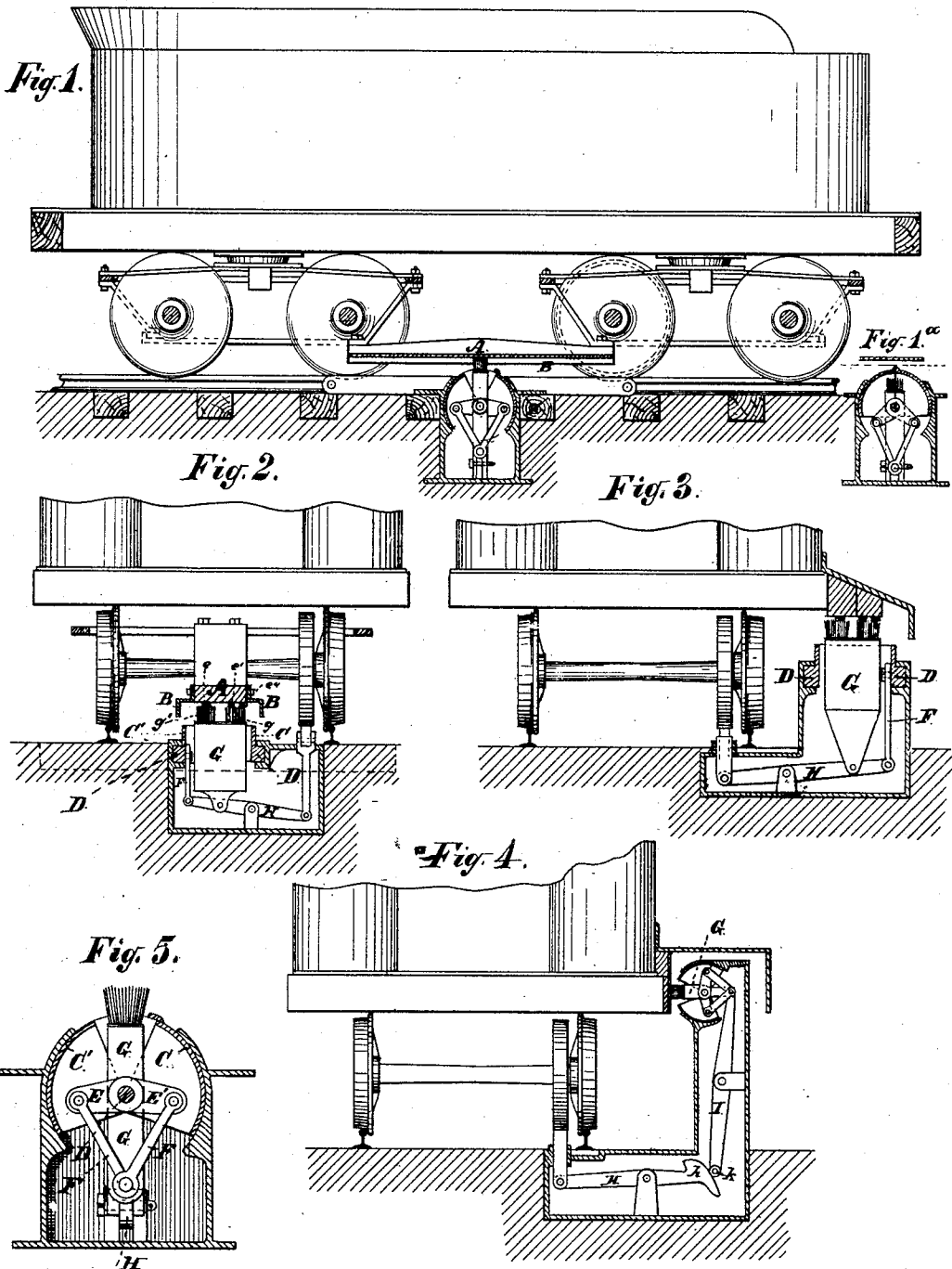


T. A. B. PUTNAM.
Electrical Railroad Signals.

No. 229,911.

Patented July 13, 1880.



Witnesses:
E. S. Blackwell
Thos. C. Miles

Inventor:
Theodore A. B. Putnam

UNITED STATES PATENT OFFICE.

THEODORE A. B. PUTNAM, OF NEW YORK, N. Y.

ELECTRICAL RAILROAD-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 229,911, dated July 13, 1880.

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To all whom it may concern:

Be it known that I, THEODORE A. B. PUTNAM, of the city, county, and State of New York, have invented certain improvements in means and methods of closing electric circuits between a moving locomotive or train and a contact on the roadway, for the purpose of operating signals, alarms, &c., either on the locomotive or train, or at points along the line of the road, all as will be more fully hereinafter set forth.

My invention relates to a peculiarly constructed and housed conductor arranged on or in the roadway and adapted to be operated by the wheel of the passing locomotive, whereby the said conductor is protruded and caused to contact with another conductor or conductors borne by the passing train.

It also relates to the peculiar construction and arrangement of the metallic conductors borne by the locomotive or train.

In the drawings, Figure 1 is a longitudinal vertical section, showing the conductors in contact. Fig. 1^a is a detached view of the road-conductor and its casing, showing the latter in section and closed. Fig. 2 is a transverse section through the casing of the road-conductor and the conductors on the train, showing the conductors in contact, as in Fig. 1. Figs. 3 and 4 are modifications of the devices shown in Figs. 1 and 2. These will be hereinafter referred to more particularly. Fig. 5 is a detached view of the road-conductor, similar to that seen in Fig. 1^a, but showing the casing thrown open.

It has been customary heretofore, in effecting the object herein sought, to place a brush or short conductor on the locomotive and a long contact on the road-bed, as shown in my Patent No. 182,384. I now reverse this arrangement, and place a long contact on the locomotive and the brush or short contact on the roadway.

As herein shown and described, the road-conductors are provided with housings to protect them from ice and snow where employed in rigorous climates; but where such protection is not required the conductors may be employed without such housings.

My present invention is designed to be em-

ployed in connection with the system of signals described in my Patent No. 182,384, before mentioned, and as a substitute, as I may choose, for the parts there described for accomplishing the same purposes.

For convenience I have shown the long-contact or moving conductors as borne by the tender of a locomotive, and these I will first describe.

A is a base-piece, which may be of wood and be attached to the tender in any convenient manner and be arranged at any convenient height above the road-bed. To this base may be attached protective shields or overhangs B. The base A may be arranged under the tender, as in Figs. 1 and 2, or be arranged at the side, as in Figs. 3 and 4. To the face of the base A are secured metal conducting-strips *e e' e''*, insulated from the base and from each other. Wires are led from these conductors to the battery on the locomotive or tender.

The non-moving or road conductor consists of a stock, G, bearing brushes *g g'*, of wire or other flexible metallic material, which are arranged to sweep the conductors *e e' e''* as the train passes. The stock G is mounted at one end of a suitably-fulcrumed lever, H, the other end of which is depressed by a lever acted upon by the wheel of the passing locomotive, whereby the brushes are protruded and caused to contact with the conductors *e e' e''*.

For protection the operative mechanism and the brushes are arranged in a housing, which is provided with two quadrant covers, C C', arranged to open and close by an oscillatory movement, being operated as follows: The covers are hung on a common axis, D, and play in curved ways in the housing-walls. They are prolonged radially to form arms E E', to which are pivoted links F F, which connect them with the extremity of the lever H. When the opposite end of the said lever is depressed by the passing locomotive the covers C C' are thrown open to permit the brushes *g g'* to protrude, and when the locomotive has passed and the lever is freed a suitable spring arranged under it serves to retract the brushes and close the covers again. One of the covers may be provided with a rabbet-strip to take over the edge of the other when

they are closed, as shown in Fig. 1^a, and the joint where they meet in closing may be provided with a rubber buffer. The stock G is arranged to play in suitable guides, so that its vertical position may be insured.

The brushes *g g'* are insulated from each other, and wires lead from them, or some of them, to any point along the line of the road.

I have shown in Fig. 2 two brushes insulated from each other and arranged to contact with three conductors, *e e' e''*, on the tender, which are also insulated from each other. A wire from the brush *g'* leads to any point on the line of road to actuate any required signal. The other brush, *g*, is completely isolated from any conductor. Wires lead from the conductors *e e'* to the positive pole of the battery on the locomotive, while the third conductor, *e''*, is connected with the negative pole of the same. Thus the isolated brush *g*, in sweeping a positive and negative conductor, *e' e''*, simultaneously, will close a circuit between them, which circuit is confined to the locomotive or train, and is a circuit of high resistance for sounding a defect-alarm. The other positive conductor, *e*, forms, with the brush *g'* and its attached wires, a circuit to operate any danger-signal required, returning by the intermediary of the earth and the locomotive-body to the battery. This is a circuit of low resistance, and the circuit of high resistance cannot operate an alarm when the current is divided between the two; but if the above circuit of low resistance should be faulty or broken, then the full current will be thrown on the circuit of high resistance, and the alarm placed in that circuit will be sounded.

The conducting-strip *e* is made longer than the strips *e' e''*, and arranged to project beyond them, preferably at both ends, so that the closing of the circuit of low resistance may be insured before the circuit of high resistance is closed. This result will be attained by the earlier contact of the road-conductor with the conductor *e*. This earlier contact of the road-conductor with the conductor *e* might be brought about by a suitable arrangement of the brushes *g g'*, the conductors *e e' e''* being of the same length; but I prefer to arrange it as shown.

I have shown but one strip or conductor, *e*, and but one brush, *g'*, to contact therewith; but it is obvious that other brushes and conductors of a similar character may be added to those shown, all to be brought into contact simultaneously to close independent circuits; or, as my battery-power would only be sufficient for a limited number of circuits to be operated simultaneously, if another circuit or circuits were required, not to be operated simultaneously with those just described, such might be formed by securing other conducting-strips to the base A, arranged to be swept by another brush or brushes in the stock G, the contact being arranged to take place when the other circuits were broken. Such circuit

or circuits might also be provided with a high-resistance circuit, to be closed by the brush *g*, as in the arrangement before described.

Modifications of the mechanism for throwing open the covers C C' will readily suggest themselves—as, for example, the arms E E', provided with rungs or bars extending across the housing, might be actuated by an arm on the stock G; or pins on the arms E E' might be arranged to play in cam-slots in a plate to be moved up and down by the lever H, and the movement of the covers be produced thereby.

In Figs. 1, 2, and 3 the brushes *g g'* are shown arranged to be protruded vertically; but in Fig. 4 they are shown arranged to play horizontally, and the base A is correspondingly adjusted. When arranged in this manner I provide the lever H with a cam, *h*, arranged to act upon the extremity of a lever, I, to which the brush-stock G and covers C C' are connected. The lever I performs in this case the functions of the lever H in Figs. 2 and 3.

I have described herein a circuit of high resistance, to be employed for sounding a defect-signal when one or all of the other circuits are impaired or broken; but I make no claim to this feature herein, as it is fully embodied in a former application of mine.

Having thus described my invention, what I claim as new is—

1. The base A, attached to a locomotive or tender and provided with the metallic conducting-strips of unequal lengths secured to the same, all constructed and arranged substantially as and for the purposes set forth.

2. The combination of the base A, the overhanging shields B, and the metallic conducting strips or surfaces secured to said base, all constructed and arranged substantially as and for the purposes set forth.

3. In combination with the base A, the long conducting strip or plate *e* and the shorter conducting strips or plates *e' e''*, arranged as described, so that the contact of the conductor *e* may be assured before the conductors *e' e''* contact with the road-conductor, for the purposes specified.

4. The combination of the insulated road-conductor *g*, arranged to be protruded by the passing locomotive, in combination with the strips or plates *e' e''*, borne by the locomotive or tender and forming the positive and negative poles of a circuit of high resistance, substantially as and for the purposes set forth.

5. The combination of the stock G, bearing flexible metallic conductors, the covers C C', and the fulcrumed lever H, arranged to be actuated, through other suitable levers, by a wheel of the locomotive, whereby the said covers are thrown open and the flexible conductors protruded simultaneously, all arranged to operate substantially as and for the purposes set forth.

6. The combination, with the road-bed conductors consisting of the brushes *g g'* and stock G, arranged in a suitable housing, of

the covers C C', arranged to be thrown open at the same time that the brushes are protruded by means of suitable levers acted upon by a wheel on the locomotive, substantially as and
5 for the purposes set forth.

7. A metal conductor or conductors projected from the road-bed of a railway by the combination of the stock G, covers C C', with prolongations E E', and the lever H, and, when
10 required, the cam h and lever I, all constructed and operated substantially as herein described, for the purposes set forth.

8. The quadrant covers C C', arranged to oscillate on a common axis and one provided with an overlapping edge, in combination with
15 the stock G, bearing the flexible conductors, and the mechanism for actuating the stock and covers simultaneously, substantially as set forth.

THEODORE A. B. PUTNAM.

Witnesses.

THOS. C. MILES,
E. S. BLACKWELL.