

931,354.

3 SHEETS—SHEET 1.



Fred. H. Miller
R. J. Dearborn

Theodore Varney

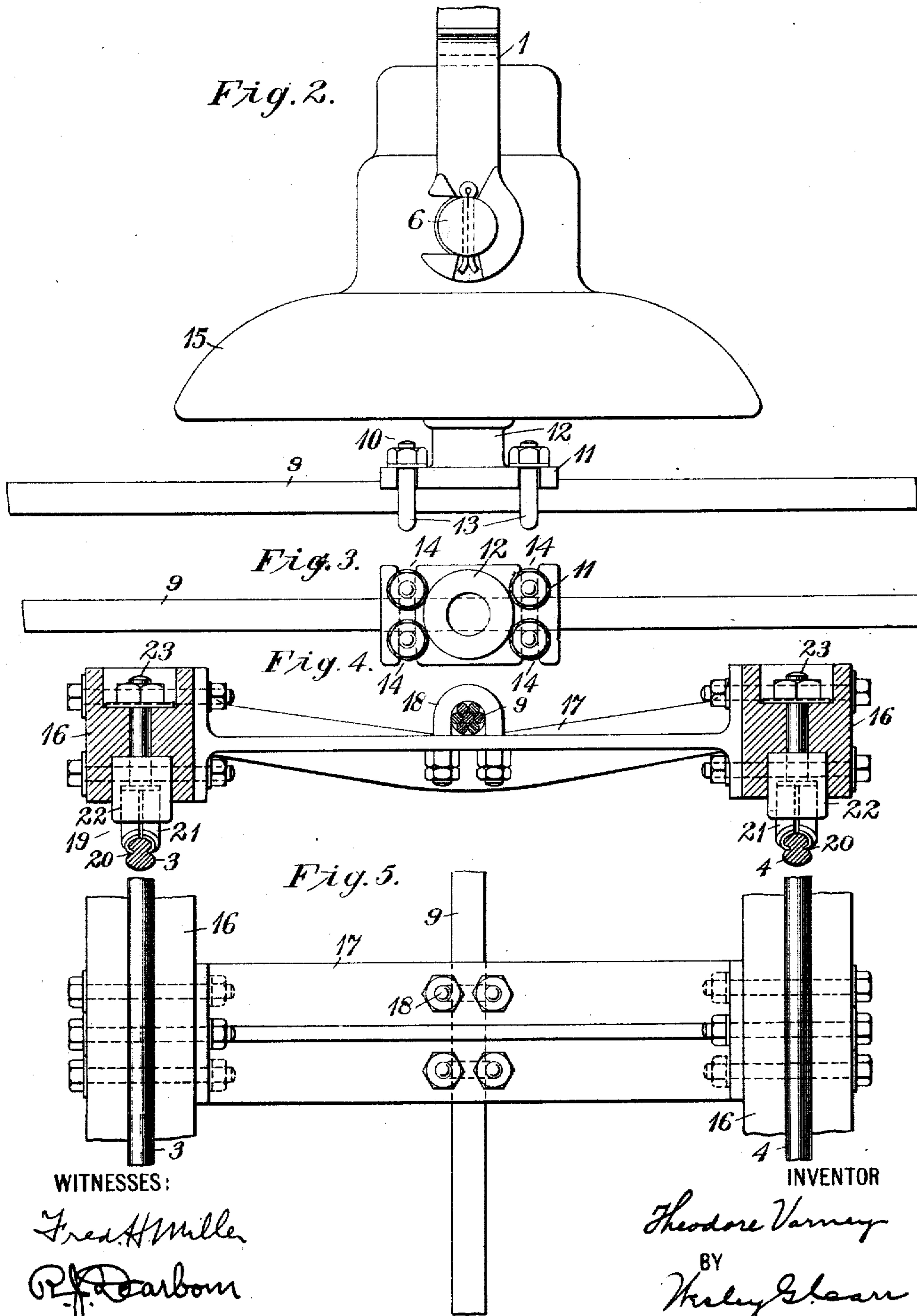
BY
Isley G. Starr
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T. VARNEY.
OVERHEAD LINE CONSTRUCTION FOR ELECTRIC RAILWAYS.
APPLICATION FILED APR. 5, 1907.

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Patented Aug. 17, 1909.

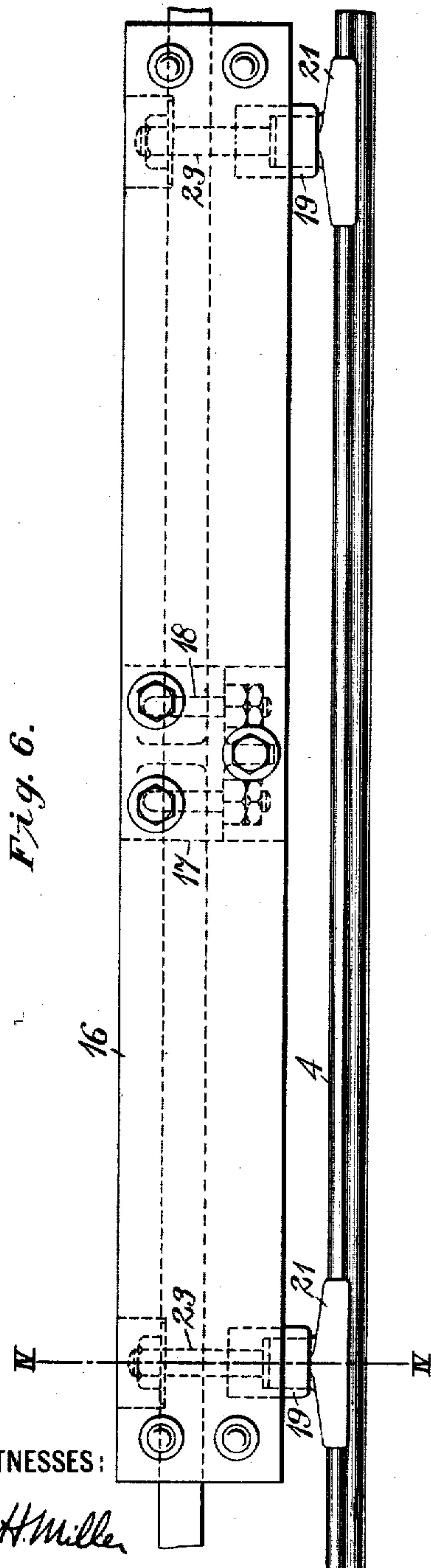
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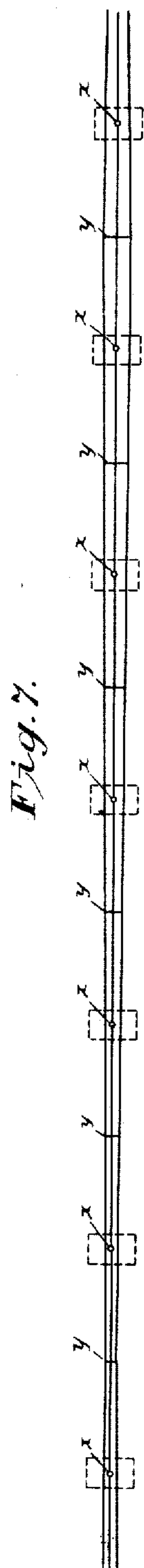
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3 SHEETS—SHEET 3.



WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

THEODORE VARNEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

OVERHEAD-LINE CONSTRUCTION FOR ELECTRIC RAILWAYS.

No. 931,354.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed April 5, 1907. Serial No. 386,500.

To all whom it may concern:

Be it known that I, THEODORE VARNEY, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Overhead-Line Construction for Electric Railways, of which the following is a specification.

My invention relates to electric line conductors and means for their suspension, and has special reference to such overhead line structures as embody electric railway trolley conductors.

The object of my invention is to provide an improved line structure of the class above indicated that shall be simple and durable and specially adapted for use in tunnels or similar locations where the overhead space is limited.

A well known catenary form of trolley line construction comprising one or more trolley conductors suspended substantially parallel to the track from a messenger cable is largely employed where high speed electric vehicles are supplied with energy from the trolley conductors.

One of the objects of my present invention is to provide suitable means for suspending trolley lines of the catenary type in tunnels and in similar locations where the available vertical space is restricted.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in elevation and partially in section, of two trolley conductors and one of their supporting structures constructed and arranged in accordance therewith. Figs. 2 and 3 are, respectively, a side elevation and a plan view of one of the messenger cable supports, and Figs. 4, 5, and 6 are detail views of one of the trolley conductor supports. Fig. 7 is a diagrammatic plan view of a section of line construction.

Referring to the drawings, a clevis 1 depends from the center of a tunnel pocket 2, and trolley conductors 3 and 4 are indirectly supported by and insulated from this clevis. A ring 5 having projections 6 is pivotally mounted in the arms of the clevis 1 and serves as a direct support for a taper plug 7 that is insulated from the ring by means of an insulating tube 8 of suitable shape. A messenger cable 9 is suspended from the lower extremity of the taper plug 7 by

means of a cable clamp 10 comprising a plate 11, a screw-threaded boss 12 which is integral therewith and U-shaped bolts 13 that encircle the cable and engage notches 14 in opposite sides of the plate. In order to prevent surface leakage between the supporting clevis and the taper plug, the insulating tube 8 is sealed by molded potticoat insulator 15 (which is formed under heavy pressure, in a well known manner, after the plug, ring and taper tube are assembled).

The cable 9 is preferably supported, in the manner described, at points indicated by X in Fig. 7 (which are relatively near together) and may preferably be drawn taut in order to avoid contact with the top of the tunnel when upward pressure is exerted by a trolley. A pair of insulating bars 16 are maintained in parallel relation by a cross beam or bracket 17 to which they are bolted substantially at their middle points. The beam or bracket 17 is supported from the cable 9, substantially midway between the cable supports, by means of U-bolts 18, and the trolley conductors are supported from the extremities of the bars 16 by means of trolley conductor clamps 19 which may be of any suitable design that is adapted to the cross-sectional shape of the trolley conductors. As illustrated in Figs. 1 and 4 of the drawings, the trolley conductors are provided with longitudinal grooves 20 and each of the trolley supports comprises a pair of clamping jaws 21, a screw-threaded bushing 22 and a bolt 23 which extends through a hole near one end of the bar.

At any given point, the distance from the supporting cable to the trolley conductors are preferably equal in order that the strains on the structure may be equalized, but it is desirable to make the beams 17 of different lengths in order that the trolley conductors may gradually diverge and converge, as shown in Fig. 7, and thereby avoid the formation of grooves in the engaging trolley shoe. The points of support for the trolley conductors are indicated by Y in Fig. 7.

By making the insulating bars 16 of considerable length they may serve as a secondary insulation to electrically separate the cable 9 and the beams 17 from the trolley conductors and at the same time economize the vertical space in the tunnel.

It will, of course, be understood that my in-

vention is not restricted in its use or arrangement of parts to the application and structure shown, and that the drawings are intended only to illustrate a convenient embodiment of my invention, without imposing restrictions upon it.

I claim as my invention:

1. In an electric trolley line, the combination with dependent hangers of inverted U-shape, clamps attached to said hangers and insulated therefrom, and a wire or cable supported by the clamps, of trolley conductors parallel to the wire or cable, longitudinal insulating bars, trolley conductor clamps at the respective ends of the bars, and means for supporting the bars at their middle points.

2. In a trolley line structure, the combination with a messenger or supporting wire or cable, and a trolley conductor, of insulating bars longitudinally located relatively thereto, trolley conductor clamps located at the respective ends of the bars, and means for supporting the bars from the wire or cable.

3. In a trolley line structure, the combination with a wire or cable and two trolley conductors, of longitudinally disposed insulating bars, trolley conductor clamps at the respective ends of the bars and a metal clamping means for supporting and spacing the bars in pairs from the wire or cable.

4. In a trolley line structure, the combination with a supporting cable or wire and two trolley conductors in a plane below and parallel to the plane of the cable, of longitudinally disposed insulating bars, trolley conductor clamps at the respective ends of the bars and a metal clamping means for supporting and spacing the bars in pairs from the cable or wire.

5. In a trolley line structure, the combination with a depending clevis, a ring having a tapered hole and provided with projections that are rotatably supported by the arms of the clevis, a tapered plug fitted into and insulated from the ring, a messenger cable and a clamp for securing the cable to the lower end of the tapered plug, trolley conductors, and means for supporting the conductors from the cable.

6. In a trolley line structure, the combination with a depending clevis, a ring having

a tapered hole and provided with projections that are rotatably supported by the arms of the clevis, a tapered plug fitted into and insulated from the ring, a messenger cable and a clamp for securing the cable to the lower end of the tapered plug, trolley conductors, and a supporting frame for securing the conductors to the cable comprising a laterally projecting beam and longitudinal insulating bars.

7. In a trolley line structure, the combination with a depending clevis, a ring having a tapered hole and provided with projections that are rotatably supported by the arms of the clevis, a tapered plug fitted into and insulated from the ring, a messenger cable and a clamp for securing the cable to the lower end of the tapered plug, trolley conductors, and a supporting frame for securing the conductors to and insulating them from the cable comprising hanger bolts, a laterally projecting beam and longitudinal insulating bars.

8. In a trolley line structure, the combination with a depending clevis, a ring having a tapered hole and provided with projections that are rotatably supported by the arms of the clevis, a tapered plug fitted into and insulated from the ring, a messenger cable and a clamp for securing the cable to the lower end of the tapered plug, trolley conductors, and means for supporting the conductors from the cable, said means comprising relatively long insulating bars, trolley conductor clamps at the respective ends of the bars, and means for supporting the bars at their middle points.

9. In a trolley line structure, the combination with a messenger wire or cable and a trolley conductor, of longitudinally disposed insulating bars, laterally projecting bracket arms for attaching said bars to said wire or cable, and clamps for suspending the trolley conductor from said bars.

In testimony whereof, I have hereunto subscribed my name this 29th day of March 1907.

THEODORE VARNEY.

Witnesses:

WESLEY G. CARR,
BIRNEY HINES.