No. 736,996. PATENTED AUG. 25, 1903.

T. S. MILLER.

CABLEWAY.

APPLICATION FILED JAN. 29, 1901.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

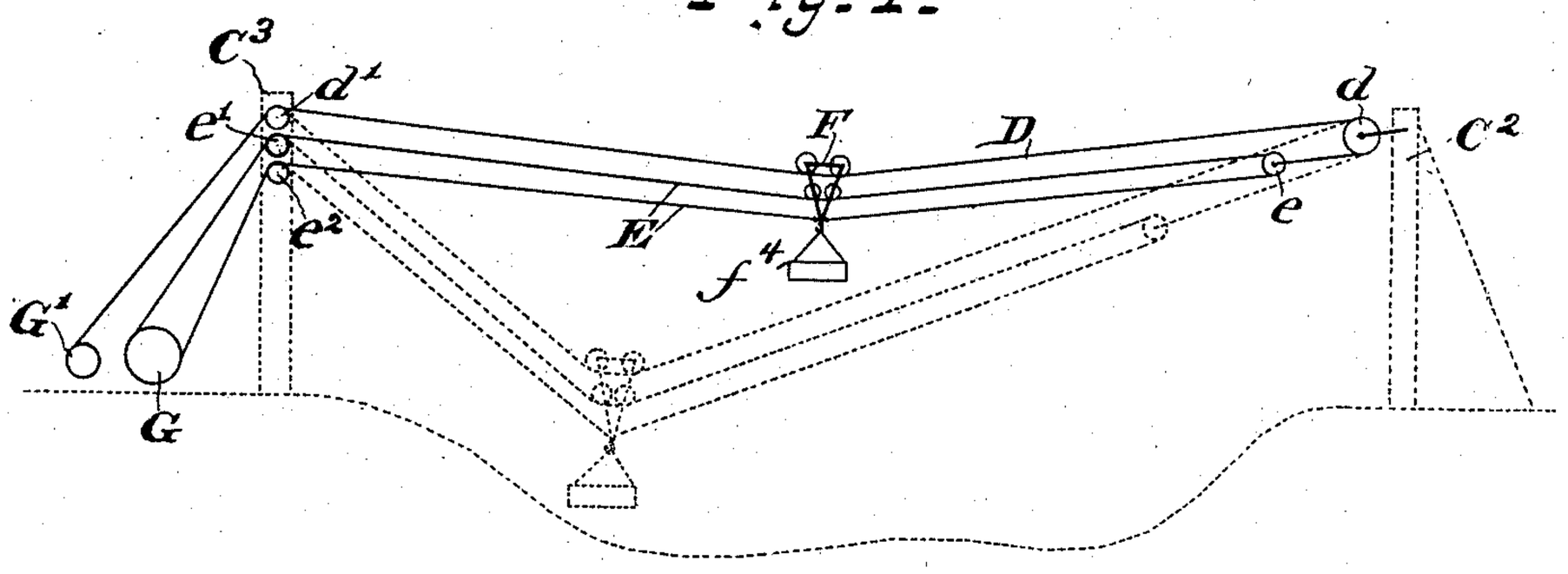

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.

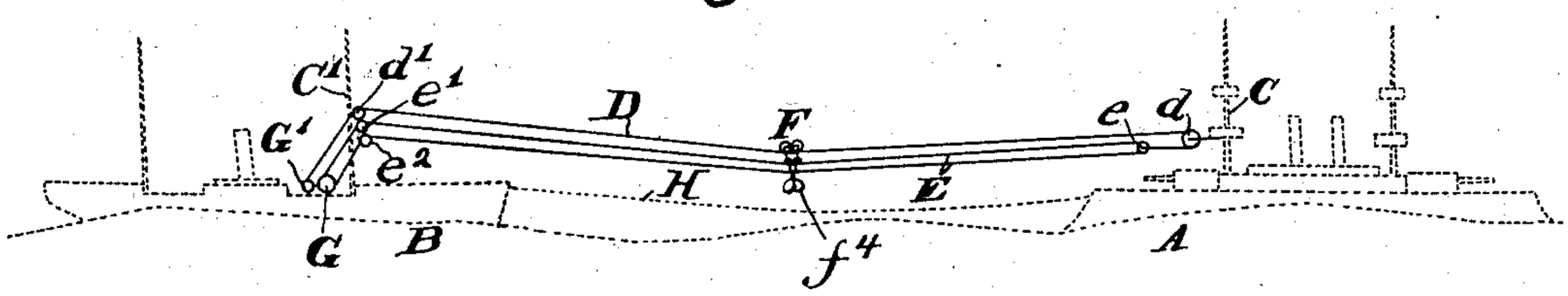
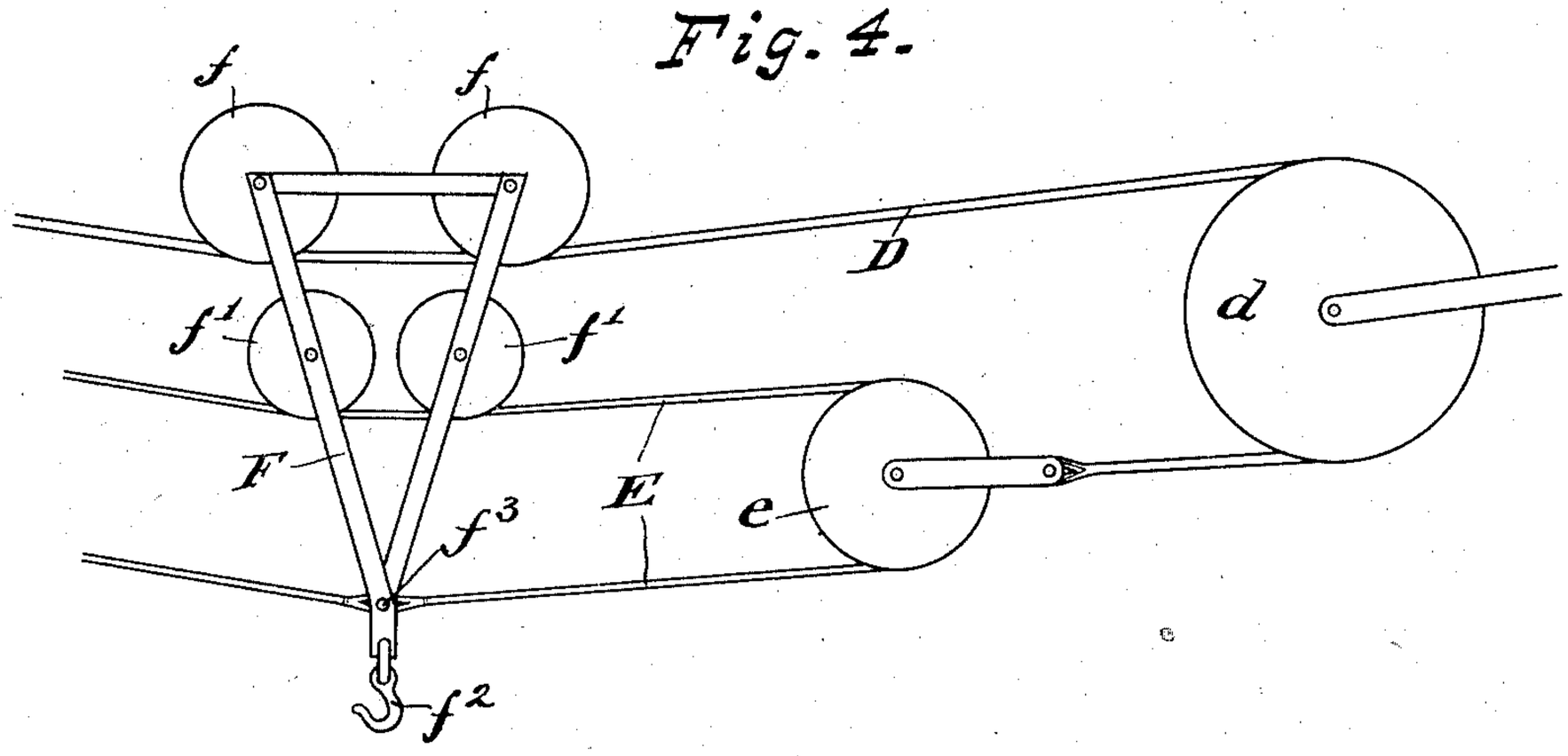


Fig. 4.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

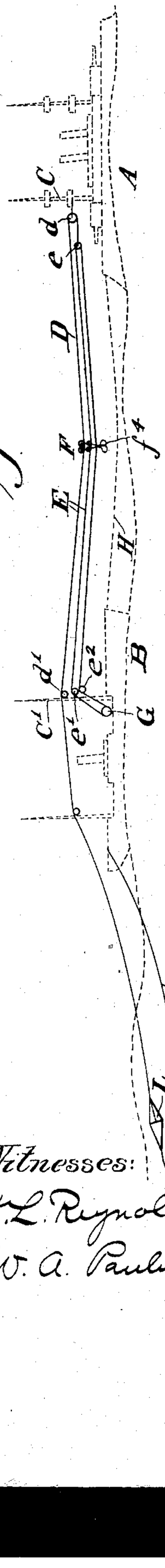


Fig. 7.

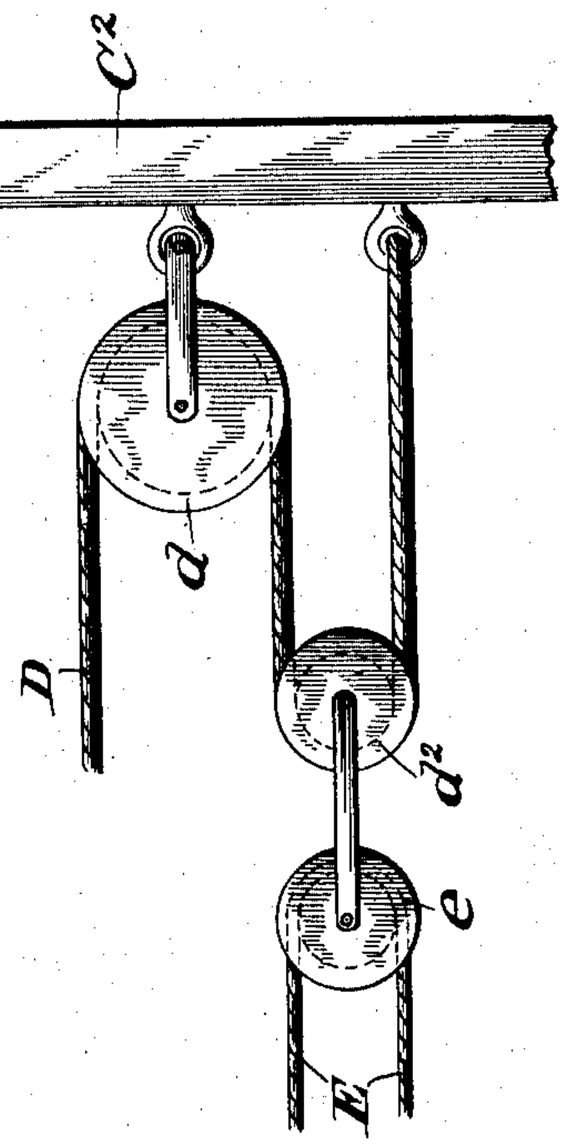
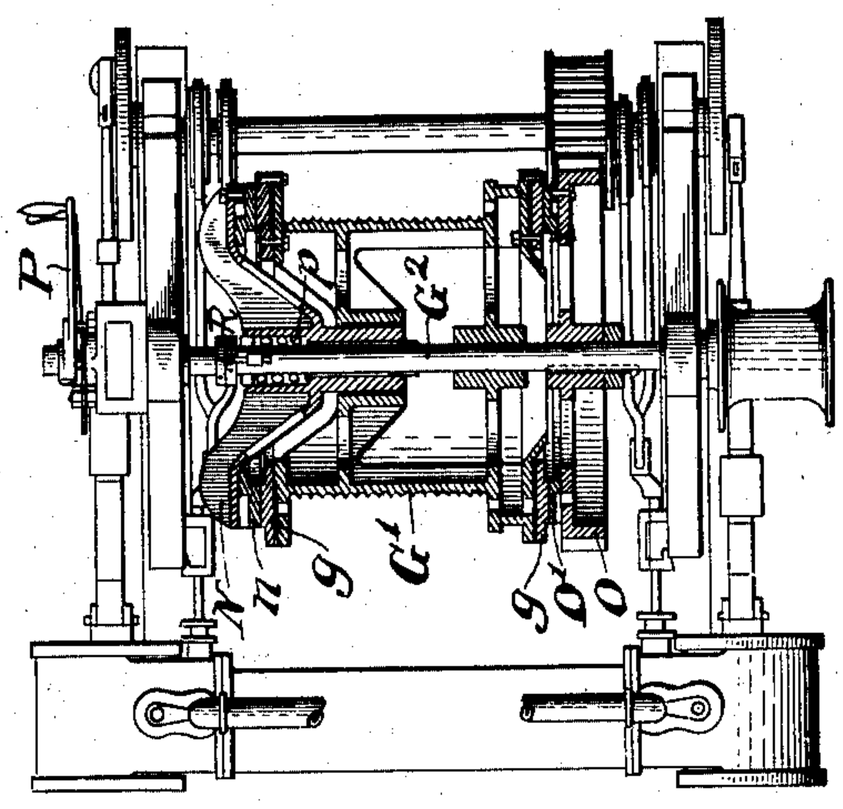


Fig. 6.



Witnesses:
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No. 736,996. Patented August 25, 1903.

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

CABLEWAY.

SPECIFICATION forming part of Letters Patent No. 736,996, dated August 25, 1903.

Application filed January 29, 1901. Serial No. 45,233. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, of South Orange, Essex county, and State of New Jersey, have invented a new and Improved Cableway, of which the following is a specification.

In the accompanying drawings, Figure 1 is an elevation of my apparatus, forming a cableway between two stationary supports. Fig. 2 is an elevation of the same, forming a cableway between one stationary support and one movable support. Fig. 3 is an elevation of the same, forming a cableway between two movable supports, being the masts of a battleship A and a collier B. Fig. 4 is a detail. Fig. 5 is a modification of Fig. 3, employing a sea-anchor instead of the drum-engine G'. Fig. 6 is a detail showing the drum-engine G'. Fig. 7 is a modification of the detail of Fig. 4.

G and G' are two rope-drums. When the cableway is used between two stationary supports, as shown in Fig. 1, these rope-drums may be of ordinary friction-rope-drum construction. When the cableway is used between two relatively movable supports, as shown in Figs. 2 and 3, the rope-drum G' should be constructed so as to automatically pay out or wind in on its cable to provide for variation in the distance between the supports due to the action of the waves. A rope-drum suitable for this purpose is described in my Letters Patent No. 637,143, dated November 14, 1899, and a modification thereof is shown in Fig. 6 herein. In this the principal features are as follows: The drum G' is mounted loosely on the shaft G^2 and has friction-plates $g\,g$ at each end engaging other friction-plates n and o', carried, respectively, by the friction-disk N and the gear-wheel O, by which the shaft is turned. Between the movable collar R on shaft G^2, which is operated by lever P and the disk N, is placed a spring p, through which the pressure is applied, whereby a constant frictional strain may be maintained upon the rope carried by said drum.

Describing first the forms shown in Figs. 1, 2, and 3, the cable D is connected at one end with the rope-drum G' and extends thence over the sheave d' on the head-support, thence across the span, thence around the sheave d on the tail-support, and thence to the block of sheave e, with which its tail is made fast.

The cable E is preferably endless. It extends from rope-drum G over the sheave e' on the head-support, thence across the span to and around the sheave e, thence back again across the span to and over the sheave e^2, thence to the rope-drum G, around which it is coiled.

The load-carriage F is provided with two wheels $f\,f$, running on top of the cable D, also with two wheels $f'\,f'$, running on top of the cable E, (preferably on the upper run or branch thereof,) also with an attachment f^3, by which it is fixed to the cable E, (preferably to the lower run or branch thereof,) also with a hook f^2 or other form of support for the load f^4.

The operation of the device is as follows: In full lines in Fig. 1 and Fig. 3 the cable D is shown as held sufficiently taut by the rope-drum G' to maintain the load-carriage and load at normal conveying elevation. While the cable D is thus held, the carriage may be moved back and forth across the span by the movement of the cable E, and the weight of the load and carriage is distributed between the cables D and E. If there is relative motion between the head and tail supports, due, for example, to the waves, the capacity of the rope-drum G' for automatically hauling in or paying out in response to the strain or slack produced by said relative motion will maintain with substantial constancy the desired elevation of the carriage notwithstanding such relative motion.

With my new construction, since the weight of the carriage and load is distributed between the supporting and conveying ropes, a supporting-cable D of very much reduced strength and size may be employed; but since whatever tension is given to the supporting-cable D will be divided between the two runs of the traction-cable E the said traction-cable may have a strength of about one-half that of the supporting-cable.

If this cableway be employed without any fall-rope, as shown in the accompanying drawings, the carriage may be lowered for loading and unloading at any point of the

span by simply paying out the cable D from the rope-drum G', as indicated in dotted lines in Fig. 1 and full lines in Fig. 2.

When my invention is embodied in the form shown in the drawings, it presents many advantages, among which I may mention the following: The fact that the weight of the loaded carriage is during all stages of the hoisting, conveying, and lowering distributed between the main cable D and the traction-cable E enables a smaller, lighter, and less powerful main cable to be employed. The power of the tension exerted by the drum G' on the main cable D and the strength of the cable D do not have to be increased to bear an increased load, because the increase in the weight of the load simply causes a greater sag at the carriage, so as to convey the load at a lower elevation, at which the strain on the cable and tension drum G' for the heavier load is the same as it is for the lighter load at the higher elevation. The hoisting and lowering of the load may be accomplished without a fall-rope or fall-rope carriers.

When my invention is employed for the specific purpose of conveying between two boats, as shown in Fig. 3, one of the boats, as A, will be provided with propelling mechanism by which it is propelled, so as to tow the other boat B. A tow-line H will preferably be used for limiting the maximum distance between them; but the cableway itself may perform in whole or in part the function of the tow-line, thus utilizing the propeller of the boat A as a factor in holding the cableway taut and maintaining the elevation of the load.

In lieu of the rope-drum G', I may employ a sea-anchor for maintaining the tension on the rope D, as shown in Fig. 5, when the boats between which the cableway extends are in motion. A counterweight may also be employed in place of drum G'. In these cases obviously some auxiliary means must be employed if the load is to be hoisted and lowered.

Instead of attaching the tail end of the main cable D to the block of sheave *e* I may, as shown in Fig. 7, pass said tail end around a sheave d^2, mounted in said block, and thence back to the tail-support C^2, to which it is made fast. In this case the supporting strain will be equally distributed between the two runs of the traction-cable E and the main cable D, and those two cables may be of the same size and power. Obviously by further multiplication of sheaves the distribution of supporting strain between the cables E and D may be still further modified.

I do not wish to limit myself to a single-span ropeway, because the same ropeway may be constructed employing intermediate supports.

I claim—

1. A ropeway having a main rope and a traction-rope, both freely supported to run through guides at each end of the span, means for actuating both of said ropes, and a carriage supported by both ropes and having an actuating connection with the traction-cable.

2. A ropeway having a main rope and a traction-rope, both mounted to run through guides at each end of the span, means for actuating both of said ropes, a carriage supported by both ropes, and unitary means for controlling the tension on main and traction ropes.

3. A ropeway having a main rope and a traction-rope, both mounted to run through guides at each end of the span, means for actuating both of said ropes, a carriage supported by both ropes, and means for varying the length of said ropes between their supports to thereby raise and lower the carriage.

4. A ropeway having a main rope and a traction-rope, both mounted to run through guides, both of said ropes being looped at the outer end of their span and the loop of the traction-rope being attached to and supported by the return-run of the main rope, means for actuating both ropes and a carriage secured to one run of the traction-rope and running upon the main rope and the other run of the traction-rope.

5. A ropeway having a main rope and a traction-rope, both mounted to run through guides at the ends of their span, both ropes being looped at the outer end of their span, and the loop of the traction-rope being attached to and supported by the return-run of the main rope, means for actuating said rope, and a carriage actuated by the traction-rope.

6. The combination with a ropeway having a main rope, a traction-rope and a carriage supported upon both said ropes, and means for supporting the traction-rope from the main rope whereby slacking off of the main rope lowers both ropes.

7. In a ropeway the combination with a main rope, a traction-rope and a carriage supported by said ropes, of means for dividing the strain between said ropes in a fixed ratio.

8. A ropeway having a main rope, a pulley receiving the outer end of said rope, a double-run or looped traction-rope, a pulley receiving the outer end of said traction-rope and supported by the end of the main rope, means for independently hauling in and paying out on both of said ropes, and a carriage supported by both of said ropes.

9. In a ropeway the combination of a main rope, a traction-rope and a load-carriage supported by both ropes, of means whereby varying the tension on one rope correspondingly varies the tension on the other rope.

10. In a ropeway the combination of a main rope, a traction-rope, a load-carriage and means for independently actuating both of said ropes, of means whereby varying the tension on either rope correspondingly varies the tension on the other rope.

11. A ropeway having a single main rope and an endless traction-rope supported at one end by the main rope, and a winding mechanism for each of said ropes.

12. In a ropeway in combination, a traction-rope, a supporting-rope, a rope-drum connected with said supporting-rope, a friction mechanism operating said rope-drum and means for operating said friction mechanism in antagonism to the sag of said supporting-rope whereby the slipping of said friction mechanism exerts tension on said supporting-rope.

13. In a ropeway in combination a load-carriage, a supporting-rope relatively to which the carriage travels, a rope-drum connected therewith, a friction mechanism operating said rope-drum, and means for operating said friction mechanism in antagonism to the sag of said supporting-rope, whereby the slipping of said friction mechanism exerts a tension on said supporting-rope.

14. In a ropeway, in combination, a load-carriage, a rope traveling with the carriage, a supporting-rope relatively to which the carriage travels and means whereby tension is transmitted to the first of said ropes through the second.

15. In a ropeway, in combination, a load-carriage, a rope traveling with said carriage, a supporting-rope relatively to which said carriage travels, means for controlling the tension on one of said ropes and a connection whereby the tension is transmitted from one of said ropes to the other.

16. In a ropeway, in combination, the head and tail supports, a load-carriage, a movable sheave between the load-carriage and the tail-support, a rope traveling with said carriage extending over said movable sheave, a supporting-rope relatively to which said carriage travels secured to said movable sheave and a tension device secured to one of said ropes whereby tension is applied to both of the same.

17. In a ropeway, in combination, a load-carriage, a rope traveling with said carriage having an inward and an outward run, a supporting-rope relatively to which said carriage travels, means for applying tension to one of said ropes and means whereby tension is transmitted from one of said ropes to the other.

18. In a ropeway, in combination, a load-carriage, an endless rope one run of which travels with said carriage, a supporting-rope relatively to which said carriage travels, means for supplying tension to one of said ropes and means whereby tension is transmitted from one of said ropes to the other.

19. In a ropeway, in combination, a load-carriage, a rope traveling with said carriage, a supporting-rope relatively to which said carriage travels, the head and tail supports for the same, a tension device connected with one of said ropes adjacent to the head-support and a connection between said ropes adjacent to the tail-support whereby the tension is transmitted from one to the other.

20. In a ropeway, in combination, a load-carriage, a traction-rope for the same, a main rope relatively to which said carriage travels, means controlling the tension on one of said ropes and a connection whereby tension is transmitted from one rope to the other.

21. In a ropeway, in combination, a load-carriage, a traction-rope for the same, a main rope relatively to which said carriage travels, winding mechanism operating said main rope, means whereby the power of said main rope is increased and a connection whereby said power is transmitted from said main rope to said traction-rope.

22. In a ropeway, in combination, a traction-rope, a load-carriage having a supporting engagement with one run of said rope and a traction engagement with the other run thereof, a traction-actuator for said rope, a movable pulley in the tail-end loop of said traction-rope and means connected with said movable pulley whereby the deflection of said traction-rope may be controlled.

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