

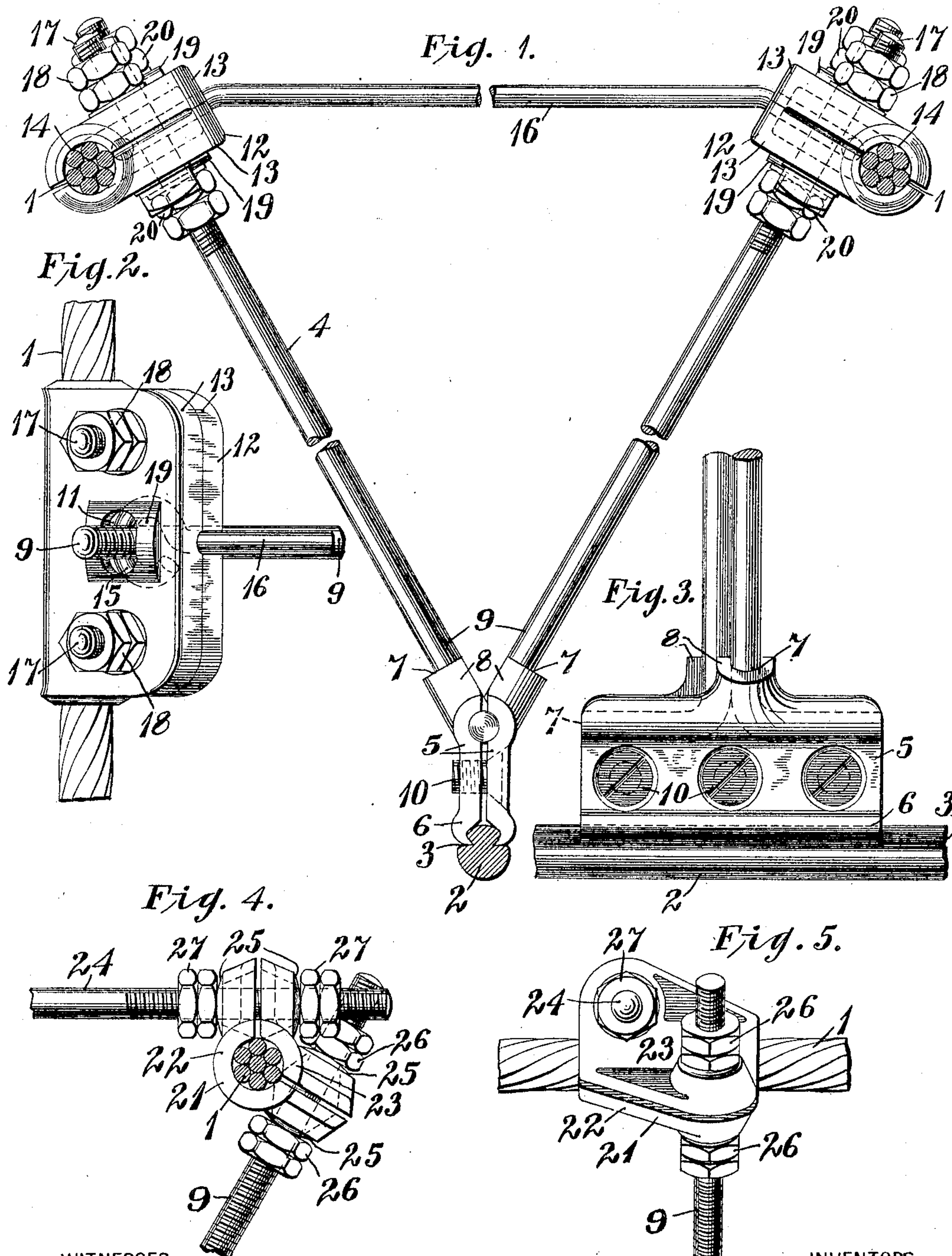
No. 803,216.

PATENTED OCT. 31, 1905.

H. P. DAVIS & T. VARNEY.
SUSPENSION DEVICE FOR TROLLEY CONDUCTORS.

APPLICATION FILED JAN. 17, 1905.

2 SHEETS—SHEET 1.



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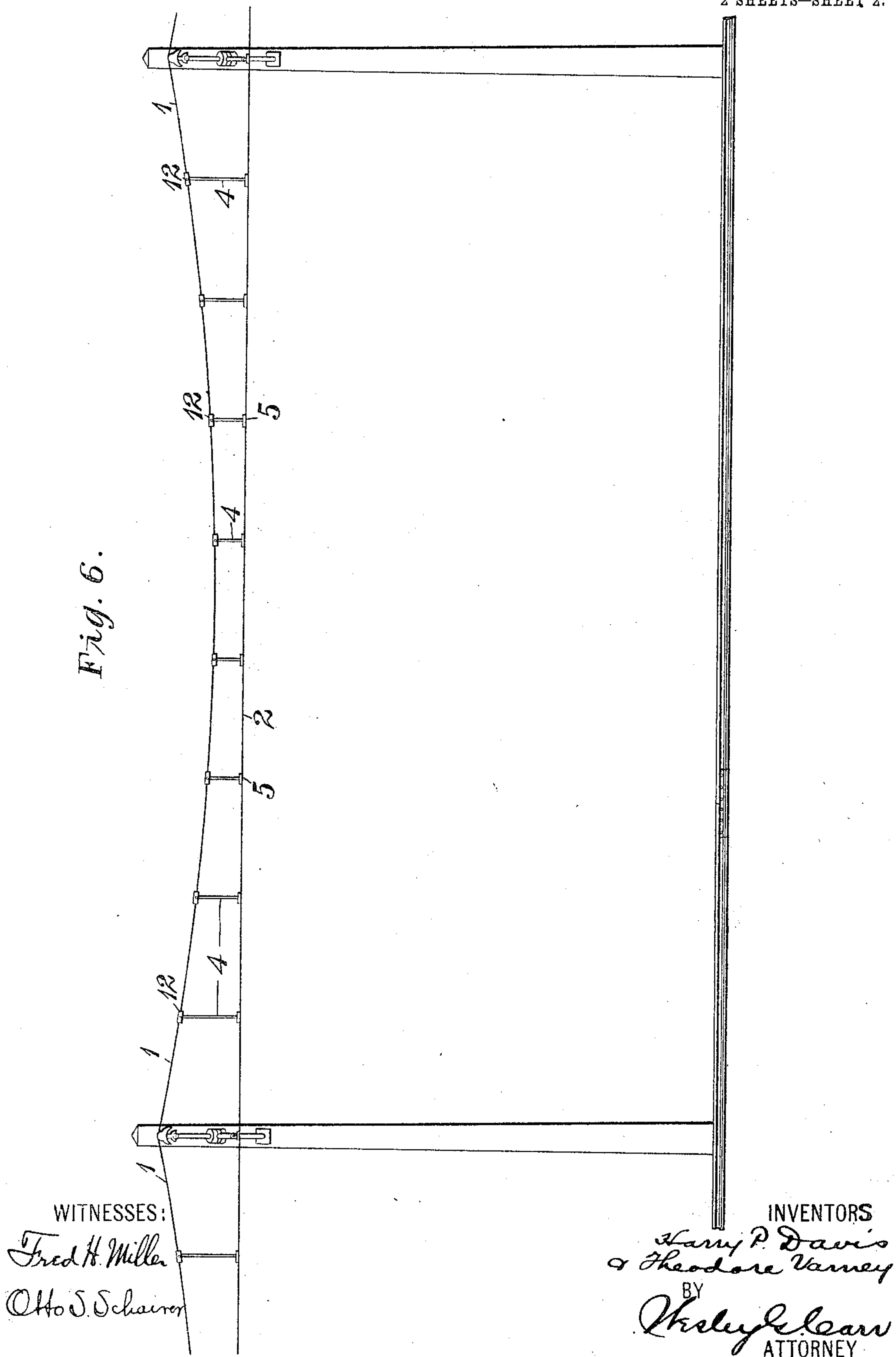
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Fig. 6.



UNITED STATES PATENT OFFICE.

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SUSPENSION DEVICE FOR TROLLEY-CONDUCTORS.

No. 803,216.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed January 17, 1905. Serial No. 241,509.

To all whom it may concern:

Be it known that we, HARRY P. DAVIS and THEODORE VARNEY, citizens of the United States, and residents of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Suspension Devices for Trolley-Conductors, of which the following is a specification.

Our invention relates to electric railways, and particularly to means for suspending the trolley-conductors which are utilized for conducting current along such railways.

The object of our invention is to provide a simple, easily-applied, and substantial means for suspending a trolley-conductor from a pair of messenger wires or cables.

In the accompanying drawings, Figure 1 is an end elevation of one of our suspension devices, the trolley-conductor and messenger-cables being shown in section. Fig. 2 is a plan view of one of the clamps for attaching the suspension device to a messenger-cable, one clamping-nut and the corresponding lock-nut being removed. Fig. 3 is a side elevation of a portion of a trolley-conductor and the corresponding clamp of one of the suspension devices. Fig. 4 is an end elevation of a modified form of messenger-cable clamp, and Fig. 5 is a side elevation of the clamp shown in Fig. 4. Fig. 6 is a diagrammatic side elevation of a section of line construction which embodies our invention.

It is essential to satisfactory operation of electrically-propelled vehicles at high speeds that the trolley-conductor shall be securely supported at an approximately uniform elevation above the tracks and in such manner that it may be free from material lateral vibration and displacement. A desirable means for properly supporting the trolley-conductor under such conditions of service embodies a messenger wire or cable which hangs between poles located at suitable intervals along the roadway in catenary curves and from which the trolley-conductor is suspended at a suitable elevation by means of hangers which differ in length in accordance with the points along the catenary curve of the messenger-cable at which they are located.

In order to provide a stronger and more stable means of suspension than is possible

by the employment of the devices heretofore used, we propose to utilize two messenger-cables disposed side by side and so connected with each other and with the trolley-conductor as to provide a triangular framework which is stable and rigid to a degree not possible with a single messenger-cable unless special steadying devices are employed and even more substantial and desirable in certain respects than is any single messenger-cable scheme of suspension which has heretofore been employed.

Referring first to Figs. 1, 2, and 3 of the drawings, the messenger wires or cables 1, which will be hereinafter referred to as "cables," with the understanding that such references are not to be considered as excluding employment of wires whenever such are desired, may be supported by means of either bracket-arms or span-wires from suitable poles or towers (not shown) that are located at suitable intervals along the roadway in accordance with the usual or any proper engineering practice. The trolley-conductor 2 is preferably provided with longitudinal grooves 3, one at each side, and is suspended from both messenger-cables 1 by means of a series of triangular frames 4. Each frame 4 comprises parts which will be hereinafter enumerated and described, but which may be reduced in number or modified in form from what is shown without departing from our invention. Two clamping plates or blocks 5, which may be alike, are severally provided at their lower edges with hooks or claws 6 to engage the grooves 3 in the trolley-conductor and at their upper edges are severally provided with semicylindrical recesses 7, which are of substantially L shape and one end of each of which is located in a projection 8 at the upper edge of the clamp-plate. This projection is located nearer to one end than the other of the plate, so that when the plates are clamped together the projections will be displaced laterally with reference to each other, as indicated in Fig. 3. Two inclined supporting-rods 9 have their lower ends bent substantially at right angles to their body portions, so as to fit within the respective recesses 7 and be clamped securely therein by means of suitable clamping-screws 10. While the rods 9 are shown as cylindrical in cross-section and as clamped to

the plates 5, it would be within the scope of our invention to make rods of different form in cross-section and also to make them integral parts of the respective plates 5, if such construction were found desirable. The rods 9 diverge from the clamping-plates 5 at a suitable angle and at their upper ends respectively project through relatively large holes 11 in double clamps 12, each clamp comprising two blocks or plates 13, which are severally provided with semicylindrical recesses 14 to receive the messenger-cable 1 and are also recessed to receive a hook 15, that is formed on the end of a span-rod 16 and surrounds the rod 9 within the clamp 12. The two parts 13 of the clamp are securely fastened together around the messenger-cable and around the span-rod 16 by means of bolts 17 and nuts 18.

It will be understood that the messenger-cables 1 hang from their supports in catenary curves, and consequently that the hangers 4 must be of different lengths in order to properly suspend the trolley-conductor at a substantially uniform height. Since the angles between the messenger-cables and the trolley-conductor vary from zero at the lowest point of the catenary curve to a maximum at the highest points, it is desirable that the hangers 4 should have an adjustable connection with the cables in order that they may be disposed in substantially vertical planes without distorting the cables. In order to permit of automatic adjustment of the hangers, the holes 11 in the clamping-blocks 13 are made of materially greater diameter than the rods 9, and the outer faces of the blocks are provided with curved surfaces 19, with which nuts 20 on the rods 9 engage. It will be understood that the curved surfaces 19 may be formed by comparatively narrow projections, as indicated, or that all or any desired portion of the outer face of each clamping-block may be curved. It will be also understood that the curvature may be that of a cylinder or of a sphere-segment, as may be desired.

In Figs. 4 and 5 we have shown a modification in which the clamp 21 for attaching the hanger 4 to each messenger-cable 1 comprises two angular blocks 22 and 23, having recesses intermediate their ends for the cable and having holes in said ends for the tie-rod 24 and for the hanger-rod 9. The holes through which the rods 9 and 24 project are of such size as to permit the rods to move laterally therein, and the outer faces of the blocks have convex curved surfaces 25, which are engaged, respectively, by nuts 26 on the rod 9 and by nuts 27 on the rod 24.

Other modifications and variations from what we have specifically shown and described may of course be made within the scope of our invention.

It will be understood from the foregoing

description that when a series of the above-described hangers are combined with a pair of messenger-cables there is little, if any, possibility of lateral vibration or displacement of the trolley-conductor and as little liability for a breakdown of the structure as a whole.

We claim as our invention—

1. A support for trolley-conductors comprising two messenger-cables and a triangular frame provided with means for clamping the same to said cables and to the trolley-conductor.

2. A supporting device for trolley-conductors comprising two messenger-cables and a triangular frame consisting of two suspension-rods, a span-rod, a two-part clamp for fastening the lower ends of the suspension-rods to the trolley-conductor and two-part clamps for fastening the upper ends of the suspension-rods and the ends of the span-rod to the messenger-cables.

3. In a supporting structure for trolley-conductors, a triangular frame comprising three rods and three clamps, one for fastening the frame to the trolley-conductor and the other two for fastening it to the messenger-cables.

4. In a supporting structure for trolley-conductors, two side-by-side messenger-cables and a triangular frame comprising two suspension-rods, a span-rod and clamps for removably fastening said parts together.

5. In a suspension structure for trolley-conductors, the combination with two messenger-cables located side by side and at approximately the same elevation, of a triangular frame comprising two suspension-rods, a span-rod, two-part clamps for fastening the messenger-cables, the suspension-rod and the tie-rods together, and a two-part clamp for fastening the meeting ends of the suspension-rods to the trolley-conductor.

6. In a suspension structure for trolley-conductors, two side-by-side messenger-cables and a triangular suspension-frame comprising two suspension-rods having their lower ends bent at approximately right angles to their lengths, a two-part clamp having L-shaped recesses to receive the bent ends of the suspension-rods, means for clamping said members together and to the trolley-conductor, a span-rod having hook-shaped ends to receive the upper ends of the suspension-rods, and two-part clamps to receive the upper ends of the suspension-rods, the hook-shaped ends of the span-rod and the messenger-cables.

7. A hanger for a trolley-conductor comprising a clamp, hanger-rods diverging upwardly and outwardly therefrom, messenger-cable clamps having outer curved surfaces and having loose connection with said hanger-rods, and a tie-rod for said clamps.

8. A hanger for a conductor comprising a clamp, rods projecting upwardly and out-

wardly from said clamp, messenger-cable clamps having holes of greater diameter than the hanger-rods, through which said rods project, and having external curved surfaces that are engaged by nuts on said hanger-rods, and a tie-rod that connects said clamps together.

9. The combination with a trolley-conductor and two messenger-cables, of a hanger comprising two messenger-cable clamps, a trolley-conductor clamp and suspension-rods that are adjustably connected to the messenger-cable clamps.

10. A hanger for trolley-conductors comprising hanger-rods, a tie-rod, a trolley-conductor clamp and two messenger-cable clamps that connect said hanger-rods and said tie-rod and are angularly adjustable with reference thereto.

11. A hanger for suspended conductors comprising a clamp, hanger-rods, a tie-rod and messenger-cable clamps that connect said hanger-rods and said tie-rod and in which said rods are adjustable.

12. A triangular hanger for conductors having a non-adjustable clamp at one apex and adjustable clamps at its other apices.

13. A triangular hanger for conductors comprising side rods and apex-clamps, one for the conductor and two that are angularly adjustable to adapt the hanger to a messenger-wire having a catenary curve.

14. A hanger comprising two hanger-rods, a tie-rod, a conductor-clamp that joins adjacent ends of the hanger-rods, messenger-cable clamps that join the adjacent ends of the hanger-rods and the tie-rod, and means for adjusting each cable-clamp along either or both of said rods.

In testimony whereof we have hereunto subscribed our names this 14th day of January, 1905.

HARRY P. DAVIS.
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Witnesses:

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