No. 677,036. Patented June 25, 1901.

L. E. LAURENT & E. E. CHERRY.

CABLE HOISTING AND CONVEYING APPARATUS.

(Application filed Sept. 30, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

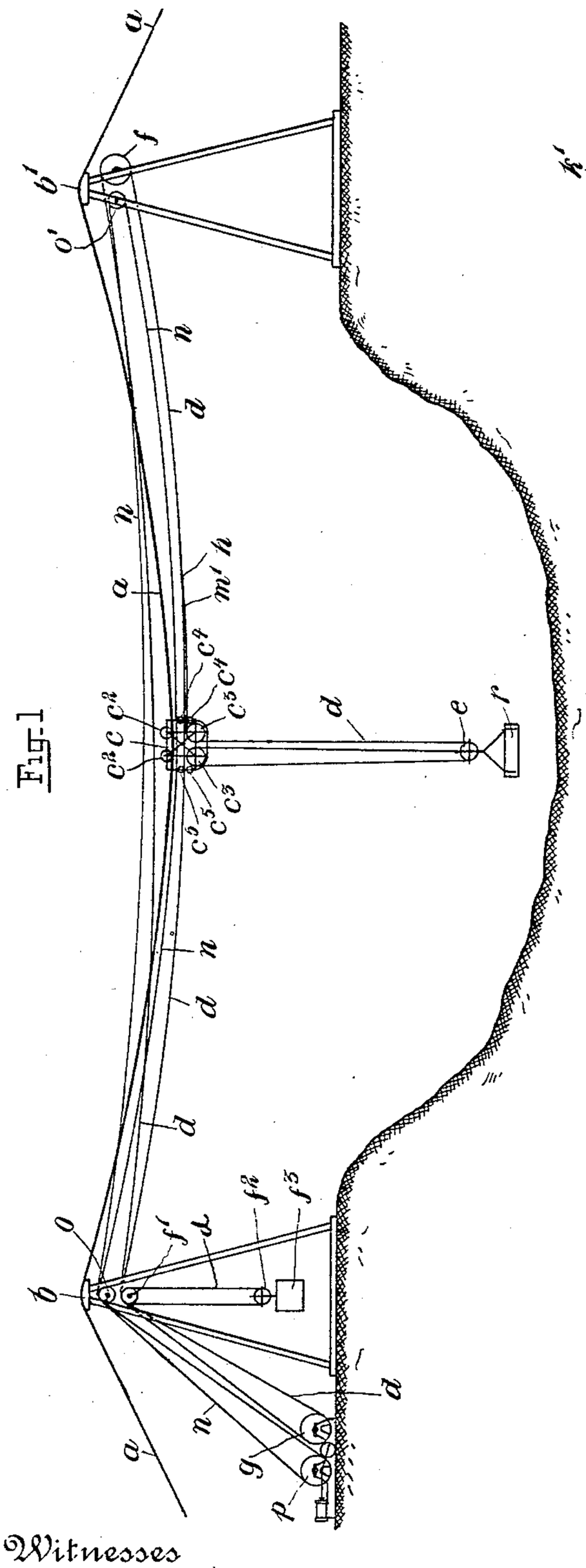

Fig. 4.

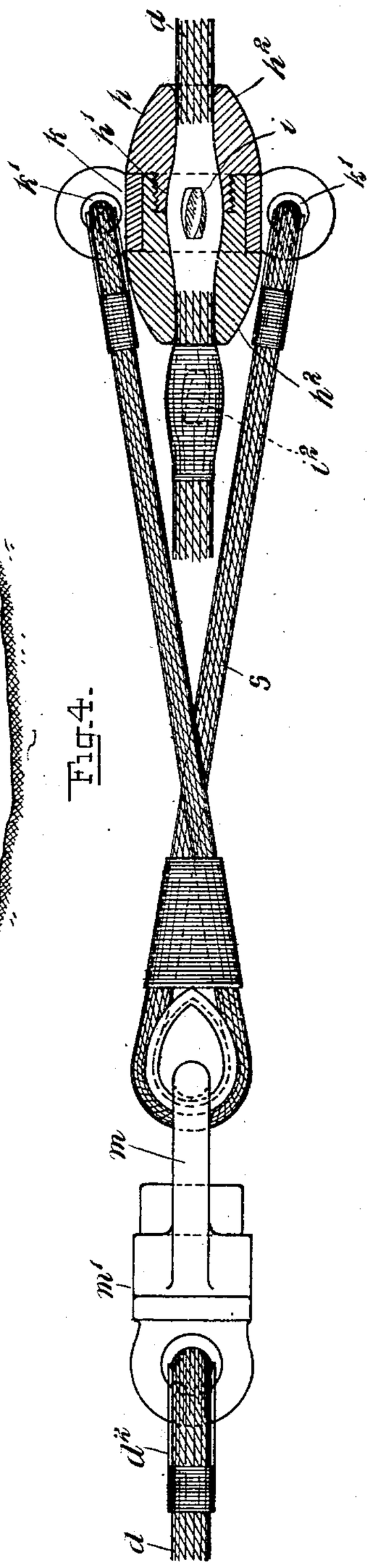

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Fig. 2.

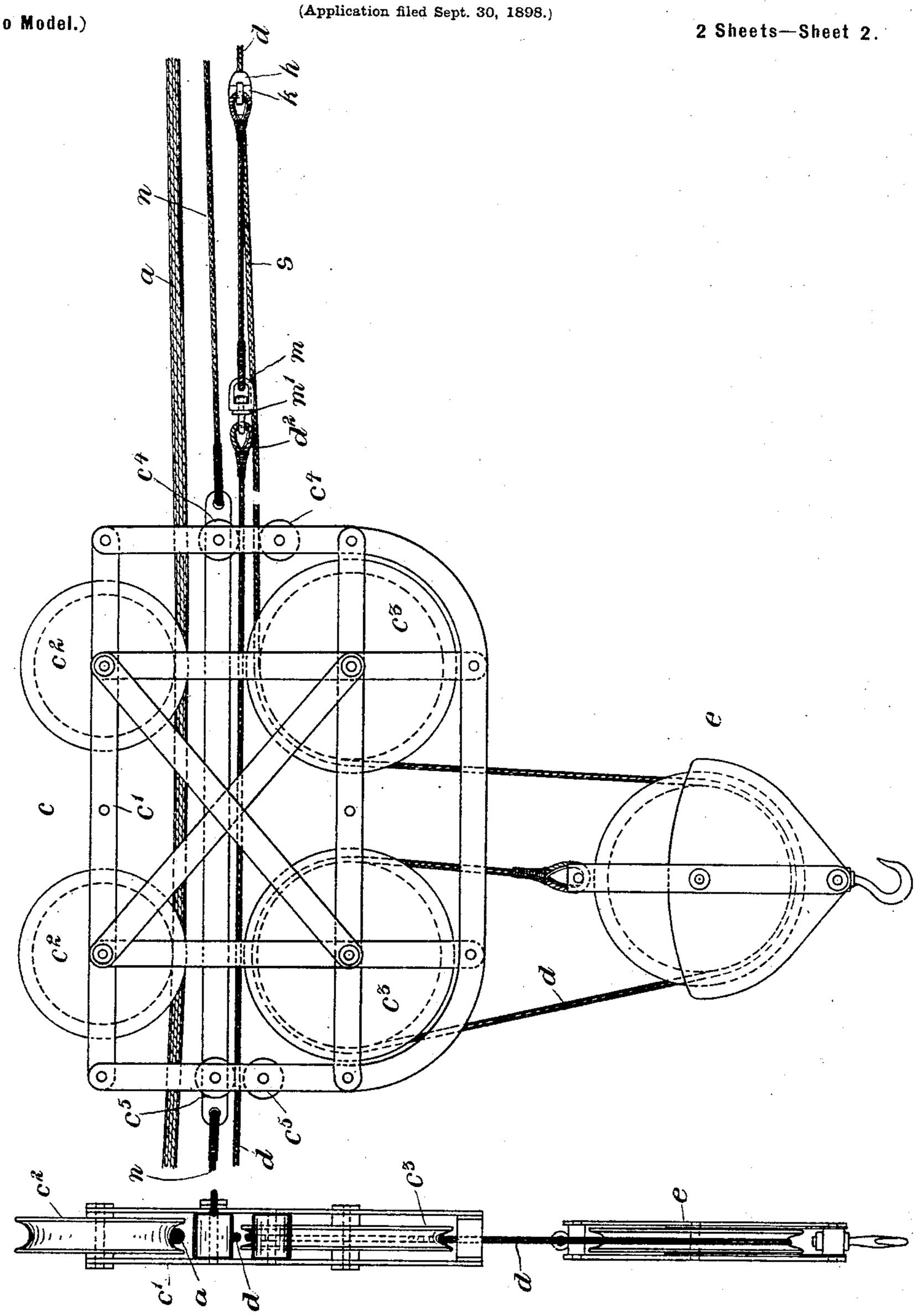

Fig. 3.

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LOUIS E. LAURENT AND EDWARD E. CHERRY, OF TRENTON, NEW JERSEY.

CABLE HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 677,036, dated June 25, 1901.

Application filed September 30, 1898. Serial No. 692,308. (No model.)

To all whom it may concern:

Be it known that we, LOUIS E. LAURENT and EDWARD E. CHERRY, citizens of the United States, and residents of Trenton, Mercer county, State of New Jersey, have invented new and useful Improvements in Cable Hoisting and Conveying Apparatus, of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

Our invention relates to cable hoisting and conveying apparatus; and it consists of certain improvements upon the apparatus forming the subject-matter of another application filed by us October 1, 1897, and bearing Serial No. 653,698. In the apparatus shown in our said pending application a carriage is supported to travel upon a suspended carrying-cable and is connected with an operating or "hauling" rope, by which it is moved back and forth upon said cable. A fall or hoisting rope passing over sheaves on said carriage is connected at one end with a fall-block and at its opposite end with an endless rope, termed a "transmission-rope," which latter passes between guide-rolls on the carriage and around an operating-drum. By this construction the union between the hoisting and transmission ropes being at the proper distance from one side of the carriage, undue sagging of the hoisting-rope is prevented without the use of supports or carriers, and its free and proper operation over the supporting-sheaves on the carriage is insured. In such construction, however, the hoisting or fall rope and the transmission-rope are in two separate pieces fastened together, and such union between the same being at a point between the load-sustaining fall-block and the engine has a tendency to weaken the rope where it is desirable to have the greatest strength.

Having the above facts in mind, it has been the object of our present invention to so arrange the connections between the load and the engine as to increase the strength of the same between such points without interfering with the general arrangement whereby the free and proper operation of the hoisting-rope is insured without the use of carriers or supports and also to otherwise increase the general effectiveness of the apparatus. Such object we secure by means of the new and novel features of construction as hereinafter set forth in detail, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a general view of our invention in side elevation. Fig. 2 is a side elevation of the hoisting-carriage and a portion of its connecting-ropes on an enlarged scale. Fig. 3 is an end elevation of the construction shown in Fig. 2; and Fig. 4 is an enlarged detail view of a portion of the hoisting-rope, to be hereinafter referred to in detail.

To explain in detail, a represents the main carrying-cable, which is suspended between vertical supports or towers $b\,b'$ and anchored at its opposite ends in the usual manner. The carriage c, which travels upon this cable a, consists of a suitable frame c', in the upper part of which are journaled grooved wheels $c^2\,c^2$, which are adapted to rest and run upon the cable a. Journaled in the frame below these wheels $c^2\,c^2$ are two sheaves $c^3\,c^3$, over which the hoisting-rope d is passed. This hoisting-rope d according to our present invention is secured at one end to the fall-block e and from thence passes over one of the sheaves c^3, down around the sheave in the fall-block, up over the other sheave c^3, then forward between two guide-rolls $c^4\,c^4$ on the carriage, to and around a sheave f on the tower b', thence back to the opposite tower b and over a sheave f' thereon, down around a sheave f^2, which is secured to a slack-controlling weight f^3, then up over another sheave (not shown in the drawings) which is supported on the tower b at one side of the sheave f', and from there down to the operating engine-drum g, around which it is passed several times to secure the desired friction to be operated thereby. From this drum the rope passes back over another sheave, (not shown in the drawings,) which is also supported on the tower b at one side of the sheave f', and from there forward between two guide-rolls $c^5\,c^5$ at one end of the carriage, then between the two first-mentioned guide-rolls $c^4\,c^4$ to a point at one side of the carriage, when it is connected to itself in a manner as will be described.

On the hoisting-rope d at a point between the carriage and one of the towers is secured

a button *h*. This button is provided with a central opening to receive the rope therethrough, which opening is formed with an enlarged diameter at a point between its ends, as at *h'*, to permit of a spreader *i* being placed in the rope at such point to lock the button from endwise movement thereon. The said button *h* is formed in two sections h^2 h^2, having a screw-threaded connection with each other, whereby they may be moved apart to permit of the spreader *i* being inserted into the rope and then be brought together to receive the raised or swelled portion of the rope caused by the inserted spreader at a point between its ends. The button *h* as thus secured upon the rope is provided with an encircling yoke *k*, which is seated in a groove in the button, so as to turn freely around the latter, and, as herein shown, is provided with two eyes *k' k'*, through which the ends of a short rope *s* pass and are secured, the opposite or loop end of said rope being connected with the link *m* of a swivel *m'*, which latter is fastened to the end d^2 of the hoisting-rope *d*. This form of swivel connection between the end d^2 of the hoisting-rope and the fixed button *h*, which may be more or less materially modified, avoids possibility of kinking or twisting of the rope and so insures its free and proper operation.

It will be understood that the hoisting-rope is liable to stretch more or less under the strain to which it is subjected in operating the fall-block, with its connected loads, and thus become unduly slack or loose. When the rope thus becomes unduly slack, it also becomes loose upon the operating-drum and does not properly respond to the action of the latter when revolved to operate the rope. To take up any such undue slack, the button *h* may be readily shifted in the desired direction upon the rope after first removing the spreader *i*, inclosed therein, and then be secured in its adjusted position by inserting the spreader in the rope at such point. In some instances it may be desirable to insert a spreader in the rope at a point in front of the button, as at i^2, as an additional means to prevent slipping of the button, or it will be obvious that such spreader in front of the button might be used alone without the one inclosed in the latter. When employing the spreader i^2, we wind the rope with wire, as more clearly shown in Fig. 4, so as to prevent said spreader from working out of the rope in its travel around the sheave at the tower *b'* and also to save the rope from wear by contact with the swivel and connections when passing around the said sheave.

By means of the construction and arrangement of parts as described the hoisting-rope is in one continuous piece from the load to the engine, whereby the greatest strength of the same is secured, and the connection of one end of the same to itself at a point at one side of the carriage secures the most effective action of the rope without the employment of supports or carriers and also provides for any necessary adjustment to take up slack. As shown in the drawings, however, we have illustrated a weight f^3, in addition to the adjustment allowed by the shifting of the button *h*, for controlling the slack in the hoisting-rope *d*. This weight, which connects with the rope in a manner as hereinbefore described, is of sufficient amount to overcome the resistance exerted by the fall-block and its load upon the hoisting-rope and serves to automatically take up any undue slack and keep the rope in proper frictional contact with its operating-drum.

The hauling-rope *n* for moving the carriage *c* back and forth upon the carrying-cable *a* connects at one end with the carriage, and from there runs over a sheave *o* on the tower *b* down to a drum *p*, around which it is wrapped several times to secure frictional contact therewith, then up over a sheave (not shown in the drawings) located at one side of the sheave *o*, from there over to and around a sheave *o'* on the opposite tower *b'*, and then back to the opposite side of the carriage *c*, to which it is secured, thus forming an endless rope which is operatively connected with the carriage and with an operating-drum, whereby said carriage may be moved back and forth upon the cable *a* at the will of the operator.

The operation of the apparatus as above set forth, in brief, is as follows: When the load (represented at *r*) is to be raised or lowered, the drum *g*, around which the hoisting-rope *d* is wrapped, is set in motion to move in the required direction and operate said hoisting-rope in a direction to either raise or lower the load *r*. After the load has been raised and it is desired to carry the same toward either tower *b* or *b'* both of the drums *g* and *p* are set in motion. This causes the rope *n* to haul or draw the carriage upon the cable *a*, and the hoisting-rope *d* being moved at the same rate of speed as said hauling-rope it thereby becomes stationary relative to the carriage *c*, and thus holds the load in a raised vertically-stationary position while being moved along upon the carrying-cable by the hauling-rope. To lower the load, the hauling-rope *n* is stopped or slowed up, while the hoisting-rope is caused to pay out at a greater speed than the hauling-rope, in case the latter should still be in motion, and thereby lower the load.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a cable hoisting and conveying apparatus, the combination, with a carrying-cable, of a carriage supported to operate on said cable, means for moving said carriage back and forth upon the latter, supports or towers between which the carriage operates, and a single rope passing over bearings on said supports with one end thereof operating over bearings on the carriage for connection with a load, and its opposite end having a swiveled connection with the rope itself at a point to be movable therewith between the carriage and one of the towers.

2. In a cable hoisting and conveying apparatus, the combination, with a carrying-cable, of a carriage supported to operate on said cable, means for moving said carriage back and forth upon the latter, supports or towers between which the carriage operates, and a hoisting-rope passing over bearings on said supports with one end thereof operating over bearings on the carriage for connection with a load, and its opposite end having an adjustable connection with the rope itself at a point to be movable therewith between the carriage and one of the towers.

3. In a cable hoisting and conveying apparatus, the combination, with a carrying-cable, of a carriage supported to operate on said cable, means for moving said carriage back and forth upon the latter, supports or towers between which the carriage operates, and a hoisting-rope passing over bearings on said supports with one end thereof operating over bearings on the carriage for connection with a load, and its opposite end having connection with the rope itself at a point to be movable therewith between the carriage and one of the towers, said rope being provided with a button having a yoke loosely supported to turn thereon with which the said opposite end of the rope is connected.

4. In a cable hoisting and conveying apparatus, the combination, with a carrying-cable, of a carriage supported to operate on said cable, means for moving said carriage back and forth upon the latter, supports or towers between which the carriage operates, and a hoisting-rope passing over bearings on said supports with one end thereof operating over bearings on the carriage for connection with a load, and its opposite end having connection with the rope itself at a point to be movable therewith between the carriage and one of the towers, said rope being provided with a button thereon with which the said opposite end of the rope is connected, the said button being formed in two sections and provided with an opening for the rope having a portion of its diameter enlarged at a point between its ends, and a spreader located in the rope at a point within the enlarged portion of the opening in the button.

5. In a cable hoisting and conveying apparatus, the combination, with a carrying-cable, of a carriage supported to operate on said cable, means for moving said carriage back and forth upon the latter, supports or towers between which the carriage operates, and a hoisting-rope passing over bearings on said supports with one end thereof operating over bearings on the carriage for connection with a load, and its opposite end being provided with a swivel connected therewith, said rope being provided with a button secured thereon at a point to be movable between the carriage and one of the towers and having a yoke loosely supported to turn thereon, and means connecting said yoke and the swivel at the end of the rope.

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