(No Model.)

J. H. CUNNINGHAM.

SUPPORT FOR TROLLEY WIRES.

No. 421,677. Patented Feb. 18, 1890.

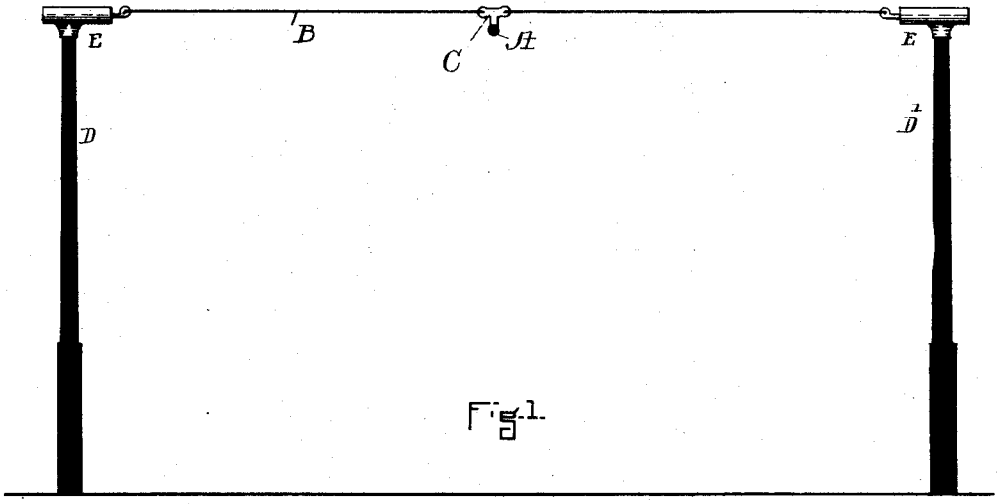

Fig. 1.

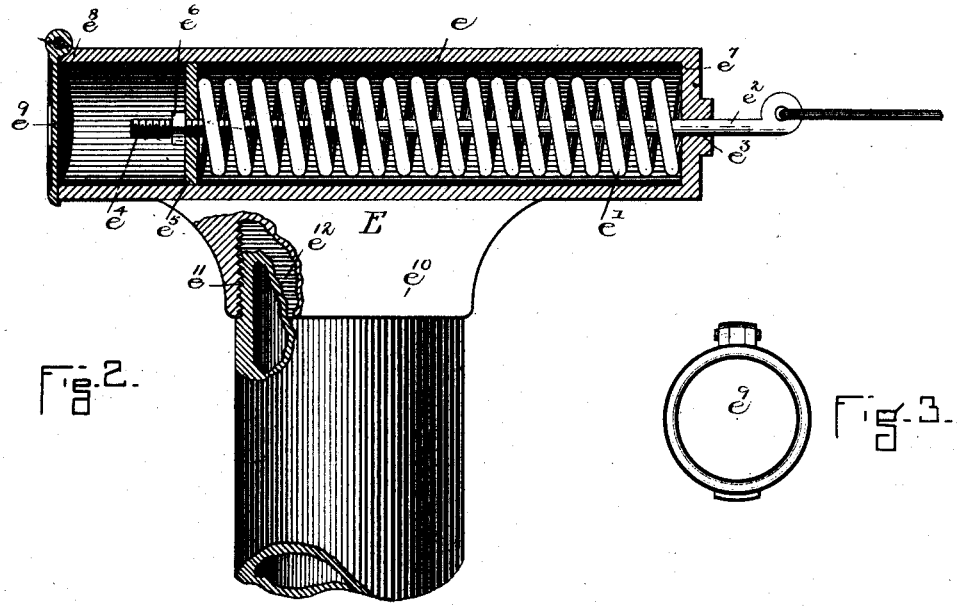

Fig. 2.

Fig. 3.

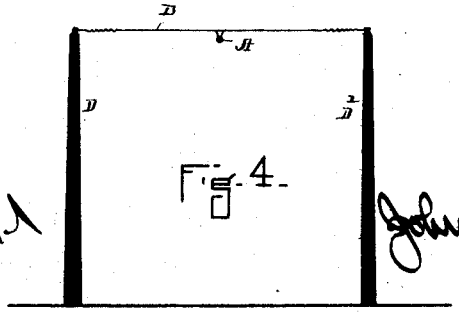

Fig. 4.

WITNESSES.

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SUPPORT FOR TROLLEY-WIRES.

SPECIFICATION forming part of Letters Patent No. 421,677, dated February 18, 1890.

Application filed October 4, 1889. Serial No. 325,956. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CUNNINGHAM, of Chelsea, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Supports for Trolley-Wires, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The trolley-wire, or the overhead wire for supplying the electric current to the motors of railway cars or engines, is made preferably of copper and of large section, and is relatively very heavy, and it has generally been suspended by insulated hangers carried by cross supporting and staying wires extended between two or more posts or supports. It is desirable that the trolley-wire be held in a position as nearly parallel with the surface of the road-bed of the railway as possible throughout its length and that it be placed centrally in relation to the rails of the track and conform to the curves thereof. The ordinary method of hanging and staying the wire does not approximate these desired results as nearly as it is possible to attain them. This is owing to two reasons—first, because the trolley-wire, being made of copper and being heavy, soon sags between its supports, even if it is very nearly straight when it is erected or run, and the variations in temperature also increase the trouble; second, because the trolley-wire supports, being also of heavy copper wire and being rigidly attached at each end to their supporting-posts, do not, because of the elongation or change in the length of the wire, owing to changes in temperature, act to maintain the insulated support for the trolley in the same position. Aside from this, the cross supporting-wires act, because of their length, under atmospheric changes to strain their supports at times to such an extent as to bend them considerably from a straight or perpendicular position, and, after they are so bent, upon the relaxing of the wire, because of increase in temperature, the poles not resuming their original position, the wire becomes slack.

My invention herein described relates especially to means for preserving the trolley-wire and insulator in a given or in substantially invariable position, and also relieves the strain upon the supporting-posts.

It comprises the application, preferably, to each end of the supporting-wire of a take-up spring carried by the pole and of sufficient strength and movement to permit of the contraction or elongation of the wire preferably from the trolley-support in either direction.

There are of course a number of ways by which the invention can be carried into effect, and I have herein illustrated the one which at this time seems to me to be the most feasible.

Referring to the drawings, Figure 1 is a view in elevation to represent the invention. Fig. 2 is an enlarged view, partly in elevation and partly in section, of the compensating connection. Fig. 3 is an end view thereof; and Fig. 4 illustrates a modified form, to which reference is hereinafter made.

A represents the trolley or overhead electric conducting-wire.

B is the cross-wire, to which the trolley-wire is attached by the insulating-hanger C. The supporting-wire B is secured to the tops of the poles D D′ as follows: There is secured to the upper end of each pole a spring holder or case E. This spring holder or case has a central cavity e, which is in line with the wire B, and which contains a coil-spring e'. The wire B is attached at its end to a rod e^2, which extends through the guide-hole e^3 of the case E into the cavity of the space through the core or center of the coil-spring, and has a threaded end e^4, which receives a guide-washer e^5, which bears against the end of the spring and the nut e^6. The other end of the spring bears against the end e^7 of the case. The other end of the case e^8 is closed by means of a hinged door e^9, or in any other suitable way. The case is represented as attached to the top of the pole by means of an arm e^{10}, having a threaded hole e^{11} to screw upon the threaded end e^{12} of the pole. The screw-thread upon the end of the rod e^2 is of sufficient length to permit the nut to be moved any desired extent to vary the tension upon the spring.

I have represented in Fig. 1 the supporting-wire B as having one of these automatic take-up attachments at each end; but I would say that while I prefer this form of construc-

tion, yet it is not essential that each end be thus connected with its supporting-post, as in many instances one only need be used. Where, however, it is desired that the trolley-support have no or very little transverse movement, it is desirable to use one of the take-up springs at each end of the supporting-wire. I would say, however, that I do not confine the invention to the specific means of carrying it into effect herein specified, as there are many ways of connecting one or both ends of the wire B with its or their supporting-posts by means of automatic take-up or compensating springs. Neither do I confine myself in the construction represented to the especial form of spiral spring described or to the manner of attaching the spring-holding case to the rod indicated.

In use the supporting-wire B is attached to the end of the slide-rod, and is then tightened to any required degree by the turning of the nut upon the screw end of the rod to compress the spring, and any strain upon the wire, either caused by variations in temperature or from other causes, instead of being transmitted directly to the ends of the poles, is taken up automatically by the spring or springs, the springs acting to relieve the wire upon excess of strain by compression, and also to keep the wire taut upon its release from such strain. This method of attaching the wires to the poles also offers means whereby the tension of the wires is adjusted or the wires changed at any time to vary the tension, it being simply necessary to turn the adjusting-nut upon the slide-rod.

Of course it will be understood that the compensating or take-up spring can be located anywhere in the cross-wire B; or it may be formed in the cross-wire as making a part of it, as represented in Fig. 4.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A support for a trolley-wire or overhead distributing-wire of an electric-railway system, comprising a cross-wire and automatic compensating spring-connection at one or both ends of said wire connecting it to the rigid ends of the rods or other supports, as and for the purposes specified.

2. The combination of the overhead distributing-wire A of an electric-railway system, the cross-wires B, the insulators C, the poles D D′, and the automatic spring-compensators carried by the rods and to which one or both ends of the wires B are secured, substantially as described.

3. The combination of the overhead conducting-wire A of an electric-railway system, the cross supporting-wire B, and an automatic compensating spring at each end of the wire B connecting it with supporting-poles or other supports, as and for the purposes described.

4. The combination, in a system for supporting overhead wires of an electric-railway system, of the cross-wire B, a slide rod or bar to which one end of said wire is attached, and an adjusting device for moving said rod or bar in relation to its support to vary the tension upon said wire and said support, substantially as described.

5. The combination, in a system for supporting overhead wires of an electric-railway system, of the wire B, the slide rod or bar having an eye or other means for receiving the end of the wire partially inclosed in a case, said case, and a spring contained in said case arranged to act against the rod or bar in opposition to the strain or draft of the wire, as and for the purposes described.

6. The combination, in a system for supporting overhead wires of an electric-railway system, of the case containing a take-up spring acting to draw its outer end toward the case, an arm or bracket having a threaded end, the pole having a threaded end to enter the threaded end of said arm or bracket, and the cross-wire B, substantially as described.

7. The combination of the case having a cavity, an opening therefrom, a guide-rod extending through said opening into the cavity and having a threaded end, a guide-washer on said guide-rod near its rear end, and an adjusting-nut to screw upon the threaded section thereof, and a spring held between the end of the case and the guiding-washer, and the supporting-wire attached to the front end of the guide-rod, as and for the purposes described.

8. The combination of the case E of a compensating device for the cross-wire of a system for supporting the electric conductor of an overhead railway system, open at one side, the end containing a compensating spring connected with said wire and having an adjusting device toward the open end of said case, whereby the tension of the spring is varied, with a bar or plate for closing said opening, as and for the purposes specified.

9. The combination, in a system for supporting overhead wires of an electric-railway system, of a cross wire or support, a housed compensating spring carried by a pole or other support, and a slide or movable connecting arm or piece between the spring and said wire B, as and for the purposes described.

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In presence of—
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