J. A. POSEY.

SWITCH THROWER FOR ELECTRIC RAILWAYS.

APPLICATION FILED NOV. 15, 1909.

950,210. Patented Feb. 22, 1910.

4 SHEETS—SHEET 1.

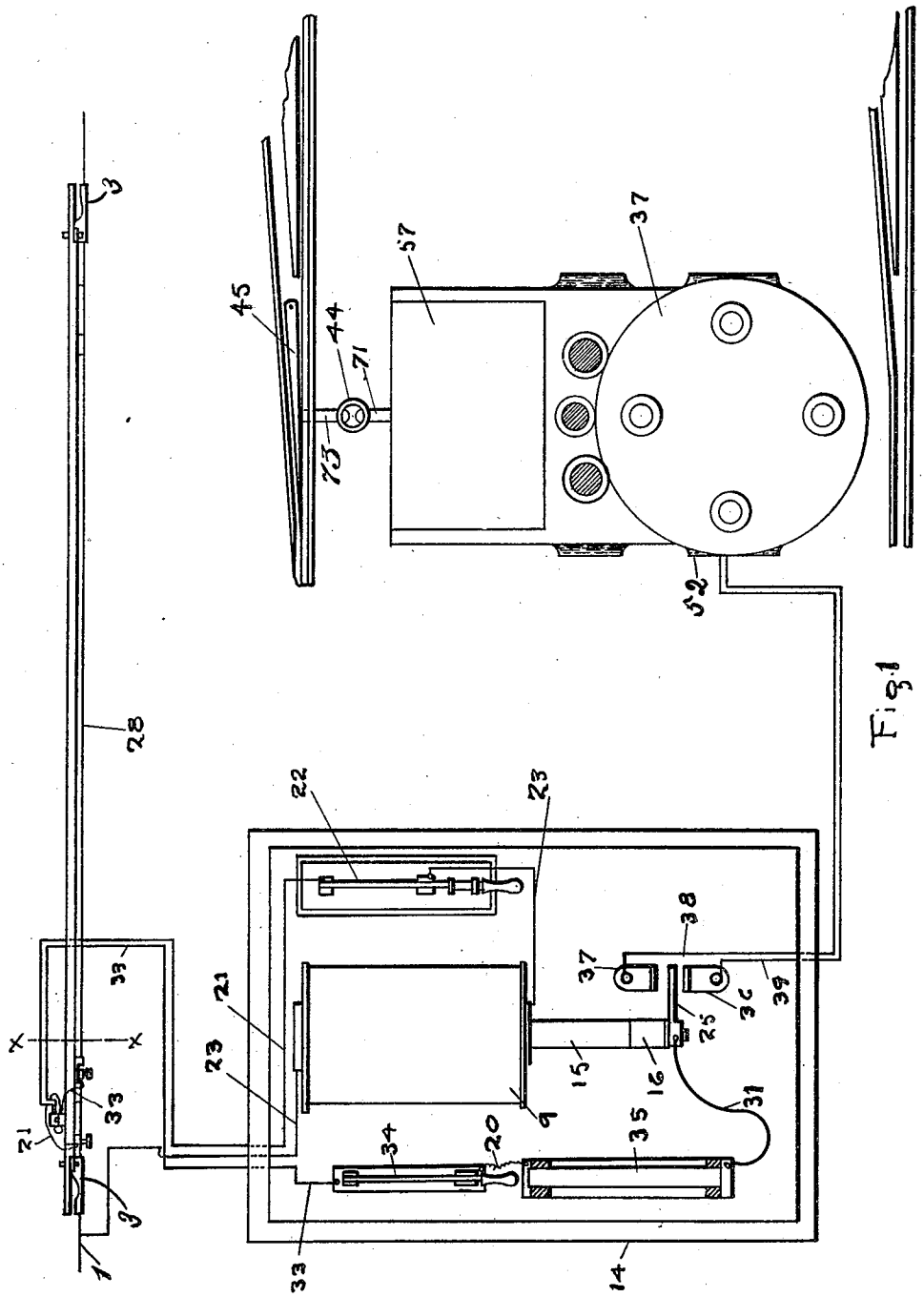

Fig. 1.

WITNESSES

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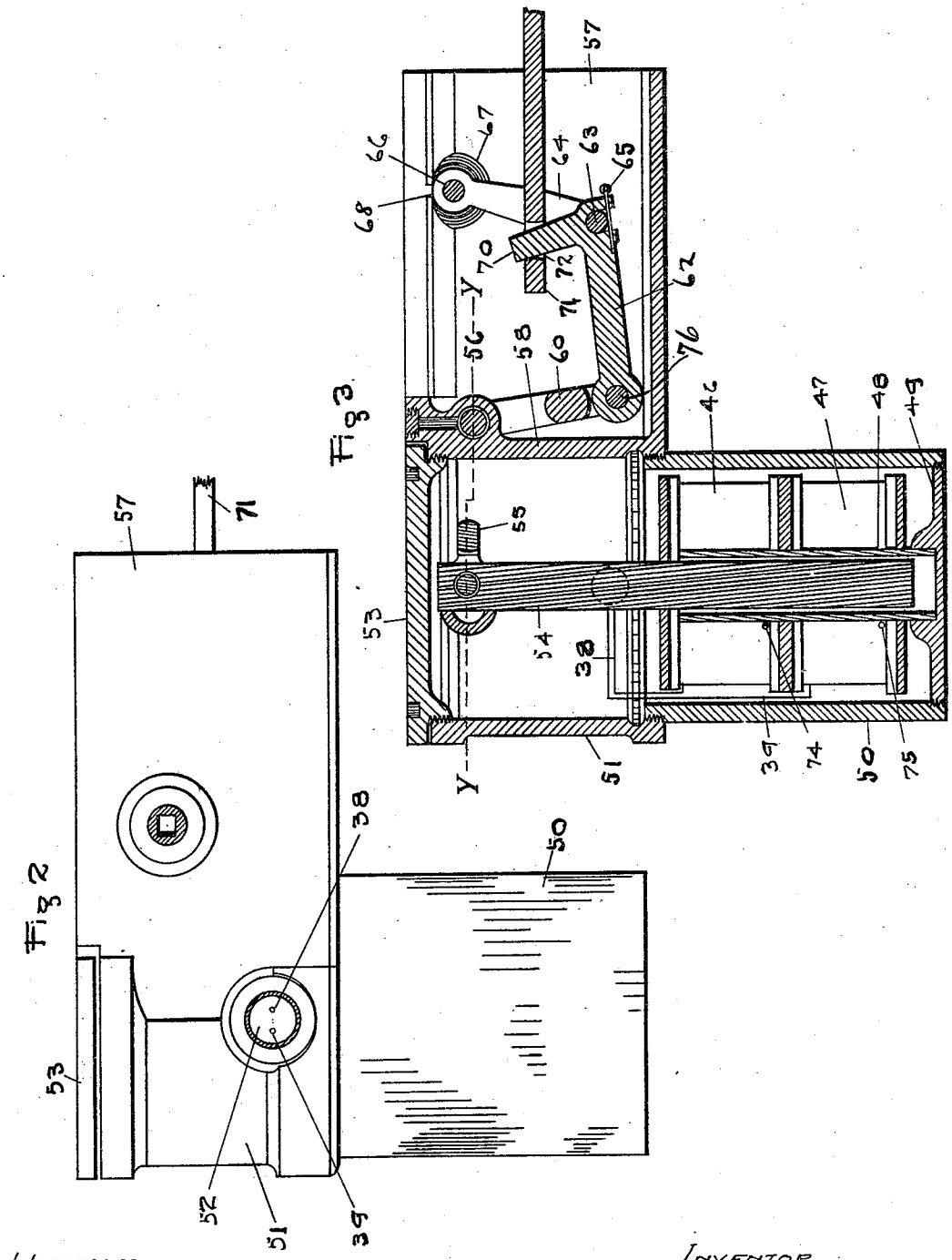

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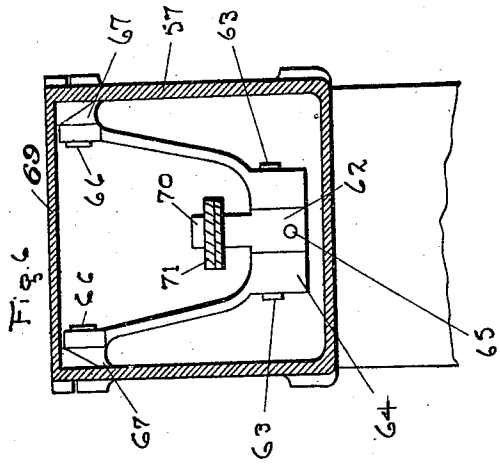

Fig. 6.

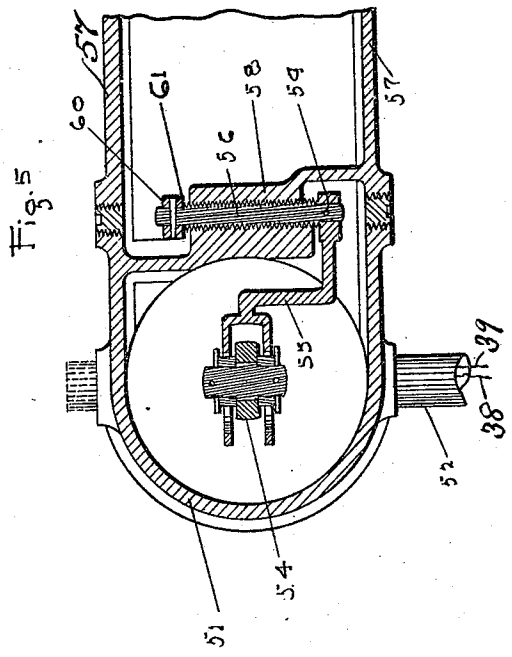

Fig. 5.

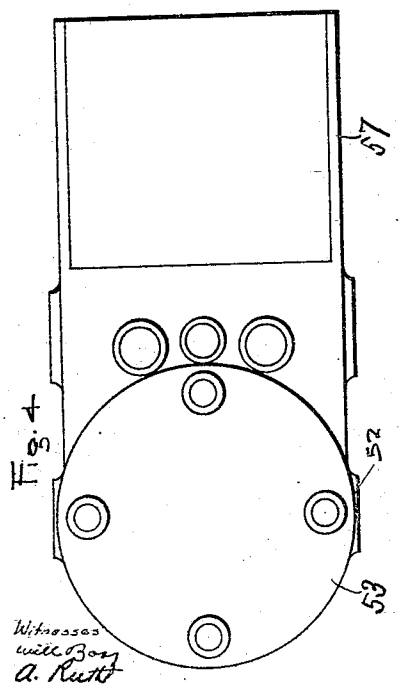

Fig. 4.

Witnesses
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4 SHEETS—SHEET 4.

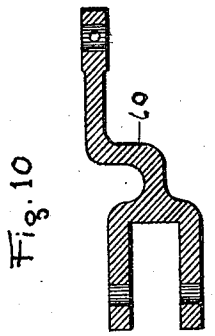

Fig. 10

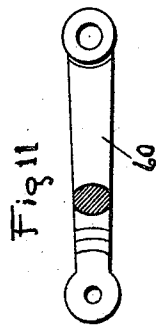

Fig. 11

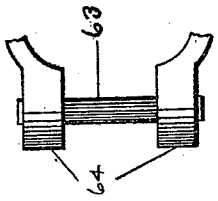

Fig. 12

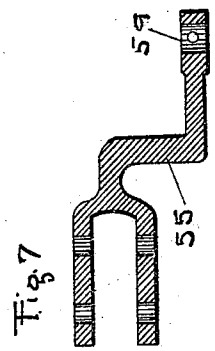

Fig. 7

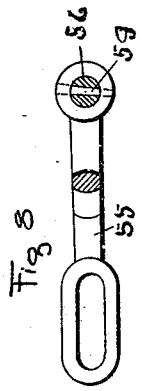

Fig. 8

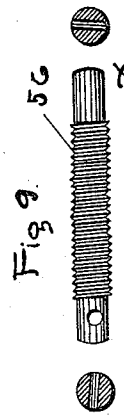

Fig. 9

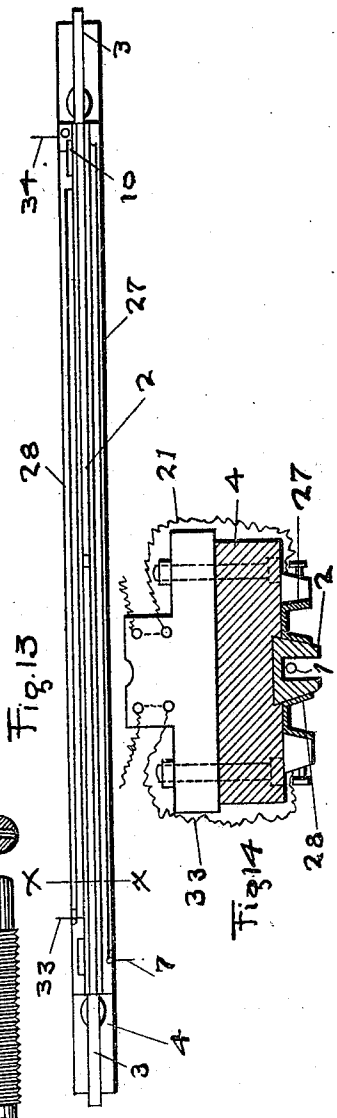

Fig. 13

Fig. 14

Witnesses

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UNITED STATES PATENT OFFICE.

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SWITCH-THROWER FOR ELECTRIC RAILWAYS.

950,210. Specification of Letters Patent. Patented Feb. 22, 1910.

Application filed November 15, 1909. Serial No. 528,107.

To all whom it may concern:

Be it known that I, JAMES A. POSEY, a citizen of the United States, residing at Waxahachie, county of Ellis, and State of Texas, have invented certain new and useful Improvements in Switch-Throwers for Electric Railways, of which the following is a specification.

My invention relates to means for throwing the switch tongues of electric railways and more particularly to solenoids and means for engaging the solenoids and suitable connections with the switch tongue of a railway, and the object is to provide means for opening or closing a switch by which means a motorman on a passing car can cause the switch tongue to be turned at will whether he sees the switch tongue or not.

One of the objects of this invention is to provide a novel and practical and efficient means for obtaining power to operate a switch tongue without in any manner interrupting the power current of the car.

Other objects and advantages of this invention will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Figure 1 is a diagrammatic view, showing the complete operating mechanism, the trolley wire attachment being shown in side elevation, the railway track being shown in plan view, the circuit changing mechanism being shown in side elevation, and the circuit changing box being shown open. Fig. 2 is a side elevation of the casing which contains the operating solenoids. Fig 3 is a vertical section of the solenoid box and of the mechanism therein which operates the switching bar. Fig. 4 is a plan view of the solenoid box and the rail box. Fig 5 is a horizontal section of the same on the line y—y of Fig. 3. Fig. 6 is a vertical section of the rail box, showing the swinging fulcrum for the operating lever. Fig. 7 is a horizontal longitudinal section of the power lever which is connected to the movable core armature. Fig. 8 is a side elevation of the same. Fig. 9 is a detail view of the screw fulcrum which forms the connection between the power lever and the transmission lever. Fig. 10 is a horizontal longitudinal section of the power transmission lever. Fig. 11 is a side elevation of the same. Fig. 12 is a detail view of the swinging fulcrum bolt 63. Fig. 13 is an inverted view of the trolley wire attachment. Fig. 14 is a vertical section of the same, taken on the line x—x of Fig. 13 or of Fig. 1.

Similar characters of reference are used to indicate the same parts throughout the several views.

In the drawings 1 indicates the trolley wire and 2 indicates an insulator which prevents the trolley wheel from coming in contact with the wire 1 during a switching operation, the trolley wheel, during a switching operation, running in contact with a metal bar 27 which is attached to a block of wood 4 and against a metal bar 28 which is also attached to the block or board 4. The current is transmitted from the bar 27 through the trolley wheel to bar 28 and thence to the operating solenoids 46 and 47. The trolley wire is mounted in the hangers 3 which are attached to the board 4 and the wire lies in the fiber trough 2. The metal strips 27 and 28 are thus insulated from the trolley wire and the bars take the place of the trolley wire during a switching operation. The object in insulating the bar 28 from the trolley wire is to cause the power current to be switched out of its normal path and to cause the current to pass through a circuit changer before it reaches the bar 27.

The circuit changer is shown in detail in Fig. 1. A box 14 is mounted at some convenient place (on the side walk if in a city), as on a post near the track of the railway. A solenoid 9 is mounted in the box and a core armature 15 is movable vertically in the solenoid 9. A piece of fiber or insulation 16 forms a continuation of the bar 15 and a contact bar or arm 25 is attached to the fiber 16. Contacts 36 and 37 are attached to the box 14 on opposite sides of the arm 25 and the arm 25 is thus adapted to engage either contact 36 or 37. A safety

switch 22 is mounted in the box 14 and this switch is electrically connected to the long bar 27 by a wire 23. The circuit is completed back to the trolley wire from the long bar 27 by connecting the switch 22 with the terminals of the solenoid 9 by a wire 23 which is also connected to the trolley wire 1, the solenoid 9 intercepting the wire 23. The trolley wheel, during a switching operation, receives its power from a current which has passed through the solenoid. Means are provided for obtaining power to energize a switch throwing solenoid while the trolley wheel is passing the long bar 27. A short bar 28 is attached to the bar 4 on the opposite side of the fiber bar 2 from the bar 27. The bar 28 is electrically connected to a switch 34 in box 14 by a wire 33. A wire 20 connects the switch 34 with a fuse block 35 and a wire 31 connects the fuse 35 with the contact arm 25. The contact 37 is connected electrically with the solenoid 46 by a wire 38 and the contact 36 is electrically connected with the solenoid 47 by a wire 39.

The switch tongue operating solenoids 46 and 47 are shown in detail in Fig. 3. The solenoids 46 and 47 are mounted on a tubular brass core 48 which is screwed into a cap 49 for a support. The cap 49 is screwed into a vertically disposed tubular or cylindrical casing 50 and the casing 50 is screwed into a casing 51. The casing 50 must be water-tight to prevent water from interfering with the operation of the solenoids. For making the casing water-tight where the wires 38 and 39 enter the casing 51, the wires enter through a plug 52 which is sealed about the wires. The upper end of the casing 51 is sealed water tight by means of a cover 53.

The principal element for moving the switch tongue of the railway is the movable core armature 54 which is actuated by the solenoids 46 and 47 when these solenoids are energized. This core armature is pivotally connected with a crank lever 55 which may be called the power lever. The lever 55 is rigidly connected with a screw fulcrum 56. The casing 51 and the rail box 57 are preferably made in a single casting and the screw fulcrum 56 is mounted in the partition 58 between the box and the casing. The threads on the screw fulcrum 56 are made close so that the water or moisture can never pass through the partition 58. It is apparent that this fulcrum will never be displaced, as the lever 55 is rigidly connected thereto by a taper pin 59. The power transmission crank lever 60 is also rigidly connected to the screw fulcrum 56 by a taper pin 61. The screw fulcrum thus has only a rocking motion in the partition 58 which partition is the fulcrum bearing. The crank lever 60 is pivotally connected with the operating lever 62 by a fulcrum bolt 76. The operating lever 62 is provided with a movable fulcrum mounted in a swinging carrier 64. The fulcrum bolt 63 is held in a slot in the lever 62 by a bolt 65. The carrier 64 is pivotally mounted by means of bolts or trunnions 66 which are journaled in bosses 67 formed on the interior of the rail box. The trunnions 66 are easily removable by reason of the slots 68 in the bosses 67. These trunnions are held against displacement by the cover 69. The short arm 70 of the crank lever 62 is loosely connected with the switching bar 71. The arm 70 projects through an elongated opening 72 in the bar 71. The switch operating bar is jointed to prevent binding of the bar during operation. The part 73 of the switch operating bar is pivotally connected to the switch tongue 45 of the railway and the two parts of the bar are projected upwardly at their meeting ends and a ring 44 connects the two parts.

There are no return wires from the solenoids 46 and 47. The wires 38 and 39 are connected respectively with the terminals of the solenoids 46 and 47. The other end of the winding of solenoid 46 is soldered to the brass core 48 at 74 and is thus grounded. The other end of the winding of solenoid 47 is soldered to the brass core 48 at 75 and thus grounded. Either solenoid 46 or 47 can be arranged to throw the switch to direct the car to the branch line.

To direct a car to the branch line: the circuit is from trolley line 1 through wire 23, solenoid 9, the continuation of line 23 to switch 22, thence through line 21 to metal bar 27, thence through the trolley wheel to wire 33, switch 34, wire 20, fuse 35, wire 31 to arm 25. The motorman leaves the current on. As soon as the trolley wheel comes in contact with the bars 27 and 28, the current will pass through the trolley wheel, as above described, bar 28, wire 33, switch 34, fuse 35, wire 31 to arm 25 which is attached to the core armature 15. The solenoid 9 having been energized by the current which is passing through wire 23 and solenoid 9, safety switch 22, and wire 21 to bar 27, the arm 25 will be in engagement with contact 37 because the solenoid 9 will have drawn the core armature upwardly. The current will pass on through contact 37, wire 38 to solenoid 46 and thus energize that solenoid. This will cause armature 54 to rise and push on the lever 55. This operation will cause the lever 60 to pull on lever 62 and this operation will cause the short arm 70 to push the switch bar and this will push the switch tongue to the branch line. To throw the switch tongue so that the car will proceed on the main line: the motorman throws the current off his car and the car

will pass the current controller, that is, the fixtures on the trolley wire, by momentum. The solenoid 9 will not be energized as the current is cut off from that circuit, consequently the arm 25 will be in engagement with the contact 36. The current will pass through contact 36, wire 39 to solenoid 47. This will energize this solenoid, and if the switch tongue is to the branch line, solenoid 47 will draw the armature 54 downwardly and thus pull the levers in the opposite direction from that above described and throw the switch tongue to the main line, and move the tongue to direct the car on the main line.

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

1. An electric switching apparatus for railways having a solenoid for throwing a switch tongue to a branch line and a solenoid for throwing a switch tongue to the main line of a railway, a water-tight casing for said solenoids, a tubular brass core carrying said solenoids, said core being rigid with said casing and one terminal of each solenoid being soldered to said core, a core armature movable vertically in said tubular core, a power lever pivotally connected to said armature, an operating lever operatively connected to a switch tongue, a power transmission lever pivotally connected with said operating lever, and a screw fulcrum rigid with said power lever and with said transmission lever.

2. An electric switching apparatus for railways having a solenoid for throwing a switch tongue to a branch line and a solenoid for throwing a switch tongue to the main line of a railway, a water-tight casing for said solenoids, a tubular brass core rigid in said casing and carrying said solenoids, a common core armature for said solenoids operating in said brass core, a power lever within said casing actuated by said solenoids, a system of levers outside of said casing operatively connected to said power lever and to the switch tongue of the railway, a screw fulcrum forming the connection between said power lever and said system of levers and means for energizing either one of said solenoids at will.

3. An electric switching apparatus for railways having a solenoid for throwing a switch tongue to a branch line and a solenoid for throwing a switch tongue to the main line of the railway, a water-tight casing for said solenoids, a tubular brass core rigid in said casing and carrying said solenoids, one terminal of each solenoid being soldered to said brass core, a common core armature operating in said brass core, a power lever pivotally connected with said armature, a rail box integral with said casing, a transmission lever mounted in said rail box, a partition separating said rail box from said casing, a screw fulcrum mounted in said partition, said levers being rigid with said screw fulcrum, an operating lever pivotally connected with said transmission lever and loosely engaging a draw-bar, the said draw-bar connected to the switch tongue, and means for energizing either one of said solenoids at will.

4. An electric switching apparatus for railways having a solenoid for throwing a switch tongue to the branch line and a solenoid for throwing a switch tongue to the main line of a railway, a water-tight casing for said solenoids, a tubular brass core rigid in said casing and carrying said solenoids, a common core armature operating in said brass core, a power crank lever pivotally connected with said core armature, a screw fulcrum mounted in the wall of said casing, said lever being rigid with said fulcrum, a transmission lever rigid with said screw fulcrum and operatively connected with the switch tongue of a railway, and means for energizing either one of said solenoids at will.

5. An electric switching apparatus for railways having a solenoid for throwing a switch tongue to the branch line and a solenoid for throwing a switch tongue to the main line of the railway, a casing for said solenoids, a brass core rigid with said casing and carrying said solenoids, a common core armature for said solenoids, a power crank lever pivotally connected to said core armature, a screw fulcrum mounted in the wall of said casing and rigid with said lever, a transmission lever rigid with said screw fulcrum, a draw-bar connected to the switch tongue of the railway, an operating lever pivotally connected to said transmission lever and loosely engaging said draw-bar, a movable fulcrum for said operating lever, and means for energizing either one of said solenoids at will.

6. In an electric switching apparatus for railways provided with a solenoid for throwing a switch tongue to the branch line and a solenoid for throwing a switch tongue to the main line of the railway; a water tight casing for said solenoids, a power lever within said casing actuated by said solenoids, a system of levers outside of said casing operatively connected to a switch tongue of a railway and actuated by said power lever, and a screw fulcrum forming the connection between said power lever and said system of levers.

7. In an electric switching apparatus for railways provided with a solenoid for throwing a switch tongue to the branch line and a solenoid for throwing a switch tongue to the main line of the railway; a water tight casing for said solenoids, a power lever with-

in said casing actuated by said solenoids, a transmission lever outside of said casing operatively connected to said power lever, an operating lever connected to said transmission lever, and a swinging fulcrum for said operating lever.

In testimony whereof, I set my hand in the presence of two witnesses, this 1st day of November, 1909.

JAMES A. POSEY.

Witnesses:
LEVI LITTLETON,
JNO. D. WATER.