(No Model.) 3 Sheets—Sheet 1.

E. THOMSON.

RAILWAY GATE CROSSING FOR OVERHEAD LINES.

No. 450,687. Patented Apr. 21, 1891.

Fig. 1.

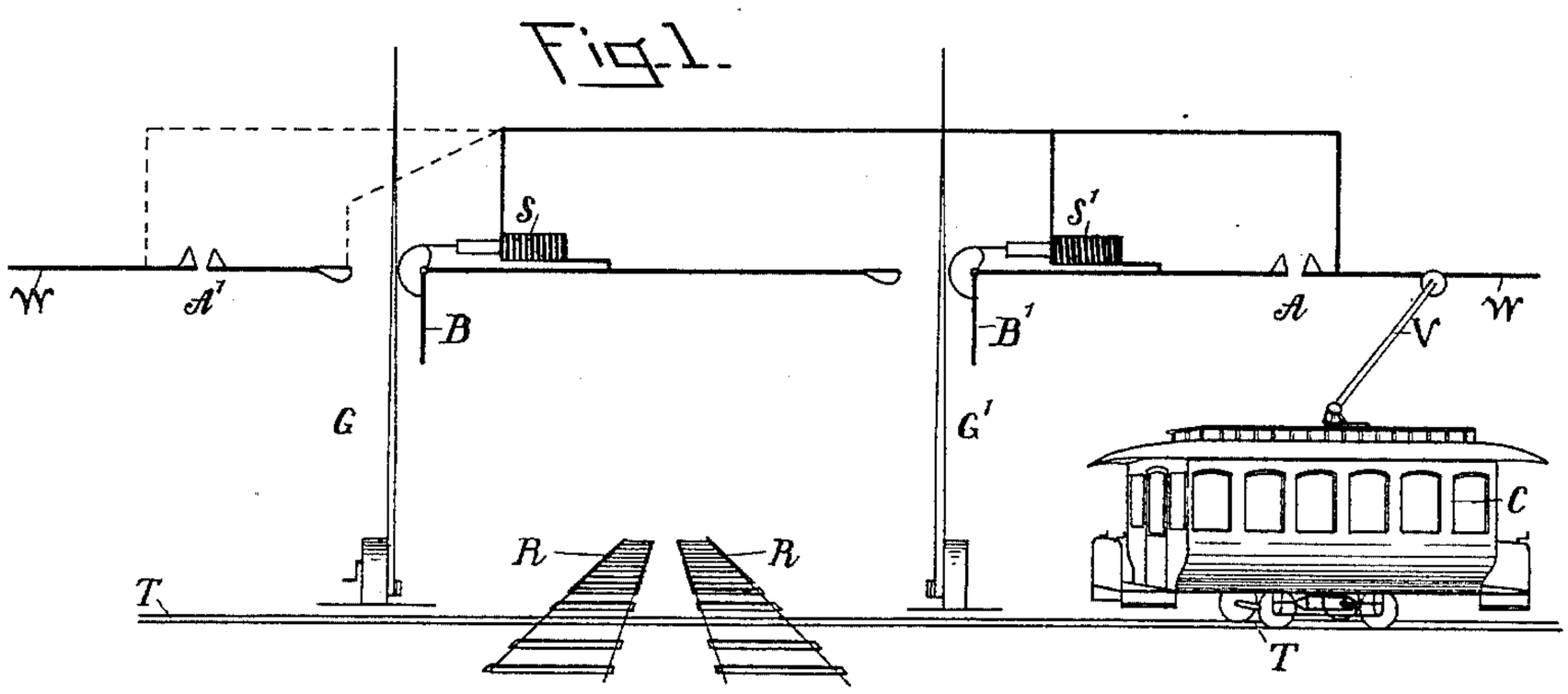


Fig. 2.

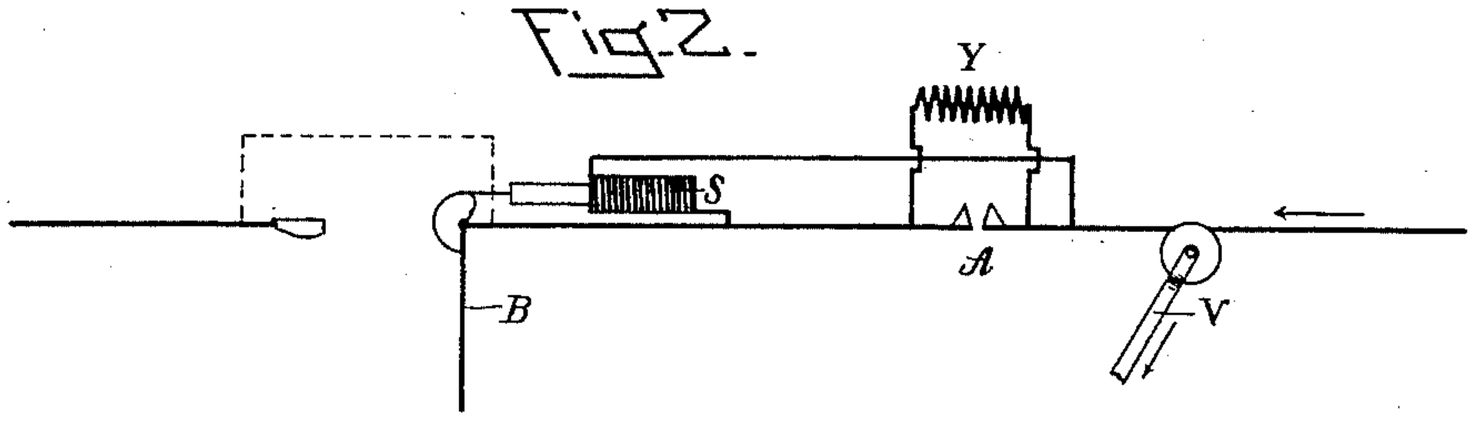


Fig. 3.

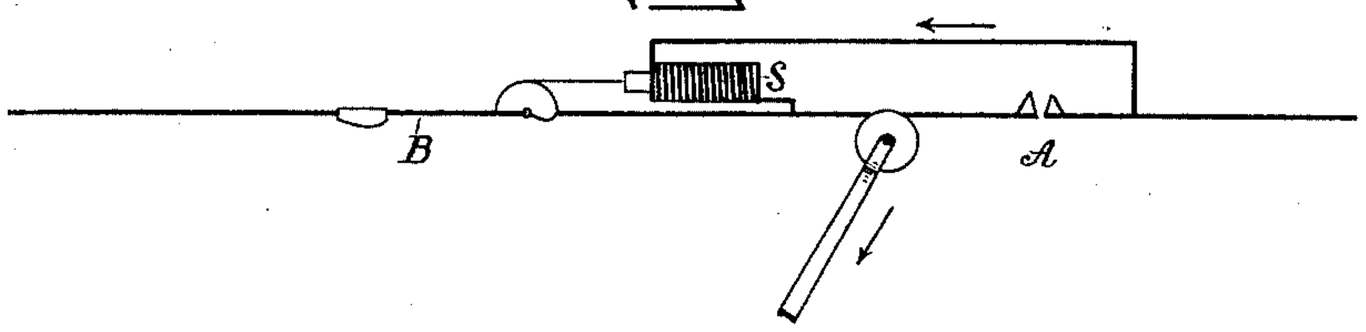
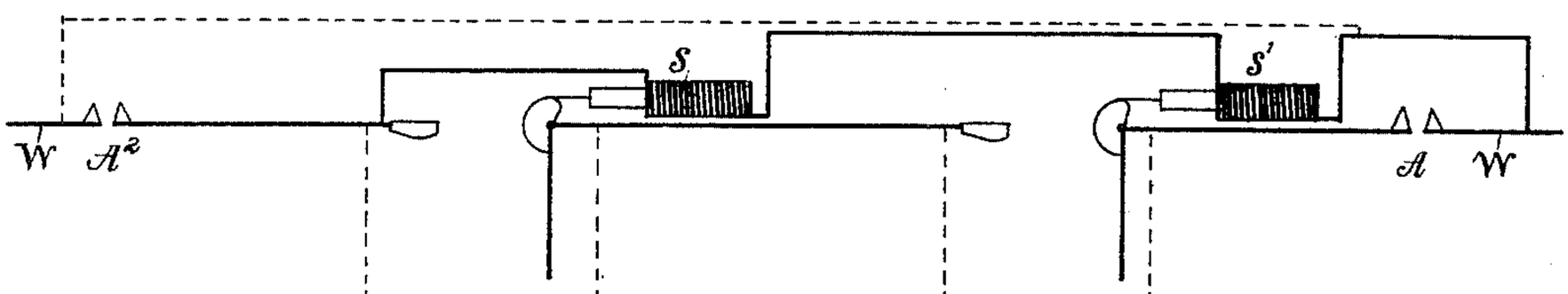


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

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RAILWAY GATE CROSSING FOR OVERHEAD LINES.

No. 450,687. Patented Apr. 21, 1891.

Fig. 5.

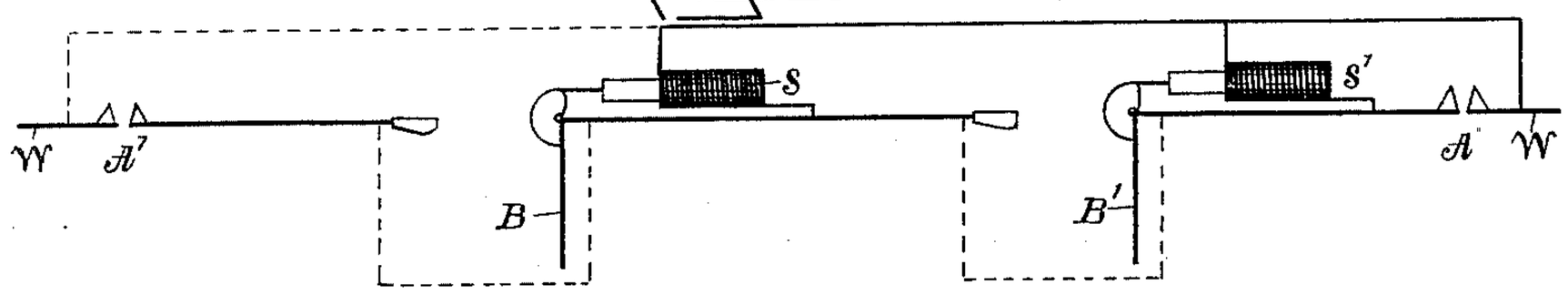


Fig. 6.

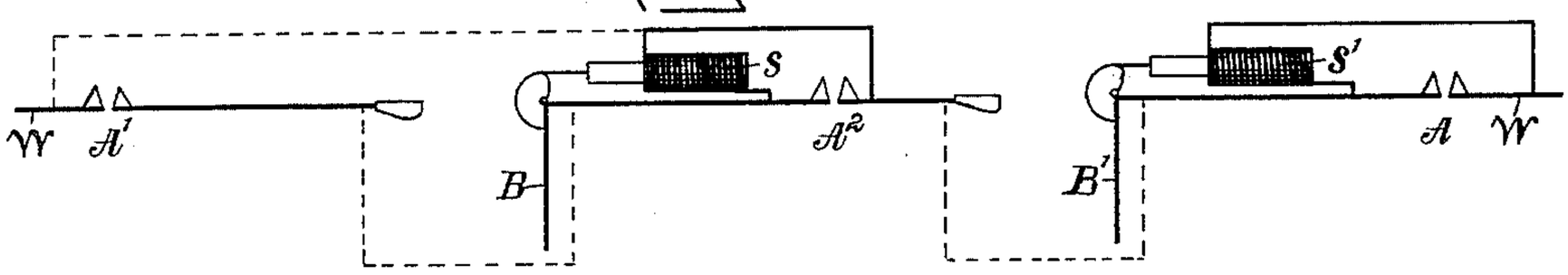


Fig. 7.

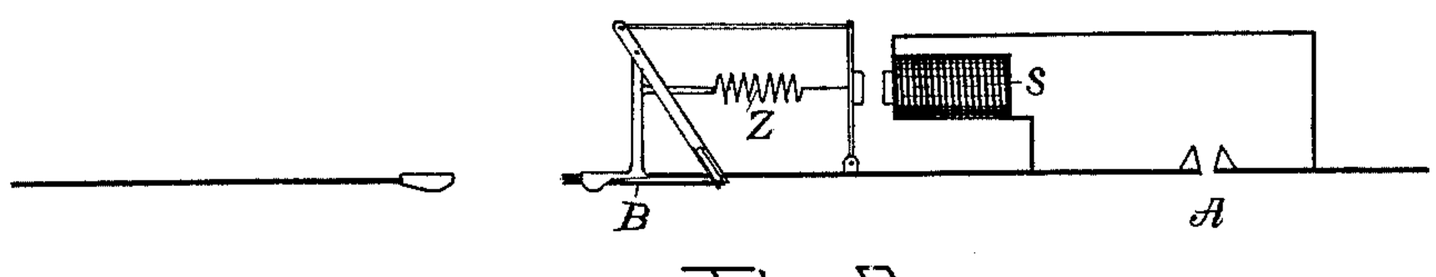


Fig. 8.

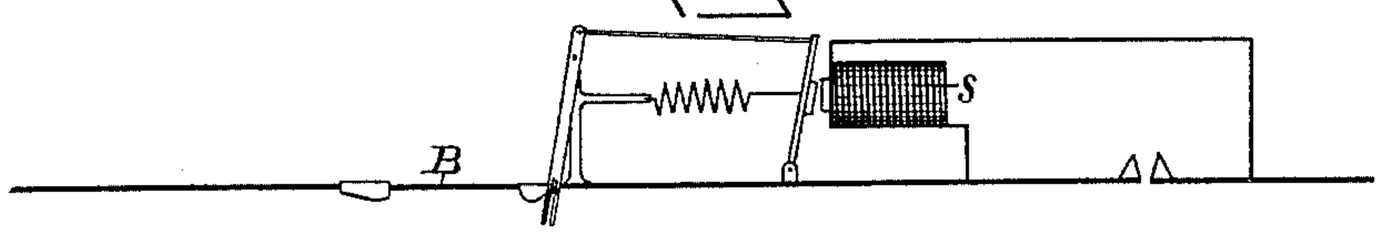
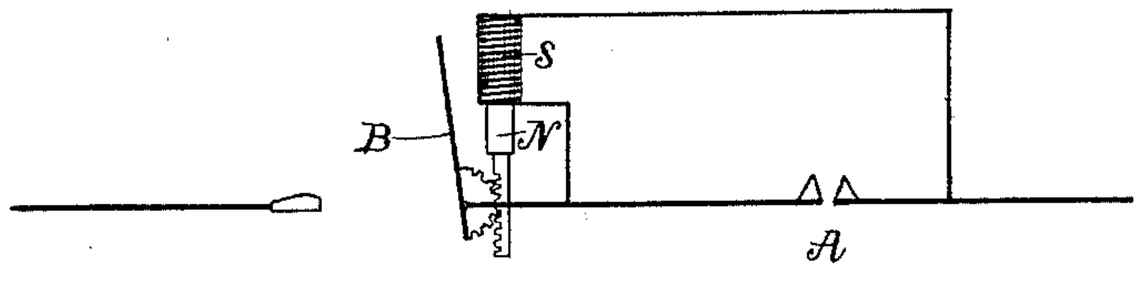


Fig. 9.



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RAILWAY GATE CROSSING FOR OVERHEAD LINES.

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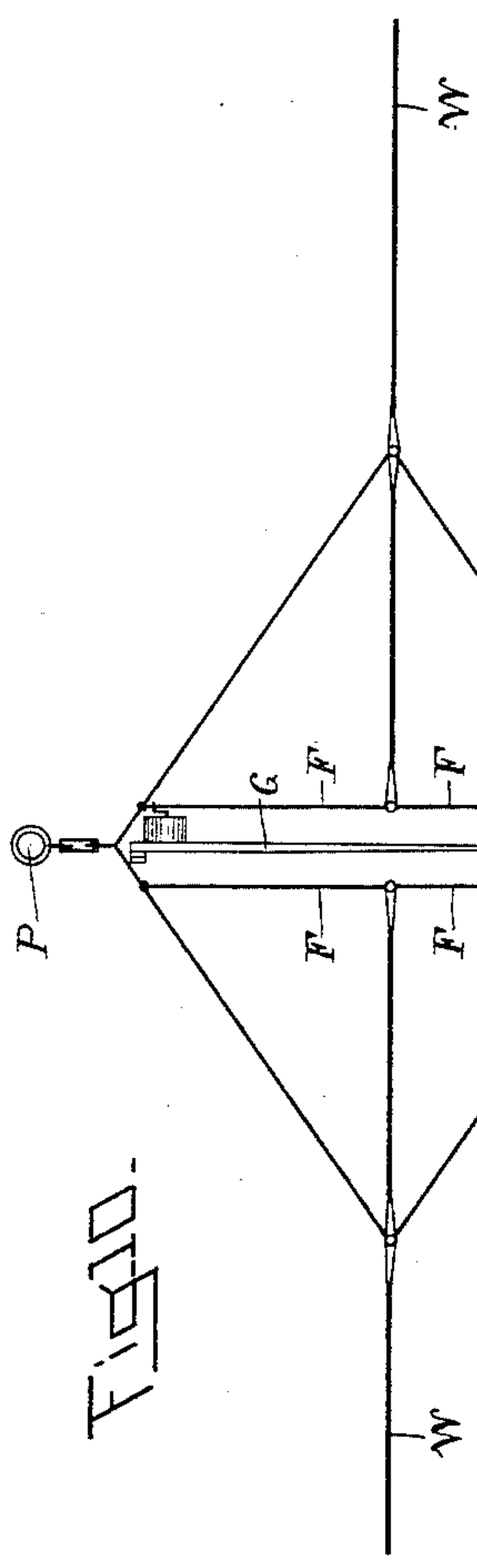

FIG. 1.

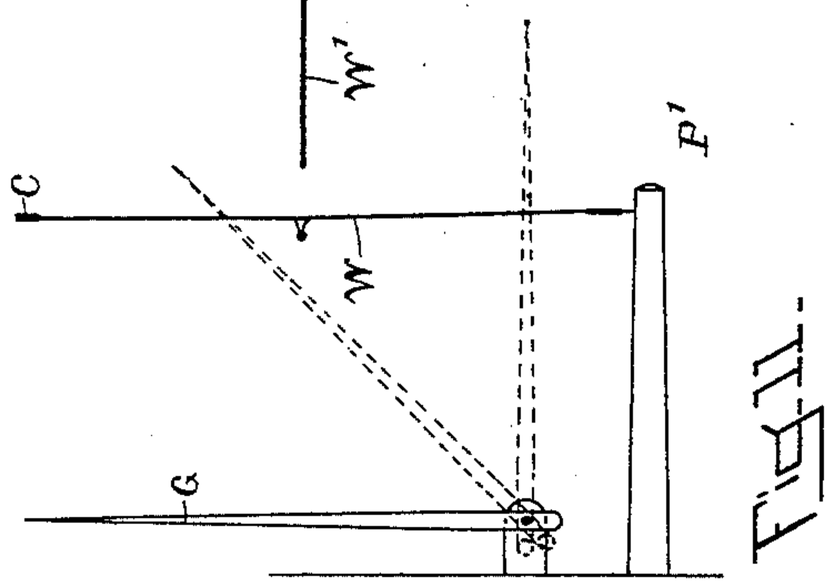

FIG. 2.

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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

RAILWAY-GATE CROSSING FOR OVERHEAD LINES.

SPECIFICATION forming part of Letters Patent No. 450,687, dated April 21, 1891.

Application filed May 5, 1890. Serial No. 350,658. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Railway-Gate Crossings for Overhead Lines, of which the following is a specification, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of a crossing constructed according to my invention. Figs. 2, 3, 4, 5, 6, 7, 8, and 9 are diagrams of circuits. Fig. 10 is a plan thereof, and Fig. 11 is a detail showing the different positions of the gate.

My present invention relates to a means for completing the circuit of a trolley-line for electric cars or traveling vehicles where such line is necessarily interrupted by interference of railway-gates or other need of discontinuity of the line.

In the operation of electric cars by overhead lines there are cases in which the railway-gates on being raised at a crossing interfere with the continuity of the trolley-line from which the cars take current; or, again, where two trolley-lines cross each other it may be desirable that the lower line of the two be cut or opened normally and only closed when the car traverses the portion at which the crossing takes place.

My invention provides an easy means for closing the line or giving the trolley a path at the time the car or vehicle reaches the point of crossing, as a railway-crossing with gates.

The invention will be understood by reference to the figures.

In Fig. 1, R R may represent a railroad, and T T a track for street-cars or electrically-propelled vehicles crossing the same, upon which a vehicle or car C is shown. G G′ represent gates such as are lowered at the grade-crossing for protection to vehicles when trains are to pass on the railway R R. These gates G G′ on being raised and lowered sometimes interfere seriously with the continuity of the trolley-line, which is marked W W, so that two gaps have sometimes to be provided in such line at the places where the gates would otherwise cut it. Whenever the car or vehicle C passes or crosses the track T T, it is necessary that it should have a continuous bearing-surface for the taking of current, or, in other words, that the gaps where the cuts are should be bridged. To this end depending hinged bridge-pieces B B′, which when raised to a horizontal position are practically a continuation of the lines W W, are provided, and they are put under the control of an electro-magnet or solenoid S S′, which on attracting its armature pulls the piece B B′ from its vertical position to a horizontal position, where it becomes, practically, a bridge or extension of the trolley-wire for the traveling of the trolley V of the car C. It is only necessary now to provide some means for actuating the electro-magnets S S′ at the proper moments—that is, when the car is about to cross. This I do by cutting the trolley-line at the points marked A A′, or at least putting in at that point a considerable resistance, as it is not necessary that the line should be actually cut. I have shown a resistance in Fig. 2 at Y, covering the gap. The object of cutting the line or introducing a resistance Y is to force a current through the magnet-coils S S′ just as soon as the trolley V or the car C passes the point A and before it reaches the gap at which the swinging piece B′ is placed. The trolley in passing the point A will receive current through the magnet S′, which on attracting its armature will swing the piece B′ to the horizontal position. The trolley may then pass over it, and the current will be retained, so that the second depending piece B is put into a horizontal position, after passing which the trolley receives its current directly. At this moment the armatures or cores of the magnets S S′ are released, and the parts B B′ can take the depending position by gravity or by the action of springs, thus leaving the gaps for the gates G G′ open at all times, except when the car is passing.

Figs. 2 and 3 illustrate the action. The trolley V has not yet arrived in Fig. 2 at the position for operating the magnet S. In Fig. 3, however, it has passed the gap A, and the magnet S now receives current, which passes to the trolley and is shown as having attracted its core and raised the swinging piece B up, so as to continue the line. It is unessential how the magnets S S′ are connected to the line, only in so far that they receive current when the trolley gets near the gaps which have to be closed.

Fig. 4 shows a connection with both magnets in series, so that they operate exactly simultaneously, while in Fig. 1 they act successively. There are also dotted connections shown, which are bridge-wires over the gaps themselves and side branches intended to electrically connect around the gaps, which connections are placed so as not to interfere with the gates. If the motion of the car is in one direction along the trolley-wire only, as in the direction in which it is supposed to move in Fig. 1—that is, toward the left—the gap in the line at A might be dispensed with. It will be easily understood, also, that the connections might be changed, as shown in dotted lines, Fig. 1, so that the central magnet-sections would receive their current from the left portion instead of the right portion of the trolley-line, it being only necessary that the magnets be connected somewhere to the general supply or to a supply which represents the general supply. This dotted substitute connection is also shown in Fig. 4 by the dotted line above, and it may be substituted for or supplement the connection to the right of point A with the trolley-line W.

In Fig. 5 the connection of the magnets is in multiple arc from either side W W, or both, and in this case the magnets will be wound with finer wire than if they were connected in series.

In Fig. 6 each magnet has an independent connection, whereby if the car be moving from the right to left one magnet receives current before the other. In this case an intermediate break is put in at A^2. The upper dotted lines show connections which may be made or not, as desired, and the lower dotted lines show connections bridging the gap, so as to preserve the electric continuity independent of the swinging pieces or gap-closing pieces B B.

The manner of swinging and the kind of magnet used in the devices is unimportant, and Fig. 7 shows an ordinary electro-magnet arranged to attract its armature against the action of the spring at Z, and at the same time move by a system of levers a sliding bolt B for closing the gap in the trolley-line.

Fig. 8 shows the same device with the action of closure completed where the part B has been thrust forward on the attraction of the magnet-armature.

In like manner Fig. 9 shows a modified form, in which, instead of depending, the part B exists in the upraised position when no current is passed through the coils of the magnet S, this being accomplished by the weight of the core of the magnet marked N. As soon, however, as the car has left, the part B is brought down to the horizontal line and completes the trolley-line, the lifting in such case being the result of the passage of the current to the magnet by the fact of the trolley having crossed the gap A, as in Fig. 1.

Fig. 10 shows a plan view of the arrangement of the wiring for supporting the trolley P, and G G′ are the railroad-gates seen in plan. W W and W′ W′ are the trolley-wires interrupted just over the gates. To support them, however, in position I prefer to make two equilaterals, or figures which resemble rhombuses or rhomboids, by stay-wires encompassing the cut, or at least that portion of the space above the cut which requires to be free in order that it may swing from its upright position to its horizontal position in use as a bar at the crossing. This is shown more clearly in Fig. 11, where the end is seen in full lines lying horizontal and in dotted lines in two other positions. The stay-wires F F are run across for the support of the open ends of the trolley-line W W near the cut and also for the support of the devices, such as are described in the previous figures, which are for the purpose of closing the gap at this position. P P′ represent poles placed on each side of the roadway, from which the structure may be hung, one of them being shown in Fig. 11. I thus obtain a simple structure for maintaining the position of the lines, respectively, and for permitting the operation of my gap-closing mechanism of the previous figures.

Fig. 11 shows the position of one of the trolley-lines, and the horizontal line leading from the pole to the left is the right-hand rhomboid figure seen on edge.

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

1. The combination, with a railway-gate, of an electric line conductor crossing the path of said gate and provided with a removable bridging-section actuated by an electro-magnet and circuit-connections for operating said electro-magnet.

2. The combination, with a railway-gate, of an electric line conductor crossing the path of said gate and provided with a bridging-section and an electro-magnet for operating the said section, the said magnet being included in the circuit of said line conductor.

3. The combination, with a railway-gate, of an electric line conductor provided with a movable bridging-section, an electro-magnet for operating said section, and a circuit for said electro-magnet shunting a break or resistance in the said line conductor.

4. The combination, with a railway-gate, of an electric line conductor crossing the path of said gate, but having a break to allow the passage of the gate, diagonal tension-wires leading from the line conductor to opposite sides of the line, and transverse supporting-wires on opposite sides of the break and attached to the diagonal tension-wires and to the line-conductor.

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