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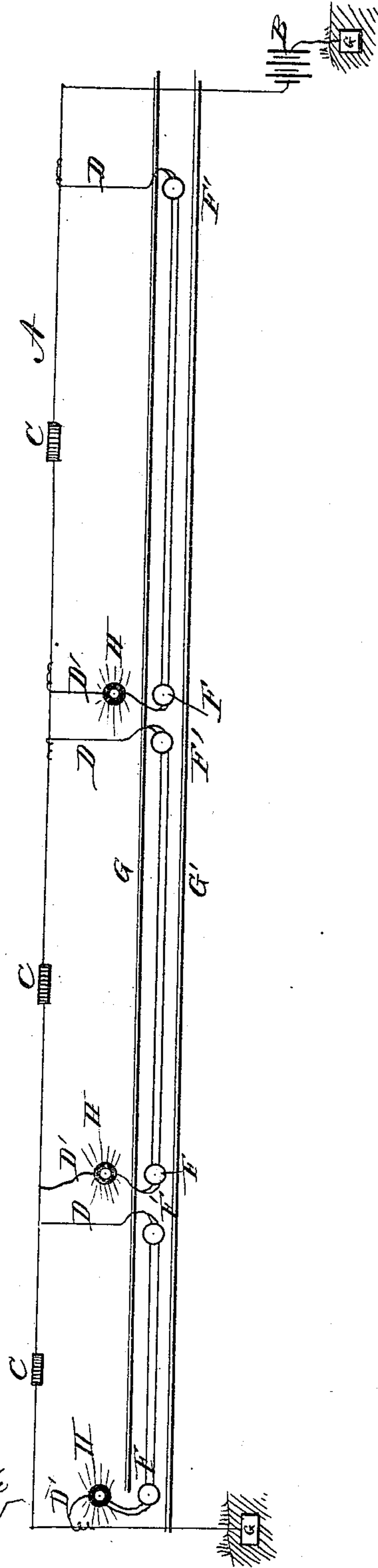
2 Sheets—Sheet 1.

R. S. JENNINGS.  
ELECTRIC RAILWAY SIGNAL.

No. 246,142.

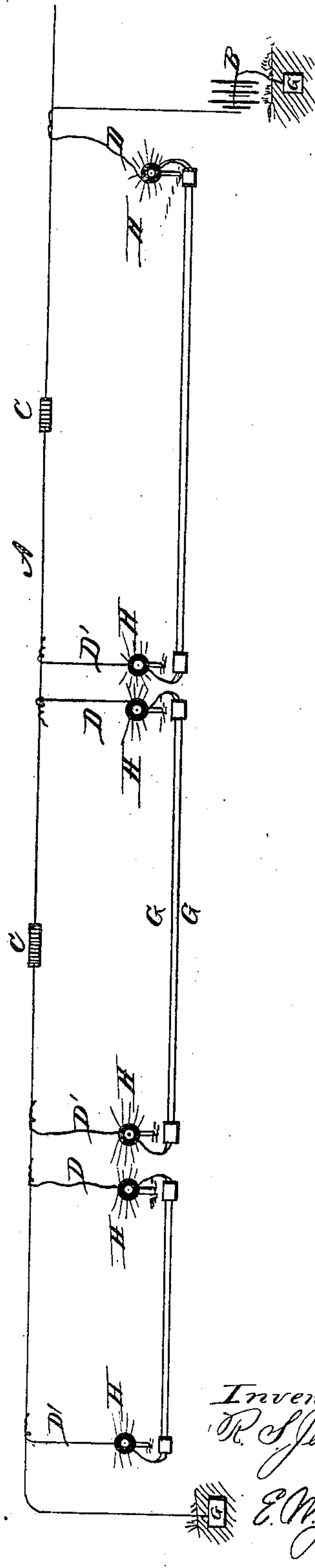
Patented Aug. 23, 1881.

Fig. 1.



Witnesses  
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Fig. 2.



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Atty-

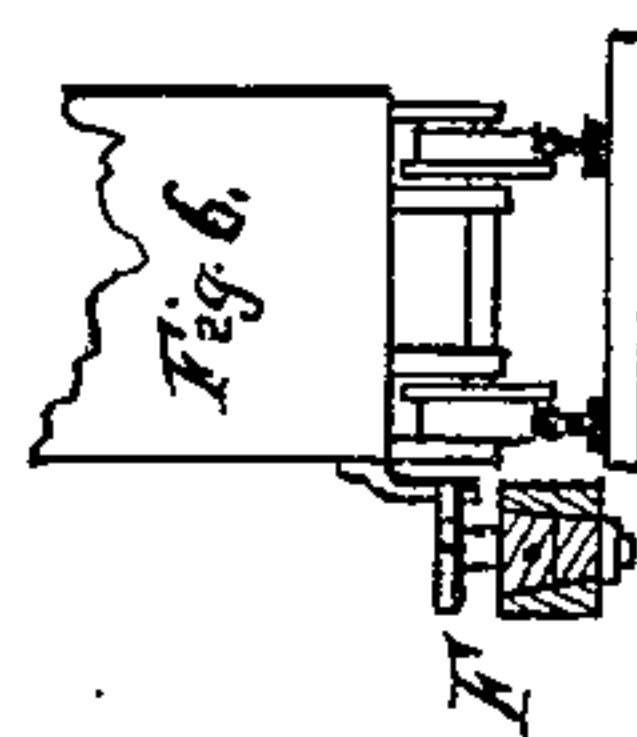
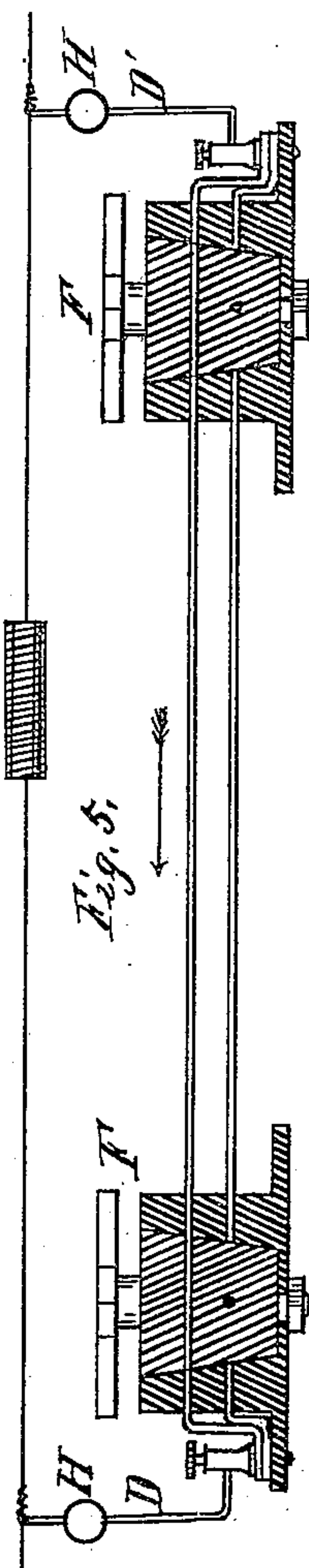
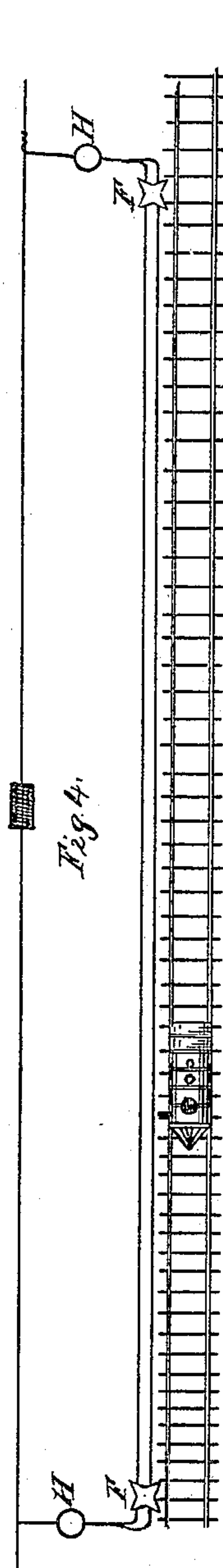
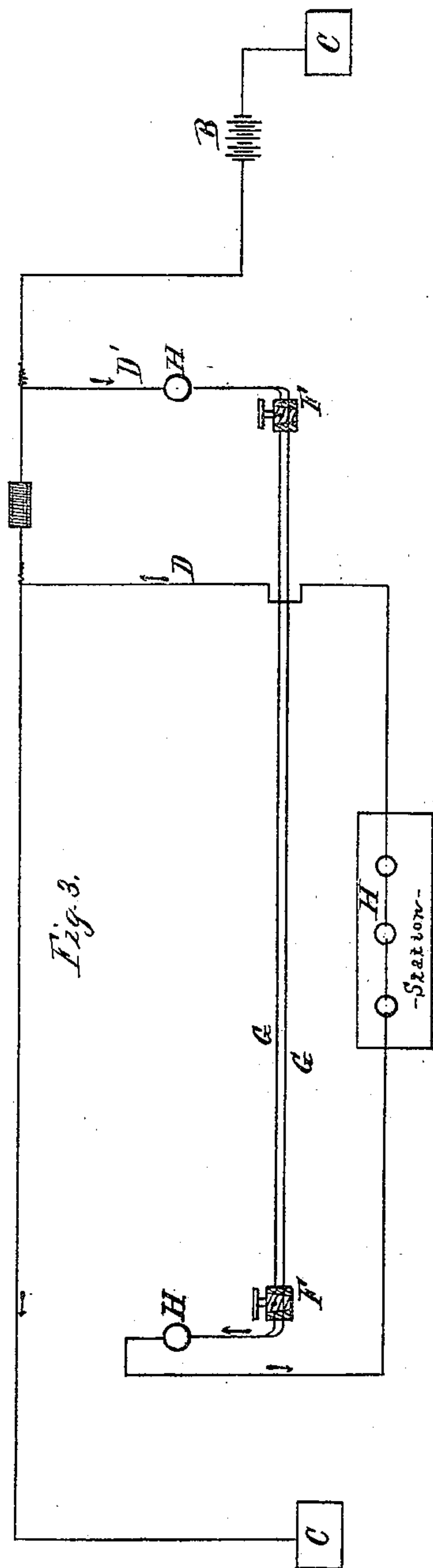
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2 Sheets—Sheet 2.

R. S. JENNINGS.  
ELECTRIC RAILWAY SIGNAL.

No. 246,142.

Patented Aug. 23, 1881.



Witnesses:  
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Inventor:  
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# UNITED STATES PATENT OFFICE.

RALPH S. JENNINGS, OF BALTIMORE, MARYLAND.

## ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 246,142, dated August 23, 1881.

Application filed May 14, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, RALPH S. JENNINGS, a citizen of the United States, residing at Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Electric Railway-Signals; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in the construction, arrangement, and operation of signals for the purpose of signaling to railway-trains, said signals being operated by the trains themselves; and it relates, also, to the arrangement and combination of means which embodies the employment of electricity to operate the signals.

My invention consists in providing the locomotive or other part of a train with a switch-operating mechanism, when used in connection with electric switches and electric conductors, when one of said conductors constitutes a main circuit, which is provided with two parallel branch circuits which operate independent of each other, and are adapted to be cut out from the main circuit by the operation of the switches, the signaling means being located within the short circuit.

My invention also consists in providing the main circuit with a shunting device which is of greater resistance than the signal, which is situated on the parallel branch circuit.

My invention also consists in providing the main circuit with a parallel circuit which has two branches, said branches operating independent of each other, and connected with switches to set and unset the signal.

My invention also consists in the employment of an electrical illuminating means which is provided with an electrical conductor, parallel branch circuits, and switches, said switches adapted to be operated by the passing train.

My invention also consists in the employment of the following elements, or their equivalents, in a method of railway-signaling: a main circuit with shunt or resistance provided with a parallel branch circuit adapted to be brought

into operation by switches which are operated by a means attached to the train, said parallel branch circuit including an electrical illuminating device or signaling means of less resistance than the shunt on the main circuit.

My invention also consists in the employment of several electric-producing devices, which are situated at different points and are connected with the main circuit.

My invention also consists in the arrangement of the signals and switches in the manner substantially as shown, for signaling, whereby the signals are set or unset by the trains when the track is occupied or about to be occupied.

My invention also consists in the arrangement, construction, and combination of the means or their equivalents as set forth in the specification, shown in the drawings, and specifically claimed.

On the annexed drawings, Figure 1 is a plan view, which illustrates the arrangement of the circuits and signals as may be used on a single track upon which the trains are run in only one direction. Fig. 2 is a similar view, showing the signals arranged for a single track upon which the trains are run in both directions. Fig. 3 shows the arrangement of the signals and lights which are used to illuminate the stations upon the approach of a train. Fig. 4 is a plan view, showing the arrangement of the switches. Fig. 5 is a sectional view of the same, and Fig. 6 is a detail view.

In the drawings, A represents the main circuit, on one end of which is located suitable electric-producing means, preferably a dynamo-electric machine, while the other end is connected with the earth to produce a complete circuit. Upon this main circuit, at suitable points, are placed "cut-outs" or resistances C, which are graduated or adjusted so as to cause the electric current to flow through the parallel branch circuits G G', when the switches are turned so as to make connection with one of the branches. These parallel branch circuits are connected to the main circuit by the wires D D'. The resistance of the parallel branch circuits when closed is less than the resistance on the main line, and when they are closed by the switches the electricity will flow over said branches. Only one of the branches



is open or closed at the same time. The parallel branch circuits  $G G'$ , which are attached to the main circuit, are provided at each end with switches  $F F'$ , which make connections  
 5 with the parallel branch circuits  $G G'$ . The space between the switches may constitute a "block" or section of the railway, and these switches are operated by a device attached to the locomotive or other part of the train, so as  
 10 to turn the switches one-quarter way round at each contact. Attached in the parallel branch circuits are electrical lamps or other suitable electrical signaling means, which are illuminated or displayed when one of the parallel  
 15 branch circuits is closed. These lamps  $H$  may be located either near one terminal of the parallel branch circuit or both, according to the requirements of the road.

I will now describe the operation of my invention as shown by Figs. 1 and 2, Fig. 1 representing a single track upon which traffic is carried on in only one direction, the battery or dynamo-electric machine  $B$  producing a current, which is caused by the resistance  $C$  on  
 20 the main circuit  $A$  to flow through the wire  $D$ , parallel branch circuit  $G$ , and lamp  $H$ , back to the main circuit  $A$  by the wire  $D'$ , the switches being set so as to make connection with one of the branches of the parallel branch circuit.  
 25 When the circuit is complete the lamp  $H$  will be lighted. The switches are constructed so as to make and break circuit when turned one-quarter way round. When the switches are set so as to make circuit and light the lamp, a train,  
 30 in passing one of the switches on a circuit, will break the parallel branch circuit and extinguish the lamp, which will not be lighted until the train passes the switch upon the other end of the circuit, when it will set the switch  
 35 and allow the current to flow over the other branch of the parallel branch circuit. The switches may be arranged so that the lamps will be lighted when the section is "blocked" or clear, as may be desired.

Fig. 2 is a similar arrangement like Fig. 1, with the exception of the arrangement of the lamps, which are placed near each terminal  
 40 of the parallel branch circuit. This arrangement is desirable upon roads with one track upon which traffic is carried on in both directions, the lamps being lighted or out, indicating at each end of the section that the section is occupied.

Fig. 3 represents an arrangement of the parallel branch circuit, which includes lamps at each end of the section and lamps which are used to illuminate a station upon the approach  
 55 of a train and while the train occupies the section, said lamps being arranged, substantially as shown, upon the parallel branch circuit.

If desirable, I may place several dynamo-electric machines along the line of the main circuit and attach them by suitable connections to the main circuit for increasing the current upon the same.  
 60

It will be noticed that in this invention no

electro-magnets or similar devices are used in the circuits, and that the electric current is guided solely by the resistances and positive-acting switches, which are operated by the  
 70 passing train. Also, should one of the parallel branch circuits become disarranged it will not affect the other portions of the line. The detail construction of the switches and operating device upon the train will form the subject of  
 75 another application.

In practice this invention operates as follows: The lamps at all the stations or signals being out shows that the track is clear, the valves or switches  $F$  being turned so that the  
 80 current cannot pass through the branches  $G G'$ . When a train enters a section it turns the valves at the beginning of the section one-quarter way round, thus allowing the electricity to flow over one of the branches and  
 85 light the lamps. The lamps being lighted indicates that the track is occupied. The train upon leaving the section turns the other valve one-quarter way round, which breaks the circuit and puts the lamps out.  
 90

What I claim as new is—

1. In an automatic block-signaling apparatus, a motor provided with a switch-operating mechanism, in combination with a main-circuit conductor, said conductor being provided  
 95 with two parallel branch circuits operating independent of each other and adapted to be cut out from the main circuit by switches operated substantially as described.

2. In an automatic block-signaling apparatus, a main-circuit conductor provided with a parallel circuit with two branches, said branch circuits including a signaling means, the current through said branch circuit being guided  
 100 by switches operated by a means attached to the motor.

3. In an automatic block-signaling apparatus, a main circuit provided with an automatic shunt, and a parallel circuit with two branches and switches, said branch circuit including an electric illuminating means or other  
 105 electrical signal.

4. In a signaling apparatus, a main circuit provided with a shunting device, in combination with a parallel circuit with two branches and switches, said parallel branch circuits including an electrical signal which is of less  
 110 resistance than the shunt on the main circuit.

5. In a signaling apparatus, a main circuit, in combination with a parallel circuit which  
 115 has two branches operating independently of each other, and provided with switches operated by the passing train to set and unset the signals.

6. A system of railroad-signaling embracing the following instrumentalities: a main circuit with shunts or resistances provided with parallel circuits with two branches adapted to be brought into operation by switches which  
 120 are operated by the passing train, said parallel circuits including an electrical illuminating means.  
 125  
 130

7. An electrical illuminating means provided with electrical conductors and switches, said switches being adapted to be operated automatically by the passing train when used  
5 as a railroad-signal.

8. In a method of railway-signaling, the combination of the following elements: a main circuit with shunt or resistance, and a branch circuit adapted to be brought into operation by

switches, said branch circuit including an electrical illuminating device or signaling means of less resistance than the shunt on the main circuit, the switches being adapted to be operated by a means attached to the train.

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Witnesses:

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