

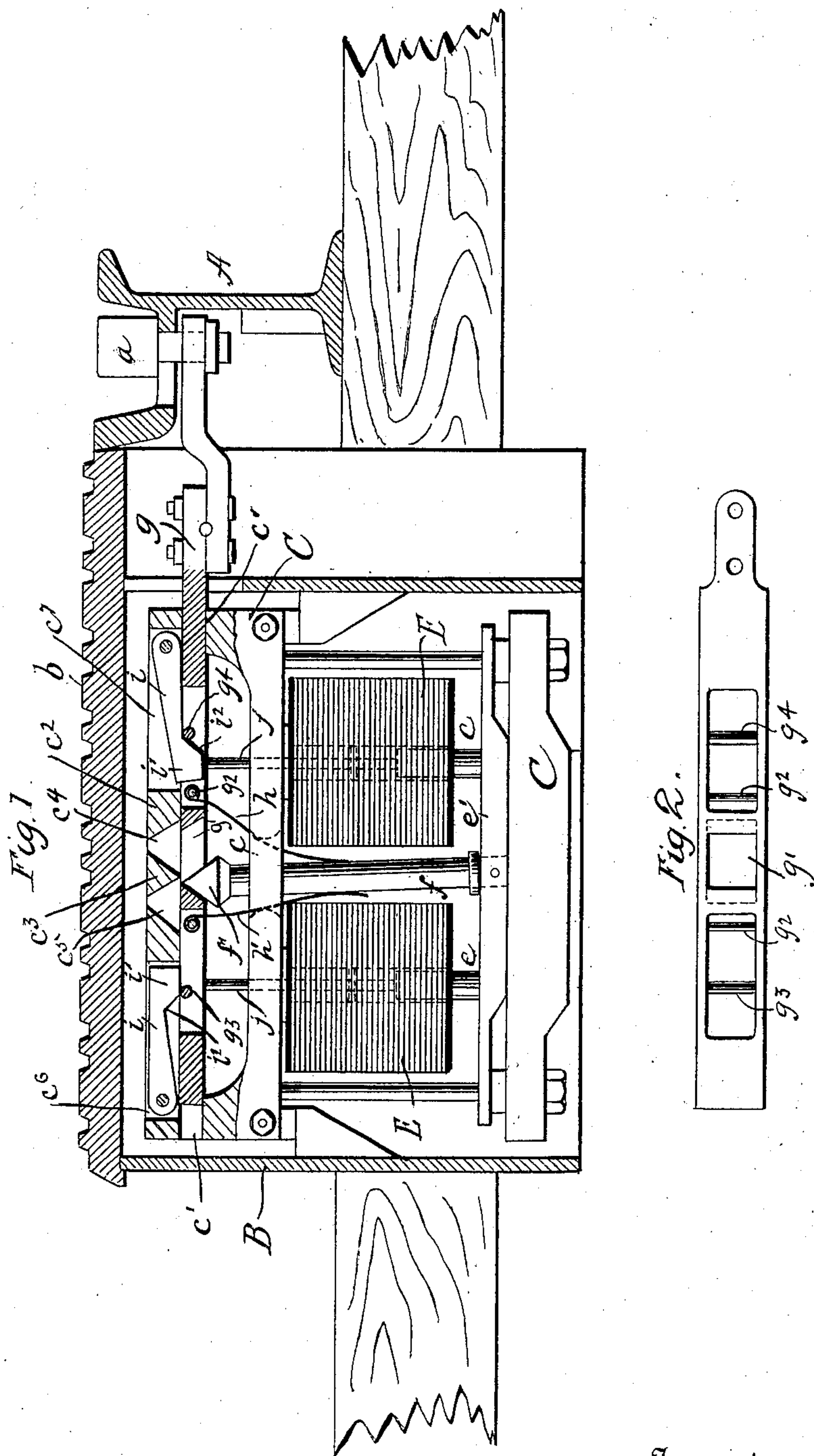
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R. A. BALDWIN.  
ELECTROMAGNETIC RAILWAY SWITCH.

APPLICATION FILED DEC. 18, 1902.

NO MODEL.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ELECTROMAGNETIC RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 736,055, dated August 11, 1903.

Application filed December 18, 1902. Serial No. 135,684. (No model.)

*To all whom it may concern:*

Be it known that I, ROLLIN A. 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 Electromagnetic Railway-Switches, of which the following is a full, clear, and exact description.

This invention relates to electromagnetic railway-switches and involves the use of a single electromagnet adapted by special mechanical appliances to throw the switch-point first in one direction and then in the other as the magnet is successively energized.

The invention consists, first, of a special arrangement of springs to reset the mechanism, so that after the switch has been thrown in one direction the next operation of the magnet will be to throw it in the opposite direction, and, second, of means for locking the switch-point in either of its positions automatically by a lock of such character that the jarring to which the switch structure is ordinarily subjected by a passing car or the street traffic will not move the switch, and yet not be of so positive a nature as to prevent throwing of the switch by hand when desired.

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

Figure 1 is a sectional view through the switch box or casing, showing some of the parts of the mechanism in elevation. Fig. 2 is a plan of the sliding bar connected to the switch-point.

A is a section of a portion of a rail containing the switch-point *a*. Adjacent to the rail and sunken in the road-bed is a box B, having a cover-plate *b* substantially flush with the street. Inside of the box is a frame C, supporting two solenoidal coils E, whose armatures or movable cores *e e* are connected to a cross-bar *e'*, adapted to move in a vertical direction and guided by side rods forming a part of the frame C. When the magnets are energized, this cross-bar is lifted, and when the magnets are deenergized it falls by gravity. Pivotaly attached to the middle of the bar *e'* is a thrust-rod *f*, leading

upward between the two coils and passing through a slot *c* in that portion of the frame C which forms the back yoke of the magnet. At its upper end this rod has a wedge-shaped head *f'*. The sliding bar to which the switch-point is connected is indicated by *g*. It enters the side of the box and passes through guiding-openings *c'* in the frame C in a horizontal direction. At its middle portion the bar is provided with a slot *g'*, having oppositely-inclined end walls, into which slot the head *f'* of the push-rod enters and normally stands. Upon suitable pins *g<sup>2</sup>*, located in the bar, are loosely pivoted or suspended two leaf-springs *h* and *h'*, respectively, which hang downward, passing through the slot *c* on each side of the push-rod and resting at their lower ends against or adjacent the opposite sides of the rod. These springs are adapted to bear laterally against the rod to swing it slightly to one side or the other out of its vertical position in the operation of the switch, as will be hereinafter described.

The frame C consists in part of a top plate *c<sup>2</sup>* immediately above the bar *g*. This top plate is provided at the center with a wedge-shaped cam *c<sup>3</sup>*, pointing downward and flanked on each side by wedge-shaped openings *c<sup>4</sup>* and *c<sup>5</sup>*, the apexes of which point upward. Said openings are to receive the head of the rod *f* when the same is lifted, and the cam is intended to force the rod to one side as it engages the inclined surface of the head. The top plate is also provided with two grooves *c<sup>6</sup>* and *c<sup>7</sup>*, one on each end, in each of which is pivoted a dog *i*, the pivotal point being at the outer end of the plate and the inner ends of the dogs being free to fall by gravity when not supported. The free ends of the dogs are each provided with a head *i'*, and back of each head is an inclined shoulder *i<sup>2</sup>*. In the bar *g* is another pair of cross-pins *g<sup>3</sup>* and *g<sup>4</sup>*, arranged beneath the dogs, but so located with respect thereto that when one of them is directly under the head of the dog, and thus supporting it in its upper position, the other is back of the head and engaging with the inclined shoulder thereon.

*j* and *j* indicate axial extensions of the cores *e e* and consist of brass rods leading upward



through the back yoke of the magnet and terminating immediately under the bar *g* at a point where they can strike the heads of the respective dogs *i i*.

5 The operation is as follows: The normal position of the rod *f* is slightly inclined from the vertical, with the point of its head to one side of the point of cam *c*<sup>3</sup> and with the head resting against one end of the slot *g'* in the  
10 bar *g*, as shown in the drawings. When a current of electricity is passed through the magnet, the upwardly-moving push-rod co-operating with the cam *c*<sup>3</sup> forces the bar *g* to  
15 shifts the switch-point. If we assume the motion to have been toward the left, as seen in the drawings, the left-hand pin *g*<sup>3</sup> will thus be carried beyond the head of the dog *i* above it, allowing said dog to fall upon the end of  
20 the brass rod *j*, connected with the magnet-core immediately under it. This same movement to the left will also throw the spring *h'* against the end of slot *c*, causing its free end to bear under tension against the rod *f*. When  
25 the magnet is deenergized, the push-rod falls by gravity, and as soon as it is clear of the cam the tension which was stored in the spring, as described, shifts the rod to the right, so that the point of its head will pass  
30 to the opposite side of the point of the cam *c*<sup>3</sup>. At the same time also the magnet-core in falling allows the dog at the left to lower until its inclined shoulder rests in engagement with the pin. In this condition the  
35 switch-point is locked against movement due to jarring or other accidental or abnormal causes, because the angle of the inclined shoulder forms sufficient of a hook for this purpose, and this angle can of course be  
40 made to any degree of efficiency as a hook. There are occasions, however, when it is required to move the switch-point by hand, this being accomplished usually by forcing the switch-point over by means of a lever.  
45 Obviously when such means are employed the restraining influence of the dog can be readily overcome. If, however, it is never required to move the switch by hand, the inclination of the shoulder of the dogs can be  
50 made a perfect hook and absolutely prevent movement of the switch-point except in the normal way, which is now to be referred to. At the next energization of the magnet the push-rod *f* is raised, as before; but this time  
55 it travels upward against the opposite side of cam *c*<sup>3</sup> and engages with the opposite end of the slot *g'* in bar *g* and forces the switch-point in the opposite direction. At the beginning of the upward movement of the magnet-cores the brass rod *j* under the locking-dog raises said dog out of engagement with the pin, and thus allows bar *g* to move. In this motion to the right the spring *h* is forced

against rod *f*, so that upon again deenergizing the magnet it reverses the position of the push-rod, as before. This time the other dog comes into play to lock the switch-point against movement, while the dog *g*<sup>4</sup> is supported in its upper position by the pin.

Having described my invention, I claim— 70

1. In an electromagnetic railway-switch, the combination of an electromagnet, a push-rod actuated in one direction thereby and in the other direction by gravity, a wedge-shaped head carried by said rod, a fixed cam adapted to be engaged by said head, a switch-moving bar adapted to be moved by the co-operation of said head and cam and two leaf-springs suspended from said cam on each side of the rod and means whereby the movement of the bar in one direction will create a tension in one spring to shift the position of the rod after its operation upon the bar, substantially as described. 75 80

2. In an electromagnetic switch-throwing mechanism, the combination of a switch-moving element, an electromagnet adapted to move the same positively in both directions, a lock for the switch in each of its positions, said lock being releasable manually and means whereby the electromagnet will simultaneously release the lock and throw the switch. 85 90

3. In an electromagnetic switch-throwing mechanism, the combination of a switch-moving element, an electromagnet adapted to move the same positively in both directions, two pivoted dogs having oppositely-inclined shoulders, adapted to alternately engage said moving element and means for lifting the dogs out of engagement with the moving element when the magnet is energized. 95 100

4. In an electromagnetic switch-throwing mechanism, the combination of a switch-moving element, an electromagnet adapted to move the same positively in both directions, a locking device for the switch in each of its positions and means whereby the electromagnet will simultaneously release the lock and throw the switch. 105 110

5. In an electromagnetic switch-throwing mechanism, the combination of a switch-moving element, an electromagnet adapted to move the same positively in both directions, a locking device for the switch in each of its positions consisting of a hook adapted to engage with the switch-moving element and means whereby the electromagnet will simultaneously release the hook and throw the switch. 115 120

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

ROLLIN A. BALDWIN.

Witnesses:

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JAMES PAUL.