

(No Model.)

G. T. WOODS.

TUNNEL CONSTRUCTION FOR ELECTRIC RAILWAYS.

No. 386,282.

Patented July 17, 1888.

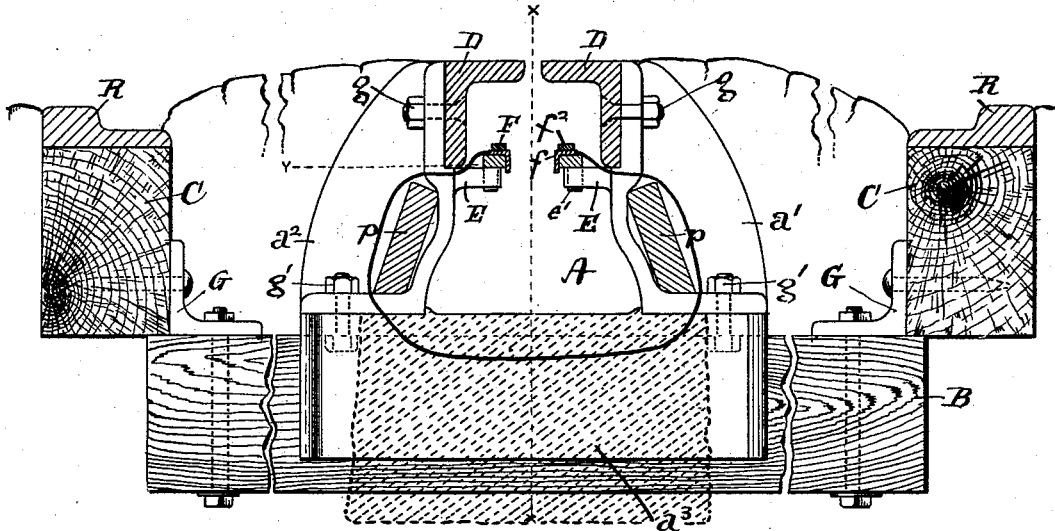


Fig. 1.

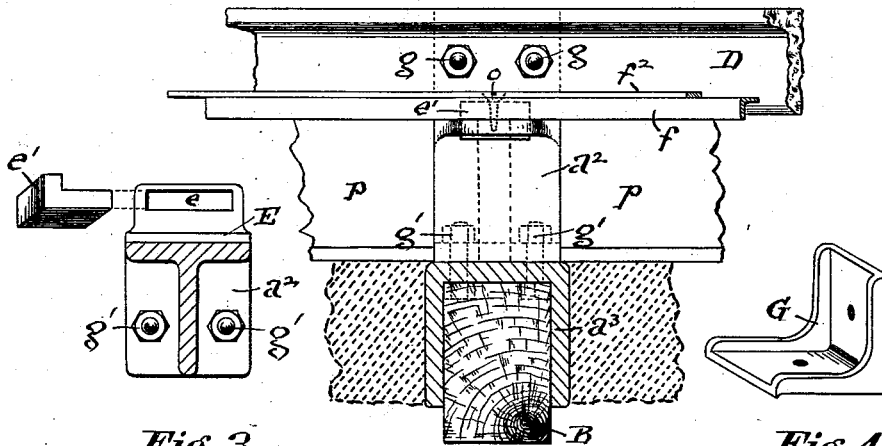


Fig. 3.

Fig. 4.

Fig. 2.

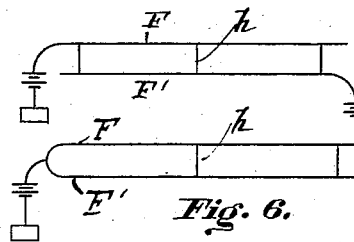


Fig. 5.

Fig. 6.

Attest.  
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## TUNNEL-CONSTRUCTION FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 386,282, dated July 17, 1888.

Application filed May 2, 1887. Serial No. 236,777. (No model.)

*To all whom it may concern:*

Be it known that I, GRANVILLE T. WOODS, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Tunnel-Constructions for Electro-Motive Railways, of which the following is a specification.

My invention relates to tunnels for carrying the conductor or conductors of electro-motive railways, its object being to produce an economical and efficient construction for carrying said conductors below the surface of the ground, in which position they may be reached and utilized by the traveling contacts upon the car or motor through a slot at the surface of the roadway; and it consists in the construction and arrangement of the parts, as hereinafter set forth.

In the drawings herewith, illustrating and forming part of this specification, Figure 1 represents a cross-section of the roadway, showing one of the yokes supporting the slot-rails and conductors; Fig. 2, a central vertical section of the same in the central plane,  $x$ , of the roadway-slot; Fig. 3, a horizontal cross-section of one of the jaws of the yoke on the plane  $y$  of Fig. 1; Fig. 4, a detached view of one of the corner-brackets; Figs. 5 and 6, diagrams representing the arrangement of the conducting circuits.

Referring now to Fig. 1, A represents a yoke, preferably formed of cast-iron in three parts, as hereinafter explained, and which is secured upon a cross-tie, B, between the stringers C of the track R. Upon the inner faces of the jaws of the yoke A are carried the slot-rails D, and immediately below them, upon projecting brackets E, are carried the conductors F F'.

The particular description of the yoke is as follows: It consists of two jaw-pieces,  $a' a^2$ , (shown in elevation in Figs. 1 and 2, and one of them in horizontal cross-section in Fig. 3,) formed of cast-iron and adapted to rest upon a base-piece,  $a^3$ , which latter is formed to fit over and upon the cross-tie B. The jaw-pieces  $a' a^2$  are each cast with an inner projection or bracket, E, having a vertical opening,  $e$ , to receive a plug,  $e'$ , of wood or other insulating material, formed as shown in Fig. 3, upon which the conductor proper, F, is carried and

supported, as indicated in Figs. 1 and 2. The bracket E also serves as a bottom support for the slot-rail D, the latter being the ordinary merchant angle-iron. The jaw-pieces are secured to the base by bolts  $g'$  and the slot-rails to the jaws by bolts  $g$ , as indicated. The cross-tie B may be secured to the longitudinal stringers C by the angle-pieces G, (shown in Fig. 4,) and by bolts and spikes, as indicated in Fig. 1.

The conductor F consists of a strip of angle-iron,  $f$ , carried upon the top and extending downward at the inside of the supporting-plugs  $e'$ , and superimposed upon its upper surface is a strip of copper,  $f^2$ , the whole being secured by a screw,  $o$ , (indicated by dotted lines in Fig. 2,) passing through the metal strips into the wooden plug  $e'$ .

The two jaw-pieces  $a' a^2$  being exactly similar may be cast from the same pattern, and while I have shown the jaw-pieces and base as separate and bolted together these parts may be cast as one, if preferred. I prefer to form the bottom of the tunnel of concrete (indicated in section by broken lines in Fig. 1) as a continuous gutter and provided with drainage openings at suitable intervals. The sides of the tunnel may be formed by a continuous series of planks,  $p$ , resting against the sides of adjacent yokes, and the top and upper sides of the tunnel are formed by the angle-irons or slot-rails D.

The two conductors F F' are intended to exhibit the same polarity, the source of electricity being arranged in relation thereto as exhibited in Fig. 6; and to this end suitable connections,  $h$ , (indicated by full lines in Fig. 1,) are to be provided at proper intervals. The general plane of working the circuit is from the conductors through the motor to ground at the slot-rail or at the carrying-rails.

Within the tunnel and upon the wooden plugs inserted in the bracket-holes are carried the two conductors in parallel lines, contact being made by a traveling brush upon the motors, suitably formed to rest upon and between the conductors. The electrical arrangement is indicated in Figs. 5 and 6. As arranged in Fig. 1, a battery or source of electrical energy is attached to each end of the lines to the opposite conductors F F', and cross-connections

h made at frequent intervals. The current is taken from the conductors, or either of them, and shunted through the motor apparatus to ground at the rails R or the slot-rails D, as  
 5 may be convenient. The yokes in each case form convenient grounding-connections. The cross-connections h may be made by insulated wires carried around and beneath the tunnel,  
 10 as indicated by dotted lines in Fig. 1. As shown in Fig. 6, the conductors F F' are connected at the same end to a single generator, and the cross-connections arranged as before. The general advantage of this arrangement is  
 15 that both conductors exhibit the same polarity, and consequently the leakage is reduced to a minimum; also, that the double conductor insures at all times an efficient contact of the brush.

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

1. The yoke for supporting the slot-rails of electro motive-railway tunnels, consisting of a base-piece adapted to fit over and upon the  
 25 sides and top, a cross-tie beneath the roadway-surface, and two removable jaw-pieces adapted to rest upon and be secured to said base and support angle-iron slot-rails, substantially as set forth.

2. The improved yoke for electro-motive-  
 30 railway tunnels, consisting of a base and two

upwardly-projecting jaws, each provided with an inwardly-projecting bracket for maintaining the conductors, and a recessed face above the bracket for maintaining the angle-iron slot-rails, substantially as set forth. 35

3. In electro-motive railways of the character described, the combination, with suitable tunnel-supports, of two continuous conductors of the same polarity, with independent cross-connections, substantially as set forth. 40

4. In electro-motive railways of the character described, in combination with insulated tunnel-supports, a conductor embodying an angle-iron strip extending over successive supports and down at the inside of the same, and  
 45 a copper strip or facing superimposed upon the upper face of the angle-iron, substantially as set forth.

5. The tunnel construction for electro-motive railways, embodying, in combination, the  
 50 yokes A, brackets E, insulated supports e', and conductors F F', arranged and operating substantially as set forth.

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

GRANVILLE T. WOODS.

Witnesses:

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