(No Model.) 2 Sheets—Sheet 1.

S. C. C. CURRIE.

RAILWAY SWITCH.

No. 374,733. Patented Dec. 13, 1887.

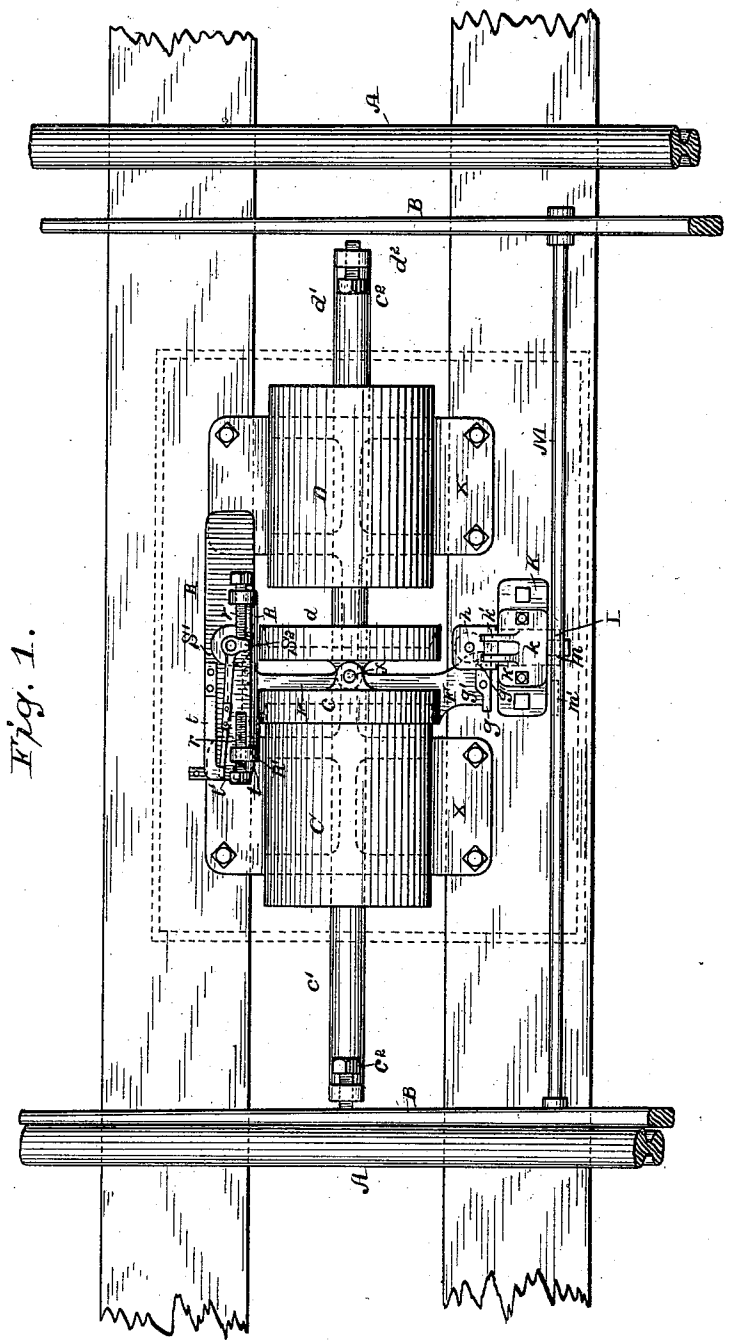


Fig. 1.

WITNESSES

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Stanley C. C. Currie,
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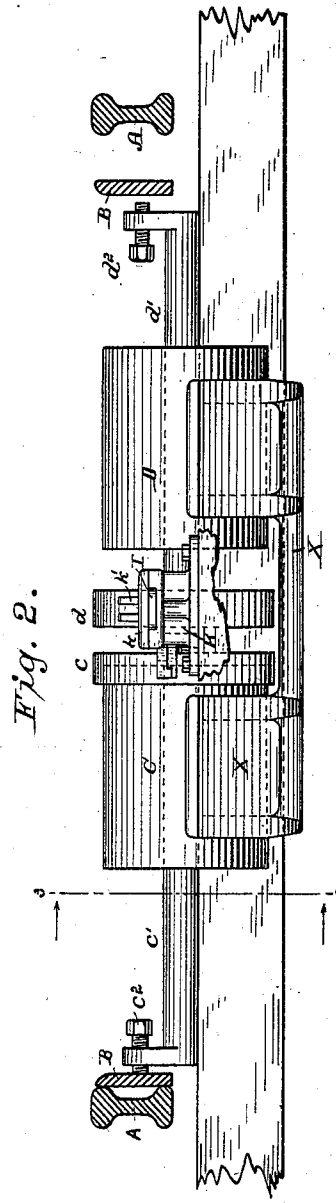


Fig. 2.

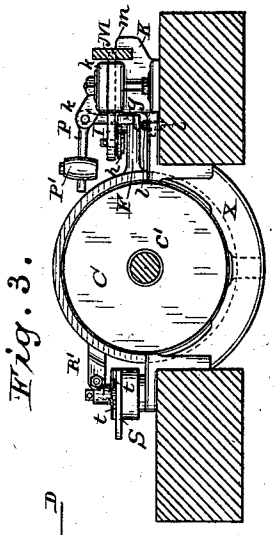


Fig. 3.

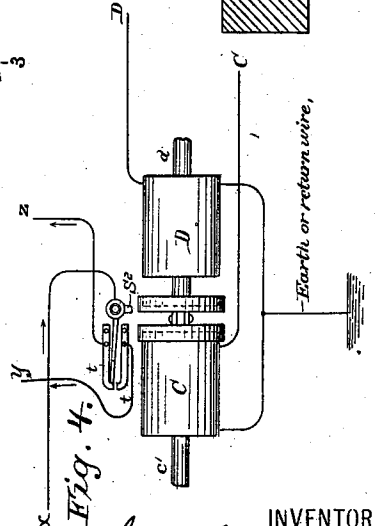


Fig. 4.

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UNITED STATES PATENT OFFICE.

STANLEY C. C. CURRIE, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND, ASSIGNOR TO THE CURRIE-TIMMIS ELECTRIC AND RAILWAY SUPPLY COMPANY, (LIMITED,) OF PHILADELPHIA, PENNSYLVANIA.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 374,733, dated December 13, 1887.

Application filed June 3, 1887. Serial No. 240,148. (No model.)

To all whom it may concern:

Be it known that I, STANLEY C. C. CURRIE, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex, England, have invented certain new and useful Improvements in Automatic Electric Railway-Switches, of which the following is a specification.

My invention relates to that class of railway-switches in which the switch-rails are operated by electro-magnets; and the invention contemplates certain improved organizations of the operating devices, magnets, and interlocking connections by which the switch is automatically unlocked, moved, and locked in any position to which it may be adjusted.

The object of my invention is to produce an organization of the requisite practical simplicity in which a minimum amount of battery will be required to operate the mechanism. With this object in view I preferably arrange the magnets between the rails with their axes about parallel with the cross-ties. Their power is then exerted at right angles to the length of the shifting rails. They can be conveniently protected by any suitable boxing or cover and are entirely out of the way.

The specific details of the preferred construction will fully appear from the accompanying drawings and the following detailed description.

Figure 1 is a plan view; Fig. 2, a side or end view; Fig. 3, a transverse view of the apparatus on the line 3 3 of Fig. 2; and Fig. 4 shows the manner of running the circuits.

A represents the ordinary stationary rails of a railway-track, and B the shifting rails of an automatic switch. Two electro-magnets, C and D, are arranged end to end, with an interval between them in the space between the cross-ties, as illustrated, being supported by a suitable cast-iron frame, X. The armatures *c* and *d* of the respective magnets C D are preferably cup-shaped and provided, respectively, with spindles or core-pieces *c'* *d'*, which pass axially through the magnets C D, and have their outer ends turned up at right angles and provided with adjusting-screws c^2 d^2, the ends of which alternately abut at times against the shifting rails of the switch, as presently described.

The armatures *c* *d* and their core-pieces *c'* *d'* may all be formed in a single piece; but I prefer to form them separately and to pivot the armatures together at a point, *x*, between the two armature-disks, as illustrated.

The magnets C D and their armatures may be of the type illustrated in United States Patent No. 293,116, granted to Timmis and Currie on the 5th day of February, 1884; or any other known suitable construction may be adopted.

Either cast with one of the armature-disks—say *c*—or secured thereto is a transverse arm or frame, F, Fig. 1, which operates the switch-interlocking devices, and also controls circuit-contacts. The interlocking devices will first be described.

Upon the upper face of the end of the arm F is a steel plate, *g*, having two curved or cam faces, *g'* *g'*, which operate against an anti-friction roller, *h*, carried by a sliding locking bolt or latch, I, which moves endwise, substantially at right angles to the axes of the magnets, in a suitable socket or bearing formed by a frame, K, bolted to the cross-tie, and a top plate or cover, *k*. This end of the frame F is supported by and travels upon a roller, *l*, carried by the frame K. The shifting rails B B are coupled together by a transverse bar, M, provided with sockets *m* *m'*, in either of which the sliding locking-bolt may engage.

Between the ends of the adjustable bolts c^2 d^2 and the sides of the shifting rails there is a certain amount of play, as will appear from the drawings. Assuming, therefore, that the parts are in the position shown in Fig. 1, and that the magnet D is energized by the completion of its circuit at any point, its armature *d* will be attracted, and the cam-face *g'* of the plate *g*, acting upon the anti-friction roller *h*, will draw the latch I out of engagement with its socket in the transverse bar M. This occurs before the screw d^2 abuts against the side of the shifting rail B. This is a very desirable feature, for the reason that the first action of the magnet, when its armature is in the weakest part of the magnetic field, is only to perform the slight work of drawing the locking-bolt I

out of engagement with the transverse bar M, and the adjustment is such that, this having been effected, the continued more powerful movement of the armature brings the screw d^2 in contact with the side of the shifting rail B and shifts the switch. The cam-plate *g* prevents the locking-latch I from moving toward the transverse bar M until the shifting of the rails is just being completed, and then the anti-friction roller *h* runs down the other cam-face of the plate and the locking-bolt enters the socket *m'* in the bar M, thereby locking the switch in its adjusted position. In working in the opposite direction the operation is precisely the same, though of course reversed.

On the upper face of the plate *k* are two lugs, *k'*, between which is pivoted an elbow-lever, P, the downwardly-projecting short end of which engages with an aperture in the sliding locking-bolt I, while its horizontal arm is provided with an adjustable weight, P'. The weight constantly tends to move the locking-bolt toward the transverse bar M and cause it to engage the sockets in the bar when permitted by the cam *g*.

Each magnet C or D may be worked by separate wire, as shown in Fig. 4, so that the magnets may be controlled from any desired point or operated according to any desired system. The automatic switch described may be used in connection with any suitable signaling system or apparatus—such, for instance, as that shown in the patent of Timmis and Currie, No. 326,068—and to effect the operation of the signaling mechanism to indicate in what condition the switch is, the following arrangement may be employed:

The opposite end of the casting F is provided with a transverse arm, R, having right-angular projections or lugs R' at each end, in which are adjustable screws *r*. A circuit-changing arm, S, is pivoted upon a plate, S', of insulating material and provided with a short crank projection, S^2, against which the adjustable screws *r* work. Two contact or switch fingers, *t t*, are mounted upon the insulating-plate S', their greatest length being parallel with that of the transverse arm R on the end of the frame F, and their ends *t'* are turned at right angles to each other, as clearly seen in Figs. 1 and 3. The end of the pivoted circuit-changing arm S sweeps these contacts, as clearly shown, and transfers the circuit from one contact to the other when the screws *r* strike the crank projection on the circuit-changing arm as the switch mechanism is operated. For instance, assuming that the mechanism is in the position illustrated in Fig. 1, the left-hand screw *r*, striking the crank projection of the arm S just as the movement of the switch is being completed, as above described, would move the arm out of contact with the upper switch-finger *t* and place it in contact with the lower one. This, however, would only take place when the operation of shifting the rails B to the right, as viewed in the drawings, is about being completed.

The switch-arm is connected, as shown, Fig. 4, by wire *x* with any suitable source of electric energy, while the contact-fingers *t t* are connected with wires *y z*, which lead, respectively, to the signaling apparatus of each of the tracks. Thus when the switch is operated the signaling apparatus upon each of the tracks controlled by the switch is set in proper position to indicate the condition of the switch.

With the organization described, it will be perceived that the switch-magnets may be energized from any desired point or operated according to any desired system and used in connection with any suitable system of railroad-signaling; that they automatically effect the unlocking of the switch, its shifting, and relocking, and just as the operation is completed automatically set the relative signal-circuits.

The armatures are preferably pivoted together at *x*, as shown, so as to allow a certain amount of play, as it is difficult to lay the magnets and their cores and armatures with the precision which would be necessary if the armatures and spindles were all rigidly connected.

By arranging the magnets between and with their axes at right angles to the rails and operating directly upon the shifting rails an economical application of power is made.

I have described my invention and illustrated it in one practical and efficient form, but do not limit myself to the details of construction, which may readily be varied by those skilled in the art.

I claim as my invention—

1. The combination of the shifting rails, an operating switch-magnet, its armature, and the rail-shifting rods or spindles operatively connected with the armature and moved directly thereby to effect the shifting of the switch, substantially as set forth.

2. The combination of the shifting rails, the hollow switch-operating magnet interposed between the rails, its armature, and its spindle which passes through the magnet and operates upon the shifting rails, substantially as set forth.

3. The combination of the shifting rails, the hollow magnets, their armatures, the pivotal connection between the armatures, and the armature-spindles which pass through the magnets and operate upon the shifting rails.

4. The combination of the shifting rails, the hollow magnets interposed between the rails and having their axes substantially at right angles thereto, the connected armatures of the magnets arranged between the adjacent inner ends of the magnets, and the cores or spindles of the armatures which pass through the hollow magnets and act on the shifting rails, substantially as set forth.

5. The combination of the shifting rails, their transverse connecting-bar, the locking-bolt which engages said bar, the switch-operating magnet, its armature, and the locking-bolt-operating devices carried by the armature, whereby the armature upon its move-

ment unlocks the switch and then shifts it, substantially as set forth.

6. The combination of the shifting rails, the locking-bolt for holding the rails in a fixed position, the electro-magnet, its armature, connections between the armature and the locking-bolt, whereby the bolt is released when the electro-magnet is first actively energized, and the rail-shifting rods or spindles operated by the continued movement of the armature, substantially as set forth.

7. The combination of the shifting rails, the transverse socketed connecting-bar, the locking-bolt which constantly tends to engage it, the operating-magnets, armatures, and rail-shifting devices, the frame F, its roller-bearing *l*, the cam *g*, and the roller of the locking-bolt against which the cam works, substantially as set forth.

8. The combination of the shifting rails, the electro-magnet, its armature, the rails, shifting rods or spindles connected with the armature, the circuit-changing contacts which control the signaling-circuit, and connections between the contacts and the armature, whereby its movement shifts the contact, substantially as set forth.

9. The combination of the shifting rails, electro-magnetic operating devices located between the rails, mechanism connecting the electro-magnetic devices and the shifting rails, and circuit-changing contacts operated by the movement of the apparatus to control the signal-circuit to indicate the position of the switch.

In testimony whereof I have hereunto subscribed my name.

STANLEY C. C. CURRIE.

Witnesses:
THOS. MORAN,
GEO. R. THOMPSON.