No. 819,397. PATENTED MAY 1, 1906.

R. A. BALDWIN.

RAILWAY SIGNAL.

APPLICATION FILED FEB. 16, 1904.

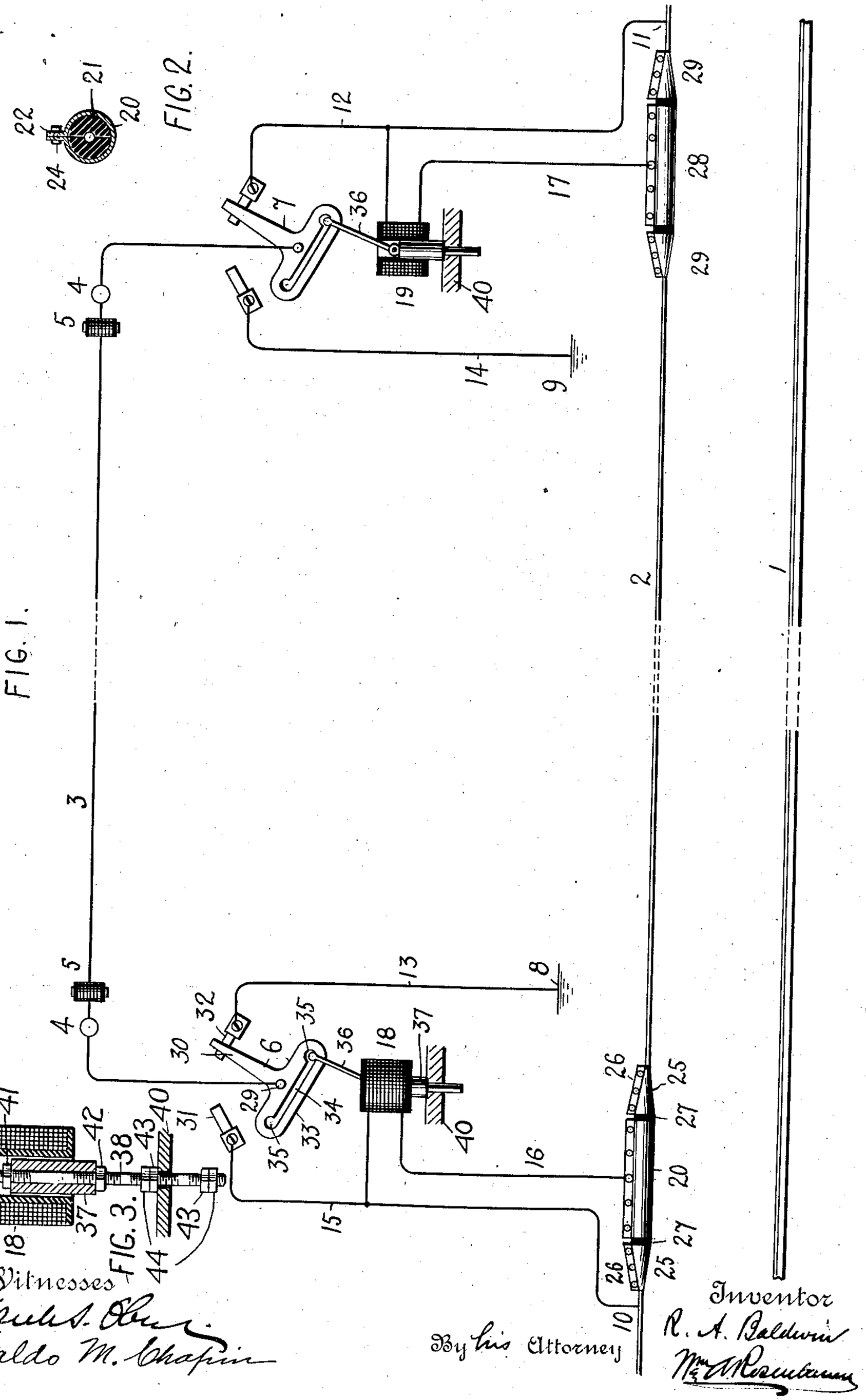

FIG. 1.

FIG. 2.

FIG. 3.

Witnesses
Frank S. Ober
Waldo M. Chapin

Inventor
R. A. Baldwin
By his Attorney
Wm. A. Rosenbaum

UNITED STATES PATENT OFFICE.

ROLLIN A. BALDWIN, OF SOUTH NORWALK, CONNECTICUT, ASSIGNOR TO THE BALDWIN & ROWLAND SWITCH & SIGNAL COMPANY, A CORPORATION OF CONNECTICUT.

RAILWAY-SIGNAL.

No. 819,397. Specification of Letters Patent. Patented May 1, 1906.

Application filed February 16, 1904. Serial No. 193,853.

To all whom it may concern:

Be it known that I, ROLLIN A. BALDWIN, a citizen of the United States, residing at South Norwalk, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Railway-Signals, of which the following is a full, clear, and exact description.

This invention relates to improvements in railway-signaling devices, and particularly to block-signaling apparatus for electric railways; and its principal object is to provide improved means for displaying a signal or signals to indicate that a block or section of railway is occupied by a car.

Other objects will hereinafter appear.

In the accompanying drawings, Figure 1 is a diagram of one form of block-signaling apparatus organized in accordance with my invention. Fig. 2 is a cross-section of a tubular contact adapted to be secured upon a trolley-wire. Fig. 3 is a sectional detail illustrating an adjustment whereby a signal-controlling circuit may be rendered ineffectual or inoperable by the minor circuits of a railway-car but operable by the motor-circuit thereof.

The rails of the railway are indicated at 1 and the overhead trolley-wire at 2. It will be understood that the rails form the return-conductor for the electric current and that the invention is adapted to be used with either a trolley-wire, as shown, or other forms of main conductors. An electric signaling-wire 3 extends the length of the railway section or block shown in the diagram and operates signal-lights 4 and semaphores at 5 at the ends of the section, as well as at intermediate points, if desired. By means of switches 6 and 7 at the ends of the section either end of the signaling-wire may be either grounded at 8 or 9 or connected to the main conductor 2 at 10 11. When the switches are set as shown in the diagram the current flows from the main conductor 2 at point 11 through wire 12, switch 7, signaling-wire 3, switch 6, and wire 13 to ground at 8, thus causing the signals 4 and 5 to be displayed. The wires 13 and 14 may of course be grounded by connecting them to the rails 1. If the position of the switch 7 should be reversed, the grounded wires 13 and 14 would become connected together but disconnected from the main conductor 2, and no current passing over the wire 3 the signals would be withdrawn. If, however, the switch 7 should remain as shown and the switch 6 be reversed, the wire 3 would become connected through the wire 15 with the main conductor 2, while remaining connected with 2 at point 11 also, thus forming a shunt around the section, and since but little or no current would pass through the wire 3, owing to the resistance of the lights 4, the signals would not be displayed. It will thus be perceived that the signals if displayed may be withdrawn by the reversal of either switch, and it will also be understood that when the signals are withdrawn they may again be displayed by the reversal of either switch.

At the ends of the section of railway I provide local circuits 16 17, which include solenoids 18 19 for operating the switches 6 7, respectively. Said local circuits are operable through the motor-circuit of a railway-car, so that the simple passage of a car along the road may throw the corresponding switch and control the signaling. One end of the circuit 16 is connected at 10 to the main conductor 2 and the other end thereof is provided with a tubular contact 20, containing a sectional bushing of insulating material 21. The tube is split longitudinally so that it may be slipped over the trolley-wire and along the edges is provided with flanges 22, united by bolts or other clamping devices 24, whereby the tubular contact and its inclosed bushing are clamped immovably upon the trolley-wire. It will be understood that while the trolley of the railway-car is riding upon this contact said trolley is held away from the main conductor 2, so that current cannot pass directly from the latter to the trolley. While, however, the trolley is in contact with said tube 20, the current does pass from the main conductor 2 at point 10 through the local circuit 16 to the said tube 20 and through the trolley and motor-circuit of the car to the rails 1, said motor-circuit thereby serving to cross-connect said local circuit to the main conductors 1 and 2 of the railway. By the passage of the current through the local circuit 16 the solenoid 18 is energized and the switch 6 operated. For guiding the trolley onto and off from said contact 20 I provide at its ends cones 25, having flanges 26 and

clamped upon the trolley-wire in the same manner as the tube 20. The conical guides, however, are in direct contact with the trolley-wire and are insulated at 27 from the ends of the contact 20. The gap filled by the insulation 27 is, however, so short as to avoid liability of sparking, and it will be seen that at no time is the current cut off from the motor-circuit of the car, so that the latter is always under control. At the other end of the railway-section the apparatus is similar, the local circuit 17 being connected to the main conductor 2 at 11 and having a hollow contact 28, provided with guides 29. Thus the passage of a car in either direction, either into or out of the railway-section, throws the corresponding switch and affects the signals accordingly.

Each switch is pivoted at 29 and comprises a contact portion 30 for engaging the signal-contacts 31 and 32 and also a portion 33 in the form of a two-arm lever, said lever portion having a longitudinal slot 34, terminating upon opposite sides of the pivot 29 in socket-like cut-aways 35. A link 36 connects the core 37 of the solenoid to the slot 34 and is adapted to enter the sockets 35. When the solenoid is energized, its core is drawn up and the link thrust up into the socket, whereupon the continued movement of the core drives up the link and vibrates the switch until the position of the latter is reversed. When the solenoid is deënergized, the core drops and the upper end of the link or the stud thereon slides down the inclined slot to the opposite end of the lever, the latter remaining at rest. Thus successive operations of the solenoid cause the switch to be moved to alternate positions.

Assuming a car to be occupying the block and moving toward the right-hand end thereof, the trolley rides down upon the conical guide 29 and onto the tubular contact 28, thereby completing a cross-circuit from 2 through 11 19 17 28, and the motor-circuit of the car to the rails 1. The solenoid 19 being energized, the link 36 is thrust up, entering the socket or notch 35 and vibrating the switch to the left, thereby disconnecting the signaling-wire 3 from the main conductor 2 and grounding the former at 9, and since the other end is grounded at 8 the signaling-wire becomes dead, thus signifying to the motorman of the following car that the block is clear. As said following car enters the block the local circuit 16 is cross-connected in the same manner through the motor-circuit, energizing the solenoid 18 and operating the switch 6 so as to connect the signaling-wire 3 with the main conductor 2 at point 10, and said wire 3 being grounded at 9, as just explained, current flows from the conductor 2 through said wire 3 and displays the signals. When the trolley subsequently runs upon the right-hand contact 28, the switch 7 is caused to reverse again, assuming the position shown in the drawings, thereby connecting the signaling-wire 3 in shunt with the main conductor 2 at points 11 and 10, so that said wire becomes dead, insufficient current passing therethrough to operate the signals. Upon the entry of the third car into the block the switch 6 moves automatically to the position shown in the drawings, thus causing the signals to be displayed. It will be understood that a like cycle of operation takes place if the cars move successively in opposite directions and that the signals work properly when successive cars occupy the block, but traveling alternately in opposite directions, the entry of the car at either end into the unoccupied block causing the signals to be displayed and its departure from either end causing them to be withdrawn.

Referring now to Fig. 3, it will be seen that the core 37 of either solenoid 18 or 19 may be made hollow and a brass rod 38 inserted therethrough, being pivoted at its upper end at 39 to the link 36 and being guided at its other end in a fixture 40. Nuts 41 and 42 are threaded upon the rod at the ends of the core and clasp the latter, so that the rod and core move together. By means of these nuts the core may be adjusted up or down the rod, so as to stand normally in different relations to the solenoid, whereby the effective power of the solenoid may be rendered less or greater, as desired. In the drawings the core is shown adjusted up to such a height that in case the motorman shuts off the motor-circuit when the trolley approaches and runs over the contact 28 the weaker electric currents traversing the minor circuits in the car are insufficient in passing through the circuit 16 or 17 to energize the solenoid sufficiently to lift the core and operate the switch. The much stronger circuit which passes through the motor-circuit is, however, capable of energizing the solenoids for throwing the switch. Hence in passing a station the motorman may by throwing out the motor-circuit fail to operate the switch or by throwing in said circuit he may operate the signal. The minor circuits on the car are such as operate the lights, heating appliances, brakes, air-pumps, &c. The rod 38 may be provided with adjustable stops in the form of nuts 43, secured by binding-nuts 44, the former adapted to stop the rod by contacting with the fixture 40. The nuts 43 may be adjusted for giving the proper throw, and the core may be then adjusted to a suitable height by nuts 41 42.

Variations may be resorted to within the scope of my invention and portions of my improvements may be used without others.

Having thus described my invention, I claim—

1. In combination, a two-arm lever provided with a longitudinal slot terminating at opposite sides of the lever-fulcrum and pro-

vided at each end with a socket, a reciprocating member, and a link pivoted at one end to said reciprocating member and at the other end engaging said slot and movable into either socket by a movement of said reciprocating member.

2. In combination, a switch comprising a contact member and a portion in the form of a two-arm lever provided with a longitudinal slot terminating at opposite sides of the lever-fulcrum and provided at each end with a socket, a reciprocating member, and a link pivoted at one end to said reciprocating member and at the other end engaging said slot and movable into either socket.

3. In combination, a two-arm T-shaped lever provided with a longitudinal slot terminating on opposite sides of the lever-fulcrum and provided at each end with offset sockets, a solenoid, a core therefor, and a link attached to said core and having shifting engagement with said slot.

4. In combination, a switch comprising a contact member and a portion in the form of a two-arm lever provided with a longitudinal slot terminating at opposite sides of the lever-fulcrum, a solenoid, a core, and a link connecting said slot to one of said solenoid and core elements.

5. In combination, a switch comprising a contact member and a portion in the form of a two-arm lever provided with a longitudinal slot terminating at opposite sides of the lever-fulcrum and provided at each end with a socket, a solenoid, a core, and a link connecting said core to said slot.

6. In a railway signaling apparatus, a signaling-circuit provided with a switch, said switch being pivoted and comprising a portion in the form of a two-arm lever having a longitudinal slot terminating at opposite sides of the lever-fulcrum, a reciprocating member operable through the passage of a railway-car, and a link connecting said reciprocating member to said slot.

7. In a railway signaling apparatus, a signaling-circuit provided with a switch, said switch being pivoted and comprising a portion in the form of a two-arm lever having a longitudinal slot terminating at opposite sides of the pivot, a local circuit controllable through the motor-circuit of a railway-car, a solenoid included in said local circuit, a core, and a link connecting said core to said slot.

8. In a railway signaling apparatus, a signaling-wire extending the length of the section, a switch at each end of the wire for either grounding the latter or connecting it to the main conductor of the railway, each switch being pivoted and comprising a portion in the form of a two-arm lever having a longitudinal slot terminating at opposite sides of the pivot, local circuits at the ends of the section, one for controlling each switch, said local circuits being controllable through the motor-circuit of a railway-car, a solenoid included in each local circuit, cores for the solenoids, and links connecting the cores to said slots.

9. In a railway signaling apparatus, a signaling-wire extending the length of the section, a switch at each end of the wire for either grounding the latter or connecting it to the main conductor of the railway, each switch being pivoted and comprising a portion in the form of a two-arm lever having a longitudinal slot terminating in sockets at opposite sides of the pivot, local circuits at the ends of the section, one for controlling each switch, said local circuits being controllable through the motor-circuit of a railway-car, a solenoid included in each local circuit, cores for the solenoids, and links connecting the cores to the slots and adapted to enter said sockets.

10. The combination of a local circuit having a contact in position to engage the traveling contact of an electric-railway car, a solenoid included in said circuit, a core for said solenoid, means for effecting relative adjustment of the solenoid and core, and means operable by a movement of one of said solenoid and core elements, for directing or controlling the movement of the car.

11. The combination of a local circuit having a contact in position to engage the traveling contact of an electric-railway car, a solenoid included in said circuit, a core for said solenoid, means for adjusting the core, and a signal operable by the core.

12. The combination of a local circuit including a solenoid and having a contact in position for engagement with the traveling contact of an electric-railway car, a core, a rod adjustably connected to the core, and a car controlling or directing member operable by said rod.

13. In a signaling apparatus for electric railways, the combination of a local circuit connected at one end to the main conductor of the railway and at the other end having a contact in position for engaging the traveling contact of a railway-car, a solenoid included in said circuit, a core for said solenoid, a rod adjustably connected to said core, adjustable stops for limiting the movements of said rod, a link connected to said rod, a switch having a portion in the form of a two-arm lever provided with a longitudinal slot engaged by said link, and a signal-circuit controllable by said switch.

ROLLIN A. BALDWIN.

Witnesses:
HY. MUSCH,
R. E. JONES.