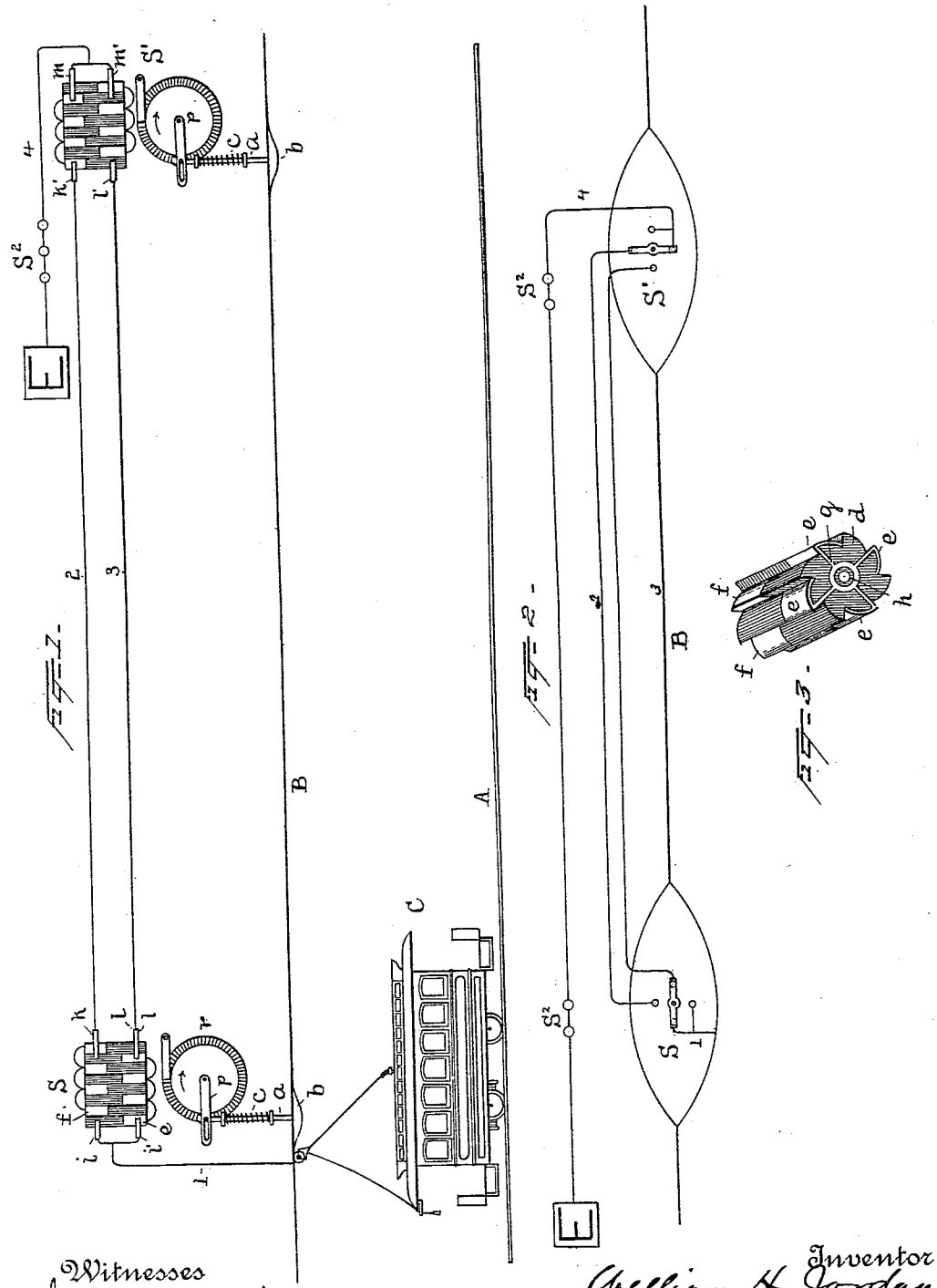
(No Model.)

W. H. JORDAN.

ELECTRIC RAILWAY.

No. 555,248. Patented Feb. 25, 1896.



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ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 555,248, dated February 25, 1896.

Application filed January 17, 1896. Serial No. 575,826. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. JORDAN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Electric Railways, of which the following is a specification.

The object of my invention is to provide a simple system and apparatus for signaling on electric railways and to avoid the use of the expensive and complicated mechanism for operating signals as heretofore proposed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 illustrates a single track of railroad with my invention applied thereto; Fig. 2, a diagrammatic view illustrating the application of my invention to a single-track railroad having sidings or turn-outs, and Fig. 3 a perspective view of the ratchet-switch employed by me for controlling the signaling-circuit.

Referring to Fig. 1 of the drawings, A represents the track; B, the working conductor, which may be overhead or underground, and C represents the car. The signaling-circuit consists of a conductor 1 extending from the working conductor B to a switch S, divided circuit 2 3 leading from the switch S to the switch S′, and the conductor 4 leading from the switch S′ to earth and containing the signaling devices S^2. These devices may be lamps or other visible or audible signals. The switches S and S′ are operated by a pawl and ratchet, *r* indicating the ratchet-wheel and *p* the pawl-arm pivoted on the spindle of the ratchet. The pawl-arm is actuated by a vertically-reciprocating rod *a* having a curved shoe *b*, which is in the path of the trolley-wheel and is raised thereby as a car enters a section. A spring *c* is provided for returning the actuating-rod and shoe to the normal position. The switch S′ is operated by a similar device.

The switches are constructed similar to those known as "ratchet-switches," and, as illustrated in Fig. 3, consist of an insulating-body *d* having ratchet-teeth, and this body at its ends carries a series of contact-plates *e* and *f*, there being four of each, and each series being connected together by a spider *g*, and *h* is the spindle of the ratchet, upon which the ratchet-wheel *r* of the operating device is rigidly attached. The circuit 1 has two brushes *i* and *i′* arranged to engage the same ratchet of the switch, but one resting on a metal plate *e* or *f*, while the other rests on the adjacent insulating portion. The circuits 2 3 are provided with brushes *k* and *l*, respectively, which also bear on the same ratchet of the switch, and one making contact with a metal plate, while the other rests on the insulating portion. At the switch S′ the circuit 2 has a brush *k′* and the circuit 3 a brush *l′* which make contact with the switch S′ similar to the brushes already described. The circuit 4, containing the signals, is provided with two brushes *m* and *m′* similar to the brushes *i* and *i′* at the switch S.

As illustrated, the signaling-circuit is open, and as the car C enters the section and elevates the shoe *b* the ratchet-switch S is turned to the right and the circuit connections will be changed as follows: The brushes *i* and *k* at the switch S will both make contact with a plate *f* and the brushes *i′* and *l* will rest on insulation, the switch S′ remaining in the position illustrated. The circuit connection will then be wire 1 to brush *i* and plates *f* to brush *k*, wire 2 to brush *k′* of switch S′ and plates *f* to brush *m*, and wire 4 through the signaling device to earth, the brushes *i′*, *l*, *l′* and *m′* being on insulation. As the car leaves the section and operates the switch S′, it will be moved one step to the right, reversing the connections and opening the circuit 2 at that switch, and circuit 3 being open at switch S the signaling devices will be cut out of circuit. The next car to enter the section will operate the switch S and move it one step forward, thus bringing metal plates *e* in contact with the brushes *i′* and *l*, respectively, and the first car having operated switch S′ and brought plates *e* of that switch in contact with brushes *l′* and *m′* circuit 3 will be completed and the signal operated. This operation will open the circuit 2 at both switches S and S′. As the second car leaves the section, the switch S′ is again operated, thus opening the circuit 3 at that switch and bringing metal plates *f* in contact with brushes *k′* and *m*, so that when another car enters the section circuit 2 will be completed at switch S by bringing plates *f* into contact with brushes *i* and *k*,

and the circuit 3 will be opened at both switches.

The switches S and S′ may be operated by any other suitable device, as will be readily understood, the only special requirement being that the operating device should rotate the switch continuously in a forward direction with each operation of the actuating device, regardless of the direction the car is moving in. The reason for this is that it often happens—as, for instance, in single-track roads with turn-outs or sidings—that two cars enter a section from opposite sides and one of them must return to the turn-out or siding. If the car in returning does not operate the switch, the signal at the other end of the section will remain set and the car at that point will not be apprised of the clearance of the track, and, furthermore, should the same car re-enter the section the signal at the distant point would be again operated, but this time opening the signaling-circuit and indicating that the section is clear, while in fact it is occupied. This same objection exists with signal devices operated by magnets upon the closing of the signal-circuit by a car entering a section. If the car returns, the position of the signal at the distant point is not changed.

In Fig. 2, which illustrates a single-track road with the sidings or turn-outs $x\,y$, I have illustrated the wire 4 as extending from the turn-out y to the turn-out x with a set of signals at each turn-out. The object of this is to operate a signal at each turn-out no matter which direction a car may be moving in on the intermediate section. Thus when a car enters the turn-out x and is moving toward the right the switch S will be operated so as to close the circuit 2, the operation of the signals at the turn-out y serving to apprise a car moving toward the left that a car is in the intermediate section, and the operation of the signals at the turn-out x serves to inform the operator of the car passing through that turn-out that the signals at the turn-out y have operated. If, for instance, cars should be entering both turn-outs from opposite directions, the signals at both turn-outs would fail to operate, and thus warn the operators not to proceed. In backing out of the section each car will again operate a switch, which will still leave the signaling-circuit open, so that the signals will not operate, which, as before stated, is an indication that the track is clear. Then the car having the right of way will proceed, operating the switch at its turn-out and causing the signals at both turn-outs to operate as before.

What I claim is—

1. The combination with an electric railway, of a divided signaling-circuit, a switch at each end of the circuit, a connection from one switch to the working conductor, a connection from the other switch to earth containing signaling devices, and means at each switch operated by the contact devices carried by the car for operating the switch, whereby the signaling devices are successively connected with each division of the signaling-circuit, substantially as set forth.

2. The combination with a single-track electric railway having turn-outs or sidings, of a divided signaling-circuit, a switch at each end of the circuit located at the turn-outs, a connection from one switch to the working conductor, a connection from the other switch to earth extending from one turn-out to the other and containing signaling devices at each turn-out, and means at each switch operated by the contact devices carried by the car for operating the switch, whereby the signaling devices are successively connected with each division of the signaling-circuit, substantially as set forth.

3. The combination with an electric railway, of a divided signaling-circuit, a switch at each end of the circuit, a connection from one switch to the working conductor, a connection from the other switch to earth containing signaling devices, and means at each switch operated by the contact devices carried by the car whereby the circuit is closed at one end of the section by the entrance of the car, and opened at the other end of the section as the car leaves that section, and whereby the signaling devices are successively connected with each division of the signaling-circuit, substantially as set forth.

This specification signed and witnessed this 15th day of January, 1896.

WM. H. JORDAN.

Witnesses:
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JOHN R. TAYLOR.