(No Model.)

F. F. LOOMIS.

SIGNAL FOR ELECTRIC RAILWAYS.

No. 479,138. Patented July 19, 1892.

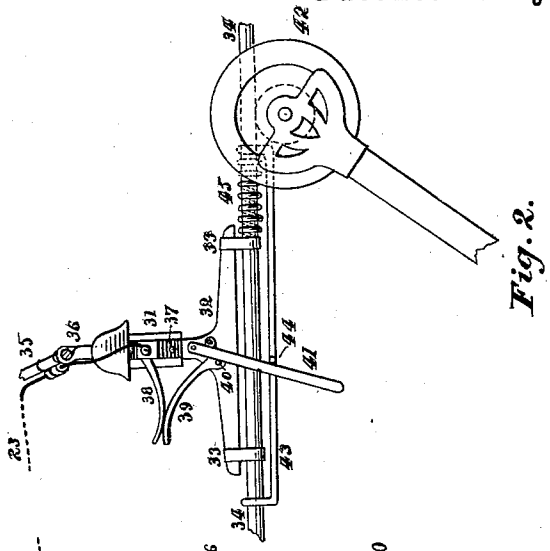

Fig. 2.

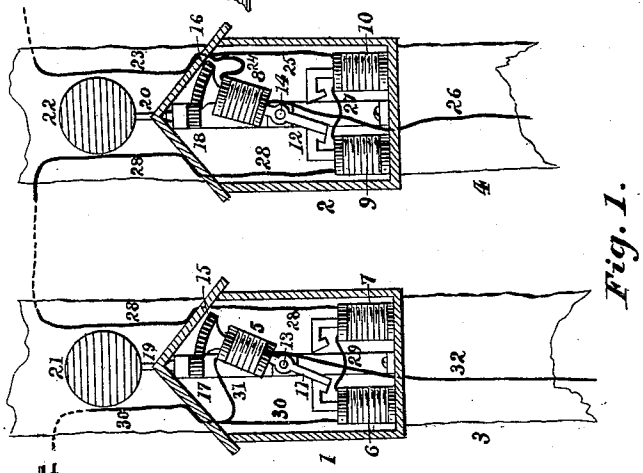

Fig. 1.

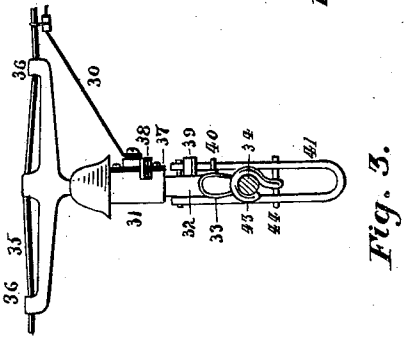

Fig. 3.

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SIGNAL FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 479,138, dated July 19, 1892.

Application filed April 8, 1892. Serial No. 428,305. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LOOMIS, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Signals for Electrical Railways, of which the following is a specification.

My invention has relation to improvements in electrical signaling devices by which the approach of a car or its passing a determined point is communicated to a distant place.

The object of my invention is to provide electrical apparatus to be used in connection with a trolley-railway system, which shall be energized by a portion of the main circuit and simultaneously operate a series of signals at different places along the wire when the car passes a given point.

It also consists in devices for transmitting a portion of the current from the trolley-wire to the signaling mechanisms as the determined point is passed.

To the aforesaid purposes my invention consists in the peculiar and novel construction, arrangement, and combination of parts hereinafter described, and then specifically pointed out in the claims, reference being had to the accompanying drawings, forming a part of this specification.

In the accompanying drawings, in which similar reference-numerals indicate like parts in the different figures, Figure 1 is an elevation of two of a series of my signaling-boxes, with the fronts of the boxes removed to show their internal mechanism and the wire connections; Fig. 2, an elevation, greatly enlarged from the scale of Fig. 1, of the transmitter parallel with the trolley-wire at the moment of making connection; and Fig. 3, an elevation of the same transverse to the trolley-wire, with the contact-plates separated.

Two signal-boxes 1 2, which may be all of the system or a part of a series, are mounted, for convenience, on two posts 3 4, each of which is at one end of and serves to sustain the span-wire that supports the trolley-wire. In each of these boxes are three electro-magnets 5 6 7 and 8 9 10, the magnets 5 and 8 having elongated cores 11 12, which project below their respective coils and are pivoted in the box at the points 13 14, so as to rock thereon, the upper ends of which cores extend above the coils and terminate in segmental racks 15 16. These racks mesh in pinions 17 18, mounted on small vertical shafts 19 20, journaled in suitable bearings in the boxes and bearing at their upper ends disks 21 22, of sheet metal, the parts being so arranged that when the magnets 5 8 are rocked in one direction they will turn the disks to present their faces, and when rocked in the opposite direction their edges will be presented toward the front of the box. The magnets 6 7 and 9 10 are mounted on the bottom of the boxes 1 2 and their respective cores extend above the coils, and the cores of each pair are bent toward each other, leaving spaces between them in which the cores 11 12 rock. A wire 23 from the transmitter, hereinafter described, enters the box 2 and divides into two branches 24 25, the first of which connects with one end of the coil 8, from the opposite end of which a ground-wire 26 passes to earth. The branch 25 passes to the outer end of the coil 10, from the inner end of which a wire 27 passes to the inner end of the coil 9, from the outer end of which a wire 28 runs to the next box 1 of the series and to the outer end of the coil 7, from the inner end of which a wire 29 runs to the inner end of the coil 6, from the outer end of which coil a wire 30 runs to a second transmitter. A branch wire 31 runs from the wire 30 to the outer end of the coil 5, from whose inner end a ground-wire 32 runs to earth. From this description it will be apparent that if the circuit between the wire 23 and the trolley-wire be closed and that between the wire 30 and trolley-wire open a portion of the current will pass through the coil 8 to the ground, rendering the end 12 of the core, say, positive. A portion of the current will pass through the coils 10 9, rendering the upper end of the core of one positive and of the other negative, as the current passes in opposite directions through them, and consequently the core 12 will be repelled by the positive and attracted by the negative, thereby rocking the coil 8 and turning the target 22. In the same manner the current passes by the wire 28 through the coils 7 6 to the wire 30 and thence by the branch to the coil 5 and

by the wire 32 to the ground, thereby rendering the cores of the coils 7 6 positive and negative, respectively, and the core 11 of the coil 5 positive and rocking the coil in the same direction as the coil 8 and with the same effect on its target. If, on the other hand, the circuit between the wire 30 and the trolley be closed and that with the wire 23 open the cores 11 12 will still be positive, as the current still passes through them in the same direction; but the polarity of the cores of the coils 6 7 9 10 will be reversed as the current passes through them in the opposite direction, forming a circuit through the wires 25 24, coil 8, and wire 26 with the ground.

To close the circuit from either direction with the trolley, I have employed the device shown in Figs. 2 and 3, the supporting part of which is the ordinary device for connecting the trolley and span wires and consists of a metallic tube 31, in which is cemented, with rubber or other non-conductor, the hanger 32, attached to the trolley-wire 34 by clips 33. This device is attached to the span-wire 35 by hooks 36. On the side of the tube 31 is an insulating-block 37, on which is fastened a spring 38, electrically connected with one of the wires leading to the signal-boxes, the spring in one transmitter being connected with the wire 23 and the other with the wire 30. The wires 23 and 30 are supported in insulators from the span-wire, and thence pass down the poles to their respective boxes. On the hanger 32 is pivoted a spring 39, arranged, when rocked upward, to come in contact with the spring 38, and having at one side a projecting pin 40. A hanging loop 41, which surrounds the trolley-wire, is pivoted to each side of the hanger 32, arranged to be engaged and swung upward by the trolley 42 as it passes from right to left, when the parts are in the relative position shown in Fig. 2, and engage the pin 40 and swing the spring 39 against the spring 38, thereby making electrical connection through these various parts between the trolley-wire and wire 23 during the instant the trolley is passing, and actuating the signaling mechanism. To prolong the instant of contact, I suspend below the trolley-wire a small wire 43 by looping its ends over the trolley-wire. In this wire is a pin 44, that engages the loop 41, and between its looped end toward the approach of the trolley and the adjacent clip 33 is a coiled spring 45. In operation, the trolley encounters this wire and pushes it forward, thereby rocking the loop 41 until it will go no farther, when the trolley passes under it and the spring 45 returns to its former position.

I do not confine my invention to the exact form or kind of transmitter here shown and described, as any device that will make contact with the trolley in its passage may be adopted. Nor do I confine it to the exact signal shown, as others that can be operated by the rocking magnets may be adopted. It will also be apparent that when only one box is used the exit-wire, as 28, should go directly to the ground to complete the circuit.

I claim as my invention—

1. In a signal-box for electric railways, an electro-magnet pivoted to rock vertically, combined with two fixed electro-magnets, the core of the pivoted magnet arranged to rock between the poles of the fixed magnets, the rocking magnet being connected with the source of electrical energy and having a ground-wire from its opposite terminal, the fixed magnets being connected in inverse directions with said source, and a signaling apparatus arranged to be actuated by the rocking magnet, substantially as shown and described.

2. In a signaling system for electric railways, a series of boxes, each having an electro-magnet pivoted to rock vertically, combined with two oppositely-disposed fixed electro-magnets, the core of each pivoted magnet arranged to rock between the cores of the fixed magnets of its box, each rocking magnet connected with the source of electrical energy in the same direction and each having a ground-wire, the fixed magnets being connected in inverse directions with said source, said boxes being electrically connected to permit their several magnets to be energized, and signaling devices arranged to be actuated by said rocking magnets, substantially as shown and described.

3. In a signal for electric railways, the boxes electrically connected, each having the rocking electro-magnets arranged to be constantly polarized in the same direction by the electric current, combined with the sets of fixed electro-magnets, the magnets of each set being arranged to be simultaneously polarized in opposite directions by the current from one direction and to be oppositely polarized by the current from the opposite direction, the cores of the pivoted magnets arranged to rock between the cores of the fixed magnets, and signaling devices arranged to be simultaneously operated by the rocking magnets, substantially as shown and described.

4. In a signal for electric railways, the rocking magnets arranged to be constantly polarized in the same direction and the sets of fixed magnets with the magnets of each set arranged to be oppositely polarized and the cores of the rocking magnets arranged to vibrate between the cores of their respective sets of fixed magnets, combined with a connecting-wire and a transmitter arranged to be engaged by the trolley and make electric connection between the trolley-wire and said magnets, substantially as shown and described.

5. The combination, with the signal-boxes and their mechanism and the connecting-wire, of the fixed spring 38, the rocking spring 39, the rocking loop 41, arranged to be engaged

by the trolley and rock said spring 39 against the spring 38, to make connection between the trolley-wire and connecting-wire, substantially as shown and described.

6. The combination, with the electrically-connected signal-boxes and their mechanism and the connecting-wire 23, of the fixed spring 38, rocking spring 39, having the pin 40, rocking loop 41, sliding wire 43, having the pin 44, and spring 45, all constructed and arranged substantially as shown and described, and for the purpose specified.

In testimony that I claim the above I hereunto set my hand.

FRANK F. LOOMIS.

In presence of—
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C. E. HUMPHREY.