

No. 608,031.

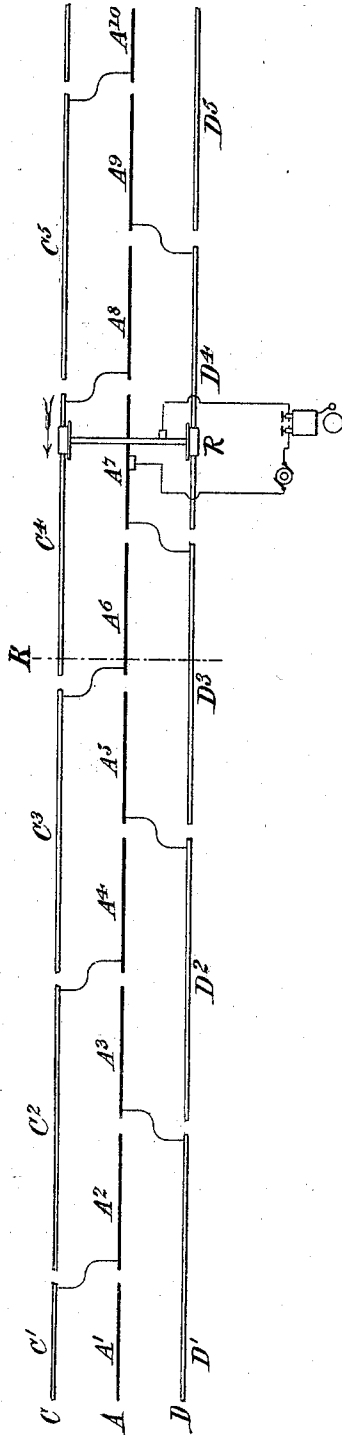
Patented July 26, 1898.

G. T. CUNNINGHAM.
RAILWAY SIGNAL SYSTEM.

(Application filed Nov. 13, 1897.)

(No Model.)

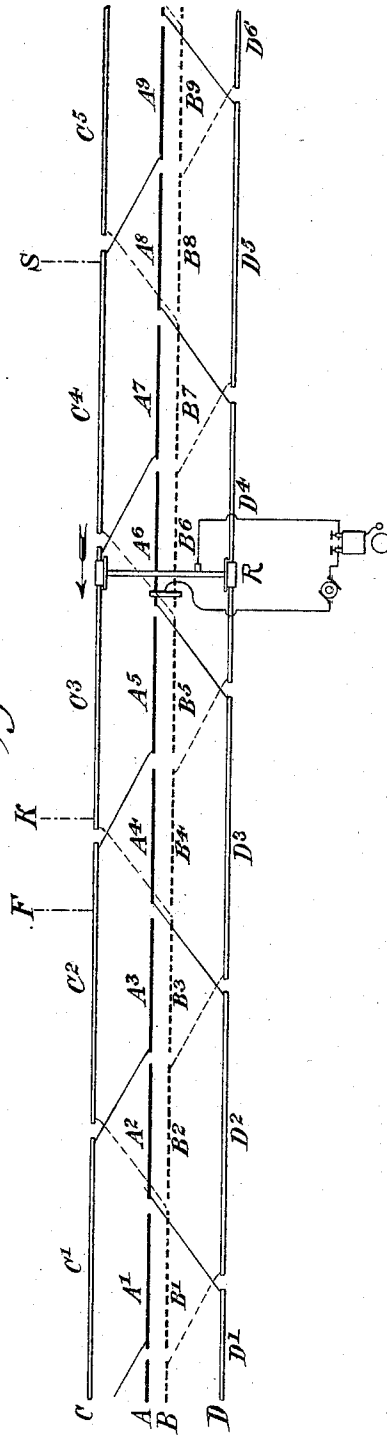
Fig. 1



Witnesses:

Raphael Netter
L. T. Shaw

Fig. 2



Inventor
George T. Cunningham
by Edward M. Bentley, Atty.

UNITED STATES PATENT OFFICE.

GEORGE T. CUNNINGHAM, OF BOSTON, MASSACHUSETTS.

RAILWAY SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 608,031, dated July 26, 1898.

Application filed November 13, 1897. Serial No. 658,366. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. CUNNINGHAM, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Railway Signal Systems, of which the following is a specification, reference being made to the accompanying drawings, in which—

Figure 1 represents the elementary principles of my invention applied to one of the two tracks of a double-track railway, and Fig. 2 represents my invention applied to a track upon which trains may pass with equal facility in both directions.

My invention relates to that class of railway signal systems in which there is an exposed sectional electric conductor extending along the railway and in which each train carries a generator and signal-receiving apparatus, both contained in a circuit having one terminal connected to the wheels and the other to a contact-brush bearing against the exposed sectional line conductor, so that whenever two trains come within a specified distance of one another—dependent upon the length of the section—the contact-brushes of the respective trains will bear upon the same section of line conductor and the circuit between them will be closed. Each train will thus receive current from its signal apparatus, thereby giving notice to the engineer of this train that another train is in the same neighborhood.

My present invention consists in dividing the track-rails also into insulated sections and so connecting them to the insulated sections of the line conductor that any advancing train will be notified not only of the presence of other trains carrying contact devices, but also of detached cars or other objects on the track which may establish electrical connection from rail to rail.

Referring to Fig. 1, it will be understood that I divide the two track-rails C and D into insulated sections of a given length (marked, respectively, C' C², &c., and D' D², &c.) by inserting in the rails at alternate points a block of insulated material, so that in one rail this insulating-block will come opposite the center of a section in the other rail. I likewise divide into sections a line conductor

A, placed between the two track-rails, so as to present its upper surface to a contact-brush carried by the locomotive of each train. Each section of line conductor is not more than one-half the length of a rail-section, so that there are twice as many of the former as there are of the latter in any one rail. I also connect the end of each conductor-section to a rail-section located in advance of the conductor-section. The succeeding sections are connected alternately to the rail-sections on opposite sides of the track, and while the sections in one rail are equal in number to one-half the number of conductor-sections, yet there are in the two rails together a number of sections equal to the number of conductor-sections. Consequently for each of the former sections there will be a corresponding one of the latter sections, to which it is electrically connected, as above described.

If we assume that the rail-sections are one mile in length and the conductor-sections are one-half mile in length, connected as hereinbefore described, it will be evident that advancing train R will be notified of the presence of a train at K as soon as it arrives at the position shown in Fig. 1—that is, a train upon entering any rail-section will always receive notice of any train, car, or other obstruction forming electrical connection between the rail for a mile in advance of itself. Consequently this system would be adequate for double-track roads in which the trains under normal circumstances proceed on each track in a single direction.

In Fig. 2 I have shown two conductors A and B, each arranged like the conductor A of Fig. 1, except that one conductor is connected with the rail-sections in the rear and the other with the rail-sections in advance. This will permit trains to operate as above described in whichever direction they may be moving on the same track and to both give and receive signals in front and rear. Thus the train R moving in the direction of the arrow will receive notice of another train at the point F, provided the latter has a contact-brush bearing upon the conductors A and B. If, however, the latter train has no contact-brush—consisting, for instance, of detached cars without a locomotive—it will need be at the point K before the train R will take

cognizance of it. In like manner the train R is notified of a following train when the latter reaches the point S. At this point each train will have its signal apparatus included in a circuit including the signal apparatus of the other. In any event, any train provided with a contact-brush and signal apparatus will receive notice a sufficient distance away of another train in front or rear, whether the other train is provided with a contact-brush or not.

It will of course be understood that in the usual fashion each locomotive will be provided with a generator constantly in condition to furnish current. A bell will be included in the circuit of this generator, and its two terminals will be connected one to the contact-brush bearing upon both of the sectional conductors and the other to the axle. The circuit of the generator will be completed either through the corresponding circuit of another train or through the circuit established by the axle of the other train connecting the two opposite rail-sections.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the track-rails divided into sections, of a conductor divided into twice as many sections as there are in each rail and a connection from the respective conductor-sections to the rail-sections on opposite sides of the track alternately.

2. The combination with the track-rails divided into sections, of a conductor divided into twice as many sections as there are in each rail, and a connection from each conductor-section extending along the track to a

rail-section in advance of the conductor-section, the several conductor-sections being connected in succession to rail-sections on opposite sides of the track alternately.

3. In a railway signal system the combination of the two track-rails divided at alternate points into insulated sections and a parallel conductor divided into sections shorter than the rail-sections, so that each rail-section may have a conductor-section opposite to it, the said conductor-sections being each connected to a rail-section adjacent to the one to which it lies opposite.

4. In a railway signal system, the combination of the two track-rails divided into sections, and a double parallel conductor divided into sections shorter than the rail-sections, each pair of conductor-sections being connected, one to a rail-section in the rear of, and the other to a rail-section in advance of the rail-section to which it lies opposite.

5. In a railway signal system the combination of the two track-rails divided into insulated sections at alternate points and a double parallel conductor divided into sections shorter than the rail-sections, so that each conductor-section may lie opposite a rail-section, the two conductors in each section being connected, one to a rail-section in the rear of, and the other to a rail-section in advance of the one to which the conductor-section lies opposite.

Signed this 5th day of November, 1897.

GEORGE T. CUNNINGHAM.

Witnesses:

ALVAH A. SKINNER,
ERNEST S. WILLIAMS.