

No. 714,142.

Patented Nov. 25, 1902.

A. C. CAMBRIDGE.

RAILWAY SWITCH.

(Application filed Feb. 17, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

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**No. 714,142.**

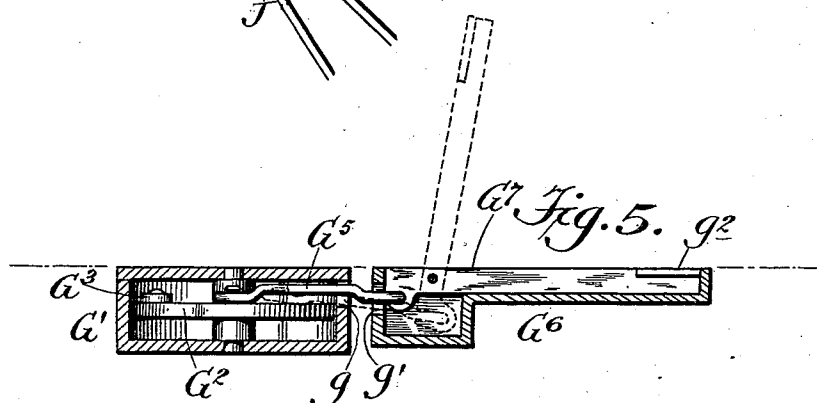
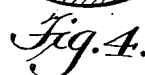
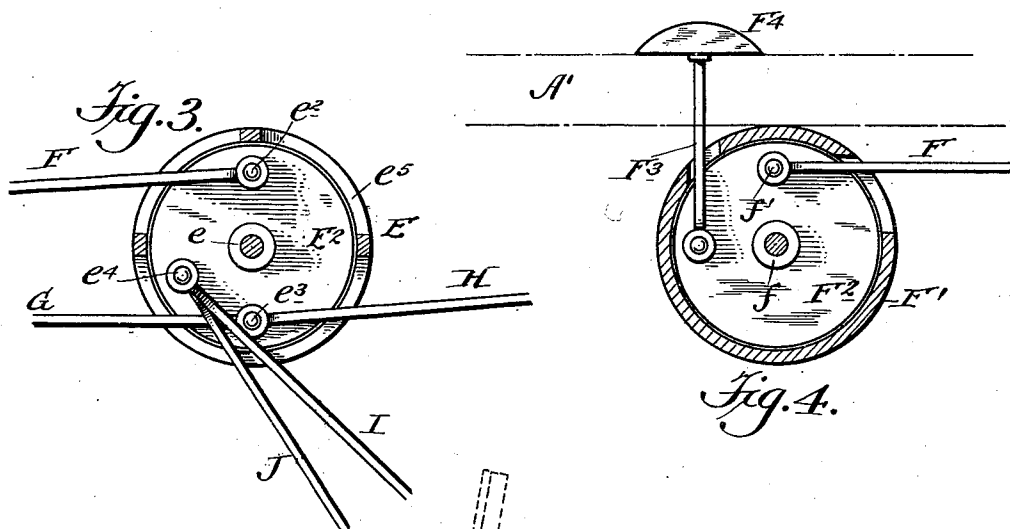
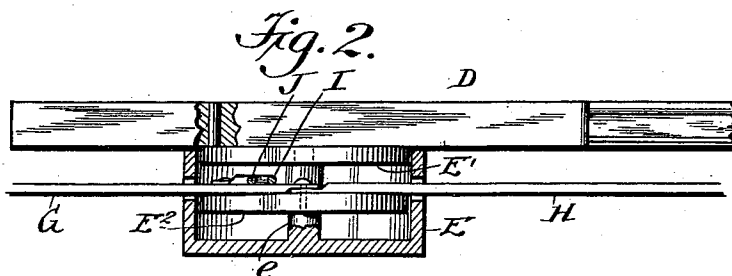
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**2 Sheets—Sheet 2.**



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# UNITED STATES PATENT OFFICE.

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## RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 714,142, dated November 25, 1902.

Application filed February 17, 1902. Serial No. 94,371. (No model.)

*To all whom it may concern:*

Be it known that I, ALONZO CARDOZO CAMBRIDGE, a citizen of the United States, and a resident of Charleston, county of Charleston, and State of South Carolina, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar letters of reference indicate corresponding parts.

The subject of this invention is an improved railway-switch, and has for its principal objects capacity for automatic and accurate operation and simplicity in the character and arrangement of parts.

With the above and other purposes in view the invention comprises generally a pivoted tongue or switch member appropriately located at the junction of a branch or turnout and having its opened or closed movements effected through its engagement with a disk or wheel suitably depressed in the track-bed and actuated by eccentric connections correspondingly attached to disks or wheels properly disposed along the track or way and capable of being turned by extensions adapted to be operated by the traveling wheel of a car. These several objects and advantages are attained by the novel system and arrangement of parts disclosed in the accompanying drawings, in which—

Figure 1 is a diagram illustrating the application of my invention to a double-track street-railway system having two diverging branches or turnouts. Fig. 2 is a partial vertical sectional view through one of the switch-tongues and devices immediately contiguous thereto. Fig. 3 is a sectional plan view through the devices immediately cooperating with the said tongue. Fig. 4 is a sectional plan view of one of the devices for automatically closing the switch from a remote point of the track or way. Fig. 5 is a vertical sectional view of the device for opening and closing the switch from a remote point in the track or way.

The parallel rails of a straight section of double track are represented by the broken lines designated by A A' in Fig. 1, while the

rails of the diverging double-track branches or turnouts are indicated by B B' C C', respectively. The practical mergence of the rails of the straight section of track with those of the diverging branches is effected by the employment of the short intermediate and properly-shaped rail-sections B<sup>2</sup> B<sup>3</sup> and C<sup>2</sup> C<sup>3</sup>, supplemented by the presence of the switch-tongues. As the arrangement of switch devices for each pair of straight rails A A' is substantially the same, a description of one will suffice for an understanding of the similar arrangement of the other pair of such rails. At the end of each intermediate rail-section B<sup>2</sup> is pivoted the butt of a switch-tongue D, extending so that its point *d* can be moved against or a short distance away from the contiguous rail A' at the point where it merges into its companion branch member. In a lower plane immediately beneath the tongue D is a circular box or casing E, Fig. 2, having a central vertical arbor *e*, on which are mounted upper and lower horizontal disks E' E<sup>2</sup>, connected together to turn coincidentally. The disk E' has at its upper side near its margin a short vertical pin *e'*, extending into a recess therefor in the tongue D above. It will be noted that the top face of the upper disk D' occupies a plane slightly above the top of the box, so that the switch-tongue can rest thereon and be supported thereby. The lower disk E<sup>2</sup> is provided on its upper side with a series of eccentrically-located studs, three being shown in Fig. 3, as indicated by *e*<sup>2</sup> *e*<sup>3</sup> *e*<sup>4</sup>. Pivotally connected with these studs are the ends of horizontal rods F, G, H, I, and J of considerable length and extending through horizontally-elongated slots *e*<sup>5</sup> in the box to and connected with variously-located devices along the track or way, which I will now proceed to describe.

In juxtaposition to the straight rail A' at a point remote from the switch is another circular horizontal circular box F', containing a central arbor *f*, on which turns a disk F<sup>2</sup>, having an eccentrically-located upper stud *f*<sup>2</sup>, with which the other end of the rod F is pivotally engaged. The vertical wall of the box F' is horizontally slotted for the passage of the rod F and also for a short rod F<sup>3</sup>, eccen-

trically pivoted to the disk  $F^2$  at another point and extending in such position relative to the rail  $A'$  that a shoe or segment  $F^4$ , carried thereby and having a rounded face, will be acted upon by the wheel of the car moving on the rail to longitudinally shift said rod  $F^3$ . Also in juxtaposition to the rail  $A'$ , but at a point somewhat nearer the switch, is still another circular horizontal box  $G'$ , containing a rotatable disk  $G^2$ , with an eccentrically-connected arm  $G^3$ , also extending in operative relation to the rail  $A'$  and carrying a round-faced shoe  $G^4$  to be actuated by the car-wheel.

Eccentrically and pivotally connected with the upper side of the disk  $G^2$  and at a point diametrically opposite the pivotal attachment therewith of the rod  $G$  is one end of a short horizontal link  $G^5$ , which extends through a slot  $g$  in the box  $G'$  and through an opposite slot  $g'$  into the deeper end portion of a horizontally-extended narrow box  $G^6$ , where it is hooked to the short depending end of a lever  $G^7$ , pivotally mounted within said deeper portion. As indicated by full lines in Fig. 5, the lever when in a horizontal position is adapted to rest snugly within the box  $G^6$ , the major portion of said lever being contained within the extended shallower portion of the box. The free end of the lever may be provided with a plate or circular head  $g^2$  to provide a greater contact-surface.

From the description thus far it will be comprehended that with the disk  $E^2$  below the switch in a position holding its disk  $E'$  so that the switch-tongue is in the open position—*i. e.*, away from the contiguous rail  $A'$ —and with the disk  $F^2$  holding the short rod  $F^3$  and its shoe in a projected position relative to the rail  $A'$  the wheel of a car moving along said rail in the direction of the switch will contact with the said shoe and shift the rod  $F^3$  to effect a partial rotation of its disk  $F^2$  and through the rod  $F$  correspondingly turn the disks  $E^2$   $E'$  to throw the tongue  $D$  to a closed position. The further progress of the car will cause the same wheel to act on the shoe  $G^4$  to turn its disk  $G^2$ , which on account of the diametrical connection of its rod  $G$  with the disk  $E^2$  will restore the switch-tongue to the open position. Such turning of the disk  $G^2$  will also occasion the link  $G^5$  to be further pushed into the deeper portion of the box  $G^6$ , so as to swing the lever  $G^7$  to the oblique position. (Indicated in broken lines, Fig. 5.)

If it is desired that the car is to be switched onto the branch or turnout presented by the rails  $B$   $B'$ , then an attendant on the car adjusts a projection suitably located at the back of the rear wheels of the same, so that the plate  $g^2$  of the lever  $G^7$  will be struck by said device on the car and the lever again thrown to a horizontal position within its box, the dimensions of the deeper part of the latter and the limit of the link movement being such that the lever when elevated will not be thrown past its vertical center and also maintaining it while elevated in such an oblique

position as to insure its positive drop when struck as described. The descending movement of the lever will, through the link connection, effect a reverse turn of the wheel  $G^2$  and restore the switch-tongue to the closed position.

Obviously if it be desired that the car pass onto the branch presented by the rails  $C$   $C'$  then the lever  $G^7$  is not disturbed from its elevated position during the passage of the car along this point.

Adjacent to the rail  $B'$  at a point considerably beyond the locality of the switch is another switch-operating device, in most respects similar to the case  $G'$  and its short rod and shoe, but minus a link-connected pivoted lever and its shallow box. The disk  $H^2$  of this device in the branch or turnout has the rod  $H$  and short rod  $H^3$  so connected therewith that when the car-wheel contacts with the shoe  $H^4$  to turn the disk  $H^2$  the closed switch-tongue  $D$ , which permitted the passage of the car onto this branch, will be again thrown to an open position. This last-mentioned arrangement insures that a car immediately behind on the straight section and which has moved considerably beyond the position of the disk  $G^2$  will pass properly through the open switch onto the branch presented by the rails  $C$   $C'$  and continue in a direction opposite to that which the car on the other branch travels.

After a car has passed through the open switch and has traveled onto the branch  $C$   $C'$  for a short distance it moves past a switch-operating device, the wheel  $I^2$  and shoe-carrying rod  $I^3$  of which are adjusted the same as the other similar devices for opening the switch. Consequently as the switch is open no actuation occurs as the car moves along that point of the rail  $C'$  where the disk  $I^2$  is located.

Inasmuch as the period between which one car moves onto the branch  $C$   $C'$  and another comes along to be diverted to one branch on the other would result in the lever  $G^7$  remaining in its elevated position during such prolonged interval, presenting an objectionable obstruction, as well as rendering the same liable to accidental contact by vehicles, &c., I further locate adjacent to the rail  $C'$ , but at a point more remote from the switch, a closing device, comprising a disk  $J^2$  and shoe-carrying rod  $J^3$ , adjusted similar to the corresponding disk  $F^2$  and rod  $F^3$  of the other switch-closing device. By this arrangement when the car gets well upon the branch  $C$   $C'$  the disk  $J^2$  will be turned to actuate, through the medium of its rod  $J$ , the switch-wheel  $E^2$ , and through the rod connection of the latter with the disk  $G^2$  effect the lowering of the lever  $G^7$  to a position within its case.

While I have referred to the disk  $I^2$  and its shoe-carrying rod  $I^3$  as being passive during the movement of the car from the straight track-section through the open switch onto the branch  $C$   $C'$ , it will be obvious that the

device comprising such disk and rod will serve to insure the opening of the switch in the event of the movement of the car from the branch onto the straight section.

- 5 The various switch opening and closing devices will be supported upon durable foundations.

By permitting the switch-tongue D to rest upon the top of the disk E the latter, in addition to its pin engagement with the tongue, will afford a smooth operating-surface for the same, besides contributing through its turntable action to throw said tongue.

The improvements are equally applicable to switches for steam railroad and other tracks, it being desirable, however, in such instances that the distances between the several devices be suitably increased.

As will be readily appreciated, the switch system and devices forming the subject of my invention are comparatively simple in construction, accurate and positive in operation, and for the most part automatically actuated. They may be ordinarily applied to track systems with comparatively little labor and expense.

One of the purposes of each disk F<sup>2</sup>, with its several connections, is that in the event of a car passing from a branch C C' to the main section before it absolutely passes beyond the limits of the switch devices it will actuate a disk F<sup>2</sup> to throw the tongue D to a closed position to place the track in a through condition with respect to the main section and the branch B B'.

I do not wish to be understood as limiting myself to the particular construction and arrangement of parts shown and described, but reserve the right to such modifications and changes as may be fairly within my invention.

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

1. In a railroad-switch, the combination with the track or way and branch or turnout, of a movable switch-tongue at the intersection of the same, a device in the track or way for effecting the movement of the tongue in one direction, and a second device interposed between that first mentioned and the tongue, and adapted to oppositely throw the latter, both said devices being successively operable by the same car, and provision interposed between the second device and the tongue and independently operable from a car for effecting a tongue movement corresponding with that of the first device.

2. In a railroad-switch, the combination with the track or way and branch or turnout, of a movable switch-tongue at the intersection of the same, a device in the track or way for effecting the movement of the tongue in one direction and a second device interposed between that first mentioned and the tongue and adapted to oppositely throw the same, both said devices being successively operable by the same car, provision interposed between

the second device and the tongue and independently operable from a car for effecting a tongue movement corresponding with that of the first device, and tongue-operating devices at the other side of the tongue in both of the relatively diverging track-sections.

3. In a railroad-switch, the combination with a main section of track or way and its relatively diverging branch sections, of a movable switch-tongue at the intersection of the main section and said branches, a horizontal disk beneath and engaged with said tongue to throw the same when rotated, horizontal disks in the main section and branches and differentially connected with said tongue-disk, each of the disks in the main section and branches, having an eccentrically-connected rod extending in operative relation to the contiguous rail and carrying a shoe adapted to be struck and laterally shifted by a car-wheel.

4. In a railroad-switch, the combination with a main section of a track or way and its relatively divergent branch sections, of a movable switch-tongue at the intersection of the main section and said branches, a box or casing, below said tongue and containing a rotating disk eccentrically engaged with the tongue, and rods passing into said box and having differential eccentric connections with the disk, said rods extending at different angles conformable to the main and branch sections and connected with actuating devices in operative relation with respect thereto.

5. In a railroad-switch, the combination with a main section of a track or way and its relatively divergent branch sections, of a movable switch-tongue at the intersection of the main section and said branches, a box or casing below said tongue and containing a rotatory disk the upper surface of which is slightly higher than the top of the box or casing, said disk being eccentrically engaged with the tongue, a second disk within the box or casing and revoluble with the first, and rods passing into said box and having differential eccentric connections with the second disk, said rods extending at different angles conformable to the main and branch sections and connected with actuating devices located in operative relation thereto.

6. In a railroad-switch, the combination with a movable switch-tongue, of a revoluble horizontal disk having a rod connection therewith, and provided with an eccentrically-attached shoe-carrying rod extending horizontally in transverse operable relation to the rail to be actuated by the car and operate the connections, revolve the disk and throw the tongue.

7. In a railroad-switch, the combination with a movable switch-tongue, of a revoluble horizontal disk having a rod connection therewith and provided with an eccentrically-attached shoe-carrying rod extending horizontally in transverse operable relation to the rail to be actuated by the car and through

the intermediate devices including the revolution of the disk, close the tongue, and a tongue-closing device with connections extending to said disk and connected with the same to be reversely operated when the latter moves the tongue to a closed position.

8. In a railroad-switch, the combination with a movable switch-tongue, of a revoluble horizontal disk having a rod connection therewith and provided with an eccentrically-attached shoe-carrying rod extending horizontally in transverse operable relation to the rail to be actuated by the car and operate the connections, revolve the disk and throw the

tongue, a vertically-movable pivoted lever having connections both with the disk and the pivoted tongue and having provision operable from the car for elevating the lever and opening the tongue.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 7th day of January, 1902.

ALONZO CARDOZO CAMBRIDGE.

Witnesses:

A. A. KROEG,  
E. MCSWEENEY.