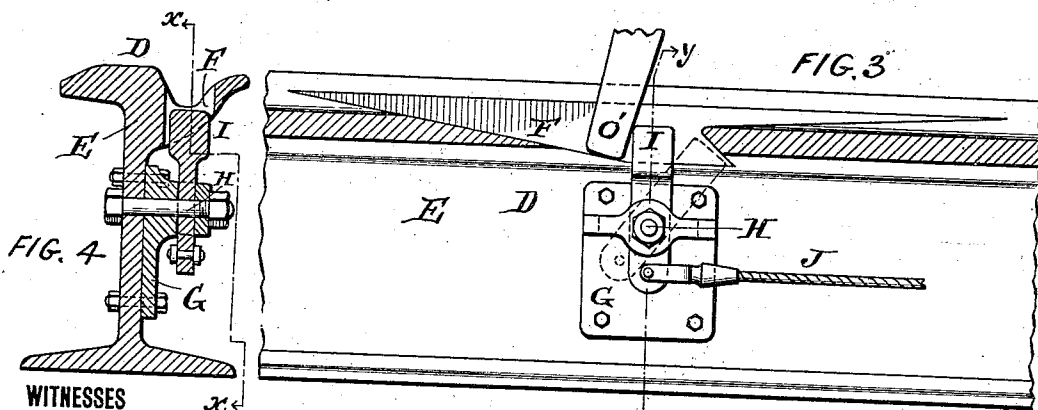
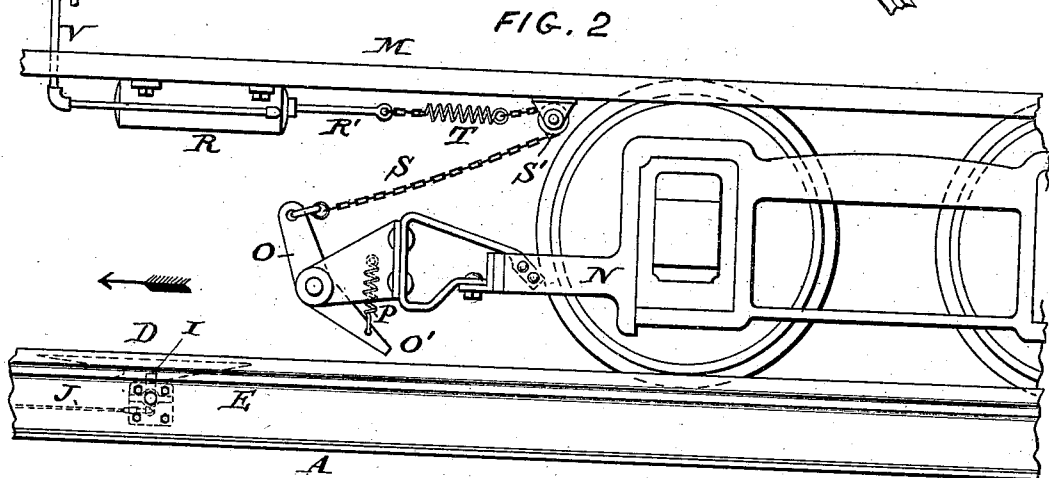
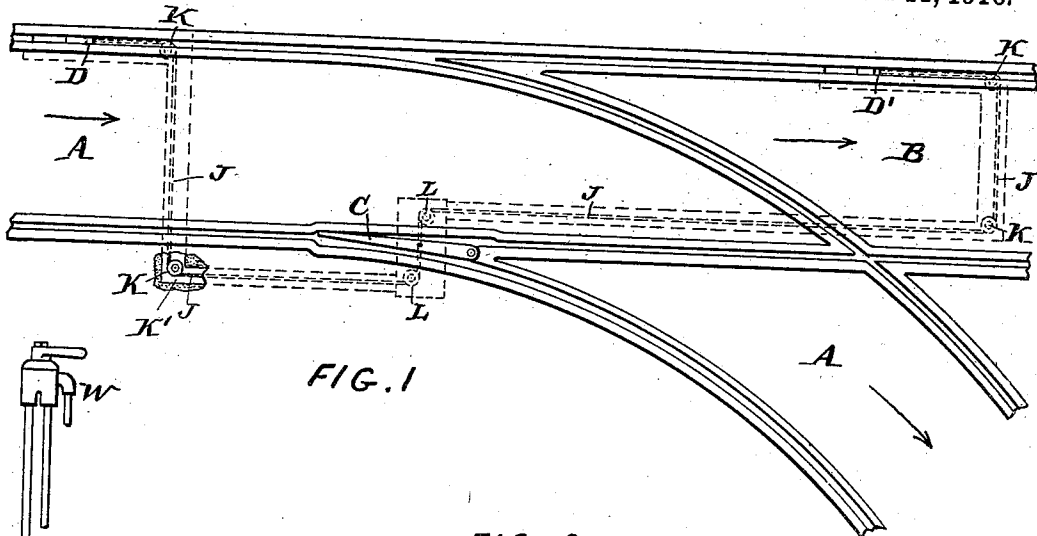


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RAILROAD SWITCH AND OPERATING MEANS THEREFOR.
APPLICATION FILED JUNE 1, 1909.

946,328.

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RAILROAD-SWITCH AND OPERATING MEANS THEREFOR.

946,328.

Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed June 1, 1909. Serial No. 499,275.

To all whom it may concern:

Be it known that we, HORACE R. BOYER and EDWARD B. BOYER, both citizens of the United States, and residents of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Railroad-Switches and Operating Means Therefor, of which the following is a specification.

Our invention has reference to railroad switches and operating means therefor, and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

The object of our invention is to provide railways, upon which motor cars are operated, with switch devices at the branching places in the tracks which may be automatically controlled by the cars in approaching and leaving the switch, whereby the motormen upon those cars which require the switch point to be manipulated may control the position of the switch point without stopping the car and without the necessity of directly operating the switch point from the street.

More particularly, our invention has for its object the employment at a branch point in a street railway of a switch which is normally in a position for guiding the cars upon the main line but which may be automatically operated by those cars which are required to pass from the main line upon a branch line, the operation of the said switch point being secured by mechanism under the control of the motorman upon the said cars which are required to pass on to the branch line. In this way, the main line cars do not require any manipulation of the switch point, and the branch line cars, which may be few in number, will automatically take care of the switch point without interfering with their normal travel and without the necessity of a switch tender being required at the junction point on the railway.

Our invention consists of a main line and a branch line, combined with a switch point normally closed to the branch line and provided with means extending along the branch line in one direction and along the main line in the other direction for operating the switch to move it to its adjusted positions, and means upon the cars which travel upon the branch tracks for operating the means extending along the main line

and along the branch line for successively opening the switch point to the branch line from the main line and then closing it to the branch line and opening it to the main line as said branch line car passes the junction point in the railway.

Our invention also consists in a branch track opening from a main railway, combined with a switch point which is normally open to the main line railway, and means in the trackway in advance of the branch point for moving the switch point in one direction and means in the branch trackway (to which the switch is normally closed and beyond the point of branching) for moving the switch point in its other or closed position to the said branching track.

Our invention also comprehends details of construction which, together with the features above specified, will be better understood by reference to the drawings, in which:—

Figure 1 is a plan view of a main line and branch track embodying our invention; Fig. 2 is a side elevation of a portion of the same and showing a part of the railway car with the operating mechanism for moving the switch point; Fig. 3 is a sectional side elevation of a portion of the trackway and means for moving the switch point, the said section being taken upon line $x-x$ of Fig. 4; and Fig. 4 is a cross section of the same on line $y-y$ of Fig. 3.

A. is the main track and B. is the branch track. These tracks connect at a branching point indicated in Fig. 1, where a switch point C. is provided. While I have shown the main track as branching at a curve, it is evident that, so far as our invention is considered, the main track might be straight and the branch track be a curved track at the branching point. However, for purposes to be explained, we prefer that the straight portion of the tracks shall be assumed as part of the main track and part of the branch track.

The switch point C, is connected to the cables J, J, which lead respectively to points in advance of the switch point and beyond the switch point; and the terminals of these cables are respectively connected to operating devices D in the main track in advance of the switch point C and D in the branch track beyond the switch. These switch point operating devices D, D', are more fully illustrated in Figs. 3 and 4, and may be described

as follows:—The rail E is slotted as indicated at F, the slot being provided with an inclined floor in the bottom of the flange, and the said slot extending downward entirely through the said flange. Secured to the side of the rail below the slotted portion is a bracket G, in which is pivoted at H an operating arm I, the end of which extends upward into the slot F, but preferably on a level with the bottom thereof as is clearly indicated. The lower end of the pivoted arm I, is connected with the end of the cable J and the cable J extends from said arm I to the switch C, and is guided by guide wheels K and L. The construction for operating the switch point C in advance and beyond it, is substantially the same, only that the respective cables J, J, connect with the switch point C from opposite sides, whereby the switch is pulled from the position shown in Fig. 1, into a position to permit the car to pass from the main track A onto the branch track B when the pivoted arm I of the operating device D is moved, and the reverse of this takes place when the pivoted arm I of the device D' is moved. This latter action will return the switch point to the position indicated in Fig. 1, so that the main track is always open excepting at a time when a car is passing the junction point in the tracks and on the branch track. The cables J, J, may be arranged in a conduit or otherwise guided under the road-way. It is evident that in place of cables, chains or other flexible connections may be employed between the operating devices D and the switch point C.

The car which travels upon the main track A, may be of any suitable construction, and need not be considered. The cars which travel from the main track to the branch track are provided with a switch operating hinged arm, which may be constructed as indicated in Fig. 2. In this figure, the car is turned in the reverse order to what it would be if placed upon the track in Fig. 1. This being done for the purpose of looking at the operating side of the car.

M is the car body or main frame.

N is the ordinary truck frame such as upon any ordinary electric car.

O is the hinged arm having the lower operating end O' which may be moved downward in the groove of the rail E and made to follow the inclined floor of the slotted portion F, as indicated in Fig. 3. This hinged arm O may be operated in any suitable manner to enable it to contact with the pivoted arm I, whose upper end extends into the slot F. When the end O' of the arm O strikes the upper end of the pivoted arm I, it throws it over to the dotted position in Fig. 3, and operates the switch point. The end O' of the arm is then caused to rock upward to ride up out of the slot. Normally the

hinged arm O is raised clear of the rail by a spring P. To enable the arm to be thrown down into the slot of the rail, we provide a chain S connecting with the upper end of the arm O, said chain passing about a guide pulley S' and connecting with a spring T, which is considerably stronger than the spring P. The other end of the spring T connects with a piston rod, R', of the operating cylinder, and piston R, which constitutes a motor device.

Compressed air from the ordinary air tank of the brake mechanism may be supplied to the cylinder device R by a pipe V under the control of a regulating valve W. When the air is submitted to the cylinder R, the spring T and chain S are put under tension, with the result that the lower end O' of the arm O is forced downward into the groove of the rail flange, and is caused to ride down the floor of the slot F until it strikes the arm I and operates it. The spring T must be strong enough to insure the moving of the switch. After operating the first pivoted arm I, the car passes along the straight part of the track A, past the switch point C, and on to the branch track B and the lower end O' of the arm O, operates the second of the pivoted arms I, to return the switch point C to its normal position after the car has passed. By providing elasticity by the spring T and the compressed air into cylinder R, the arm O will adapt itself to its operative requirements with the track and the pivoted arms I, with only a single operation of the valve mechanism W during the passage of the car. The operating arm or device O is provided only upon the branch cars. It is evident that under all other conditions, the main track will be a through track, and the cars operated upon the main track will not require any mechanism for controlling the switch point. The mechanism for operating the arm I, may be constructed in any other suitable manner than that illustrated, as the structure illustrated is only given by way of example.

It will be observed that we have shown the operating devices D and D' in that rail of the track which is not provided with the switch point C, and consequently the connecting cables are provided to cross the space between the two rails of the track. The reason of this construction is that the operating arm O on the car has a better chance of operating without interference, because the grooved portion of the rails on those portions of the tracks which are connected are more uniform, and would act better as a guide than those portions where the movable switch point C was employed. It is also evident, that, while we prefer to employ the operating parts D and D' on the same or corresponding rail of the main and branch

tracks, and thereby require the use of only one hinged arm upon the car, this is not essential, as these parts may be arranged in either rail as desired, by properly locating the arm or arms O on the car for coöperation with them.

It will be understood that while we have shown our invention in the form in which we prefer it, the details may be varied or modified without departing from the spirit of the invention.

Having now described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a railway, the combination of the main track, a branch track therefrom, a switch point at the branching point of the two tracks and normally closed to the branching track, means in the main track in advance of the junction of the two tracks for operating the switch point to throw it into the open position for the branch track, and means in the branch track beyond the point of junction with the main track for throwing the switch point into a position which is open to the main track and closed to the branch track, the said operating means consisting of pivoted arms secured in the rails of the track-way and having exposed upper ends extending through the flange of the rails and power transmitting connections from said pivoted arms to the switch to respectively move it in opposite directions.

2. In a railway the combination of the main track, a branch track therefrom, a switch point at the branching point of the two tracks and normally closed to the branching track, means in the main track in advance of the junction of the two tracks for operating the switch point to throw it into the open position for the branch track, and means in the branch track beyond the point of junction with the main track for throwing the switch point into a position which is open to the main track and closed to the branch track, the said operating means consisting of pivoted arms secured to the rails and having similar alinement therewith, cables extending from the respective arms and directly connecting with opposite sides of the switch point, and guiding means for the cable interposed between the switch point and the pivoted arms and located beneath the roadway.

3. The combination in a railway of a pivoted switch point, with means to operate the same consisting of a slotted grooved rail having an inclined lower floor leading to the slot, a pivoted arm supported by the rail and having its upper portion extending through the slot of the rail, and in which its said upper end extends above the lower part of the inclined floor but not above the bottom of the groove or normal floor of the

rail, and a power transmitting connection extending from the pivoted arm to the switch point.

4. The combination in a railway of a pivoted switch point, with means to operate the same consisting of a slotted grooved rail having an inclined lower floor leading to the slot, a pivoted arm supported by the rail and having its upper portion extending through the slot of the rail and in which its said upper end extends above the lower part of the inclined floor but not above the bottom of the groove or normal floor of the rail, a power transmitting connection extending from the pivoted arm to the switch point, and a hinged arm carried with the railway car and adapted to travel down the inclined floor and against the upper end of the pivoted arm.

5. In a railway the combination of the main track, a branch track therefrom, a switch point at the branching point of the two tracks and normally closed to the branching track, means extending through the flange of the rail in the main track in advance of the junction of the two tracks for operating the switch point to throw it into the open position for the branch track, means extending through the flange of the rail in the branch track beyond the point of the junction with the main track for throwing the switch point into a position which is open to the main track and closed to the branch track, a railway car, a pivoted arm on the car for operating the switch point operating means, hand controlled motor devices on the car for controlling the pivoted arm for moving it toward the rail flange for operating the switch point operating means, and a spring for moving the pivoted arm away from the rails, whereby the pivoted arm may be brought into or out of operative position.

6. In a railway the combination of the main track, a branch track therefrom, a switch point at the branching point of the two tracks and normally closed to the branching track, means in the main track in advance of the junction of the two tracks for operating the switch point to directly and positively throw it into the open position for the branch track, means in the branch track beyond the point of junction with the main track for throwing the switch point into a position which is open to the main track and closed to the branch track, a railway car, a hinged arm on the truck of the railway car independent of the car body for operating the switch point operating means, hand controlled devices on the car body for moving the hinged arm in the switch point operative position, and automatic means for normally holding the hinged arm out of switch point operative position.

7. In a railway, the combination of the main track, a branch track therefrom, a switch point at the branching point of the two tracks and normally closed to the
5 branching track, means in the main track in advance of the junction of the two tracks for operating the switch point to throw it into the open position for the branch track, and means in the branch track beyond the
10 point of junction with the main track for throwing the switch point into a position which is open to the main track and closed to the branch track, the said operating means consisting of pivoted arms secured to
15 the rails, cables extending from the arms and connecting with opposite sides of the switch point, and guiding means for the cable interposed between the switch point and the pivoted arms and located beneath
20 the roadway, a car, a hinged arm on the car for moving the pivoted arms which operate the switch point, means for normally holding the arms on the car out of operating position, yielding power devices for forcibly
25 pressing the operating arm on the car into switch operating position, and hand controlled devices for regulating the time of operation of the yielding power devices.

30 8. In a railway, the combination of the main track having a slotted rail flange, a branch track therefrom also having a slotted

rail flange, a switch point at the branching point of the two tracks and normally closed to the branching track, means in the main track in advance of the junction of the two
35 tracks for operating the switch point to throw it into the open positions for the branch track, and means in the branch track beyond the point of junction with the main track for throwing the switch point into a
40 position which is open to the main track and closed to the branch track, the said operating means consisting of pivoted arms secured to the rails and having their ends exposed through the slots in the flanges there-
45 of, cables extending from the arms and connecting with opposite sides of the switch point, and guiding means for the cable interposed between the switch point and the pivoted arms and located beneath the road-
50 way, a traveling car, and hand controlled means on the car for operating the pivoted arms for moving the switch point operating means in succession.

In testimony of which invention, we here- 55
unto set our hands.

HORACE R. BOYER.
EDWARD B. BOYER.

Witnesses:

R. M. HUNTER,
E. G. FARLEY.