted to be anchored to the sides of a mountain, two main dollies each movable on one of said two main ropes, two secondary carrying ropes extending transversally to said two main carrying ropes and connecting said two main dollies with one another, two secondary dollies each movable on one of said two secondary carrying ropes, a hauling capstan and connected to said main dollies for moving said main dollies, two lifting capstans, two lifting ropes, one passing first through one of said main dollies, through both of said two secondary dollies and then through said one main dolly again, and the other passing first through the other main dolly, through both of said secondary dollies, and then again through said other main dolly, one end of said lifting ropes being connected to one of said lifting capstans and the other end adapted to be anchored to the mountain, a block supported in each lifting rope in the section thereof between said two secondary dollies, a hook connected to said two blocks, said lifting ropes moving in two vertical planes which are parallel to one another and to vertical planes passing through said two main carrying ropes.

2. A cable hoisting and conveying apparatus comprising in combination two derricks, two spaced parallel main carrying ropes, one end of said main carrying ropes being adapted to be anchored to a mountain and the other end anchored to one of said derricks, two main dollies each movable on one of said main ropes, two secondary carrying ropes extending transversally to said two main carrying ropes and connecting said two main dollies with one another, two secondary dollies each movable on one of said two secondary carrying ropes, a hauling capstan, two drawing ropes operated by said hauling capstan and connected to said main dollies for moving said main dollies, two lifting capstans, two lifting ropes, one passing

first through one of said main dollies, through both of said two secondary dollies and then through said one main dolly again and the other passing first through the other main dolly, through both of said secondary dollies, and then again through said other main dolly, one end of said lifting ropes being connected to one of said lifting capstans and the other end adapted to be anchored to the mountain, a block supported in each lifting rope in the section thereof between said two secondary dollies, a hook connected to said two blocks, said lifting ropes moving the two vertical planes which are parallel to one another and to vertical planes passing through said two main carrying ropes, two tension ropes each having one end secured to a main carrying rope and at the other end adapted to be anchored to the ground, two weights, each one on a tension rope, two bracing ropes adapted to be anchored at one end to the ground and at the other end attached to the top of one of said derricks, and two further weights, each on a bracing rope, whereby said derricks are inclinable in accordance with the movement of said main dollies for compensating the change of the disposition of said main carrying ropes.

3. A cable hoisting and conveying apparatus as claimed in claim 2, and further comprising two anchoring ropes each secured at one end to the top of one of said derricks and adapted to be secured at the other end to the ground, said anchoring ropes extending to ground anchoring points laying on the side of a plane passing through the corresponding derrick and main carrying ropes, and of a plane passing through both derricks, remote from the apparatus.

4. A cable hoisting and conveying apparatus as claimed in claim 2, further comprising runners consisting of two posts, two control pulleys pivotly secured between said posts, one of said pulleys being movable on said main carrying rope and the other on said drawing rope, a driving member operatively connecting said two pulleys one to another, two tension pulleys pivotly secured to said posts inwardly of said control pulleys, and a spiral spring arranged on said posts and pressing said tension pulleys against said main carrying rope and said drawing rope, whereby by moving said drawing rope the rotation of one of said control pulleys contacting said drawing rope will be transmitted to said other control pulley causing the runner to move on said main carrying rope.

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