No. 735,083. PATENTED AUG. 4, 1903.

G. E. FRY.

SWITCH OPERATING DEVICE.

APPLICATION FILED AUG. 28, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

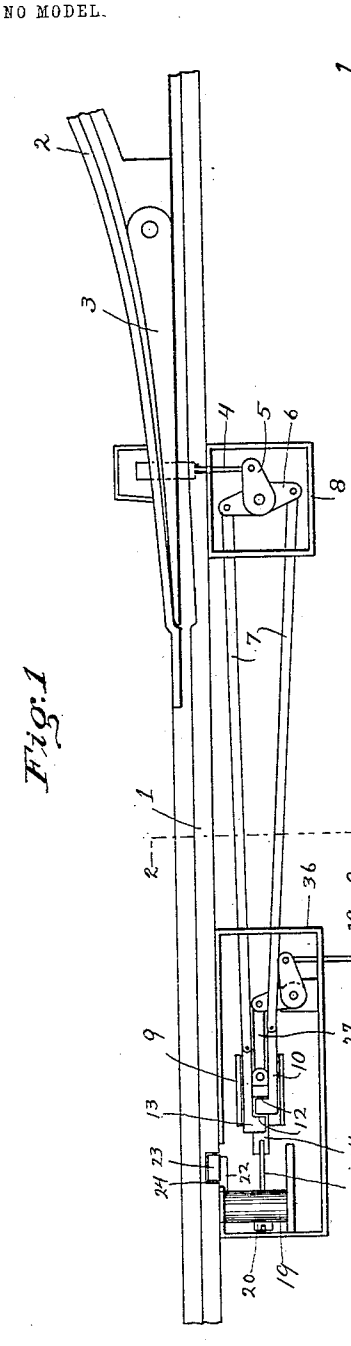

Fig. 1

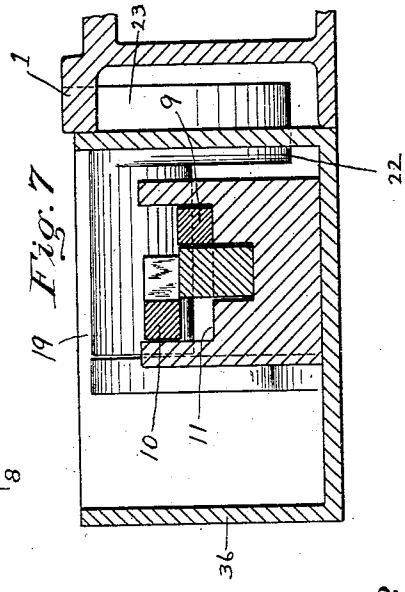

Fig. 7

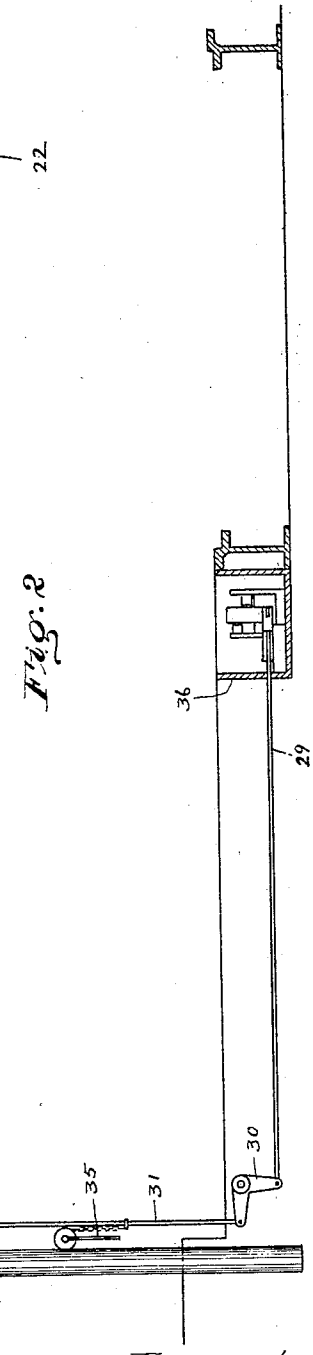

Fig. 2

Witnesses.
Fred W. Sweet.
Robt C. Totten

Inventor.
George E. Fry
By Kay & Totten
Attorneys.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3

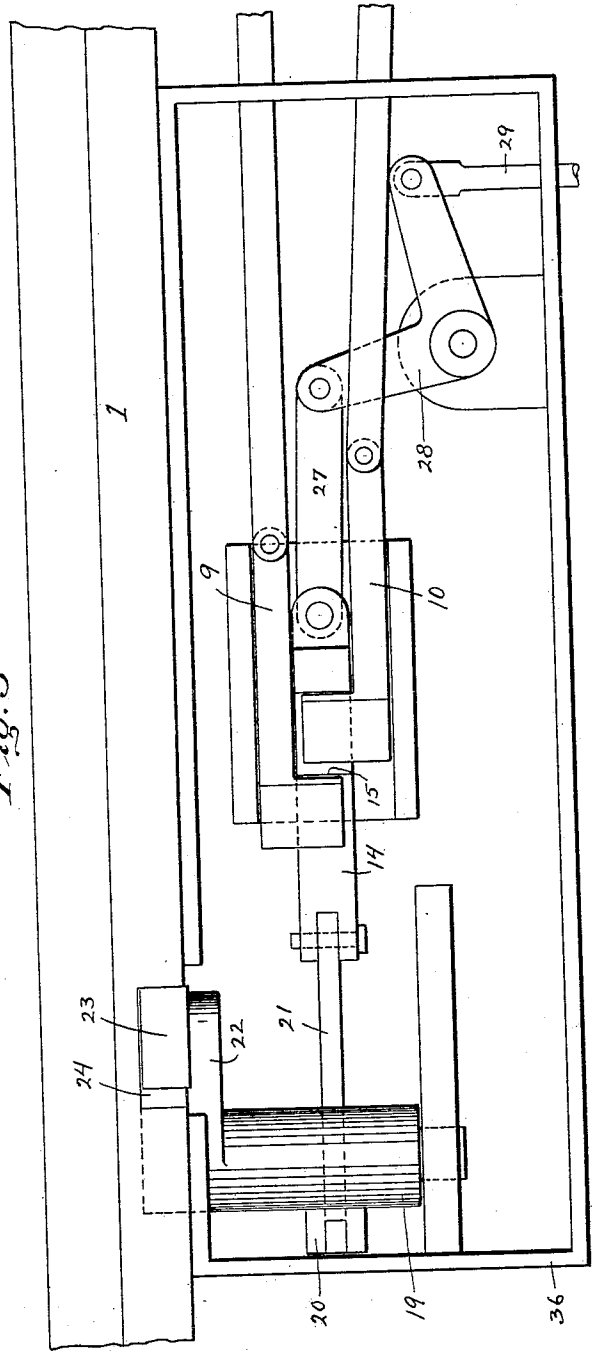
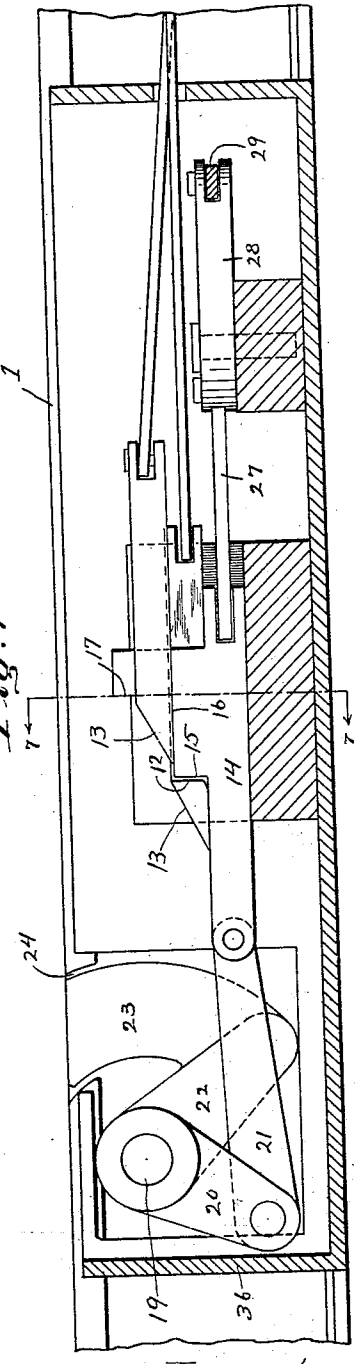


Fig. 4



Witnesses.
Fred W. Sweet
Robt C. Potter

Inventor.
George E. Fry
By Kay & Potter
Attorneys.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5

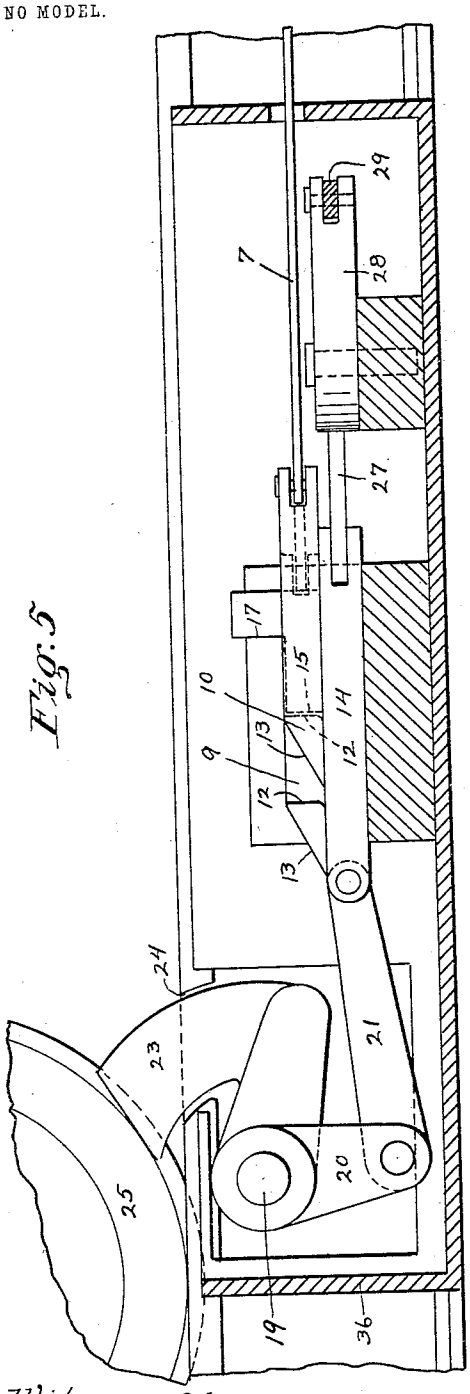
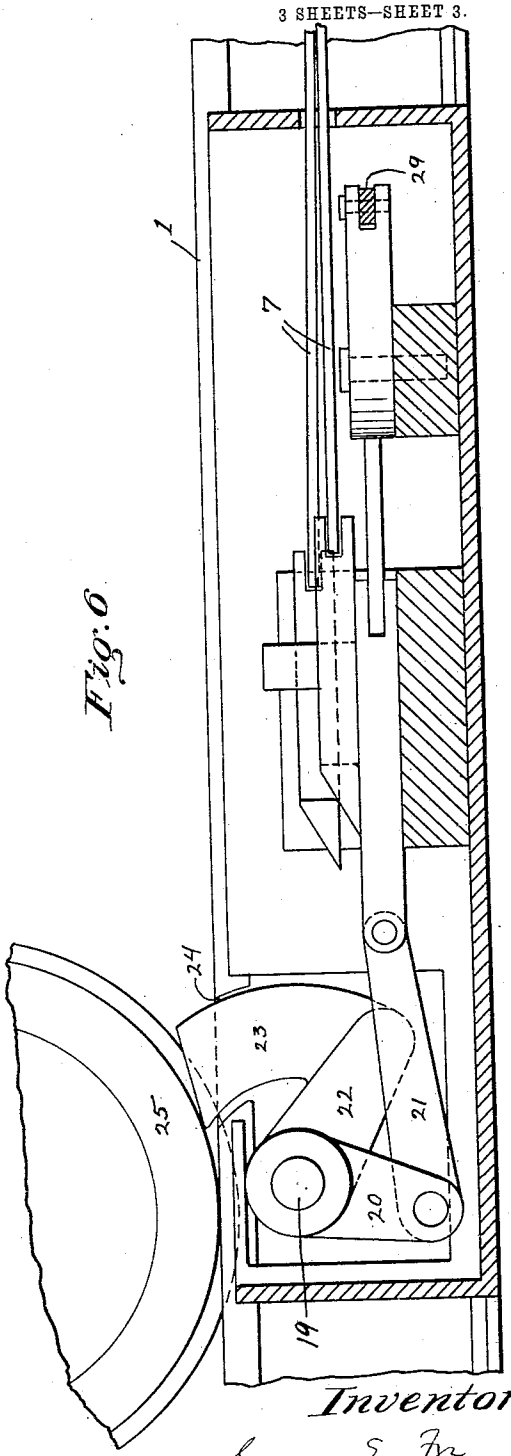


Fig. 6



Witnesses.
Fred W. Sweet.
Robt C. Totten

Inventor.
George E. Fry
By Kay & Totten
Attorneys.

No. 735,083. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

GEORGE E. FRY, OF ALLEGHENY, PENNSYLVANIA.

SWITCH-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 735,083, dated August 4, 1903.

Application filed August 28, 1902. Serial No. 121,310. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. FRY, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switch-Operating Devices; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to switch-operating mechanism, and is more especially designed for operating switches of electric railways.

The object of my invention is to provide mechanism for operating the switches which is partly electric and partly mechanical and which is so arranged that less labor is thrown upon the electric means than in switches heretofore devised, thus rendering the operation of the switch more certain.

In the operation of electric railways, and more especially street-railways, it has been customary to throw the switches by means of a solenoid mounted at the side of the track and which is adapted to be energized by current coming from the main line and when energized to push or pull the switch-point over to the opposite position. By reason of the fact that the switch-pieces or frogs frequently become clogged with dirt, snow, or ice the movement of the switch-point is not an easy matter, and frequently it is found that the solenoid does not possess sufficient power to move the point, thus necessitating the movement of the point by hand.

The object of my invention is to overcome this difficulty and to provide a switch-operating device wherein the switch-point is moved by means of mechanism which is actuated by contact with the car, but which mechanism is set or put in operative position by electrically-controlled means. In this manner the electrical means need possess only sufficient power to set the actuating mechanism, while the actual moving of the switch is done by the forward movement of the car.

In the accompanying drawings, Figure 1 is a plan view of my switch-operating device. Fig. 2 is a cross-section on the line 2 2, Fig. 1, showing parts thereof in elevation. Fig. 3 is a plan view, on an enlarged scale, of the actuating mechanism. Figs. 4, 5, and 6 are side elevations of the same, showing it in different positions; and Fig. 7 is a cross-section on the line 7 7, Fig. 4.

In the drawings the track-rail is shown at 1, the switch-rail at 2, and the switch-point at 3, all of these parts being of the usual construction. The switch-point has connected thereto a link or rod 4, which is connected to an arm 5 of the rocking lever 6. To opposite ends of this rocking lever are connected rods or the like 7, leading to the actuating mechanism. The rocking lever 6 and its connected mechanism are inclosed in a box 8, which is provided on one side with openings, through which the rods 7 pass. The opposite ends of the rods 7 are connected to suitable members 9 and 10, which I will designate "dogs," the dogs being mounted to slide on a bearing 11. Each of these dogs is provided at what I will term its "forward" end with a hook or shoulder 12, and beyond said shoulder it is beveled downwardly, as at 13.

The two dogs are reversely arranged with their projecting hooks 12 overlapping and their bodies being some distance apart. Between the bodies of these dogs and moving in a groove in the guide 11 is a slide 14. This slide is provided some distance from its forward end with a shoulder 15, projecting above the body of the slide, thence it continues as a substantially horizontal ledge 16 for some distance, and thence again rises to provide a lug or shoulder 17. This slide, as before stated, is mounted between the dogs 9 and 10; but the projecting hooks or shoulders 12 of said dogs lie above the slide, as shown in Fig. 3. The arrangement is such that when the projecting shoulder of the dog 9 lies in front of the shoulder 15 of the slide the shoulder 12 of the dog 10 will rest upon the ledge 16 of said slide. If now the slide is moved toward the right in Figs. 3 and 4, the dog 10 will remain stationary, and the ledge 16 of the slide will merely move from in under the shoulder 12 of said dog 10, thus permitting said dog to drop down to the position shown in Fig 5. If now said slide be moved toward the left, the shoulder 15 thereof will draw the dog 10 forward or toward the left, and its beveled end 13 will ride underneath the shoulder on the dog 9, as indicated in Fig. 6, thus raising the latter, and at the completion of this

movement of the slide the shoulder 12 of the dog 9 will rest upon the ledge 16, thus reversing the positions of the dogs from that shown in Fig. 4. It will thus be seen that by giving alternate right and left movements to the slide 14 the lever 6 will be rocked alternately in opposite directions, thus throwing the switch-point alternately in opposite directions.

The active movement of the slide 10—that is, the one operative for throwing the switch-point—is the movement toward the left, the slide then pulling on one of the rods 7 and rocking the lever 6. As this movement is liable to be quite heavy, I provide means which will be actuated from the moving car for accomplishing the same. As a suitable means for this purpose I have shown a rock-shaft 19, journaled in suitable bearings and extending at right angles to the track. To this rock-shaft is secured an arm 20, which is connected, by means of a link 21, to the slide 14. Also secured to this rock-shaft is an arm 22, provided with a segmental projection 23, which projects upwardly through a slot 24, cut in the flange of the rail 1, so that said projection will lie in the path of movement of the car-wheel 25.

It will be obvious that when the rock-shaft 19 has been moved to cause the projection 23 to project above the rail, as shown in Fig. 5, the car-wheel by contact with said arm will depress the same, thus rocking the shaft 19, and through the arm 20 and link 21 moving the slide 14 to the left, and as either one or the other of the dogs 9 or 10 is in front of the shoulder 15 of the slide the lever 6 will be rocked and the switch-point moved. In order to retract said slide after being moved to throw the switch-point and to bring the projection 23 into the path of the car-wheel, I connect to the rear end of the slide a link 27, which in turn is connected to one arm of a bell-crank lever 28, the opposite end of which is connected, by means of a rod 29, to a second bell-crank lever 30, pivoted on a horizontal pivot at the curb or other convenient place and connected, by means of a rod 31, to the core 32 of the solenoid 33. This solenoid will be placed in any suitable position, preferably on a pole 34 at the curb, as is now the custom. It will be arranged to be energized by current coming from the main line, as is also now the practice, and when so energized by pulling on the rod 31 through the bell-crank levers and connections will retract—that is, move the same toward the right in Figs. 3 to 6. This movement of the slide sets the actuating mechanism ready for actuation by means of the car. This retraction of the slide 14 draws the ledge 16 of said slide from underneath the projecting shoulder of whichever one of the dogs 9 or 10 may be resting upon said ledge, and at the same time through the link 21 the shaft 19 is rocked and the projection 23 thereon is projected above the tread of the rail. The position of the parts after the energization of the solenoid is shown in Fig. 5. In this position the mechanism is set, and when the wheel of the car depresses the arm 23 the slide 14 will be moved to the left, thus reversing the positions of the dogs 9 and 10 and rocking the lever 6 to throw the switch-point.

Preferably a lever 35 will be connected to the rod 31 in any suitable way—as, for instance, by a wheel and chain—so that in case the solenoid should become disabled the mechanism can be set by moving said lever. The actuating mechanism is inclosed in a box 36 to protect the same from dirt and ice.

In the operation of my mechanism if the motorman sees that the switch is in proper position he will refrain from sending current through the solenoid 33, thus not setting the mechanism, and the car will proceed on the proper track without in any way disturbing the switch-operating mechanism. Should, however, the switch be in the wrong position, the motorman in the usual manner will send current through the solenoid 33, thus drawing up on the rod 31 and through the connecting means move the slide 14 toward the right, and at the same time cause the rock-shaft 19 to throw the projection 23 above the tread of the rail. As the car then proceeds the wheel will depress the arm 23 and through the connected mechanism move the slide 14 to the left, thus pulling toward the left whichever one of the dogs 9 or 10 lies immediately in front of the shoulder 15 of the slide and through its proper connecting-rod 7 rocking the lever 6 to move the switch-point to its opposite position.

It is obvious that the mechanism may be changed in details of construction without departing from the spirit of the invention. For instance, in place of the rod 7 any suitable connector, such as a cable or chain, might be used. All of the operating parts are compact and simple and can be inclosed in boxes, so as to protect them from dirt and ice. Very little power is necessary in order to set the mechanism, and the weight and momentum of the car are always sufficient to move the switch-point, so that certainty in the movement thereof is insured.

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

1. In a railway-switch-operating device, the combination with a switch-point, of actuating mechanism therefor comprising an arm or projection normally lying out of the path of the car but adapted when engaged by the car and moved thereby to throw the switch-point, electrically-controlled mechanism mounted adjacent to said arm or projection, and connections between said mechanism and said arm or projection for moving the latter into the path of the car.

2. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and ar-

ranged to throw the same in opposite directions, said dogs being provided with hooked shoulders and beveled ends, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected to said arm or projection, and a shoulder on said slide arranged to engage the hooked shoulders of said dogs alternately and move the same to throw the switch-point.

3. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and arranged to throw said point in opposite directions, an arm or projection adapted to be engaged by the car and moved thereby, connections between said arm or projection and dogs and arranged to connect alternately with said dogs, and electrically-controlled means adjacent to said arm or projection for moving the same into the path of the car.

4. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and arranged to throw said point in opposite directions, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected to said arm or projection, means on said slide arranged to engage said dogs alternately to move the same to throw the switch-point, and stationary electrically-controlled means for retracting said slide and moving the arm or projection into the path of the car.

5. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and arranged to throw the same in opposite directions, said dogs having hooked shoulders and beveled ends, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected to said arm or projection, a shoulder on said slide arranged to engage with the hooked shoulders of said dogs alternately, and electrically-controlled means for retracting said slide and moving the arm or projection into the path of the car.

6. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and arranged to throw said point in opposite directions, an arm or projection adapted to be engaged by the car and moved thereby, connections between said arm or projection and dogs and arranged to connect with said dogs alternately to move the switch-point, a solenoid, and connections from the same to said arm or projection for moving the same into the path of the car.

7. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising two dogs connected to said switch-point and arranged to throw the same in opposite directions, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected thereto, means on said slide arranged to engage said dogs alternately, a solenoid, and connections from the same to said slide for retracting the same and moving the arm or projection into the path of the car.

8. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising a rocking lever connected to the switch-point, two rods connected to the opposite ends of said lever and arranged to move the same in opposite directions, oppositely-arranged dogs connected to the ends of said rods, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected to said arm or projection, and means on said slide arranged to engage said dogs alternately.

9. In a railway-switch-operating device, the combination with the switch-point, of actuating mechanism therefor comprising a rocking lever connected to the switch-point, two rods connected to the opposite ends of said lever and arranged to rock the same in opposite directions, a dog connected to the opposite end of each of said levers, an arm or projection adapted to be engaged by the car and moved thereby, a slide connected to said arm or projection, means on said slide arranged to engage said dogs alternately, and electrically-controlled means for retracting said slide and moving the arm or projection into the path of the car.

In testimony whereof I, the said GEORGE E. FRY, have hereunto set my hand.

GEORGE E. FRY.

Witnesses:
ROBERT C. TOTTEN,
FRED D. SWEET.