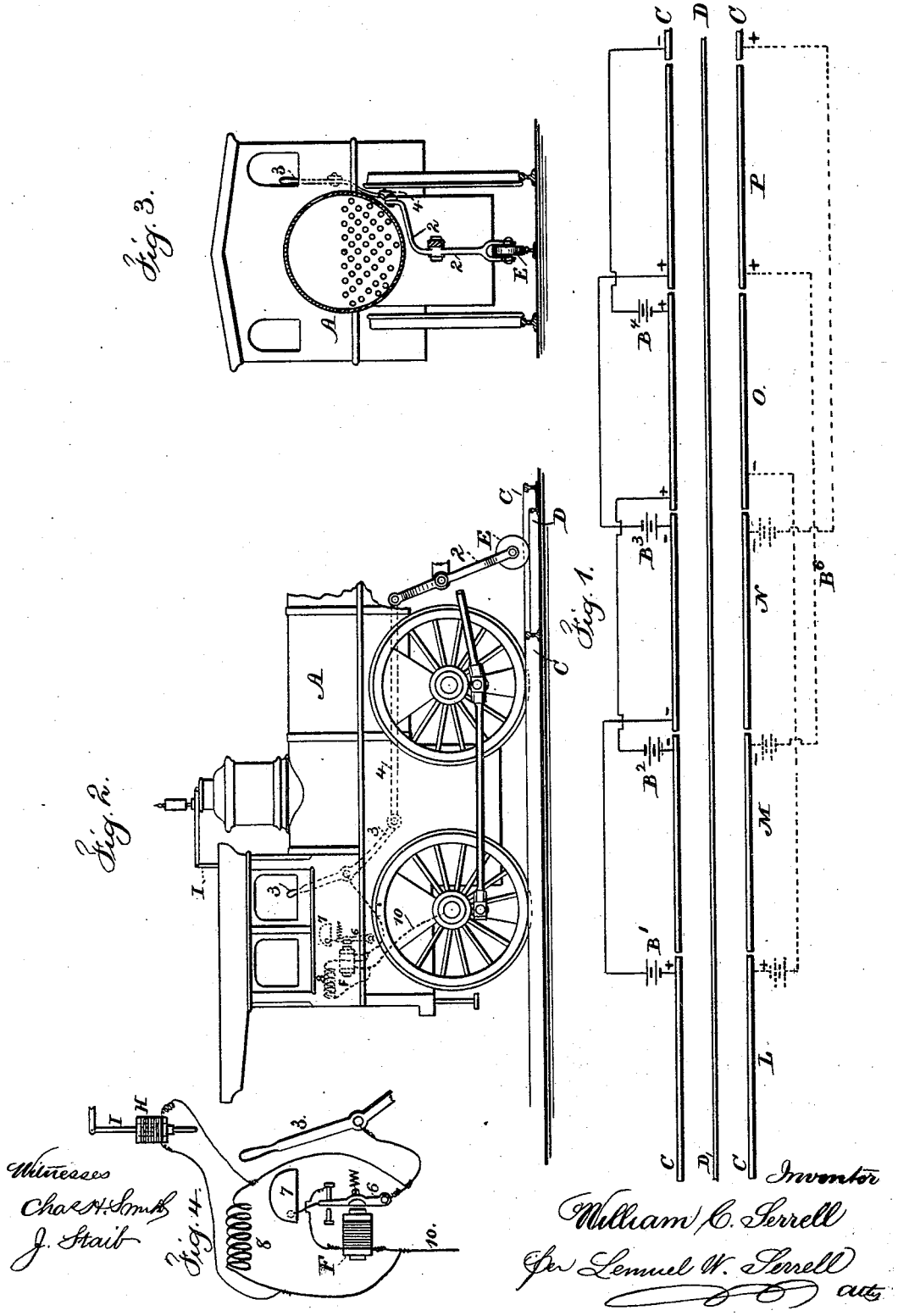
(No Model.) 2 Sheets—Sheet 1.

W. C. SERRELL.

RAILWAY SIGNAL.

No. 457,135. Patented Aug. 4, 1891.



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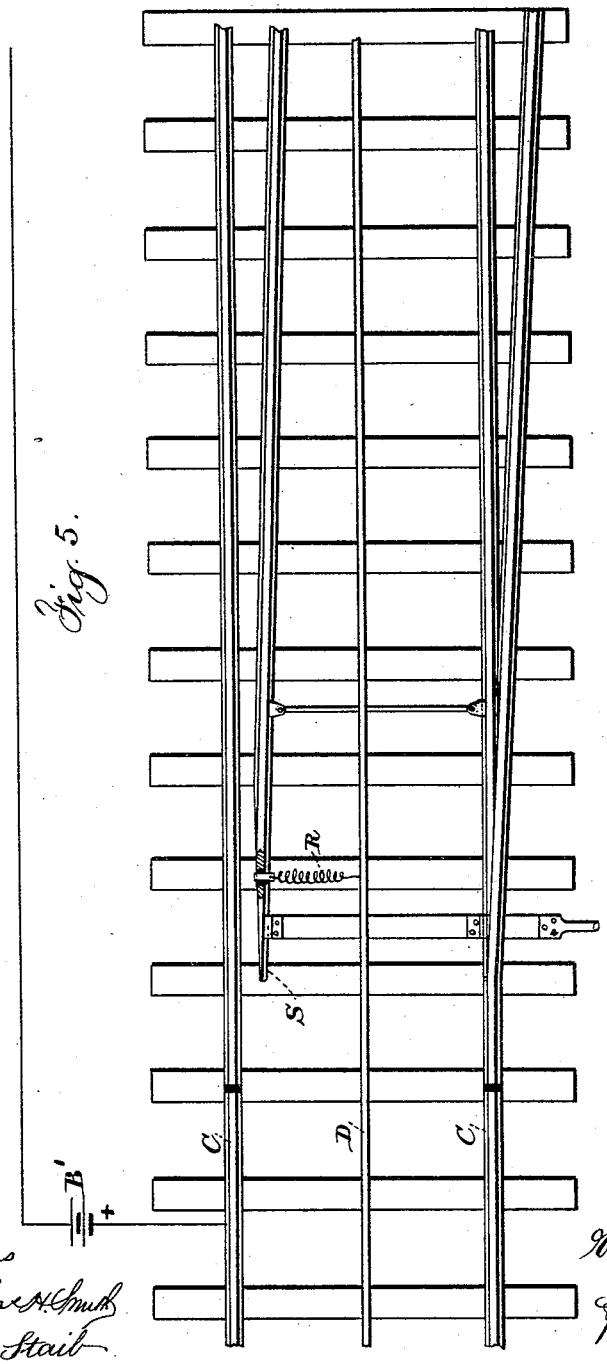

Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM C. SERRELL, OF BAYONNE, NEW JERSEY.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 457,135, dated August 4, 1891.

Application filed May 18, 1891. Serial No. 393,128. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. SERRELL, of Bayonne, in the county of Hudson and State of New Jersey, have invented an Improvement in Railway-Signals, of which the following is a specification.

Efforts have been made to ring an alarm-bell upon the locomotive electrically when two trains or locomotives approach too nearly to each other; but in most instances the circuits of the battery have remained closed and the signal has been given by increase of the electro-motive force when the trains approach each other.

In my invention the batteries are placed at intervals along the line, and they are connected, as hereinafter set forth, in such a manner that the batteries in their normal position oppose each other, and the alarm mechanism upon the engine is only brought into action when the circuit is closed through two trains when they come nearer than the prescribed distance; and I also connect this system with the switch mechanism in such a manner that when the switch is set to the siding a circuit is partially closed, so that a train approaching the switch or siding completes the circuit connections and indicates that the switch is open.

In the drawings, Figure 1 is a diagrammatic plan view illustrating the track-circuits. Fig. 2 is a diagrammatic partial elevation of a locomotive, showing the connections thereon. Fig. 3 is a diagrammatic cross-section of the locomotive, indicating the position of the electric device thereon. Fig. 4 is a diagram in larger size of the automatic electric bell upon the engine. Fig. 5 is a diagram of the circuit connections through the switch.

The engine represented at A is to be of any desired character, and between the track-rails C there is an insulated conductor D, which conductor may be a rod of copper or a rail of any suitable character, and upon the engine is a contact E, which may be a spring or flexible strip of metal rubbing on the conductor D or any other device. I have represented this contact E as a wheel upon the lever 2, and there is a lever 3 in the cab of the engine connected to the lever 2 by a rod 4, so that the contact E may be lifted from the conductor D whenever necessary. These parts are electrically connected, so that the current will pass through E, 2, 4, and 3, and pass by a wire to any suitable electric device for signaling the engineer.

I have represented in Fig. 4 an electro-magnet F, armature-hammer 6, bell 7, and a resistance-coil at 8, so that when the circuit is closed part of the current will pass through the rheostat 8 and a portion through the armature and back-stop, and the hammer will be vibrated as usual; or the electric current may be passed through the helix of a solenoid H, for acting upon the lever I of the whistle-valve, to blow the whistle. I do not, however, limit myself to any special character of signaling device.

The track is presumed to be divided into sections of suitable or desired length, each of which sections should be longer than the longest train. I have illustrated this by the sections L M N O P, it being understood that the rails C of the track are electrically connected up in each section; but the rails of one section are insulated from those of the next section, as indicated upon the diagram Fig. 1 by the separation in the rails. There is a battery connected with each section. I have shown batteries B' B^2 B^3 B^4, and the battery B' is connected at its positive end with the section L and its negative end with the section N. The negative of the battery B^2 is connected to the section M and its positive to the section O, and so on. Hence it will be observed that the negatives of B' and B^3 are connected to the same section N and the batteries oppose each other, and the negative of B^2 is connected to the section M and its positive to the section O, and the positive of the battery B^4 is also connected to the section O. In this manner each battery is connected to an adjacent section and to the second distant section.

The return circuit upon the locomotive is preferably through one of the driving-wheels, as indicated at 10, and when one locomotive is traveling along upon a track the circuit cannot be closed to either of the batteries, because the train does not extend to the second section in the rear. Hence the train will pass along without any signal being given;

but suppose that a locomotive is upon the section L, the circuit from B′ will be closed through the driver and the electric device upon the engine to the conductor D, and should a train come upon the section N the device on its locomotive will close the circuit from B′ through the rail of the section N, and the locomotive to the conductor D and the bells upon both engines will be rung simultaneously, thus enabling the engineers to prevent collisions by the forward train getting under way and the rear train being stopped, and as soon as the alarm on the engine ceases the train in the rear can proceed without danger. By these improvements it will be observed that there is little or no loss of battery-power, and it is not necessary to provide a battery on the engine, and a complete system of block-signals can be maintained, there always being one section of the block system between the trains; otherwise the alarms will be given to the respective engineers. Either engineer can stop the electric signal by moving the lever 3 and lifting the contact E.

In cases where this device is employed in connection with a switch it is only necessary to provide a spring or expansible electric conductor R between the conductor D and the switch-point S, such conductor being insulated in the switch-point, so that when the switch is opened and the main track unobstructed the contact is broken between the conductor R and the rail; but when the switch-point is closed for the siding a connection is made directly between the battery and the central conductor D. Hence when a train reaches the second section from the switch the electric circuit is closed by the engine and the signal given to the engineer that the switch has been set for the siding, so that he is enabled either to stop or to proceed upon the siding, as desired. It will be apparent that the conductor D has to be interrupted at the switch-rails; but it should either be bent downwardly to pass beneath such switch-rails or a metallic circuit connected therewith passing below the switch-rails, so that the electric circuit may not be broken.

In the diagram Fig. 1 I have illustrated by dotted lines B^6 that the circuit connections can be made to the third distant section instead of the second, as I do not limit myself in this particular.

I claim as my invention—

1. The combination, with the railway-track connected electrically into sections, of batteries included in circuit connections extending from one section to a non-adjacent section, a conductor upon the track, a signal upon the train, and circuit connections between the conductor and the signal and between the signal and one of the wheels, substantially as set forth.

2. The combination, in a railway system, of track-rails electrically connected in sections, circuit connections from one section to a non-adjacent section, batteries applied in such circuit connections with similar poles to the same track-section, a signaling device upon the locomotive, a stationary conductor upon the track, a signal upon the engine, and electric circuit connections to the signal, substantially as set forth, whereby the signals are given upon the engines when upon the second distant section, substantially as set forth.

3. The combination, in a railway system, of track-rails electrically connected in sections, circuit connections from one section to a non-adjacent section, batteries applied in such circuit connections, a conductor upon the track, a signal upon the train, circuit connections between the conductor and the signal and between the signal and one of the wheels, and a connection between the conductor on the track and the movable switch, substantially as and for the purposes set forth.

Signed by me this 12th day of May, 1891.

WM. C. SERRELL.

Witnesses:
GEO. T. PINCKNEY,
HAROLD SERRELL.