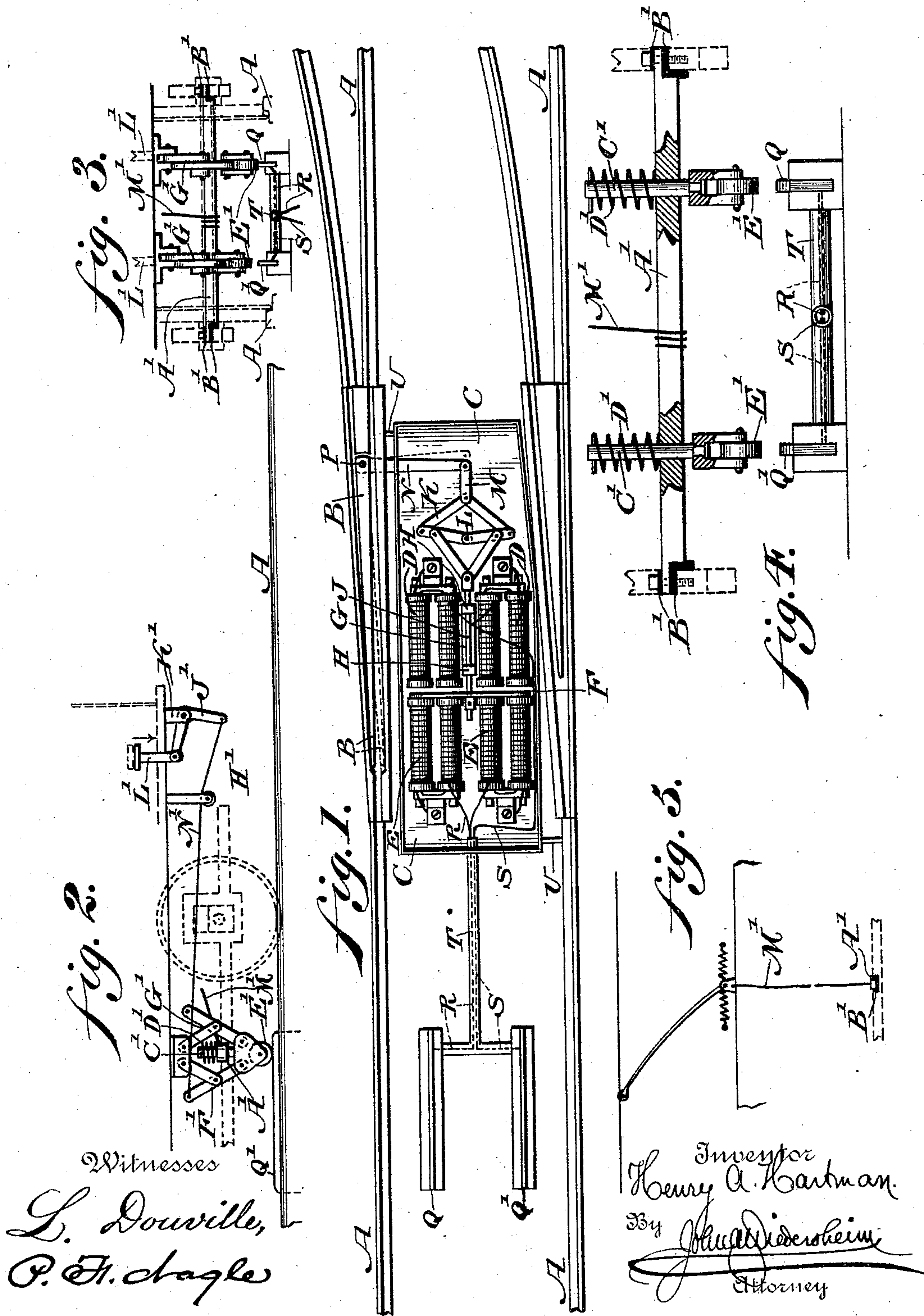


(No Model.)

H. A. HARTMAN.
ELECTRICALLY OPERATED SWITCH.

No. 538,871.

Patented May 7, 1895.



UNITED STATES PATENT OFFICE.

HENRY A. HARTMAN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICALLY-OPERATED SWITCH.

SPECIFICATION forming part of Letters Patent No. 538,871, dated May 7, 1895.

Application filed January 12, 1895, Serial No. 534,614. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HARTMAN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Electrically-Operated Switches, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of an improvement in electrically operated switches, formed of a series of magnets, an armature between said magnets, a rod supported on a frame and secured to said armature, and an arm fastened to a switch with a system of toggle levers between said arm and said rod, and contact points with connections with each series of magnets, whereby either series may be operated, and the switch moved, suitable mechanism on the car being adapted to complete the circuit.

Figure 1 represents a plan view of a switch embodying my invention. Fig. 2 represents a side elevation of the operating mechanism on a car. Fig. 3 represents an end elevation of the same. Fig. 4 represents an end elevation of part of the operating mechanism on an enlarged scale. Fig. 5 represents a view showing the course of the current to the points of contact.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings: A designates the rails of the main line of a railway, and B the switch thereof. Between the rails, near the switch B, is situated the box C, in which are placed a series of magnets D, D, and E, E, having an armature F between the said series.

G designates a frame secured to the bottom of the box C, and from said frame rise the guides H, and mounted therein is a rod J, which is secured to the armature F.

Fastened to the rod J, is one end of a system of levers K, which are pivoted to the box C by the pin L, the other end of said levers being attached to a link M, which connects the same with an arm N, the latter being passed through the side of the box C, and secured by the axial pin P to the switch B.

The system of levers K consists of two toggle levers pivotally connected at L and to the link M and two levers which are each pivotally

connected at one of their ends with the rod J and at their other end with one member of each of the toggle levers intermediate its ends and its pivotal connection at L whereby the movement of the rod J, moves the inner end of the link M in the direction of the length of the said link.

Q and Q' designate contact points suitably insulated, which are situated a little distance in front of the switch, between the tracks A.

The point Q is connected with one series of magnets by the conductor R, and the other point, Q', is connected by the conductor S with the other series of magnets, said conductors R and S being protected by a suitable covering T. Bonds U connect the box C with the tracks A.

A' designates a bar which is supported on the frame of the running gear of a car, and insulated therefrom by the pieces B'. Passing through said bar A' are the plungers C', which are held in raised or normal position by springs D', said plungers carrying rollers E' on their lower ends.

F', G' designate toggle levers, which are connected with the bearings of the rollers E' and with a suitable part of the car.

Fastened to the free end of one of the levers F' is a cord or wire N', which passes over a roller H', and is attached to one arm of an elbow lever J', which is supported by an ear K' on the car, the other arm of said elbow lever F' having pivoted thereto the post L', which passes through the floor of the car, and is in reach of the motorman.

The bar A' is suitably connected with the main conductor by the wire M'.

The operation is as follows: If it is desired to switch from the main line to the side track, the motorman depresses one of the posts L', so that it moves the elbow lever J', and forces down the plunger C', the roller E' contacting with the point Q'. This forms a circuit, and the magnets D, D, are charged and attract the armature F. Moving with the armature F is the rod J, which operates the system of levers K, so that the arm N is moved and with it the switch B, as shown in dotted lines Fig. 1, and the car is switched to the side track. The switch B will remain in the last position until operated by the next car, if desired. If the switch B is in the right place,

the plungers need not be operated, and will pass above the contact points, as shown in Fig. 4. To return the switch B to its position, the other plunger C' is operated, and with the
 5 contact point Q completes the circuit, whereby the armature is attracted and operates the parts, the switch moving so that the car can proceed on the main track.

Any number of magnets may be employed.

10 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electrically operated switch, a box, two sets of magnets therein, a frame secured
 15 to said box, guides on said frame, a rod mounted on said guides, an armature for said magnets, secured to said rod, a switch connected by a system of toggle levers with said armature and mechanism on the car being adapted
 20 to complete the circuit as described.

2. In an electrically operated switch, a box, two sets of magnets therein, an armature between said set of magnets, a frame on said
 25 box, a rod supported on said frame and secured to said armature, a switch, an arm fastened thereto, a system of toggle levers between said arm and said rod and contact points connected with the series of magnets, suitable mechanism on the car being adapted
 30 to complete the circuit, substantially as described.

3. In an electrically operated switch, main, and side rails, a switch, a box with two series of magnets therein, a common armature for
 35 said series, a rod secured to said armature and movable in guides in said box, an arm connected with said switch, a system of toggle levers connected to said rod and by a link to said arm, said parts being combined substan-
 40 tially as described.

4. In an electrically operated switch, a bar suitably supported from a car but insulated therefrom, plungers movable in said bar, and
 45 carrying rollers at their lower ends, springs for raising said plungers, toggle levers piv-

oted to each other and to a bearing of said rollers, an elbow lever mounted on the car, an operating post therefor, a connection for said elbow lever and toggle levers, and a conductor from said bar to an electric supply, 50 said parts being combined substantially as described.

5. In an electrically operated switch, a switch rail, a box with the series of magnets D and E therein, the armature F between said
 55 series, of magnets, the contact points Q, Q', the conductors R and S leading from said contact points to said series respectively, the rod J connected with said armature F, the system of toggle levers K connected with said
 60 rod, the arm N passing through the side of the box and connected with said switch rail and by a link with said levers K said rod I being movable in the guides H and said box having bonds U. said parts being combined 65 substantially as described.

6. In an electrically operated switch, a series of magnets, an armature for said magnets, a rod secured to said armature, toggle
 70 levers connected with said rod, an arm secured to the said levers, a switch having an axial pin which is fastened to said arm, contact points which have conductors to the different series of magnets, and means for operating the parts, substantially as described. 75

7. In an electrically operated switch, a box, two sets of magnets therein, an armature between said sets, a rod connected with said ar-
 80 mature, a switch rail connected by a system of toggle levers, with said rod, two contact points one of which is electrically connected with one of said sets of magnets, the other point being connected with the other set, and mechanism for making an electric circuit with either contact points, said parts being com- 85 bined substantially as described.

HENRY A. HARTMAN.

Witnesses:

JOHN A. WIEDERSHEIM,
 R. H. GRAESER.