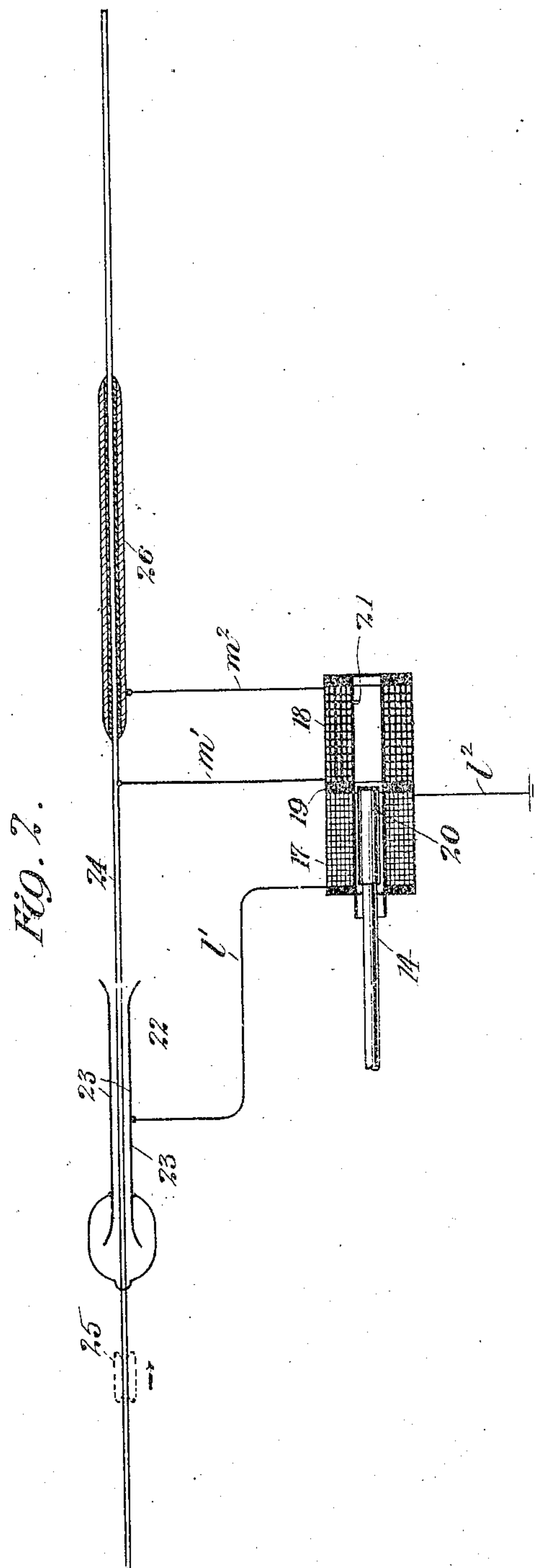
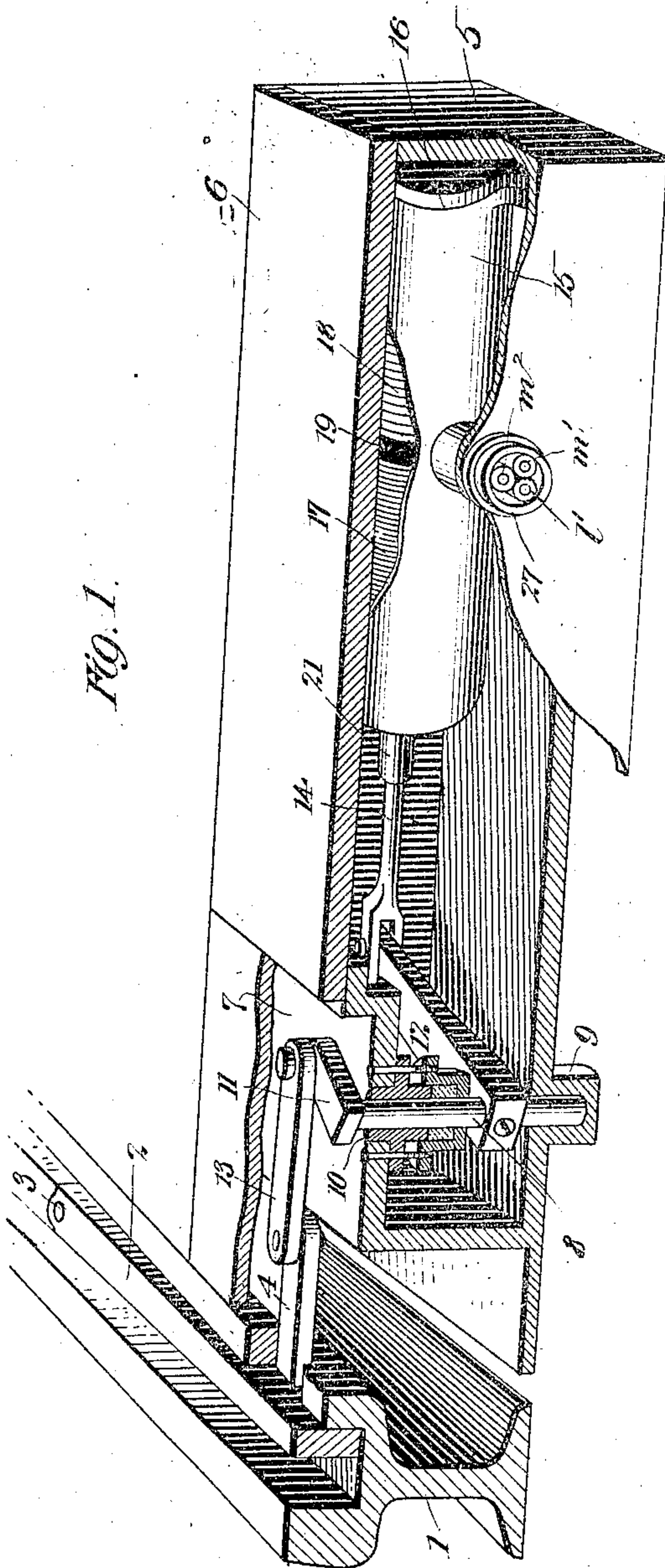


No. 877,458.

PATENTED JAN. 21, 1908.

R. A. BALDWIN.
ELECTRIC TRACK SWITCH.
APPLICATION FILED DEC. 5, 1906.



Witnesses

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ELECTRIC TRACK-SWITCH.

No. 877,458.

Specification of Letters Patent.

Patented Jan. 21, 1908.

Application filed December 5, 1906. Serial No. 346,361.

To all whom it may concern:

Be it known that I, ROLLIN A. BALDWIN, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Electric Track-Switches; of which the following is a full, clear, and exact description.

My invention relates to electrical track switches, particularly of that character used in street railway installations where the switch points at the turn-outs are required to be positioned by the motorman of each car before it enters the switch.

The principal object of the invention is to provide an electrically operated switch which is actuated in the most positive manner by the current from the ordinary power circuit or trolley, in both directions of its throw. In other words, I aim to provide a switchpoint which has separate electrical power means for moving it in the two directions of its movement, so that springs, weights, alternative mechanical movements, and all similar devices are absolutely avoided.

A further object of the invention is to provide an electrical switch which is positively set in one position or the other wholly by the manipulations of the usual motor controller on the car, and in which certain manipulations always result in a certain predetermined throw of the switch point, so that in the night, in the severest fogs or storms, and under all circumstances, the motorman is able to position the switch point in advance of his car in a certain definite way, whether he is able to see it or not, and without the necessity of looking at it in any case. It is also evident that by this means the motorman can position the switch point around the corner before he makes a turn, so that his whole attention can be given to controlling the car at the turn, where such attention is needed.

A still further object of the invention is to provide a switch point of the most simple and durable mechanical construction, and which is absolutely water tight, and which is self-locking to the extent which is required in a switch point. In other words, the mechanism is designed to present sufficient resistance to accidental displacement of the switch point to preclude its derangement by teams, etc. With these and other objects in view

the invention consists in the features of construction and combination hereinafter set forth and claimed.

In the drawings: Figure 1 is a perspective view showing an automatic track switch embodying the principles of my invention; Fig. 2 is a diagrammatic view showing the electrical circuits thereof.

The ordinary track switch of a street railway is exposed to the most unfavorable influences possible. It is buried in the ground where it is exposed to constant dampness and corroding influence, which is injurious to all the metallic parts, and particularly injurious to any electrical switches or connections. The switch is also exposed to very hard usage by reason of the blows and impacts it receives from cars and teams, and above all, by reason of the obstacles and impediments, such as mud, stones and dirt which fall in the path of the switch point, and cause the actuating devices to be overloaded to the breaking point. Finally, the mechanism is called upon to act at all sorts of varying electrical potentials, depending on the condition of the power circuit. In some cases the voltage of the power circuit of a street railway falls very low, and the device must be able to work at such low voltage. Therefore, it must not be injured by a resumption of high voltage conditions. Finally, the switch is not under the inspection or supervision of persons qualified to keep it in good order. The ordinary railroad employees are unfamiliar with delicate mechanism, and are incapable of making fine adjustments or repairs. On all these accounts it is evident that an automatic track switch to be successful must be constructed in the most simple and substantial way, so that it is practically impossible for it to get out of order under any circumstances. In carrying out my invention I aim to secure this result.

Referring to the drawings in which like parts are designated by the same reference sign, 1 indicates a portion of a track rail containing a switch point 2, pivoted at 3, so as to swing back and forth in the rail 1 through a limited arc of movement.

4 denotes an extension of the switch point which is preferably integral therewith or rigidly attached thereto. This extension 4 constitutes the part on which the devices embodying my invention operate.

The automatic mechanism is contained in a box 5, which is preferably made of cast iron, open only at its top side.

6 denotes a cover plate which is fitted upon such top side so as to wholly and hermetically close the box. The front end of the box is depressed, as shown at 7, to form a shelf or ledge, and through this depressed portion there projects a vertical shaft 8. This shaft is received at its lower end in a bearing 9, integral with the box 5, and at its upper end passes through a stuffing box 10 in the shelf or ledge 7, so as to be perfectly water-tight at the point of its emergence from the box. By this arrangement the shaft 8 is capable of transmitting an angular movement from the interior to the exterior of the box.

The shaft 8 has two crank arms 11 and 12, of which 11 is a short arm on the outside of the box, while 12 is a considerably longer arm on the inside of the box, and preferably extending in the same general direction as the crank arm 11. The crank arm 11 is connected by a link 13 with the extension 4 of the switch point. The crank arm 12 has a pitman connection 14 with certain power devices, by which the motion of the switch point is secured.

The power devices which operate the pitman 14 constitute a very important feature of my invention. In the preferred form I make use of a cylindrical compartment or casing 15, having a cylinder head 16 bolted thereto so as to be absolutely water-tight. Within this casing are contained a pair of magnet coils or solenoids 17, 18, of which 17 is wound with fine wire, say No. 21, double cotton covered, while 18 is wound with comparatively coarse wire, for example, No. 9 gage. These coils or solenoids are co-axially positioned as particularly shown in Fig. 2, and are suitably separated by an insulating partition 19, of any suitable sort. The pitman 14 extends in the direction of the hollow interior of these coils or solenoids, and has at its inner end an iron core 20, which is of sufficient length and diameter to cooperate efficiently with the two solenoids and to be sucked into one or the other of them, according to which one is energized. In Fig. 2 the core 20 is shown within the solenoid 17, and is in a position to be drawn into the solenoid 18 in case the latter were the one energized. In the practical construction I mount the solenoids 17, 18, on a tube 21, so as to form a guide for the core or plunger 20. The core or plunger 20 is sufficiently loose in the guide 21 to accommodate any angular movement of the crank arm 12 to which the pitman is connected. I also fill the entire cylinder or compartment 15 with transformer oil so as to thoroughly insulate the windings and exclude moisture.

The electrical connections will be clearly understood from a consideration of Fig. 2.

22 denotes a trolley circuit closer of any

convenient form adapted to make connection with the power wire when a car passes. For the purposes of illustration I have shown a pair of metallic strips 23, which are separated from the trolley wire 24, but which are in the path of the trolley wheel 25, so that the strips are temporarily charged during the interval that the trolley wheel is passing by.

l^1 indicates a wire connecting one or both of these strips to the solenoid 17 having the fine wire, and l^2 indicates a ground connection, constituting the other terminal thereof. The solenoid or coil 18 having the coarse wire is connected in a circuit between the wires m^1 and m^2 .

m^1 is attached to the trolley wire 24 and m^2 leads to a special trolley section 26, which may be formed by a metallic tube surrounding a portion of the trolley wire but insulated therefrom. By the above arrangement the coil or solenoid 17 is first energized by a shunt connection with the power circuit, when a car passes from left to right in Fig. 2. The coarse wire coil or solenoid 18 is thereafter energized by a series connection through the car motors, provided the motorman is drawing current when his trolley passes over the tube 26.

The operation is as follows: I will suppose a car to be moving in the direction of the arrow in Fig. 2, so that its trolley wheel is about to engage the metallic strips 23 of the initial circuit closer 22. Under these circumstances, the switch point 2 may be in any position, either at the extremes of its throw, or at an intermediate location. This position depends on the destination of the preceding car which passed unless the switch has been accidentally or purposely disturbed since the car passed. Whatever the position of the switch point, it is automatically set in advance of the car in a predetermined way by the initial energization of the coil or solenoid 17. This occurs when the trolley wheel of the car engages the strips 23, thereby raising such strips to the trolley potential, and causing a current to flow through the wire l^1 , winding 17, wire l^2 , to ground. In the illustration the switch point is moved to the left under these circumstances. This action occurs regardless of any control of the motorman and whether current is passing through the car motors or not. In the meantime, the motorman has made up his mind, which way he wishes to go, and in case he wishes to go straight ahead, he proceeds without turning off his controller, so that the car motors are taking current when the trolley wheel passes over the tube 26. But the current for the motors under these circumstances has to pass through the coil or solenoid 18, the circuit being as follows: From trolley 24, through wire m^1 , winding 18, wire m^2 , tube 26, and

trolley 25, to the car. The result of this is to energize the winding 18, and draw the solenoid 20 to the right, so that the switch point is correspondingly thrown in Fig. 1, and the car proceeds forward on the main track. If, however, the motorman wishes to make the turn, it is merely necessary for him to approach the switch with the current turned off, so that there is no circuit through the car motors, and the car is moving under its own momentum. Under these conditions, there is no circuit completed through the winding 18, so that the switch point is not disturbed from its initial position to the left, which is always initially taken under the influence of the winding 17, as above pointed out. Thus, under these circumstances, the car is switched to make the turn.

By reason of the initial movement of the switch point as above described it is evident that the motorman is relieved of all necessity of looking at the switch point before his car reaches it. It is merely necessary for him to make certain manipulations of his controller to go straight ahead, or to make a turn, as desired, and in practice these manipulations soon become a matter of habit, so that his mind is not distracted from its regular duties in running the car. In stormy or foggy weather, or dark nights, the procedure is exactly the same, and no trouble is caused by the motorman not being able to see the switch point before he arrives at it.

It will be observed that the apparatus is completely water-proof in use, and has no electrical contacts or parts liable to become corroded or inoperative in use. The circuit wires l' , m' and m^2 are led into the apparatus through an ordinary conduit pipe 27, which is made water-proof in the usual way, and leads to any ordinary outlet box near a trolley pole or at any other convenient point.

What I claim, is:—

1. In an electrical track switch, a box or casing having a cover by which it is hermet-

ically closed, one end of said box or casing being depressed to form a ledge or shelf, a shaft having a bearing in the bottom of the box and projecting upwardly through said ledge or shelf and having a stuffing box engagement therewith, a pair of cranks on said shaft one exterior and one interior of the box, and means inclosed within the box and acting on the latter crank, and a link connection from the exterior crank to the switch point to move the switch point.

2. In an electrical track switch, a box or casing having a depressed front portion, a crank projecting upwardly through said portion and having a short crank arm outside the casing, connections from said crank arm to the switch point, a long crank arm on said shaft within the casing, a bearing on the bottom of the casing for said shaft, a pair of solenoids within the casing, a single water-tight compartment therefor, and a pitman connection having a core extending into said solenoids but exterior to said water-tight compartment and pivoted to the long crank arm.

3. In an electrical track switch, a box or casing having a cover by which it is hermetically closed, a stuffing box in said casing, a shaft projecting through said stuffing box, a pair of solenoids within the casing, a guide within said solenoids, a cylinder surrounding the solenoids and forming in conjunction with said guide a water-tight compartment therefor, a core or plunger within said guide and connected to move said shaft, and insulating oil within said compartment whereby the windings of the solenoids are wholly inclosed and immersed in insulating oil.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

ROLLIN A. BALDWIN.

Witnesses:

E. L. BOWERS,

WALDO M. CHAPIN.