No. 610,016. Patented Aug. 30, 1898.

R. A. BALDWIN.

ELECTRIC SWITCH.

(Application filed Mar. 25, 1897.)

(No Model.)

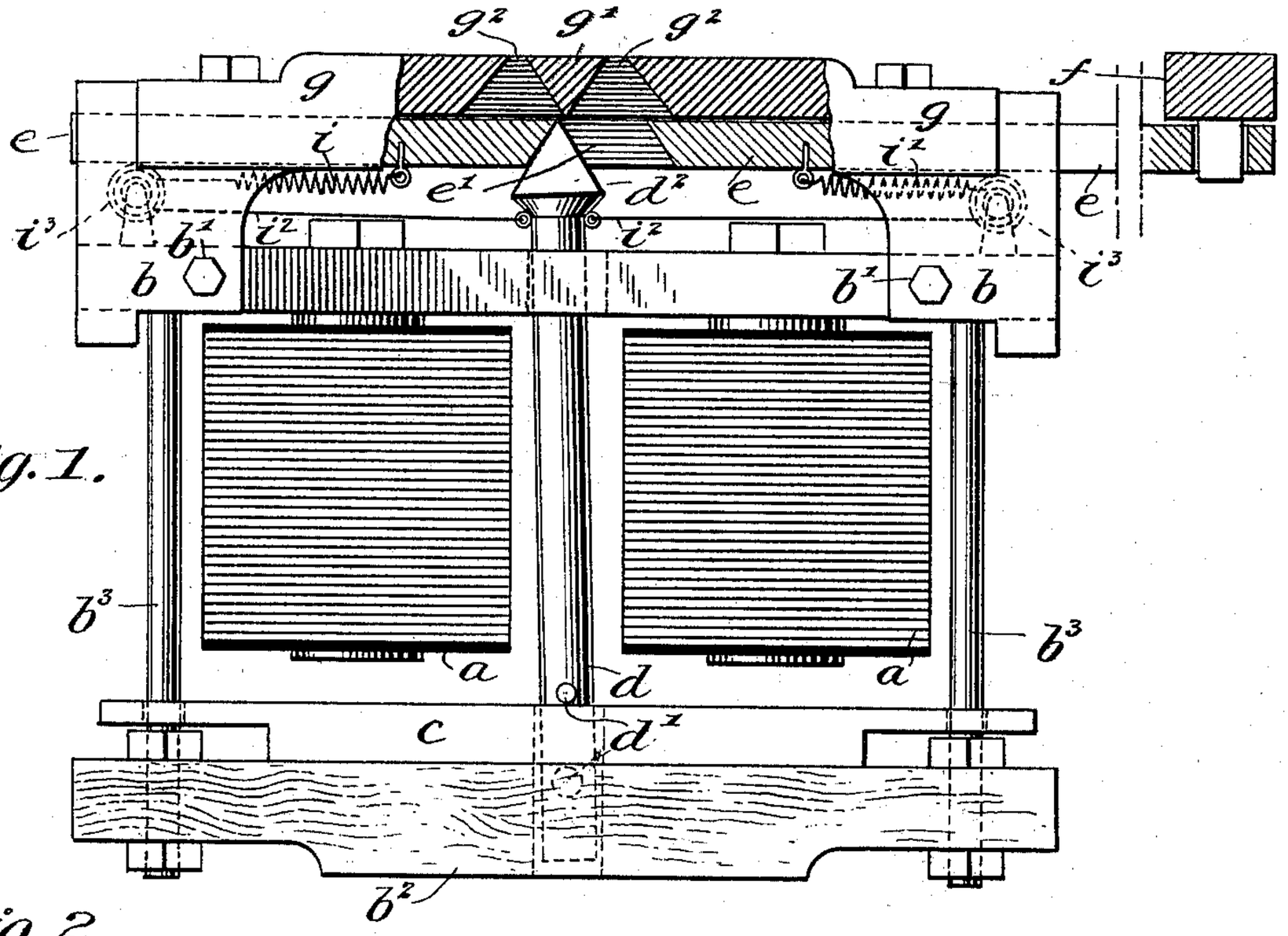


Fig. 1.

Fig. 2.

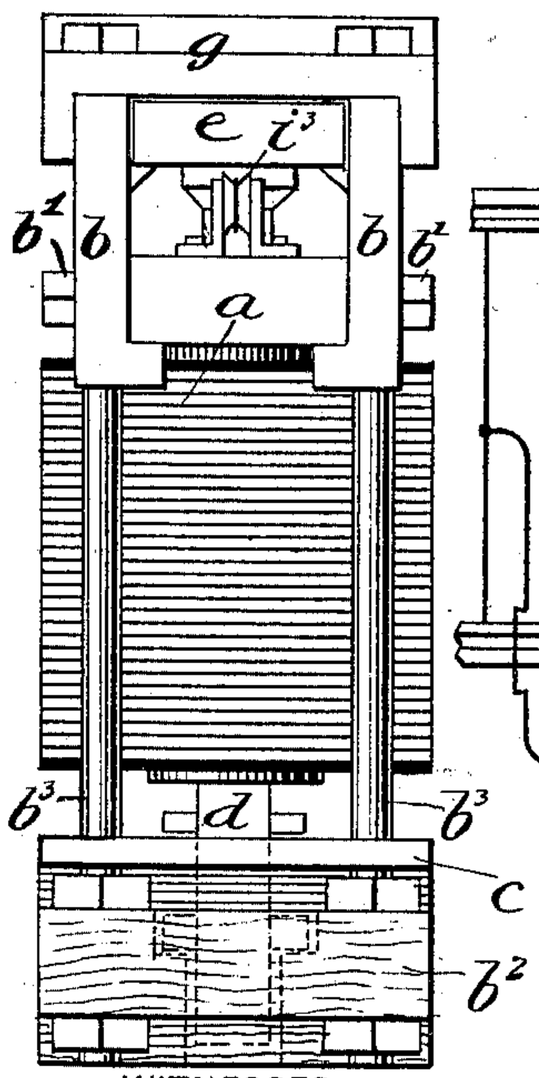
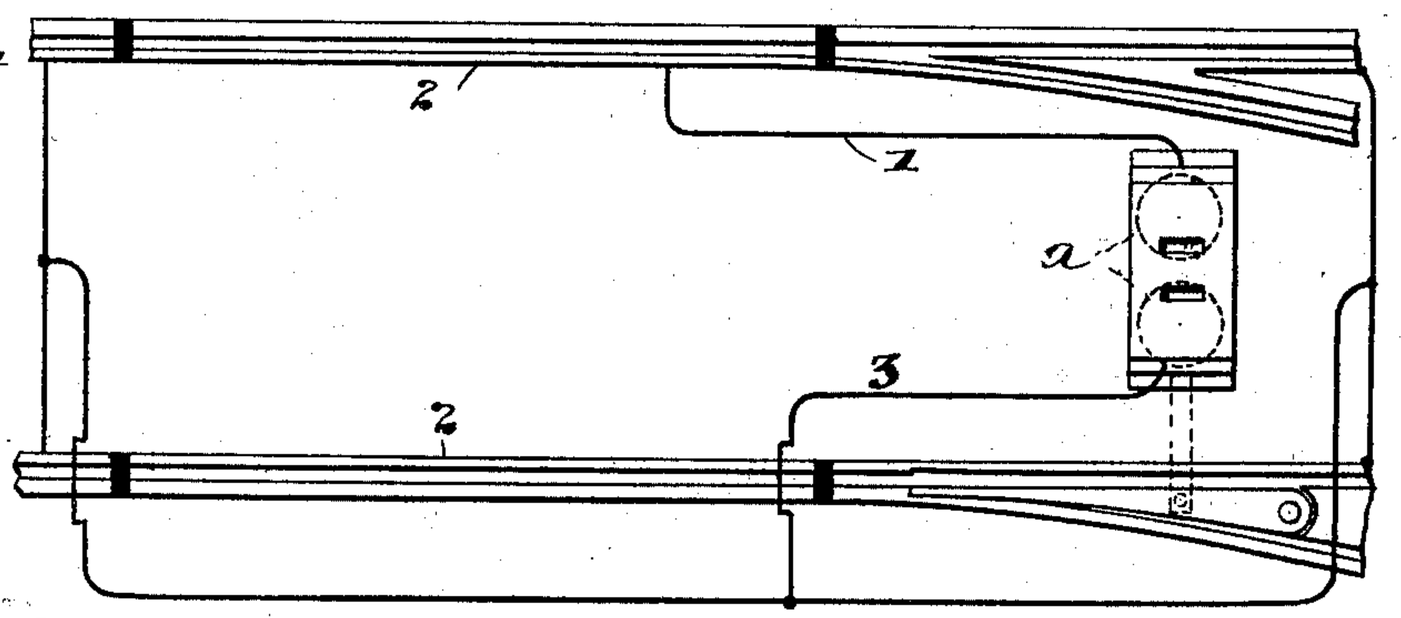


Fig. 3.



WITNESSES:

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ROLLIN ALGER BALDWIN, OF SOUTH NORWALK, CONNECTICUT, ASSIGNOR OF ONE-HALF TO HEAVLON ROWLAND, OF SAME PLACE.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 610,016, dated August 30, 1898.

Application filed March 25, 1897. Serial No. 629,213. (No model.)

To all whom it may concern:

Be it known that I, ROLLIN ALGER 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 Electric Switches, of which the following is a full, clear, and exact description.

This invention is an electrically-operated railway-switch, the object being to provide an automatic device for actuating the switches in the tracks of electric railways.

In carrying out my invention an electromagnet is located in a box in the roadway at some convenient point adjacent to the switch-tongue and current to actuate the magnet is taken from the return-circuit of the railway, which ordinarily is the rail. In order to do this, I insulate a short section of the rails ahead of the switch, and when the switch is to be turned the return-current from the moving vehicle is passed into the insulated section of rails, thence to the magnet, and finally to the return-circuit again. If the switch is not to be turned, the car passes over the insulated section of rails by its momentum, the current being cut off to prevent the energizing of the magnet. Several forms of this kind of switch have been invented heretofore, several of which have been patented by me.

The invention herein relates to the details of construction of the devices whereby the armature of the magnet transmits its motion to the switch point or tongue.

My invention will be described in detail, with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved mechanism, shown removed from its box and with parts broken away. Fig. 2 is an end view of the same, and Fig. 3 is a diagram of the circuits.

Referring to the drawings by letter, *a* represents an electromagnet of the horseshoe type, secured in a frame *b* by means of bolts *b'*, passing through its back yoke. It is mounted in an upright position with the two poles facing downward in a horizontal plane. *c* is a soft-iron bar constituting the armature of the magnet and normally resting upon a cross-piece b^2 of the frame. Its extremities are perforated or notched to fit, respectively, over two brass rods b^3, which act as guides for the armature. A hole is formed through the center of the armature, through which passes the end of an upright brass thrust-rod *d*. Cross-pieces or lugs *d'* are fixed into the thrust-rod above and below the armature to cause the rod to partake of the movements of the armature, while at the same time permitting the rod to swing laterally in the same plane with the armature. The thrust-rod passes vertically upward between the two magnet-spools and through an opening in the back yoke and is provided on its upper end with a wedge-shaped head d^2.

e is a reciprocating bar placed loosely in guides formed on the frame *b*. This bar extends out at one side, as shown, and connects with the switch-point *f* in the railway-track. The bar is provided with an opening *e'*, in which the wedge-shaped head on the thrust-rod stands, and the lateral sides of this opening are inclined to correspond, respectively, with the inclined sides of the head d^2. On top of the frame *b* is fixed a plate *g*, having a wedge-shaped lug *g'* pointing toward the wedge-shaped head d^2 of the thrust-rod, and whose sides stand at the same angle to each other as do those of the head d^2. This lug *g'* is formed by two cavities g^2 in the plate *g*, into either of which cavities the head d^2 is adapted to be thrust, as will be hereinafter explained. Two springs *i i'* connect, respectively, to the opposite sides of the thrust-rod *d* and to bar *e* by means of cords i^2, passing over pulleys i^3. The circuits are as shown in Fig. 3, wherein it will be seen that a wire 1 extends from the insulated section of rails 2 to the magnet, thence by wire 3 to the main line of rails again.

The operation is as follows: The normal position of the thrust-rod is against one or the other of the sides of the opening *e'* in the reciprocating bar and with its point immediately below and slightly to one side of the point of lug *g'*, one of its normal positions being shown in Fig. 1. If upon the approach of a car it is desired to throw the switch, the motorman leaves the current on while he travels over the insulated section of rails.

The return-current from the motor then leads through and energizes the magnet, causing it to lift its armature *c*, the motion of which is communicated to the thrust-rod *d'*. As the thrust-rod rises one side of its wedge-shaped head comes in contact with one side of the lug *g'* and it is forced in a lateral direction. The other side of the wedge-shaped head meanwhile resting against the side of the opening *e'* in the reciprocating bar forces said bar over and throws the switch-point. This movement of the reciprocating bar relaxes one of the springs *i i'* on that side toward which the motion is made and puts the other spring under tension. As soon as the car passes off from the insulated section of rails the magnet is deënergized, and the armature in falling carries the wedge-shaped head of the thrust-rod downward, while the spring, which was previously put under tension, swings it laterally until it finally comes to rest against the opposite side of the opening *e'* in the reciprocating bar. The next time current is passed through the magnet the wedge-shaped head of the rod passes up on the opposite side of lug *g'* and moves the reciprocating bar in the opposite direction. If the switch is not to be thrown upon the approach of a car, the motorman shuts off the current and permits the car to roll over the insulated section of rails by its momentum.

It will be understood that the lug *g'* may be a projection from the plate *g* instead of being formed within it, as shown. It will also be understood that the thrust-rod *d* may have two cams upon it, the second one being directly behind or below the head d^2 and the first one acting upon the lug *g'*, while the second acts upon the reciprocating bar *e*. The function of the fixed lug *g'* is merely that of a guide and purchase for the rod *d*, and in order to insure the least friction between these sliding surfaces any of the usual appliances, such as antifriction-rollers, may be inserted therein.

Having thus described my invention, I claim—

1. In an electrically-operated railway-switch, the combination of an electromagnet and its armature, a rod moved by said armature, a wedge-shaped cam against the faces of which said rod is driven by the magnet to deflect the rod in one direction or the other, means for determining which of said cam-faces the rod shall be driven against, and a switch-tongue connected with the rod and partaking of its deflected movements.

2. In an electrically-operated railway-switch, the combination of an electromagnet and its armature, a rod attached to and moving with the armature, a guide adapted to deflect the rod when it is moved by the armature and a switch-moving bar under the control of the guided movement of the rod, substantially as described.

3. In an electrically-operated railway-switch, the combination of an electromagnet and its armature, a thrust-rod carried by the armature, a reciprocating bar connected with the switch-point, the thrust-rod and bar being provided with corresponding cam-surfaces and a fixed guide directing the movement of the thrust-rod and so controlling the movement of the reciprocating bar, substantially as described.

4. In an electrically-operated railway-switch, the combination of an electromagnet and its armature, a thrust-rod carried by the armature and having a wedge-shaped cam at its extremity, a reciprocating bar connected with the switch-point, the thrust-rod and bar being provided with corresponding cam-surfaces and a wedge-shaped fixed cam against which the cam on the thrust-rod is adapted to strike to deflect the latter and cause it to act on the reciprocating bar, as set forth.

5. In an electrically-operated railway-switch, the combination of an electromagnet and its armature, a rod pivoted to the armature and carrying a wedge-shaped cam, two opposing springs connected respectively to the opposite sides of the rod, a fixed wedge-shaped cam pointing toward the cam on the rod, and a reciprocating bar connected with the switch-point and adapted to be engaged by the rod, substantially as described.

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

ROLLIN ALGER BALDWIN.

Witnesses:

FRANK S. OBER,

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