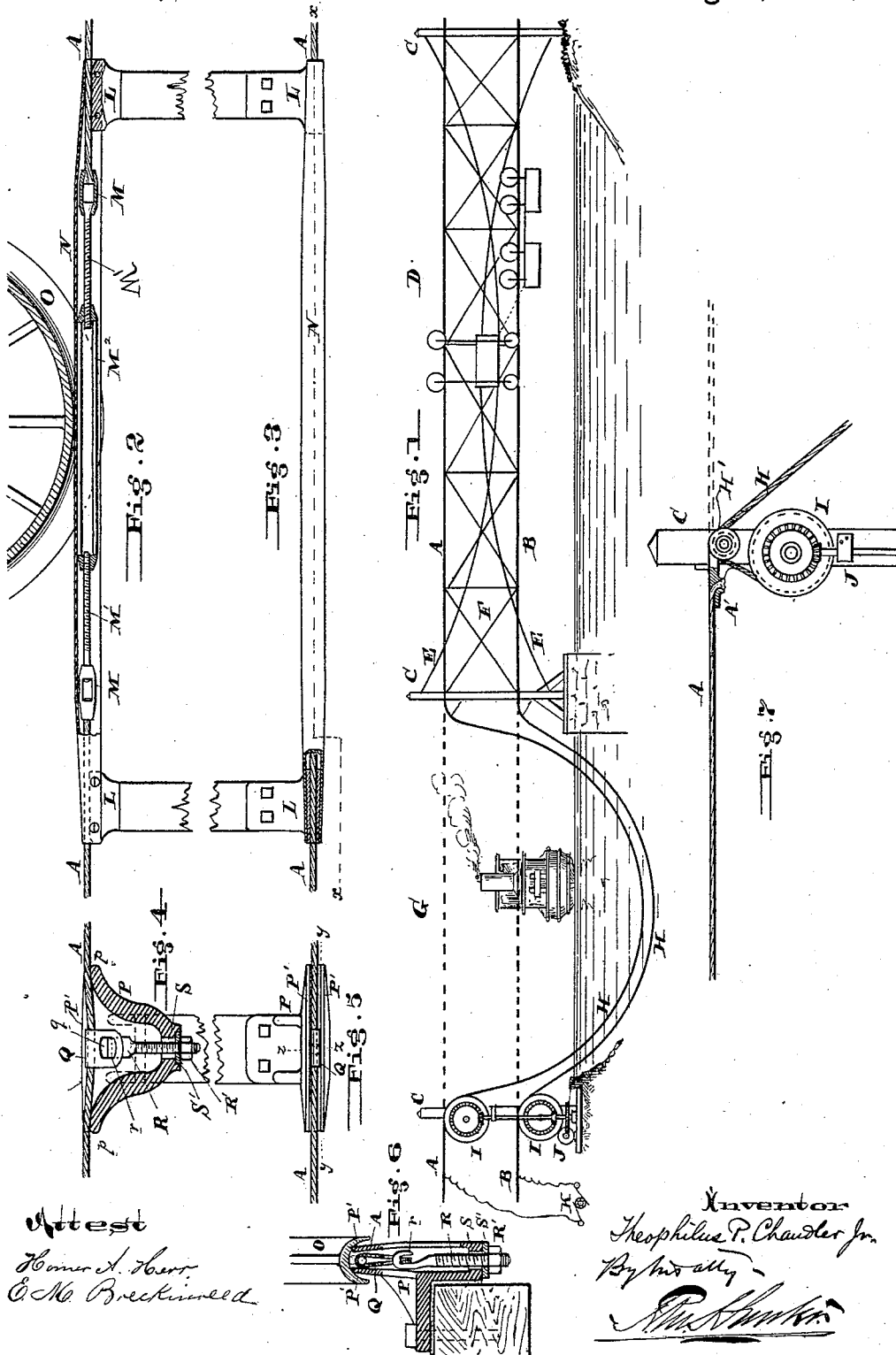


(No Model.)

T. P. CHANDLER, Jr.  
RAILWAY.

No. 346,724.

Patented Aug. 3, 1886.



# UNITED STATES PATENT OFFICE.

THEOPHILUS P. CHANDLER, JR., OF PHILADELPHIA, PENNSYLVANIA.

## RAILWAY.

SPECIFICATION forming part of Letters Patent No. 346,724, dated August 3, 1886.

Application filed May 20, 1885. Serial No. 166,080. (No model.)

*To all whom it may concern:*

Be it known that I, THEOPHILUS P. CHANDLER, JR., of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Railways, of which the following is a specification.

My invention has reference to railways, but more particularly electric railways, in which the rails are formed of flexible metallic cables; and it consists in certain improvements upon Letters Patent granted to me on September 16, 1884, and numbered 305,155, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

The object of my invention is to provide suitable take-up or tension devices by which all slack in the cables may be taken up and the cables maintained under the requisite tension and thereby prevent all undue sagging and lateral vibration.

In carrying out this part of my invention I prefer to provide at long distances take-up devices capable of taking up all excessive slackness in the cables, and between them on all of the supports, or as many as may be found desirable, auxiliary take-up or tension devices, whereby the cables may be put under the requisite tension for practical operation of the railway.

My object is also to provide suitable bracing or trussing to cables of this system of railway in which the cables forming the rails are supported at different levels, so that in very long spans the cables cannot separate, sag unequally, or have any material lateral vibration. This is particularly advantageous in crossing rivers when it is not economical nor desirable to build any or more than a very limited number of supporting piers or abutments.

My object is also to so arrange the cables that they may be allowed to drop down into the river for the purpose of allowing a boat to pass over them, thus in this novel manner constituting the equivalent of a draw-bridge without any of the great expenses incident thereto.

In the drawings, Figure 1 is an elevation of a portion of a railway constructed in accordance with my invention, showing the crossing of a river and illustrating how the cables may

be trussed and the draw for passage of boats may be made. Fig. 2 is a sectional elevation of one of the main take-up or tension devices on line *xx* of Fig. 3. Fig. 3 is a plan view of same. Fig. 4 is a sectional elevation of one of the auxiliary take-up or tension devices on line *yy* of Fig. 5. Fig. 5 is a plan view of same. Fig. 6 is a cross-section of same on line *zz* of Fig. 5; and Fig. 7 is an elevation of a modified construction for operating the cables for the draw-bridge.

A is the upper cable, and B is the lower cable, upon which the supporting, conducting, and guide wheels O of the car run. These cables are supported on posts C, arranged at given distances apart, and are secured to suitable brackets, L and P.

The main take-up or tension consists of the following parts: L are two shoes or brackets, arranged about twenty feet apart, and over which the ends of the cable pass, the ends of which are secured to the links M, having bolts M', one of which is provided with a right-hand screw-thread, and the other with a left-hand screw-thread, and working over these screw-threaded bolts is the link M<sup>2</sup>, which, when turned, draws the two ends of the cable together or allows them to move apart, according to which way it is turned. This take-up device is bridged by the U-shaped rail N, which incloses the parts above mentioned on the top and sides, and is secured at each end to the brackets L, when it is also made tapering, so as to form a gradual rise.

The auxiliary brackets P are made with the two shoulders *p*, over which the cable is drawn, a hollow or depressed portion into which the cable is drawn, and side extensions or rails, P', arranged upon each side of the cable and being raised sufficiently high at their ends that the wheels are prevented from cutting the cable where it rests upon the shoulders *p*. These side rails, P', support the car as it passes over the bracket.

Q is a strap having holes *q* on its ends, and is bent over to embrace the cable between the points *p*, and is hooked to the screw R, having the hook *r* at its upper end. This screw R passes down through the hole S in the bracket, and also through a washer or plate, S', and is

provided with a nut, R'. By turning the said nut the cable is drawn down into the bracket or allowed to rise therein, according as to whether tension or expansion is required. The hole S is made oblong so that the bolt R with its enlarged head may be inserted from below; but this is not essential.

The particular means shown for drawing down the cable from both sides may be greatly modified without in anywise departing from my invention; but the construction shown is simple, effective, and cheap, and therefore most desirable.

The trussing or bracing of the cables A and B may be done in any manner desired, either by simple triangular bracing or suspension or both combined, as shown.

The combined action of the triangular braces F and suspension and tie braces E will effectively prevent separation or swinging of said cables, and they will support a traveling load with all the effects of a rigid truss.

Where it is desired to cross a navigable river a short length of the cables A and B should be secured firmly at one end to their post, and have their other ends secured to drums or wheels I, by which the sections H of these cables may be lengthened or shortened to the end that they may be allowed to sag down until on the river bottom or sufficiently low to allow the passage of a vessel, thus forming a draw-span, G. These wheels or drums I may be rotated by gearing J or otherwise. The upper peripheries of the drums would be in line with the cables A and B, so that when the parts H of said cables are made taut the treading line will be continuous. It is evident that these cables H may pass over the guide-wheels, and both be wound upon a single drum, or, as shown in Fig. 7, the cables H may pass over guide-wheels H' and be wound upon separate drums, and the end of the cables A and B, connected rigidly to brackets A'.

K is an electric generator and is adapted to feed positive and negative currents of electricity to the cables A and B, one of which acts as the positive conductor and the other the negative conductor; but it is self-evident that this system of railway is adapted to the use of other motive power than electricity, though that is by far the most preferable.

The particular mechanism for actuating the sections H of the cables is immaterial to my invention, and if desired, they may be paid out or taken in from both sides simultaneously.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A railway consisting of two cables, each combined with one or more main take-up or tension devices, and a series of auxiliary tension devices to each of said cables, whereby the slack in the cables may be taken up and the requisite tension imparted, substantially as and for the purpose specified.

2. A supporting cable combined with a main take-up to take up all excessive slack in said cable, and a series of auxiliary tension devices adapted to put the cable under the requisite tension, substantially as and for the purpose specified.

3. The main take-up, consisting of the brackets L, bolts M', having right and left hand screw-threads, and link M<sup>2</sup>, in combination with cables A, which are supported upon suitable posts and forming with the take-up a continuous railway for a motor, the upper portion of the cables and the frame or casing of the take-up being exposed from above, and form, substantially, a horizontal rail over which the motor-wheels may travel in running from cable to cable, substantially as and for the purpose specified.

4. The main take-up, consisting of the bracket L, bolts M', having right and left hand screw-threads, and link M<sup>2</sup>, in combination with rail N and cables A, substantially as and for the purpose specified.

5. The auxiliary tension devices, which consist of bracket P, having shoulders p and rails P', made of cast-iron, strap Q, screw R, detachably connected to the strap, and nut R', in combination with cable A, substantially as and for the purpose specified.

6. The bracket-casting P, made with two shoulders, p, and the two rails P', substantially as and for the purpose specified.

7. Suitable supports and two cables supported thereon at different levels from the ground and arranged parallel to each other, in combination with trussing or bracing uniting said cables together, whereby they become more or less rigid and are prevented from spreading in long spans, and a motor or car provided with supporting and guide wheels adapted to run upon both of said rails, substantially as and for the purpose specified.

8. A cable supported over a river and having one section thereof made extensible, by which it may be allowed to sag down into the river to allow the passage of a vessel, substantially as and for the purpose specified.

9. A cable supported over a river and having one section thereof made extensible, by which it may be allowed to sag down into the river to allow the passage of a vessel, in combination with a drum upon which said extra cable may be wound or unwound, substantially as and for the purpose specified.

10. Two cables supported at different heights, carried upon suitable supports and spanning a river, one section whereof is made extensible, so that it may be allowed to sag down under the water to allow vessels to pass over it, in combination with two winding-drums upon which the excess of the cables is wound or unwound, and gear mechanism connecting both of said drums, by which they may both be rotated simultaneously, substantially as and for the purpose specified.

11. The combination of cable A, supports

C, section of cable H, guide-wheel H', and winding-drum I, substantially as and for the purpose specified.

12. The combination of the brackets L and  
5 the rail N, connecting them with the ends of the cable A, and suitable take-up mechanism, consisting of right and left handed bolts M', and double-ended nut M<sup>2</sup>, located under and

within said rail and protected thereby, substantially as and for the purpose specified. 10

In testimony of which invention I hereunto set my hand.

THEOPHILUS P. CHANDLER, JR.

Witnesses:

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HENRY A. McMURROW.