No. 628,856. Patented July 11, 1899.

F. A. RUFF.

ELECTRIC RAILWAY SWITCH.

(Application filed May 9, 1898.)

(No Model.)

Fig. 1.

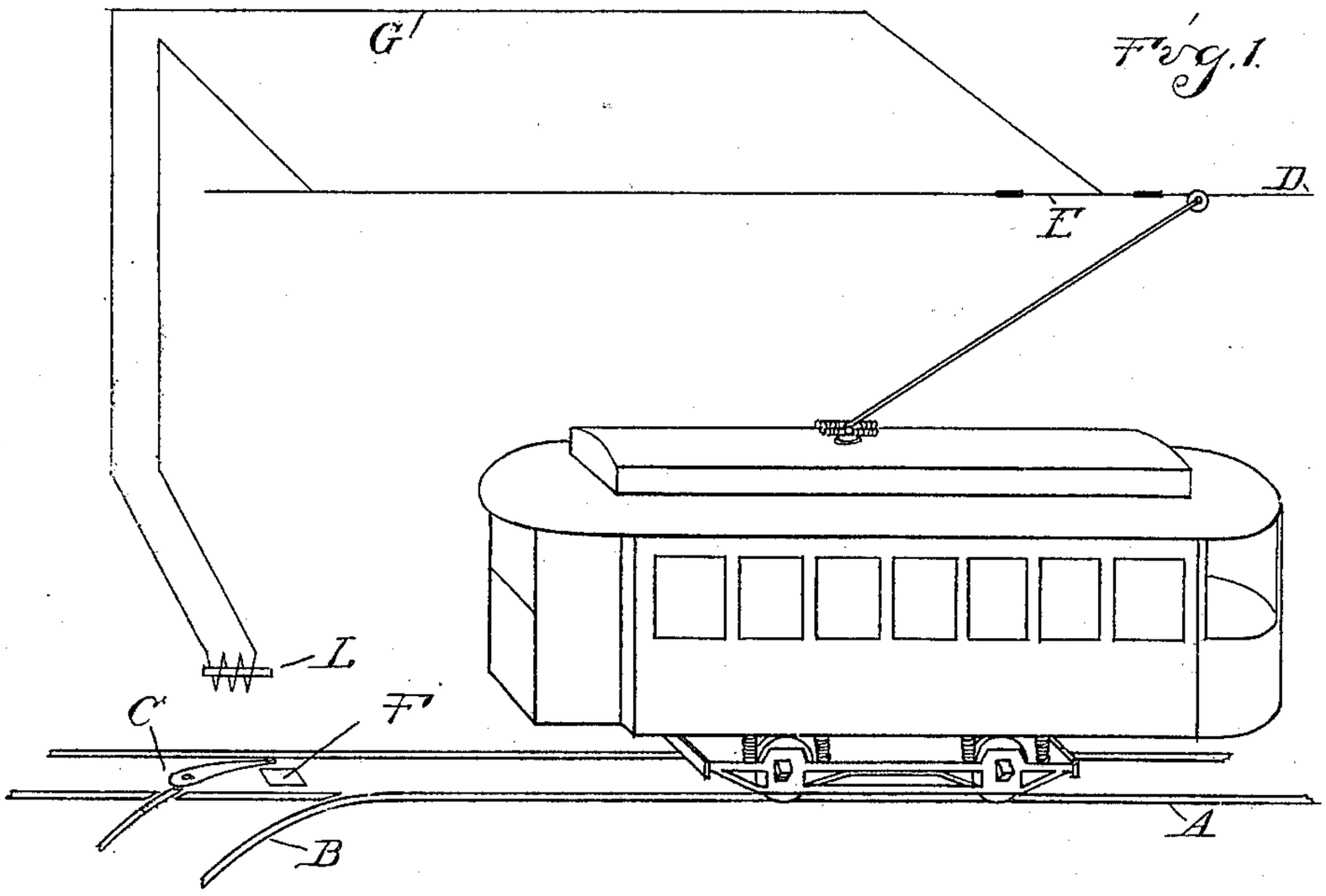

Fig. 2.

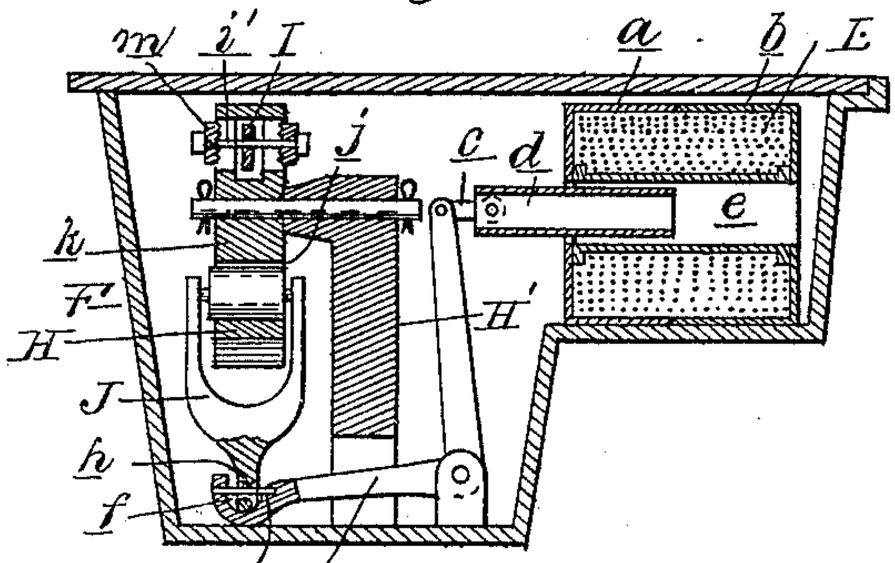

Fig. 3.

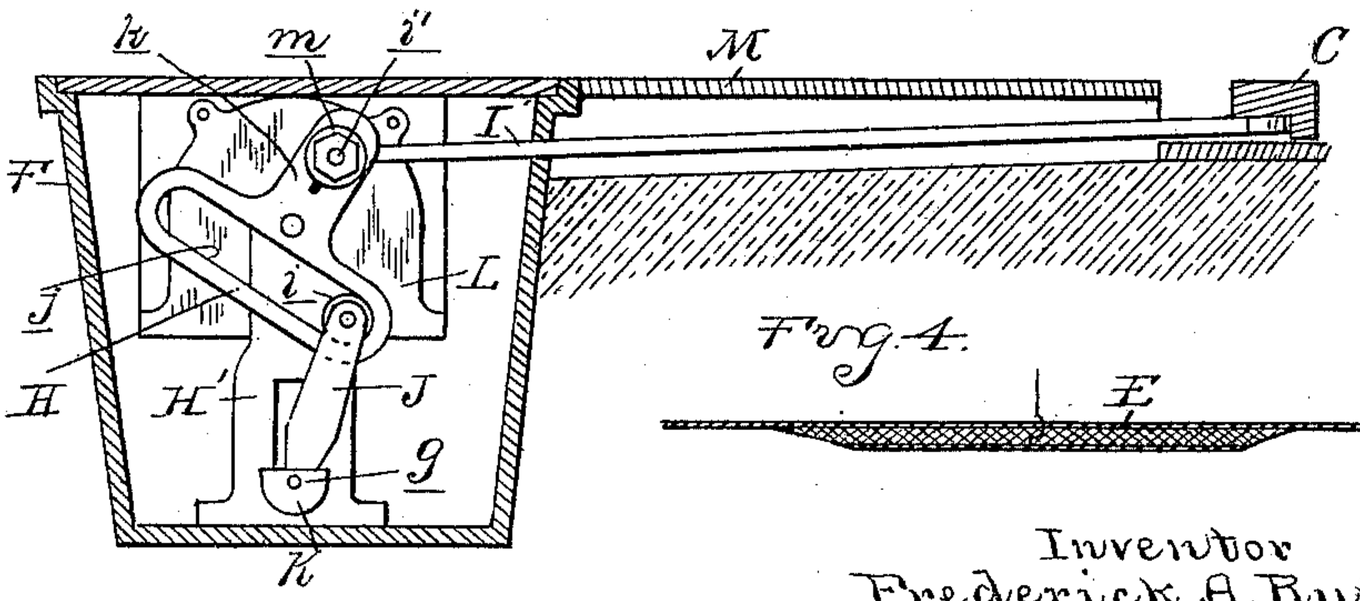

Fig. 4.

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UNITED STATES PATENT OFFICE.

FREDERICK A. RUFF, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT AUTOMATIC SWITCH COMPANY, LIMITED, OF SAME PLACE.

ELECTRIC RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 628,856, dated July 11, 1899.

Application filed May 9, 1898. Serial No. 680,126. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. RUFF, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electric Railway-Switches, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of railway-switches in which the operation of the switch may be controlled from the car while in motion; and it is the object of the invention to obtain a simple construction of operating means which is absolutely certain in its action and is easily controlled by the motorman on the car.

Heretofore railway-switches have been provided with electric operating means comprising electromagnets for throwing the switch-rail, electric circuits in which said magnets are included, and insulated sections of the trolley-wire forming portions of said circuits, the arrangement being such that when the car-motor is turned on the trolley in passing said insulated sections will complete their electric circuits and energize their corresponding magnets. Thus to throw the switch in one direction the motorman turns off the motor while passing the first of said insulated sections and turns it on while passing the other section. To throw the switch in the reverse direction the motor is turned off while passing the second section, and to prevent the operation either way the motor is turned off while passing both sections. This form of switch is objectionable, first, on account of its complication, two sets of electromagnets with independent electrical connections and two insulated sections of the trolley-wire being necessary, and, second, that in its operation it is necessary for the motorman to turn off and on the motor at precisely the proper points in order to throw the switch in the right direction, and this is difficult to do, especially if the car is running at more than a very slow rate of speed.

My invention consists in an improvement upon the above-described switch-operating means, in which I am enabled to dispense with one set of electromagnets, together with one of the insulated sections and electrical connection therefor.

More particularly, my invention consists in the combination, with a single insulated section of trolley-wire and electromagnetic operating device connected therewith, of mechanism adapted to alternately throw the switch reversely, and, further, in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a diagrammatic perspective view of my switch and a trolley-car about to pass the same. Fig. 2 is a longitudinal section through the rail-throwing mechanism, and Fig. 3 is a section at right angles thereto. Fig. 4 is a horizontal section through a modified construction of insulated section of trolley-wire.

A is the main track, B the side track, C the movable rail or switch-point, and D the trolley-wire, of an electric-railway line.

E is a short insulated section of the trolley-wire located a short distance in advance of said switch-point. This may be formed either by cutting out a section of the main trolley-wire and securing it in place again by insulator connections, or, if desired, the wire may be left continuous and an insulated bridge secured to the under side thereof having inclined ends for guiding the trolley thereon, as shown in Fig. 4.

F is a metallic casing located in proximity to the switch-point, preferably between the rails of the track and containing the switch-throwing mechanism and an operating-electromagnet therefor. The latter is included in an electric connection G between the insulated section E and a source of electrical energy, such as the feeder for the trolley-wire, or, as shown in the drawings, it may be connected to the live trolley-wire.

The mechanism for throwing the switch-rail may be of any suitable construction adapted to alternately move the rail reversely in successive operations thereof; but I preferably employ a construction similar to that shown and described in a prior patent issued to me on October 5, 1897, No. 591,141, of which the following is a description.

H is a tilting lever or walking-beam pivotally secured to a standard H′ and connected by a rod I to the movable rail C.

J is an oscillating rod or pitman having a traveling engagement at its upper end with

the walking-beam and at its lower end connected to an actuating-lever K, the parts being so arranged that the actuation of the lever K will lift the oscillating rod J and tilt the beam H, thereby throwing the rail through the connecting-rod I, and when the lever is released the oscillating rod will fall to the opposite end of the beam, which it will tilt in the opposite direction when again actuated. This mechanism is arranged in the casing F and is adapted to be actuated by the electromagnet L above referred to. As shown in the drawings, I preferably employ for this magnet a solenoid, which is secured in one end of the casing, preferably by placing it in the two-part iron casing *a b*, screwed or bolted together and to the casing F and forming an iron-clad magnet. The lever K is in the form of a bell-crank and has connected to its upper end by means of the pivotal link *c* the movable core *d* of the solenoid, which is slidingly secured in a tube *e*, around which the solenoid is wound. The other arm of the bell-crank passes through and is guided in a slot in the standard H′ and has connected thereto the oscillating lever J, which is of sufficient weight to retract the core from the solenoid when the latter is not energized. To assist in this operation, I preferably make the core *d* tubular, with which form I find I am enabled to obtain the requisite magnetic pull with a lesser weight of metal in the core, which thus facilitates the withdrawal of the latter. The rod J is pivoted at its lower end and rests in a socket *f* at the outer end of the bell-crank, to which it is also secured by a pin *g*, passing loosely through an aperture *h* in said rod. The upper end of the rod J is bifurcated and has secured between the arms of the bifurcation the antifriction-roll *i*, which engages with a longitudinal slot *j* in the walking-beam lever H. This beam is provided with the upwardly-extending rock-arm *k*, which is slotted to receive the end of the connecting-rod I, the pivot *i′* of the latter being made adjustable toward or from the pivot of the beam by securing it to the notched clamping-plates *m*. The rod I passes out through a slot in the casing F and is covered and protected by the V-shaped casing or inverted trough M, which extends from this casing to the rail.

In operation if the motorman upon approaching the switch desires to pass on without changing it he simply shuts off the current from the motor before the insulated section E of the trolley-wire is reached, the momentum of the car carrying it over said section without operating the switch. If, on the contrary, he wishes to change the switch it is not necessary for him to do anything; but as the trolley passes the insulated section of the wire it will throw the solenoid L in series with the car-motor and cause it to pull its core *d*, which will cause the bell-crank *k* to lift the rod J, tilting the beam H and throwing the rail. As soon as the trolley passes off from the section E the solenoid is deënergized and the weight of the rod J will cause the roller *i* to travel down the inclined slot to the other end of the beam and at the same time cause the bell-crank K to withdraw the core *d*. It will thus be seen that my switch is thrown automatically whenever a car passes the section E unless the motor is shut off. This simplifies the operation, as it is not necessary to stop the car or to shut off the motor at any precise point, as with the devices heretofore used. Moreover, the construction is simple and is not liable to get out out of order, and there are no electric switches or other delicate parts, and the mechanism and the solenoid are thoroughly protected by the casing F.

What I claim as my invention is—

1. In an electric railway-switch, the combination of a movable switch member, an insulated section of trolley-wire, a connection leading therefrom to a source of electrical energy, an electromagnet included in said connection and mechanism operated by said magnet for throwing said switch member, comprising a walking-beam lever, a connection between the same and the switch member, a lever operated by said magnet, and a pitman operated by said lever having a movable connection with said walking-beam lever and adapted to throw the same alternately in different directions to move the switch in opposite directions substantially as described.

2. In an electric railway-switch, the combination of a solenoid having a movable core, a walking-beam lever, a pitman having at its upper end a traveling connection with said beam, a lever connecting the lower end of said pitman with said movable core and a connection between said walking-beam and the switch, substantially as and for the purpose described.

3. In an electric railway-switch, the combination of a solenoid having a movable core, a bell-crank lever having one arm connected to said core, a walking-beam lever, and a pitman resting on the opposite arm of said bell-crank and having at its upper end a traveling connection with said beam, for the purpose described.

4. In an electrical railway-switch, the combination of a movable switch member, an electromagnet, a walking-beam lever, a connection between the same and said switch member, the lever operated by the said magnet, and a pitman operated by said lever having a movable connection with said walking-beam lever and adapted to throw the same alternately in different directions to move the switch member alternately in opposite directions, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK A. RUFF.

Witnesses:
M. B. O'DOGHERTY,
OTTO F. BARTHEL.