

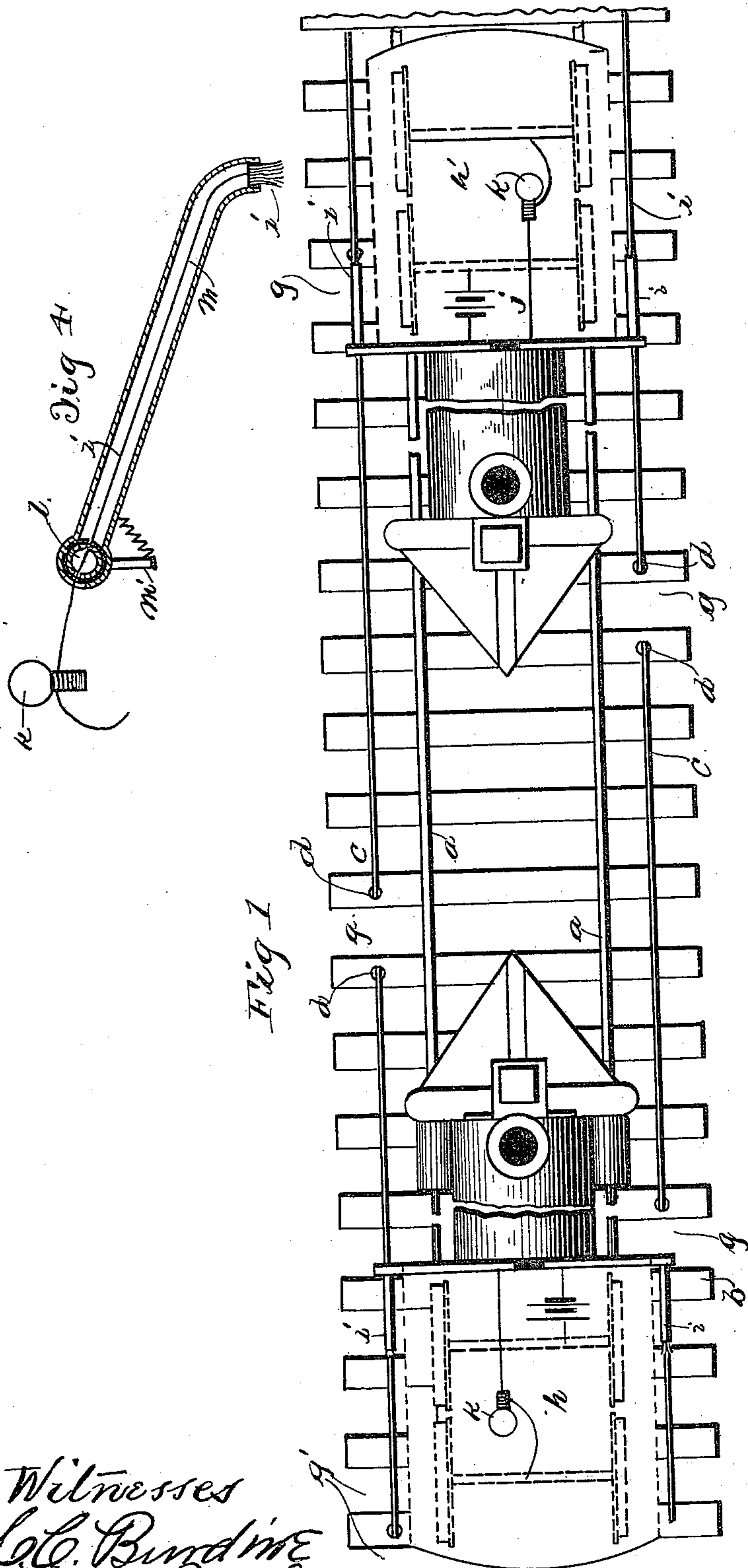
(No Model.)

2 Sheets—Sheet 1.

W. H. WADDELL.  
ELECTRIC RAILWAY SIGNAL.

No. 441,044.

Patented Nov. 18, 1890.



Witnesses  
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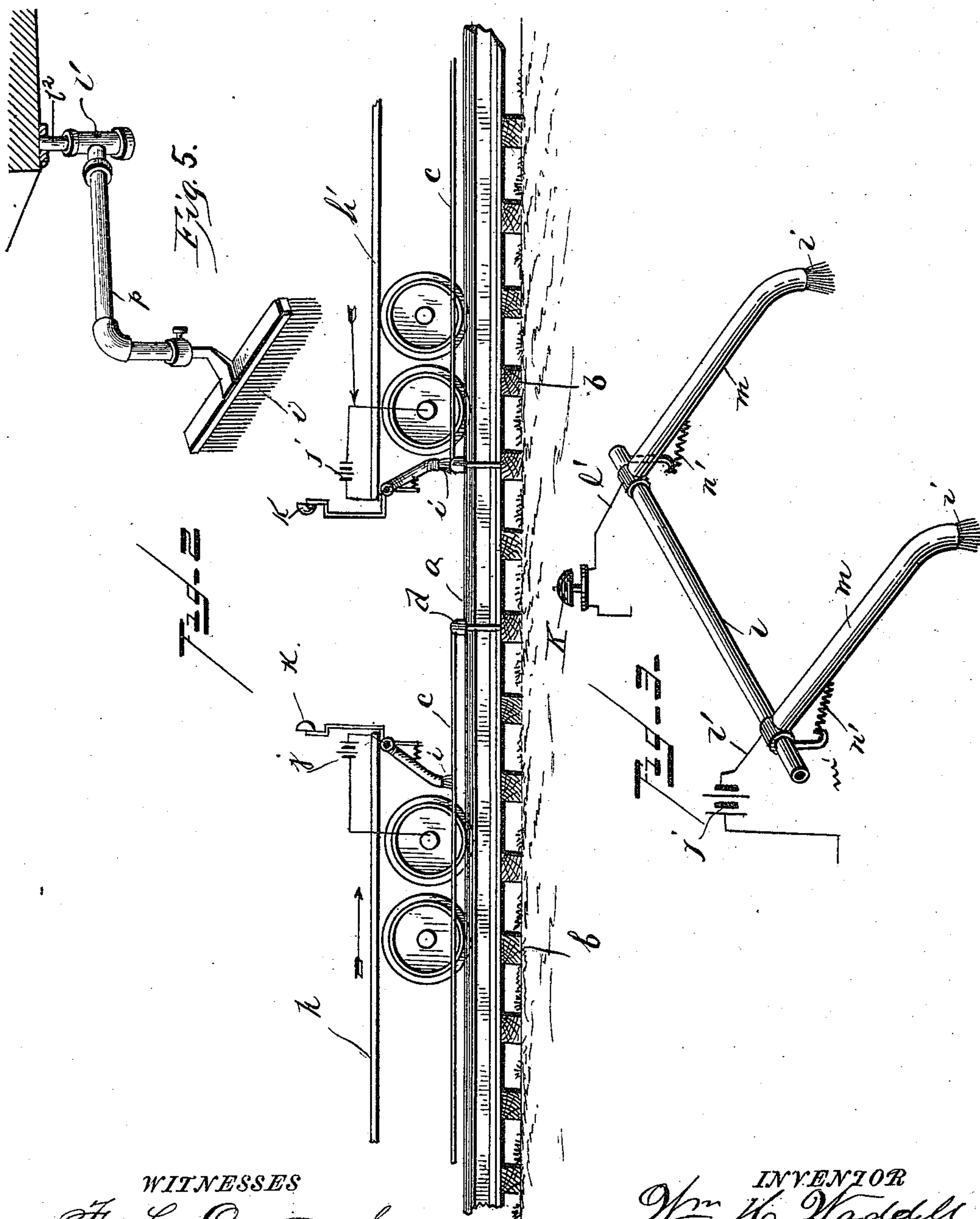
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# UNITED STATES PATENT OFFICE.

WILLIAM H. WADDELL, OF LEXINGTON, VIRGINIA.

## ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 441,044, dated November 18, 1890.

Application filed October 21, 1889. Serial No. 327,710. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. WADDELL, of Lexington, in the county of Rockbridge and State of Virginia, have invented certain new and useful Improvements in Electric Railway-Signals; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to certain improvements in electric railway-signals, and more particularly to an improvement over the Patent No. 400,525, granted to me April 2, 1889; and my invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a plan of a portion of a railroad-track, showing the conductors and two moving vehicles and their signaling devices. Fig. 2 is a side elevation of the track and two vehicles thereon. Fig. 3 is a detail perspective of the brackets, each carrying a contact-brush. Fig. 4 is a section of one of the brackets of Fig. 3. Fig. 5 is a detail perspective of a different form of brush-bracket.

In the drawings, the reference-letters *a a* indicate the rails of a railroad-track, resting upon the usual sleepers *b*.

Each side of the track is provided with a single conductor *c*, extending parallel with and at a distance from the series of rails on the respective sides. The conductors *c c*, located on the opposite outer sides of the tracks, are hence parallel with each other. These conductors preferably consist of a wire or wires or cables supported at a distance from the ground or sleepers by the insulators *d*, usually formed of glass with a socket in the bottom to receive a rigid standard extending up from a sleeper or other suitable support and each having a transverse groove in its top, in which the conductor lies.

Each conductor is broken into a number of sections insulated from each other and of suitable and, preferably, equal lengths, and the breaks *g* in the conductors on opposite

sides of the track are so arranged that the sections of the opposite conductors overlap—that is, the sections of each conductor are of the same length and the breaks *g* of one conductor are located approximately opposite the centers of the sections of the conductor on the opposite side of the track.

*h h'* indicate two moving vehicles on the track, and each of said vehicles is provided with a pair of brushes or other suitable contact-carriers *i i*, insulated from each other and each bearing on one of said two conductors. Each vehicle is provided with two circuits, each circuit terminating in one of said brushes and in a wheel or axle, so that there will be a partial or open circuit from each conductor to the rails on the same side of the track. The circuit on one side is provided with an electric alarm *k* only and the other circuit with the source of electricity *j*, as shown. Thus it will be seen that either of these circuits will be closed when the conductor and rails are electrically connected, and when so closed the alarm will be sounded. It should be stated here that the rails on the two sides of the track can be electrically connected to form two conductors; or the separate rails need not be connected together, but be so located that the circuit from the vehicles can be grounded through them.

From the foregoing it will be seen that when two vehicles, equipped as before described, approach each other on the same track, so that their brushes or said other contact-carriers will be on the same conductor-sections the circuits in both vehicles on that side will be closed and the alarms in both vehicles will be sounded, thereby notifying the engineers of the danger of a collision and giving them time to stop their trains, the circuit in each vehicle passing from the rail (through the series of rails or from the ground through a rail) through the wheel, battery, and bell to a brush or other contact-carrier *i*, and through the conductor-section to the corresponding brush or other contact-carrier of the other vehicle. These conductor-sections are of such length that when two approaching trains come in contact with one of them the trains will be far enough apart to have ample time in which to stop before coming into collision. If one circuit of a vehicle has



a bell and the other the source, the vehicle is provided with a switch, (not here shown,) as fully described in my former patent, No. 400,525, so that the source can be shifted from one circuit to the other.

If the conductors on the opposite sides of the track were not formed in overlapping sections, but the breaks in the conductors were opposite each other, two trains might meet at the breaks without notice to their respective engineers. The conductor-sections are drawn tight and at their ends rigidly secured to the insulators, so that throughout their length they will rest in the top grooves of the insulators without being fastened.

The arms or brackets carrying the contact-brushes are tubular, as shown, and in Figs. 3 and 4 these brackets consist of a tube *l*, horizontally secured to the car and projecting beyond the sides of the same, and the two tubular brush-arms *m m* at their upper ends journaled on said cross-bar to allow their free ends to swing vertically, and the lower open ends of said tubular arms contain the wire or metal brushes *i*, which rub upon the conductors. The wires *l' l'* from the two brushes or contact-carriers extend up inside of said two hollow arms *m* to the interior of the car, and the two brushes *i i* are insulated from each other at any suitable points, as by insulating material surrounding the brushes themselves, or by insulating material between the arms *m m* and shaft *l*, as shown in Fig. 4. These arms can be provided with springs *n'* to yieldingly hold them in contact with the conductors, each spring being secured to its arm *m*, and at its opposite end to a rigid arm *m'*, rigidly secured to shaft *l*.

In Fig. 6 an elongated brush *i'* is shown, which will have an extended bearing on the wire, and this brush is adjustably and removably secured to the lower end of a tubular right-angular bracket *p*, through which the wire *l'* extends, and which is secured to and extends out from the side of the car, each brush being provided with a separate bracket. Each bracket *p* is secured to the vehicle by means of a depending rigid post *l<sup>2</sup>* from the bottom or other part of the vehicle, fitted and secured in a vertical socket or tube on the end of the bracket.

The alarm mechanism is carried by a loco-

motive or other car and is so located as to notify the engineer.

In my patent, No. 400,525, I used two pairs of parallel conductors on opposite sides of the track in overlapping sections, a contact-carrier running on each conductor, and so completing the circuit. It being a well-established fact that the rail will act as a ground-connection, I propose to improve on that patent by using a single conductor on each side of the track in overlapping sections and using only one contact-carrier where I used two before, using the rail as a ground-connection. These single conductors may be of one wire or other suitable material, or, to obtain better contact with the contact-carrier, may be composed of any number of wires or other suitable material, preferably united or joined together at the end of a section, thus forming a single conductor, and one contact-carrier or brush running over the whole.

What I claim is—

1. In an electric railroad-signal, the combination, with a vehicle and a conductor along the track, of a tubular bracket carried by the vehicle, having a metal brush on its lower end bearing on the conductor, and the wire from the brush extending up the interior of the bracket, substantially as described.

2. The combination, with a track, of the two separate distinct conductors respectively located on opposite sides of the track in overlapping insulated distinct sections, with a single alarm and single source of electrical energy on an engine, said alarm and electrical source being disconnected and in separate circuits, connected, respectively and separately, with the rails and with a different one of said conductors, substantially as described.

3. In an electric railway-signal, the combination, with a line-conductor and a vehicle, of a tubular bracket extending down from said vehicle, a support fitted in the upper end of said bracket, and a contact fitted in the lower end thereof, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM H. WADDELL.

Witnesses:

PERCY C. GARING,  
S. B. WADDELL.