(No Model.) 2 Sheets—Sheet 1.

H. M. LANE.

TENSION APPARATUS FOR CABLE RAILWAYS.

No. 342,367. Patented May 25, 1886.

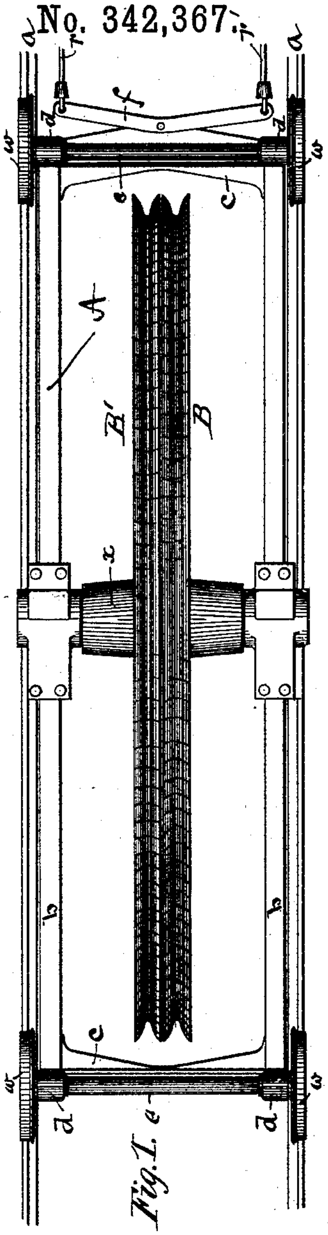

Fig. 1.

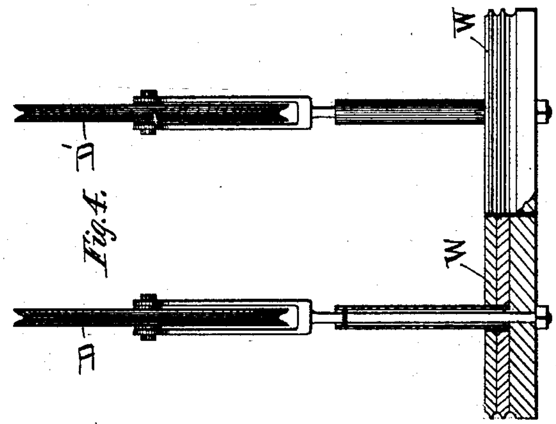

Fig. 4.

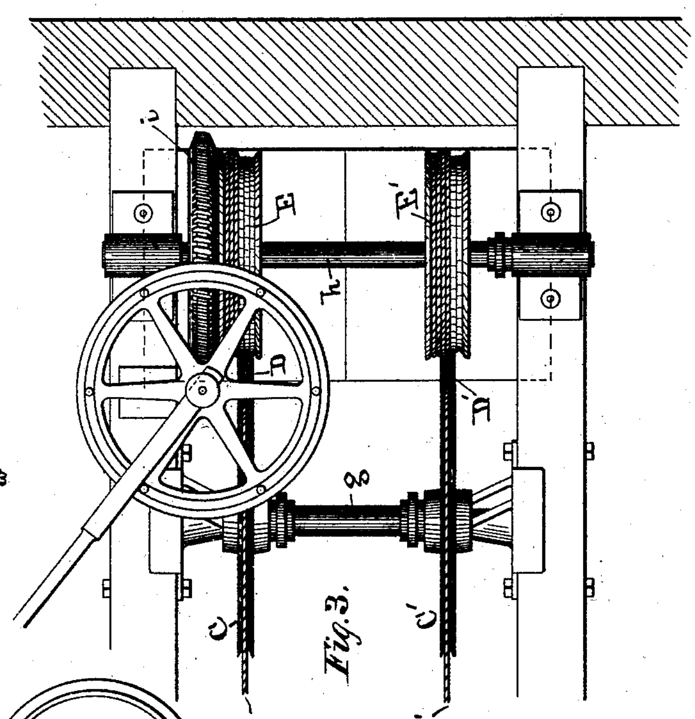

Fig. 3.

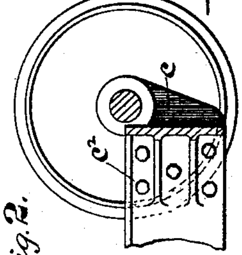

Fig. 2.

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(No Model.) 2 Sheets—Sh

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Fig. 5.

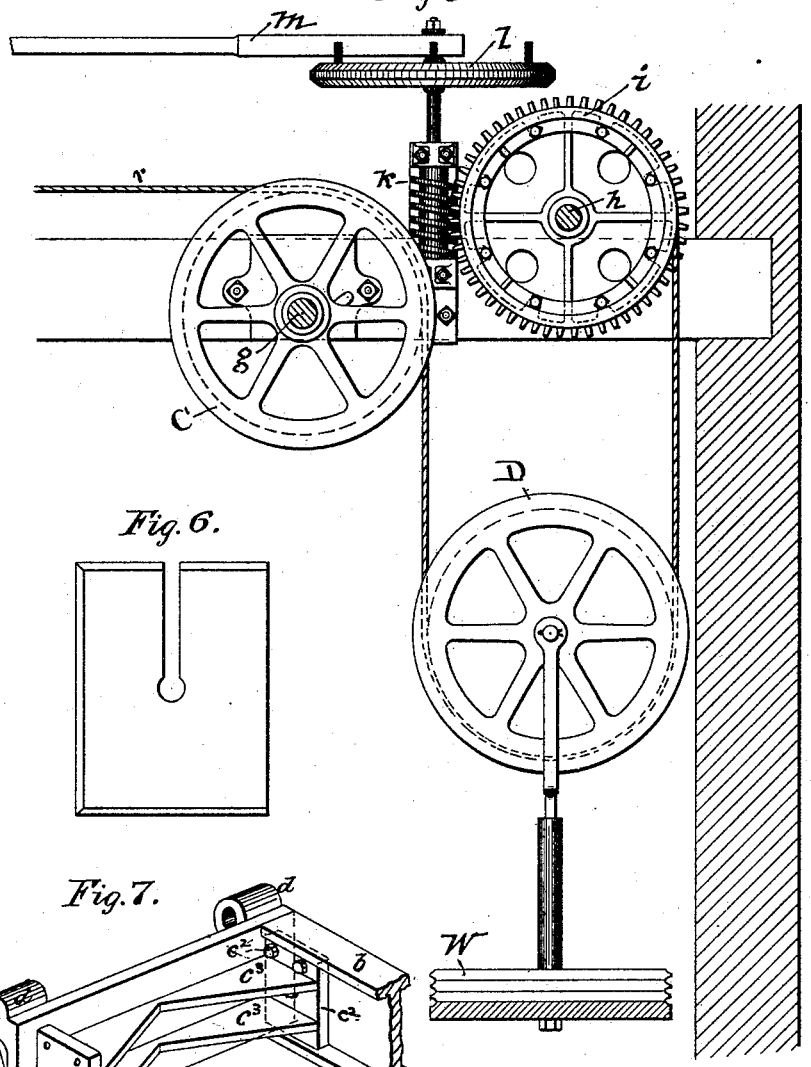
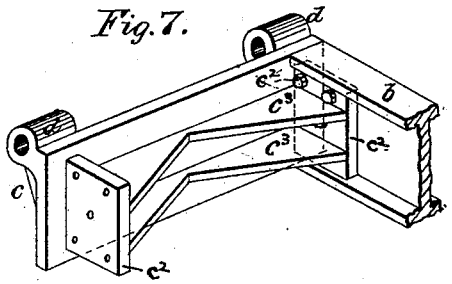


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY M. LANE, OF CINCINNATI, OHIO.

TENSION APPARATUS FOR CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 342,367, dated May 25, 1886.

Application filed December 7, 1885. Serial No. 184,880. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. LANE, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Tension Apparatus for Cable Railways, of which the following is a specification.

My invention relates to the tension devices of cable-railway mechanism designed to regulate the tension of the cable during use and to compensate the variations in the same occurring from various natural and artificial causes, such as atmospheric conditions, the unequal and varying distribution of load, &c.; and it consists in the construction of the tension-carriage and the weight-connections of the same, also in the construction and arrangement of the weight supporting and regulating mechanism, all as more particularly hereinafter described.

My invention is illustrated in the accompanying drawings, in which Figure 1 is a plan view of the tension-carriage, its tension-wheels, and weight-equalizing bar; Fig. 2, a detail showing the constructive connection of the end and side braces of the carriage; Fig. 3, a plan view of the weight supporting and regulating mechanism; Fig. 4, an end elevation of the weight-supporting sheave hangers and weights; Fig. 5, a side elevation of one of the weight-supporting pulleys, its idler-pulley, and the screw-gear actuating the winding-drum; Fig. 6, a detached view of one of the removable weights; and Fig. 7, a perspective view of one of the end bars of the tension-carriage, showing its construction and mode of attachment to the **I**-beams of the carriage.

Referring, now, to the drawings, A designates the "tension-carriage" arranged to run upon a suitable track, *a a*, behind the cable-driving drums. (Not shown.) The carriage carries upon a shaft, *x*, journaled between and upon its side bars, *b*, a fixed pulley, B, and a loose pulley, B′, side by side.

The arrangement of the cable upon its main winding-drums and the tension-carriage is the same as usual, and need not be described in detail.

In order that the action of the tension-weights (hereinafter described) may be thoroughly effective and respond sensitively to any variations occurring in the cable, it is requisite that the carriage A should be light, perfectly rigid, and move with little frictional resistance upon the track. To this end I construct the sides of the carriage-frame of two **I**-beams or "deck" beams, *b b*, secured by two cast end pieces, *c c*, (more fully shown in Fig. 7,) upon which latter are cast the journal-bearings *d d* of the axles *e e*, and to the latter are rigidly secured the wheels *w*. The end pieces, *c*, are formed with end flanges, c^2, and bracing-webs c^3, the end flanges, c^2, being formed to fit against the web of the deck-beams between the upper and lower flanges of the same, and are there secured by bolts or rivets, forming a rigid connection. The two castings *c* are similar, excepting that one has a central flange extending forward centrally, Fig. 1, for the attachment of the equalizing-bar *f* of the weight-ropes *r r′*. I employ two of the latter, attached to the ends of the equalizing-bar *f*, and extending thence over idler-sheaves C C′, mounted upon a common shaft, *g*, journaled in fixed bearings near the end of the track-way and around traveling sheaves D D′, by which the weights W W are suspended in lower bights of two ropes, *r r′*, and thence pass up again to winding-drums E E′ upon a common shaft, *h*, also journaled in fixed bearings upon the track-frame.

The shaft *h*, carrying the winding drums, is provided with a screw gear-wheel, *i*, with which is meshed a screw-shaft, *k*, arranged vertically and provided with an actuating-wheel, *l*, which may be operated by a removable bar, *m*.

The weights W, composed of separate removable slotted plates, are arranged upon yokes hung from the pulleys D D′, and the weight is increased or diminished at pleasure by adding or removing plates.

It has been common in cable constructions heretofore to locate the mechanism for taking up the "slack" of the tension-weight ropes upon the carriage; but this, together with the otherwise necessarily increased weight of the carriage, introduces a detrimental element of momentum of the carriage to disturb the proper action of the tension devices, besides adding to the friction of the carriage in its movement upon its track. This difficulty I avoid, first, by removing the take-up mechanism entirely from the tension-carriage and arranging it in

fixed position upon the track-supports, and, secondly, by the described construction of the tension-carriage, which combines the elements of great strength and rigidity with the minimum of dead-weight. It has been common heretofore, also, to construct the carriage with loose wheels and with a single rope attached directly to the weight. Not only does this require a deep "well" for the action of the weight, but its action in the gathered force of its fall, or by the uneven motion of the carriage, often brought undue strain upon the cable. This I avoid, first, by a rigid carriage-frame with rigid wheel-connections, as described, and, secondly, by securing the weight to a traveling pulley suspended in a bight of the rope, one end of which is fixed.

By my improvements not only is unevenness in the carriage action avoided, but the action of the weight is confined within smaller limits by a construction which equalizes its action upon the rope, and as thus constructed the tension mechanism as a whole acts without sudden impulses, and all undue strains upon the cables are avoided.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. The take-up device for cable-railway-tension apparatus embodying, in combination with a carriage-rope passing over a fixed idler-sheave and a weight hung by a traveling sheave in the lower bight of the rope, a horizontal winding-drum, to which the end of the rope is fixed, provided with a gear meshing with a vertical screw, by which the rope may be wound or unwound upon the drum, substantially as set forth.

2. The tension-carriage as constructed, embodying, in combination with the tension-wheels, a frame consisting of the rolled I-beam sides, the end braces cast with flanges secured against the webs of the side beams and carrying the axle-bearings, and the axles journaled in said bearings with wheels rigidly secured upon the axles, substantially as set forth.

3. The combination of the carriage A, equalizing-bar *f*, weight-ropes *r r'*, idler-sheaves C C', winding-drums E E', traveling sheaves D D', and weights W, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY M. LANE.

Witnesses:
L. M. HOSEA,
C. D. KERR.