

No. 667,508.

Patented Feb. 5, 1901.

J. D. EDWARDS.  
AUTOMATIC SWITCH.

(Application filed Oct. 30, 1900.)

(No Model.)

2 Sheets—Sheet 1.

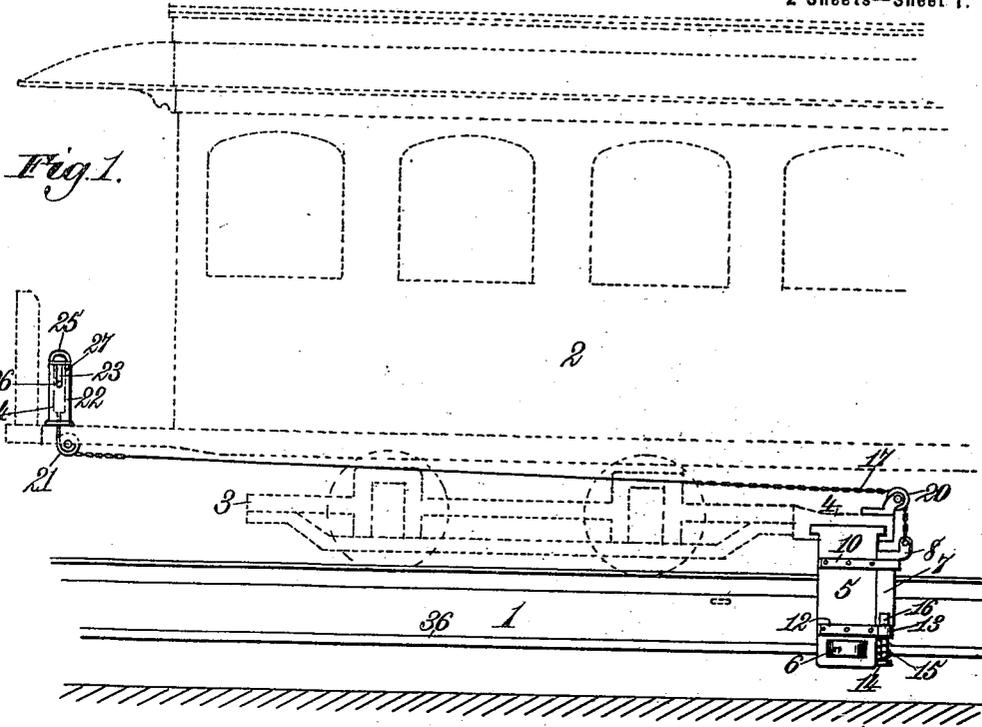


Fig. 1.

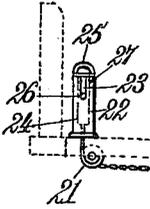


Fig. 2.

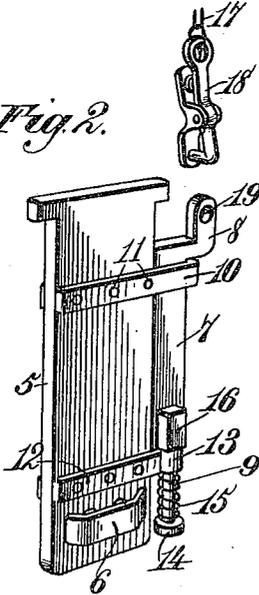
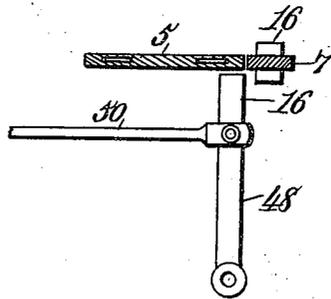


Fig. 3.



Witnesses:  
*Robert Everett,*  
*J. B. Keefe*

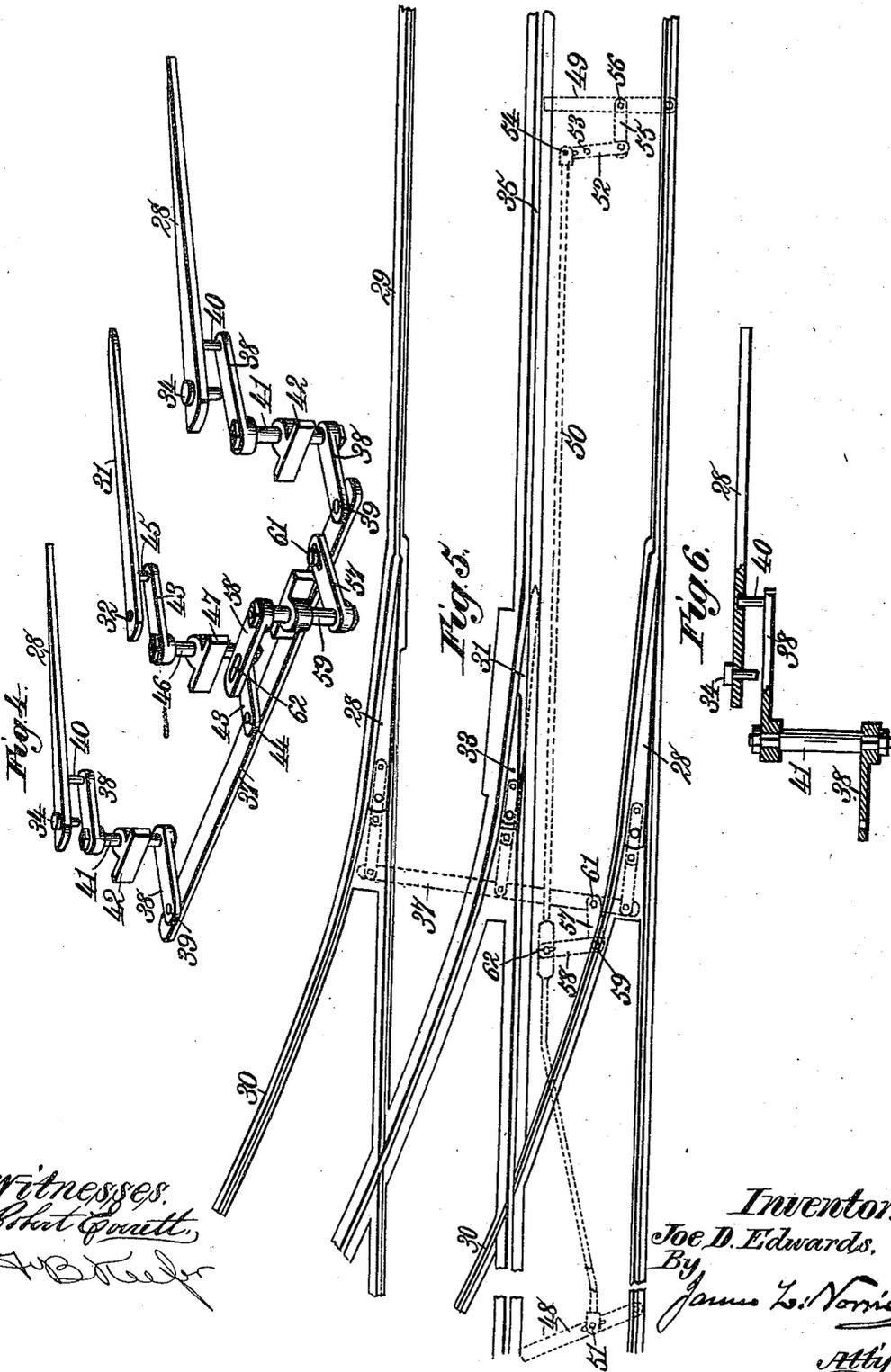
Inventor:  
*Joe D. Edwards.*  
 By *James G. Norris,*  
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J. D. EDWARDS.  
AUTOMATIC SWITCH.

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(No Model.)

2 Sheets—Sheet 2.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

JOE D. EDWARDS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 667,508, dated February 5, 1901.

Application filed October 30, 1900. Serial No. 34,943. (No model.)

*To all whom it may concern:*

Be it known that I, JOE D. EDWARDS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates to a switch-operating device for underground electric railways, and has for its general object to provide an improved means carried by the car for operating the switches along the line of the road.

Stated in detail, the primary object of the invention resides in mounting a switch-operating device upon the ordinary plow of an electric car and in providing means for operating the device from the car.

A further detailed object of the invention resides in the provision of an improved construction of the lever mechanism for operating the switches.

Other objects of the invention relate to certain details of construction and to combinations and operations of parts, all of which will be fully described in the following specification and specifically indicated in the claims.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a view in elevation of a car-body, showing my invention applied thereto and also showing in section a portion of the conduit of an underground electric railway. Fig. 2 is a perspective view of a plow having my improved switch-operating device applied thereto and showing a snap-hook adapted for engagement with said device. Fig. 3 is a sectional plan view through the same, showing my device about to engage a trip-lever. Fig. 4 is a perspective view illustrating one method of operating the switch-points. Fig. 5 is a plan view of a portion of a street-railroad, showing the manner of applying my improved lever-operating mechanism for the switch-points; and Fig. 6 is a section through one of the bell-cranks for operating the switch-points.

The numeral 1 indicates a portion of the conduit of an underground system of an electric railway, 2 the car-body, (shown in outline,) 3 the front truck of the car, 4 the plow-holder, 5 the plow detachably secured therein, and 6 one of the shoes carried by the plow, all

of these parts being of the ordinary and well-known construction.

The numeral 7 indicates a flat metal bar having at one end an upward projection 8 and at its lower end a rounded portion 9.

The bar 7 is slidably mounted on the rear side of the plow in the following manner: The numeral 10 indicates a clip made of flat metal, the space between the parallel arms of the clip being such as to permit the clip to embrace the bar 7 snugly. This clip is inserted over the bar 7 and the plow 5, and screws 11 at two or more points are passed through the arms of the clip and through the plow embraced by said arms. Toward the bottom of the plow 5 and above the shoes 6 I provide a second clip 12, secured to the plow in a like manner as just described with reference to the clip 10, said clip having at its bent end a circular portion or eye 13, which is adapted to snugly receive the cylindrical portion 9 of the bar 7. The engagement of the eye 13 with the cylindrical portion or guide and of the clip 10 with the bar 7 is such as to permit a ready up-and-down movement of said bar. On the lower end of the guide 9 is secured a collar 14, between which and the eye 13 is located a coiled spring 15. Located toward the lower end of the bar 7 and projecting from both sides thereof is a contact-piece or trip 16, which is normally held downward by the spring 15 in contact with the eye 13.

The numeral 17 indicates a cable which is connected by means of a snap-hook 18 with the upward projection 8 of the bar 7, said projection having an aperture 19 for that purpose. The purpose of the snap-hook is to permit the cable 17 to be disengaged from the projection 8 when it is desired to remove the plow from the car, as in changing from the underground to the overhead system. The cable 17 passes over a roller 20, mounted on the top of the plow-holder, and extends to the front platform of the car, where it passes beneath a roller 21, mounted on the under side of the platform.

The numeral 22 indicates a metal pipe secured in an upright position on the front platform and having in its upper edge a slot 23.

The numeral 24 indicates a rod having at its upper end a handle 25 and provided with a pin 26, which normally lies in the slot 23.

The rod 24 is connected at its lower end to one end of the cable 17.

In the operation of the device, as will appear later on, it is necessary to raise the plate 7 in order that the switch may be operated by the contact-piece or trip 16. This is done by the operator grasping the handle 25 and raising the rod 24 until the pin 26 is lifted out of the slot 23, and the bar 7 may be held in this raised position against the resistance of the spring 15 by giving the handle 25 a quarter-turn, so that the pin 26 will rest upon the upper edge of the pipe 22 or in a recess 27 provided in the upper edge for the reception of said pin. When it is desired to again lower the bar 7, the pin 26 is again turned into engagement with the slot 23 and the handle 25 released, when the spring 15 will draw the bar 7 downward.

The numeral 28 indicates two switch-points, which are located, as usual, at the junction-point of the rails 29 of the main track and of the rails 30 of a curve.

The numeral 31 indicates the switch-point for guiding the plow of the car, said switch-point 31 being located below the surface, as usual, and pivoted at 32 on a metal plate 33, arranged as usual. The switch-points 28 for the rails are pivotally mounted in the usual manner, the pivot-points being indicated by the numeral 34.

The numeral 35 indicates a slot in which the plow of the car runs. Located within the conduit and below the contact-rails 36 is a bar 37, extending at right angles to the rails. At each end of the bar 37 are provided two bell-cranks, each of which consists of two metal plates 38, one of which is pivotally connected at its outer end at 39 to the outer end of the bar 37 and the other of which is rigidly secured at its outer end at 40 to the switch-point 28 beyond its pivot-point 34. The plates 38 are rigidly secured at their inner ends to a vertical bar 41, which is held by and works in a journal 42. It will be understood, of course, that one of the plates 38 is located near the bottom of the conduit, while the other plate 38, which is connected to the switch-point, is located immediately below the upper surface of the road-bed. In a like manner the switch-point 31 is connected to the bar 37, centrally thereof, by means of plates 43, one of which is pivoted to the bar 37 at its outer end, as indicated at 44, and the other of which is rigidly secured to the switch-point 31 beyond the pivot-point 32, as indicated at 45. A vertical rod 46 rigidly connects the inner ends of the plate 43, said rod being held by and working in a journal 47. At the proper distance beyond the switch in either direction I pivotally secure beneath the surface and to the under side of an outer rail two trip-levers 48 49.

The numeral 50 indicates a connecting-rod which at one end has a slotted connection with the trip-lever 48, as indicated at 51. Pivotally mounted toward one end beneath

the road-bed and adjacent to the trip-lever 49 is a short lever 52, the pivot being indicated by the numeral 53, said pivot being located near one end of the lever 52, so as to provide a long and a short arm for said lever. The connecting-rod 50 has its opposite end connected to the short arm of the lever 52 by a slotted connection 54. The long arm of the lever 52 is connected by a bar 55 with the trip-lever 49, about centrally of the latter, as indicated at 56. The inner ends of the trip-levers 48 and 49 project into the path traversed by the projection 16 on the bar 7 when said projection is raised by elevating the bar 7. Intermediate its ends the connecting-rod 50 has a crank connection with the bar 37, toward the outer end thereof. This is effected by means of two plates 57 58, rigidly connected at their inner ends by a vertical rod 59, held by and working in a journal. The outer end of the plate 57 is pivotally connected to the bar 37, as indicated at 61, and the outer end of the bar 58 has a slotted connection with the connecting-rod 50, as indicated at 62.

By the construction and arrangement of the lever mechanism and bell-cranks just described it will be seen that a longitudinal movement of the connecting-rod 50 will through the medium of the bell-crank connecting said rod with the bar 37 move said bar longitudinally in one direction or the other, and thereby through the connection of the bell-cranks at the outer ends and center of said bar with the switch-points cause said switch-points to be thrown to open or close the curve.

In the operation of my device it will be assumed that the switch-points normally occupy the positions shown in full lines, so that a car passing along the main track will go around the curve. If it is desired that the car should continue on the main track, the motorman would elevate the bar 7 in the manner previously described, so that as the car passed along the contact-piece or trip 16 would strike the inner end of the trip-lever 49, and thereby through the various connections described throw the switch-points into the proper positions, so that the wheels of the car would continue on the main track and the plow of the car would continue in the slot of the main track. As the car passes all of the switch-points onto the main track the contact-piece 16 will strike the outer end of the trip-lever 48, and thereby return the switch-points to the position first described.

It will be obvious, of course, that the switch-points could be arranged so that the curve would be normally closed and the switch would have to be operated to permit the car to pass around the curve. In either case if it is not desired to operate the switch-points the contact-piece 16 will not be raised and will simply pass below the ends of the trip-levers 48 and 49.

No claim is made herein to the special ar-

5 rangement of the bar 37 and the bell-cranks connecting said bar with the switch-points 28 and 31; but any arrangement which will permit the switch-points to be operated by throwing the trip-levers 48 and 49 will answer the purpose of this invention.

While I have described the plow as being located on the front truck of the car it is obvious that my invention may be employed equally well with a plow that is located centrally of the car.

While I have described my invention as being applicable to the operation of switch-points, it will be obvious that the same might be used for operating signals of various descriptions or for other analogous purposes.

It will be obvious that my improved switch-operating device mounted on the plow of a car may be operated equally well whether the car be traveling in a forward or backward direction relative to the position of the plow.

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

1. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, and a spring-controlled contact-piece carried by the car and adapted to engage the end of said trip-lever to throw the same, substantially as described.

2. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, and a spring-controlled vertically-movable contact-piece carried by the car and adapted to engage the end of said trip-lever to throw the latter, substantially as described.

3. In an underground electric-railway system, in combination with a series of pivoted switch-points, trip-levers operatively connected therewith and located below the surface and beyond the location of the switch in either direction, respectively, and a contact-piece carried by the car and adapted to engage the ends of said trip-levers to throw the latter, substantially as described.

4. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, and a contact-piece carried by the plow and projecting from both sides thereof and adapted to engage the end of said trip-lever to throw the latter, substantially as described.

5. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, and a movable contact-piece mounted on said plow and projecting from both sides thereof and adapted to engage the end of said trip-lever to throw the latter, substantially as described.

6. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, and a vertically-movable contact-piece mounted on the plow and projecting from both sides thereof and adapted to engage the end of said lever to throw the latter, substantially as described.

7. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, and a spring-controlled, vertically-movable contact-piece mounted on the car and adapted to engage the end of said lever to throw the latter, substantially as described.

8. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, a spring-controlled movable contact-piece mounted on the plow, and means carried by the car for moving said contact-piece, whereby in the travel of the car, it may engage the end of said trip-lever to throw the latter, substantially as described.

9. In an underground electric-railway system, in combination with a series of pivoted switch-points, operating mechanism therefor located within the conduit and including a connecting-rod, trip-levers operatively connected to said connecting-rod and situated beyond the location of the switch in either direction, respectively, and having their free ends located adjacent to the slot of the conduit and a trip carried by the plow of the car for engaging said trip-levers, substantially as described.

10. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, a bar slidably mounted on said plow and having a trip thereon for engaging said trip-lever, and mechanism detachably connected to said bar for elevating the same, substantially as described.

11. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, a spring-controlled bar slidably mounted on said plow and having a trip thereon for engaging said trip-lever, and mechanism detachably connected to said bar for elevating the same, substantially as described.

12. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, a spring-controlled bar slidably mounted on said plow and having a trip thereon for engaging said trip-

lever, a roller mounted on the plow-holder, and an operating-cable passing over said roller and connected to said bar, substantially as described.

5 13. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car, a spring-controlled bar slidably mounted on said plow and  
10 having a trip thereon for engaging said trip-lever, a roller mounted on the plow-holder, and an operating-cable passing over said roller and detachably connected to said bar,  
15 substantially as described.

14. In an underground electric-railway system, in combination with a series of pivoted switch-points, a trip-lever operatively connected therewith and located below the surface, a plow carried by the car and provided  
20 with bearings, a bar slidably mounted in said bearings and having a collar on its lower end, a coiled spring interposed between said collar and one of said bearings, a trip on said bar  
25 for engaging said trip-lever, a roller mounted on the plow-holder, and an operating-cable passing over said roller and detachably connected to said bar, substantially as described.

30 15. As a new article of manufacture, a plow for electric cars having a trip mounted there-

on and projecting from both sides thereof, substantially as described.

16. As a new article of manufacture, a plow for electric cars having a movable trip mounted thereon and projecting from both sides  
35 thereof, substantially as described.

17. As a new article of manufacture, a plow for electric cars having a spring-controlled movable trip mounted thereon, substantially  
40 as described.

18. As a new article of manufacture, a plow for electric cars provided with bearings, a spring-controlled bar slidably mounted in said bearings, and a trip on said bar, substantially  
45 as described.

19. As a new article of manufacture, a plow for electric cars provided with bearings, a flat metal bar of the same thickness as said plow slidably mounted in said bearings with one  
50 of its edges facing an edge of the plow, a spring operating normally to hold said bar in a given position, and a trip on said bar, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.  
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JOE D. EDWARDS.

Witnesses:

BRUCE S. ELLIOTT,  
GEO. W. REA.