

(No Model.)

2 Sheets—Sheet 1.

J. W. HEARN.
ELECTRIC SWITCH.

No. 543,181.

Patented July 23, 1895.

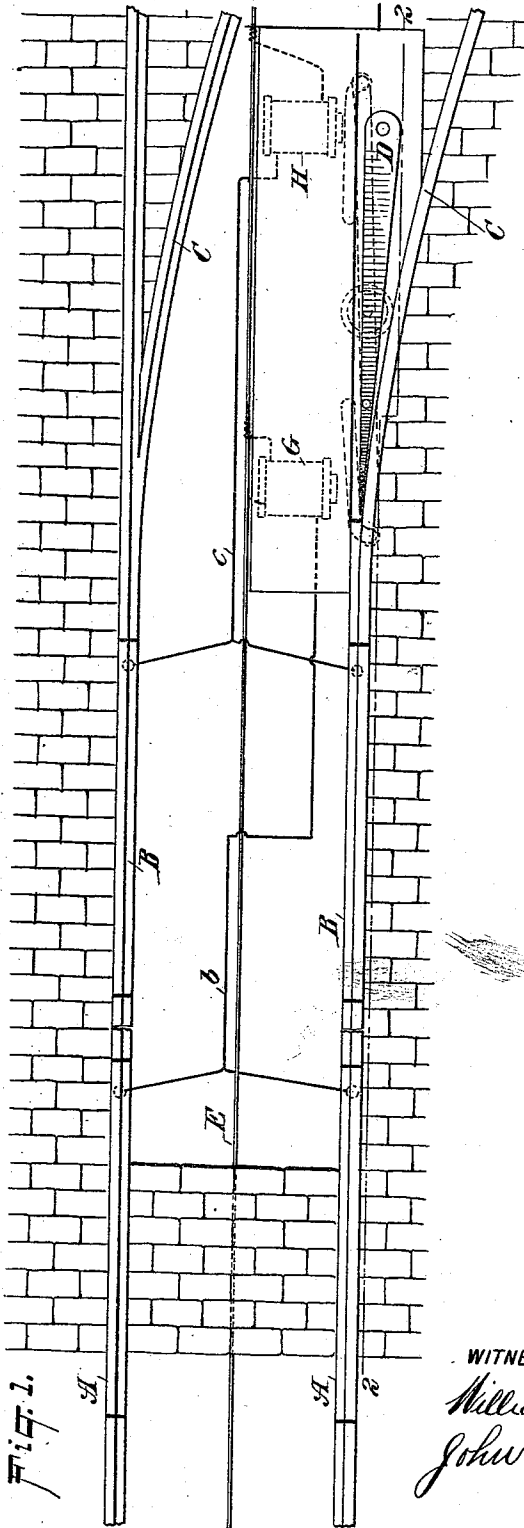


Fig. 1.

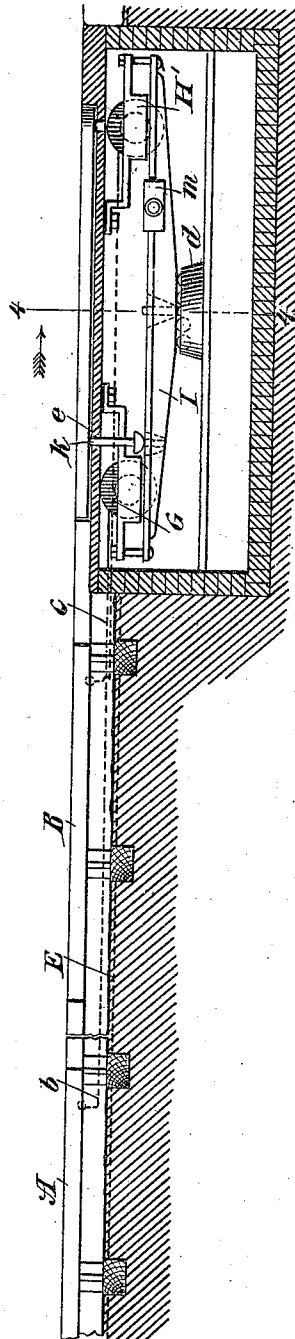


Fig. 2.

WITNESSES:

William Goebel.
John T. Morgan.

BY

John W. Hearn
George Cook.

INVENTOR

ATTORNEYS.

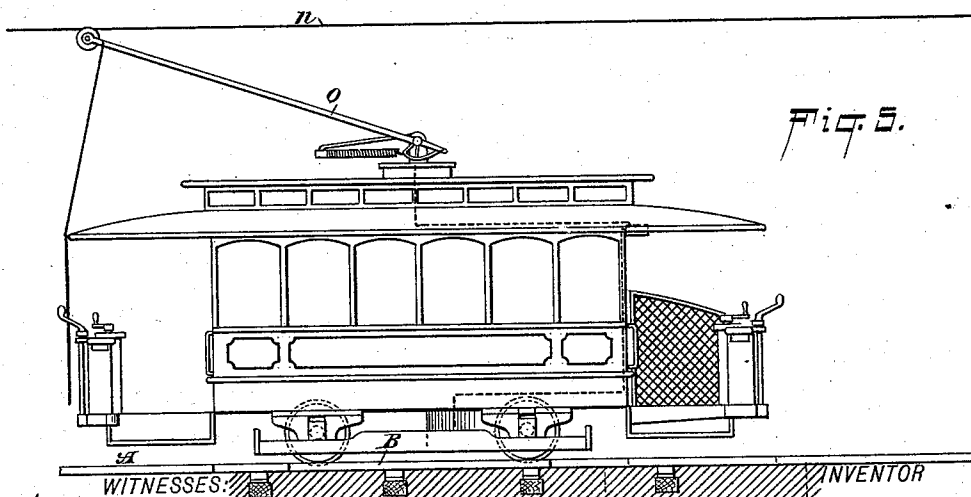
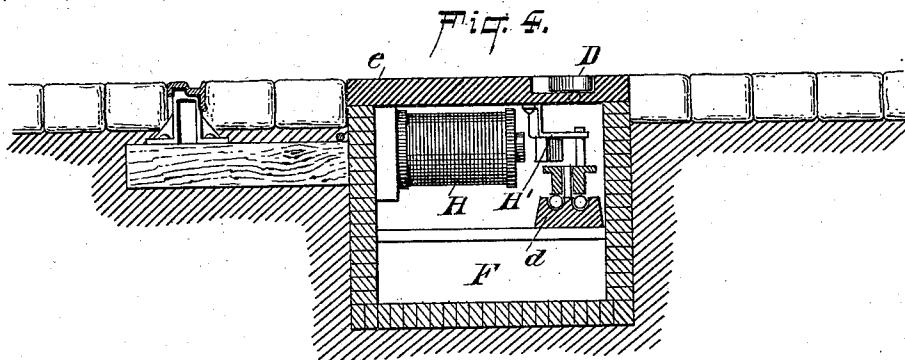
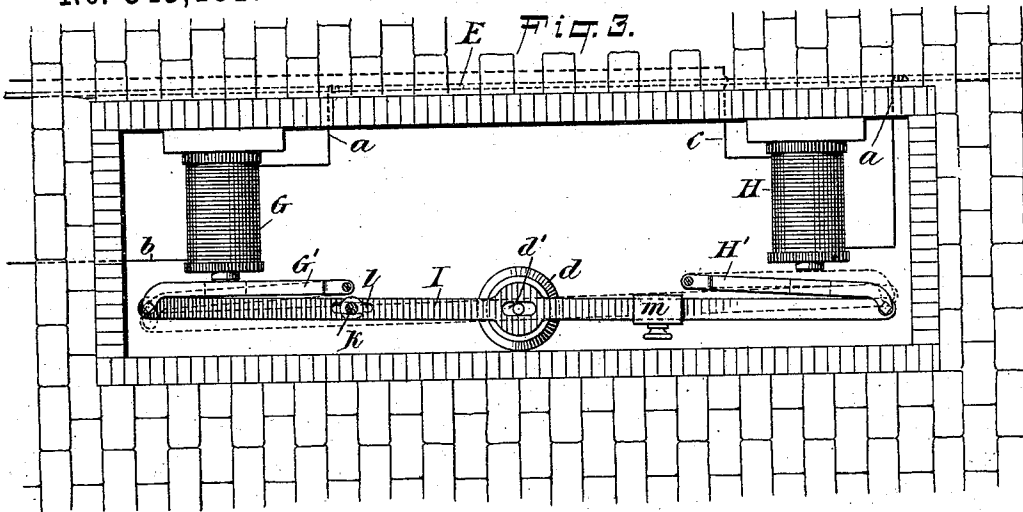
(No Model.)

2 Sheets—Sheet 2.

J. W. HEARN.
ELECTRIC SWITCH.

No. 543,181.

Patented July 23, 1895.



WITNESSES:
William Goebel.
John T. Morgan.

INVENTOR
BY John W. Hearn
George A. Hart
ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN W. HEARN, OF BROOKLYN, NEW YORK.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 543,181, dated July 23, 1895.

Application filed October 3, 1893. Serial No. 487,072. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HEARN, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to an improvement in electric switches, and more particularly for use on electric roads employing the "trolley system," the object being to so construct and arrange the switch and its several parts that it may be controlled by the same lever which operates the car-motor and thus be moved in either direction without the necessity of attaching to the car any additional fixtures and without necessitating the motorman to give his care or attention to any lever or levers other than those already secured to the car.

With this and other ends in view my invention consists in certain novel features of construction and combinations of parts whereby the switch is moved in either direction by means of a magnet or magnets placed below the track and excited by means of the current passing from the trolley-wire through the car-motor and wheels and through the car-rails, as hereinafter fully described.

In the accompanying drawings, Figure 1 is a plan view of a part of a track with its switch, the paving-blocks between the rails being removed in order to show the attachment of the wires leading therefrom to the magnet. Fig. 2 is a sectional view thereof taken on the line 2 2 of Fig. 1. Fig. 3 is a plan view of the box or receptacle for containing the magnet, the lid or cover thereof being removed. Fig. 4 is a sectional view taken on the line 4 4 of Fig. 2, and Fig. 5 is an outline of a trolley car.

Referring to the drawings, A A and B B represent sections of the car-rails, which are completely insulated from each other and from the other rails in any desired manner; C C, the switch-rails, and D the switch-tongue. In the present instance these track-rails are arranged for the use or accommodation of trolley cars, E representing the ground-wire to which the rails, as ordinarily laid, are electrically connected.

Below the surface of the ground, and near the switch to be operated, is formed a well or receptacle F, preferably made of some non-

conducting material, such as masonry work, and within which are located magnets G H, both of which are connected with the ground-wire E by means of the wires *a*, said magnet G being also electrically connected with the insulated rails A A by means of the wire *b* and the magnet H to the insulated rails B B by means of the wire *c*. Within the receptacle F is also located a lever I, pivoted or otherwise loosely connected at its center and arranged to rotate and rock in or upon the bearing *d*, said lever at one end having pivoted thereto one end of an armature G' and at the other end an armature H', the opposite ends of said armature being pivoted to some part of the receptacle F—as, for instance, the cover or lid *e*, as shown in Fig. 2 of the drawings.

Formed on or secured to the switch-tongue D is a pin or bolt *k* passing down into the receptacle and into a slot *l*, formed in the lever I for its reception, this slot, like the slot *d'* formed in the central portion of the lever, being slightly elongated in order to allow of a slight rocking or tilting thereof, this connection of the switch-tongue and lever I, by means of said pin or bolt *k*, causing the rotation or movement of the latter to be communicated to the former, and in order to properly balance the two parts and allow said switch-tongue to be moved with as little friction as possible I place upon said lever a weight *m*, which may be moved on said lever and tightly secured at its proper point to accomplish that purpose.

Having described the construction and arrangement of the several parts, I will now proceed to describe the *modus operandi*.

The electric current used for propelling the car is, as is well known, passed through the trolley-wire *n*, pole *o*, and through the car-motor and car-wheels. The car passing on to the insulated sections A A of the rails excites the magnet G, the current passing from said insulated sections A A to the magnet through the wire *b*, the excitement of this magnet G causing its armature G' to be pulled toward the same, this movement of the armature being communicated through the lever I and pin *k* to the switch-tongue, thereby setting it in such position as to allow the car to run on to the switch-rails C, it being understood, of course, that the current will be shut off by the

motorman while the car is passing over the insulated sections B B of the rails, in order that the magnet H will not be excited and cause the switch to again be pulled in the opposite direction. If it is desired that the car shall proceed upon the main track, the current passing from the trolley-wire through the motor and into the rails is kept on, as it will be understood that when the car passes on to the insulated sections A A the switch-tongue will be caused to move, as above described, but upon the car passing on to the insulated sections B B the magnet H will become excited, the current passing from the car - wheels through said rails and wire c. The excitement of this magnet will cause the armature H' to be drawn toward its magnet H, the movement of this armature being communicated to the switch-tongue through the lever I and pin k and causing the switch-tongue to be so set as to allow the car to proceed on the main line. In other words, if it be desired to set the switch-tongue to allow the car to pass on to the switch, the motorman has simply to cut off the current which propels the car while passing over the insulated sections of the rails B B, and if it be desired to continue along the main line the current is kept on, the momentum in the first instance carrying the car over the insulated sections B B, and in the latter instance the switch-tongue being pulled first in one direction while the car is passing over the sections A A, and in the opposite and proper direction as soon as the car passes on to the sections B B.

It will now be understood that my invention is exceedingly simple in its construction and operation, the complicated devices heretofore attached either to the car or placed within the receptacle being dispensed with. No additional parts to the car are required, it only being necessary for the motorman to cut off the current while passing over a small section of the rails to set the switch - tongue for the

switch, and absolutely nothing being required of him in case the car is to proceed on the main line.

It will be obvious that many changes might be made in the construction and arrangement of the parts without departing from the spirit of my invention—as, for instance, the sections A might be electrically connected with the magnet H instead of the magnet G and the sections B connected with the magnet G instead of the magnet H, thereby reversing the operation of the switch-tongue—that is, when the car is to turn into the switch the motorman will simply keep the current on while passing over both sections, and in case it is desired to send the car along the main line the motorman will cut the current off while passing over the section B. It is also obvious to those skilled in the art that the invention may also be utilized in connection with cars employing the storage-battery system. I would, therefore, have it understood that I do not limit my invention to the exact construction and arrangement of parts as above described; but

What I claim as new, and desire to secure by Letters Patent, is—

In an electric switch, the combination with the insulated rails A, B, magnets G, H, connected with said rails and with a ground wire, a switch tongue D, indirectly connected with armatures G', H', the several parts being constructed and arranged substantially as described, whereby the switch is operated by the current which propels the car, substantially as described.

Signed at New York, in the county of New York and State of New York, this 30th day of September, A. D. 1893.

JOHN W. HEARN.

Witnesses:

B. P. STRATTON,
JOHN T. MORGAN.