H. I. BLATTLE.

ELECTRIC RAILWAY SWITCH OPERATING MECHANISM.

APPLICATION FILED DEC. 27, 1909.

997,897.

Patented July 11, 1911.

3 SHEETS—SHEET 1.

Fig. 1

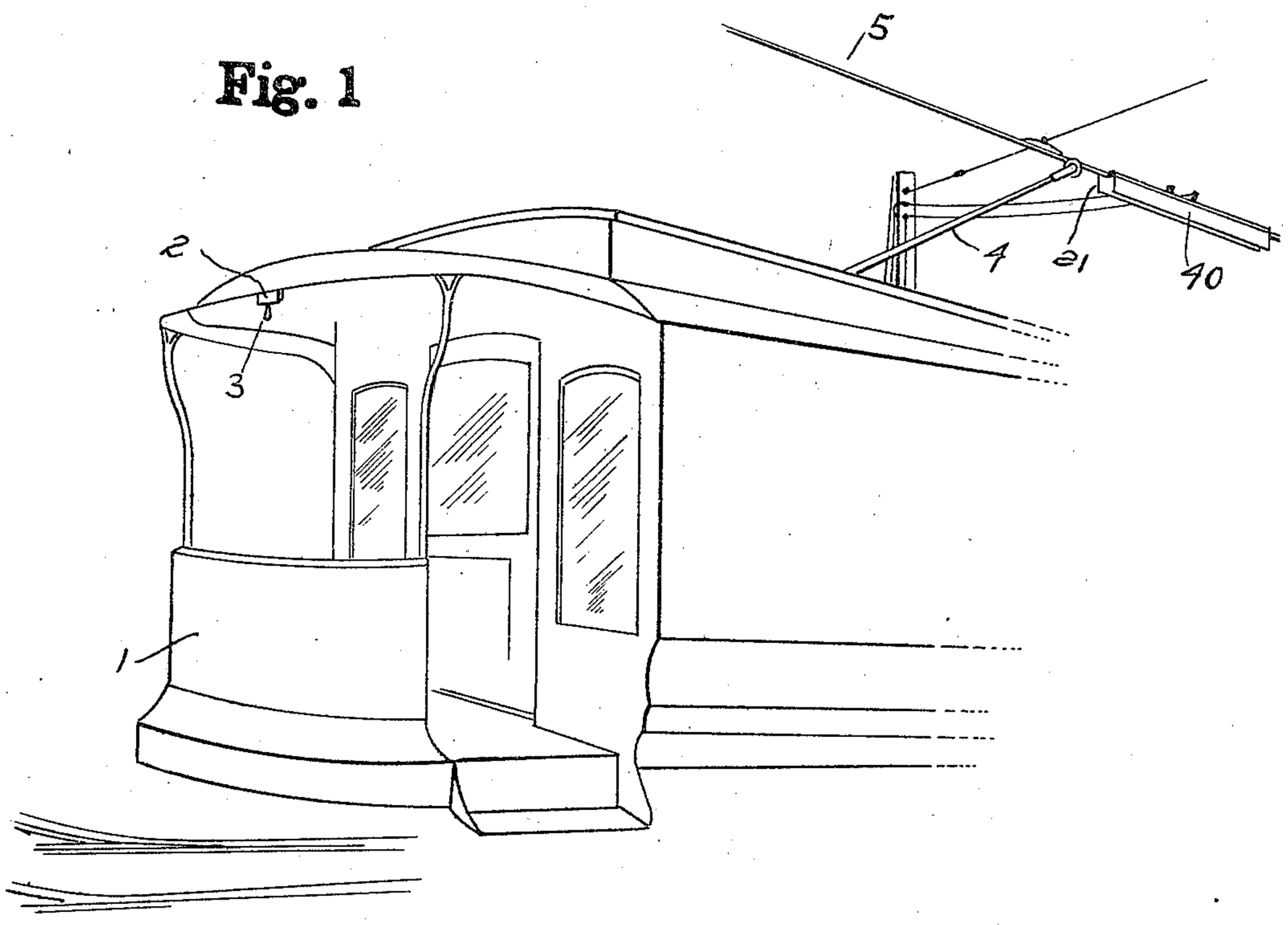
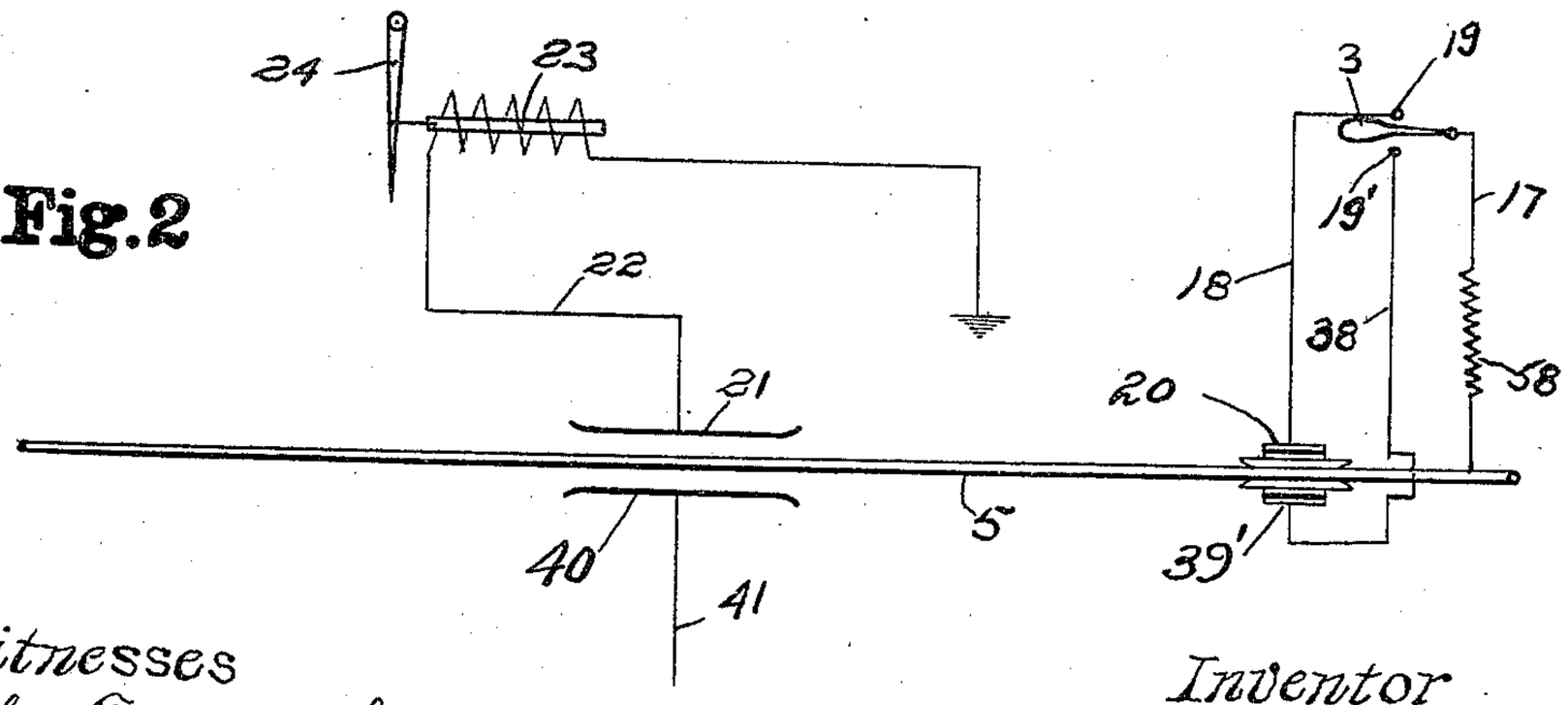


Fig. 2



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3 SHEETS—SHEET 2.

Fig. 6.

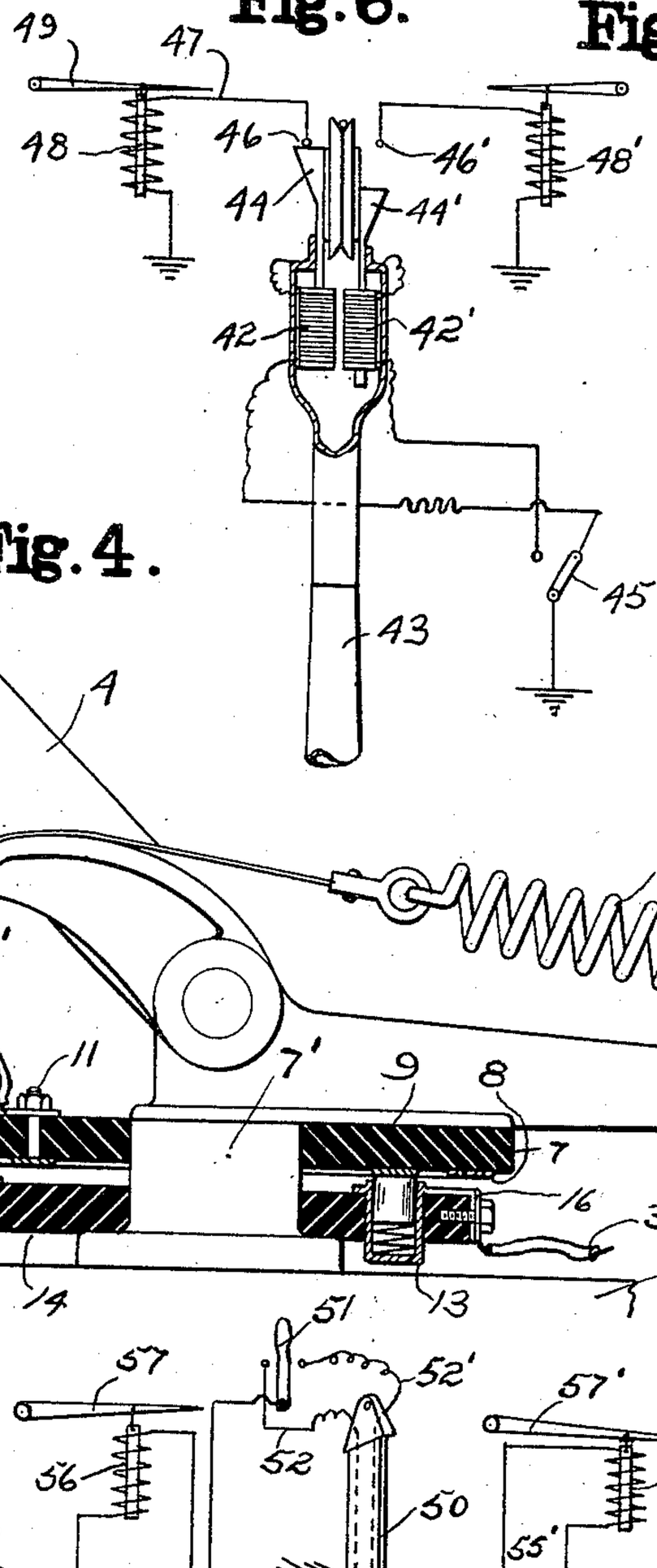


Fig. 3.

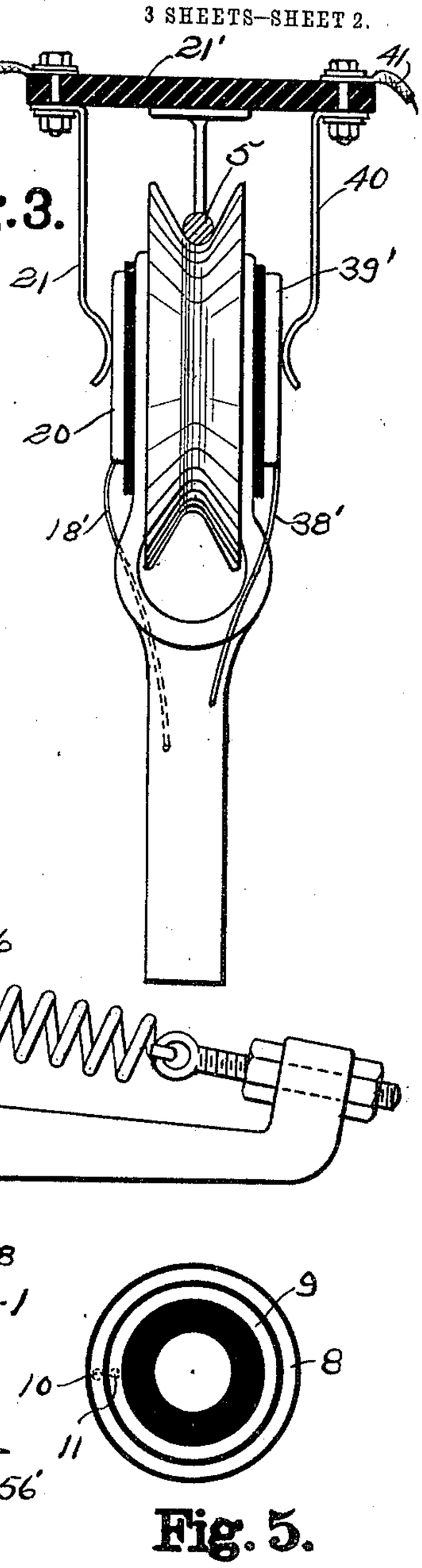
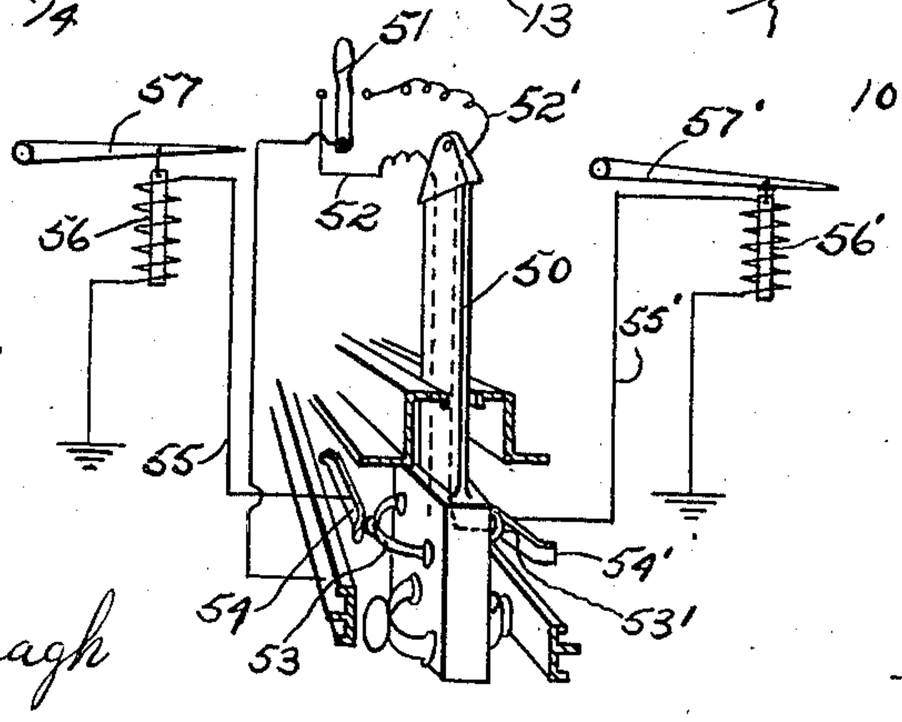


Fig. 4.

Fig. 5.

Fig. 7.



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3 SHEETS—SHEET 3.

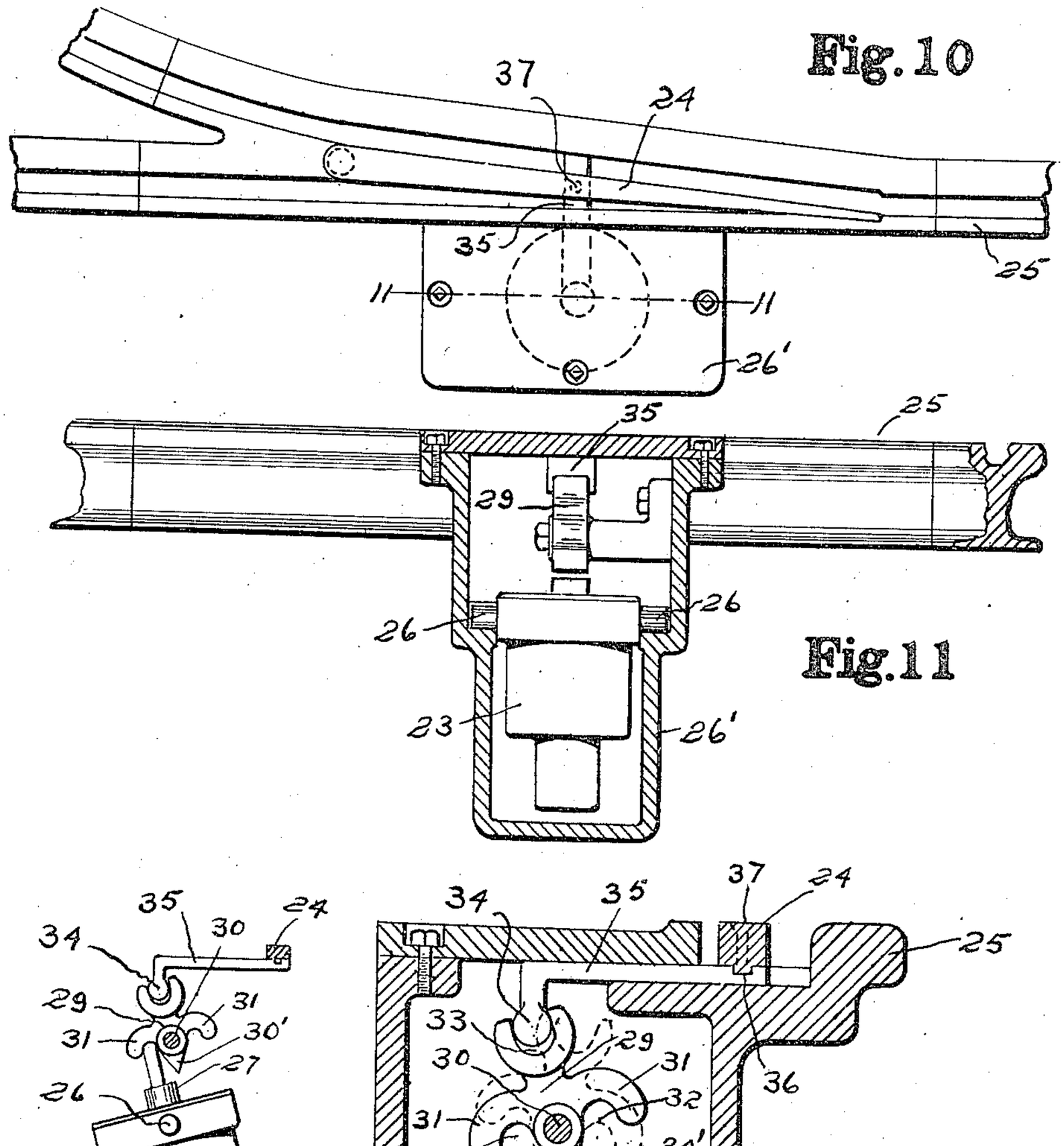

Fig. 10

Fig. 11

Fig. 9

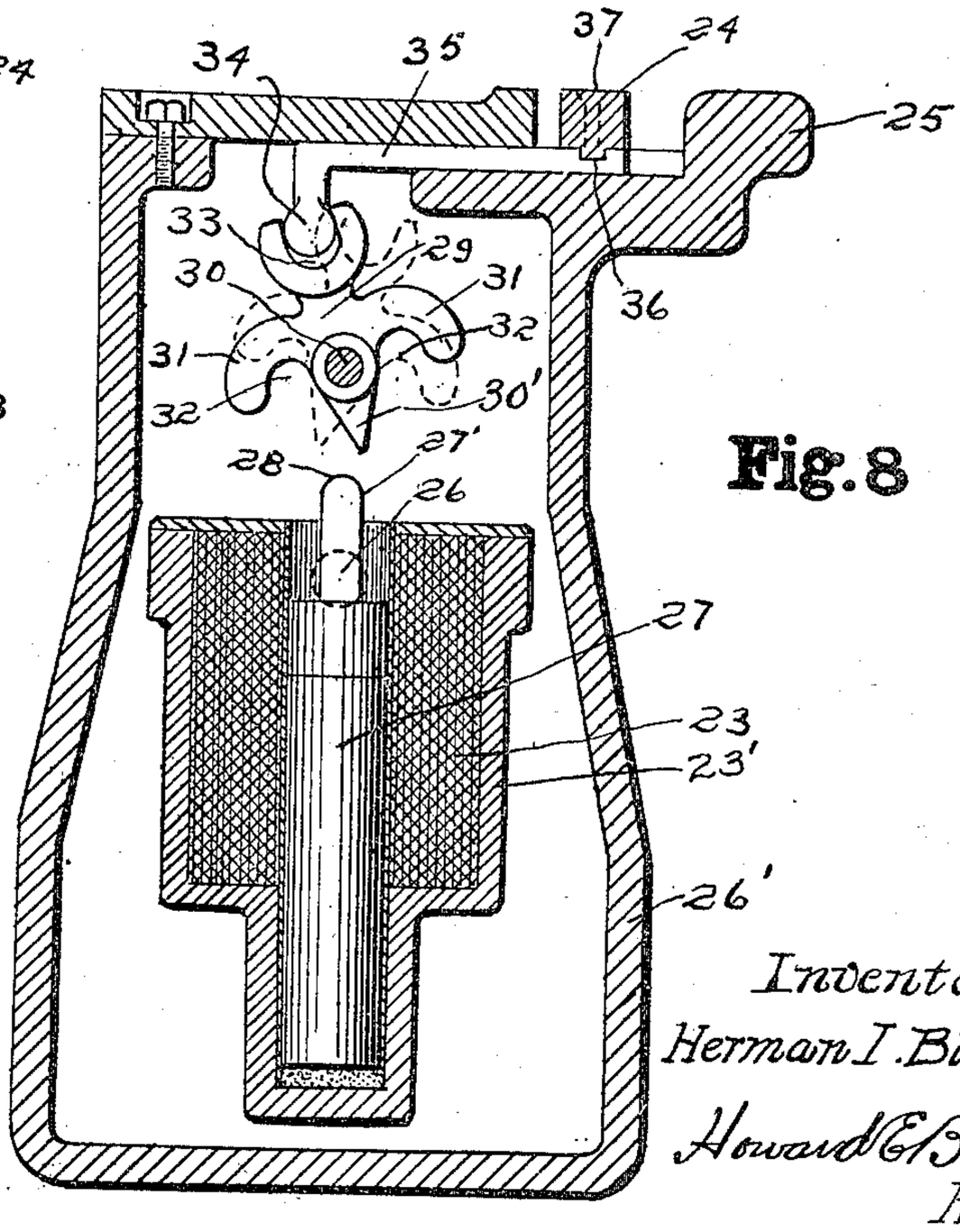

Fig. 8

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UNITED STATES PATENT OFFICE.

HERMAN I. BLATTLE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO PAUL NEWMAN, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC RAILWAY-SWITCH-OPERATING MECHANISM.

997,897. Specification of Letters Patent. Patented July 11, 1911.

Application filed December 27, 1909. Serial No. 534,995.

To all whom it may concern:

Be it known that I, HERMAN I. BLATTLE, a citizen of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Electric Railway-Switch-Operating Mechanism, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to electric railway switch operating mechanism and has for its object to provide a simple, practical and effective means whereby the railway switch tongue may be thrown automatically by the use of electro-magnets the operation of which is controlled at will by the motorman on the car.

A further object of the invention is that by my system of wiring a shunt or auxiliary circuit to the main or power circuit is provided, and therefore the railway switch may be prevented from operating without being obliged to withdraw the trolley pole from the wire or to in any way interfere with the motor or power circuit of the car, as is the case in some switching systems.

It is found in practice in the construction of railway switches of this character to be of great advantage to so arrange the electro-magnet that it may be readily removed for inspection or repair. I have, therefore, hung the magnet on trunnions rendering it very readily removable and also adapting the body portion to oscillate while acting upon switch throwing mechanism, the core of the magnet being arranged to return to its normal or inoperative position by gravity, thus obviating the necessity of using springs for this purpose, and but one magnet for accomplishing the throwing of the switch in both directions.

My improved system is so arranged as to be readily applied to any electric road whether the trolley or conductor is overhead or underground.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— is a perspective view showing a portion of a trolley car and the relative position of the hand operated circuit breaker on the car, also the trolley as having just passed through the contact members on the trolley wire. Fig. 2— is a wiring diagram. Fig. 3— is an enlarged end view of the contact box with the trolley in electrical connection with the spring fingers. Fig. 4— shows the shunt circuit wiring and continuous contact arrangement at the base of the trolley pole. Fig. 5— is a reduced plan view showing the underside of the insulated disk which moves in a circular direction with the trolley pole, said disk carrying the two concentric contact rings. Fig. 6— illustrates a modified construction and also a wiring diagram in which a pair of small auxiliary solenoids are located in the upper end of the trolley pole which magnets are energized at the will of the motorman to complete the circuit through the switch throwing magnets when desired. Fig. 7— is another modification illustrating my improved construction as connected to the underground trolley circuit. Fig. 8— is an enlarged view showing a sectional view of the main solenoid with the core withdrawn and the whole in its normal or inoperative position ready to be energized to throw the switch to the right. Fig. 9— illustrates the magnet casing with the core raised and the whole swung over to the left in position to throw the switch to the right. Fig. 10— is a plan view showing the relative position of the solenoid casing connected with the rail. Fig. 11— is a section on line 11—11 of Fig. 10 showing the manner of hanging the solenoid casing on its trunnions.

Referring to the drawings, 1 designates an electric car and 2 the hand operated electric switch or circuit maker and breaker mounted thereon in such location that the handle 3 may be readily positioned by the motorman to complete the circuit for the purpose of throwing the switch tongue when he sees upon approaching the same that said switch is not in the required position.

The trolley pole 4 is mounted in the usual way, being held up in contact with the trolley wire 5 by the usual tension spring 6. I have, however, mounted on the base of

this trolley pole an insulated disk 7 to rotate with the same on the center trunnion 7′, on the underside of this disk is mounted two spaced apart concentric rings 8 and 9 respectively, see Fig. 5, to which are connected the binding posts 10 and 11 respectively. Spring pressed contact pins 12 and 13 are held in the plate 14 to respectively engage these rings 8 and 9. These pins are preferably mounted in pockets of conducting material and are electrically connected to the binding posts 15 and 16 respectively. Connection is made, as will be seen, by the wiring diagram, through the wires 17 and 18 from one side 19 of the circuit breaker through the trolley pole 4 to the insulated plate 20 on the outside of the forked trolley arm, thence through the spring contact 21, which latter is connected to the insulated member 21′ supported on the trolley wire 5, as illustrated in Fig. 3, thence through wire 22 to the solenoid 23, which in turn operates to throw the switch tongue 24, mounted on the rail 25, to its opposite position. A feature of my improved construction is that this solenoid 23 having a shell 23′ is mounted on trunnions 26 in the casing 26′. The core 27 is flattened at 27′ and rounded at its upper end 28 for better engaging the switch throwing dog 29. This dog is pivotally mounted at 30, its lower end 30′ being tapered to a wedge shape, the body being provided with outwardly and downwardly curved arms 31 on either side being recessed at 32 on their underside for the reception of the upper end 28 of the solenoid core when the same is raised. The upper portion of this dog is slotted at 33 for the purpose of engaging the downwardly turned end 34 of the bar 35, the opposite end of said bar being drilled or cored at 36 to receive the head of the pin 37 in the switch tongue 24.

When two railway switch tongues are located in close proximity to each other requiring a separate electro-magnet for operating each, the motorman after moving the circuit breaker handle to the right to throw the first switch, as above described, then moves it to the left to throw the second switch, in which case the second movement completes a circuit through the contact point 19′, wire 38 and 38′ to the contact plate 39′, see Fig. 3, thence through the spring contact finger 40, wire 41, down to a similar railway tongue operating electro-magnet not shown, thereby throwing the second switch to its reverse position.

Instead of using the spring contact fingers 21 and 40, as illustrated in Fig. 3, for completing a shunt circuit, it is sometimes found advisable to locate a pair of auxiliary solenoids 42 42′ in the upper end of the trolley pole 43, as illustrated in Fig. 6, each solenoid being provided with a contact core 44 44′ respectively. The circuit maker 45 controlled by the motorman is shown as positioned to complete the first circuit and energize one of the pair of trolley pole magnets 42 and cause core 44 to engage the auxiliary wire or member 46, thereby completing the second circuit through wire 47 causing the main solenoid 48 to throw the switch 49 in the direction desired. By moving the circuit breaker 45 to its opposite position solenoid 42′ may be energized and caused to complete its circuit to energize the second switch tongue operating magnet 48′ in the same manner as described above, the wiring and mechanism in this view being illustrated diagrammatically.

Fig. 7— illustrates my improved electric railway switch operating mechanism as applied to an underground system in which the wires are placed in a conduit. In this case the member 50 performs the same function as the trolley pole, the circuit being completed by the breaker 51 by the motorman through the wire 52, plate 53, spring contact finger 54 out through wire 55 to the solenoid 56 for operating the switch tongue 57, which wiring is shown diagrammatically. When the circuit breaker is thrown to the opposite side the connection is made through wire 52′, plate 53′, spring contact fingers 54′ out through wire 55′ to the solenoid 56′ for operating the switch tongue 57′.

The operation of my improved device may be more fully described as follows: As the car approaches the switch and the motorman observes that it is set in the wrong position he simply operates the handle 3 of the circuit breaker pressing it to one side into connection with the contact point 19. The trolley then passes between the spring contact fingers 21 and 40 and the current from the trolley wire 5, which enters the car in the usual way, passes through wire 17, resistance 58, wire 18 and 18′ through contact finger 21 and wire 22 to the solenoid 23, which being immediately energized the core rises striking the inclined surface of the downwardly extending point 30′ causing the solenoid to tip slightly on its trunnions and allow the core to pass upwardly along the side of said member until it brings up in the recessed portion 32, as illustrated in Fig. 9. Here the action of the plunger forces the dog to turn on its pivot 30 throwing said dog into its opposite or dotted position and at the same time pressing the switch tongue 24, through its connection 35, to its opposite position in the rail 25. The spring contact finger 21 is of a length to prolong the period of contact sufficiently to insure a positive operation of the solenoid to throw the switch tongue, after which the trolley in moving forward

passes out of contact with said finger, breaking the connection and deënergizing magnet 23, thereby allowing the core 27 to return automatically by gravity to its normal or inoperative position, as illustrated in Fig. 8, also upon being released by the motorman the circuit making handle 3 is returned to its open or normal position. The dog having been thrown to its opposite or dotted position is now ready, when the solenoid is again energized by again throwing the handle to the same position, to be engaged on its opposite side to throw the switch back to its first position, and so on each time the solenoid is operated it will throw the switch to first one side and then the other. Should a second switch located close to the first switch also require operating, the motorman throws the handle to the opposite side into engagement with point 19′, thereby completing the circuit to energize another magnet to throw the second switch, not shown. When the switches are set in their proper positions it is unnecessary for the motorman to operate his circuit closer and the car proceeds without completing the circuit or disturbing the switches.

A feature of this construction is that the solenoid being hung on trunnions in the casing 26′ may be readily removed for inspection and repairs or replaced by a new one when necessary.

Another feature of this construction is that when the solenoid is deënergized it returns to its inactive position, thus entirely releasing the switch tongue to be operated by hand if so desired.

By arranging this switch throwing mechanism to be operated on a shunt circuit and the same to be controlled at the will of the motorman, renders this system very simple, practical and effective.

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

1. In a railway switch operating mechanism, a solenoid magnet pivotally hung, means for engaging and acting upon the magnet core as the same moves outward from its shell to deflect its path of movement and throw the switch alternately in opposite directions each time the magnet is energized, and means whereby said magnet may be energized by a passing car.

2. In a railway switch operating mechanism a solenoid magnet pivotally hung, a pivotally mounted wedge shaped dog arranged to engage and act upon the magnet core to deflect its path of movement and throw the switch alternately in opposite directions each time the magnet is energized, and means on the car positioned at will for controlling the action of said electro-magnet.

3. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and the magnet shell being free to return by gravity to their normal position after action, means for directing the next action of the core to throw the switch in the opposite direction, and means whereby said magnet may be energized by a passing car.

4. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and the magnet shell being free to return by gravity to their normal position after action, means for directing the next action of the core to throw the switch in the opposite direction, and means on the car positioned at will for controlling the action of said electro-magnet.

5. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and the magnet shell being free to return by gravity to their normal position after action, an oscillatory member arranged to engage and direct the next action of the magnet core whereby the switch is thrown in the opposite direction, and means in each passing car for controlling the current to said magnet.

6. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and the magnet shell being free to return by gravity to their normal position after action, and a pivotally mounted wedge-shaped dog arranged to engage and act upon the core to deflect its path of movement whereby the next action of said core throws the switch in the opposite direction.

7. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and magnet shell being free to return by gravity to their normal position after action, and means for directing the next action of the core to throw the switch in the opposite direction, a contact member supported by and insulated from the trolley wire, a contact plate supported on and insulated from the trolley pole, the same being adapted to come in contact with said member as the car approaches a switch tongue, and means on the car operated at will for controlling the shunted current through said member and plate to said magnet.

8. In a railway switch operating mechanism, a solenoid magnet pivotally hung, said solenoid core and the magnet shell being free to return by gravity to their normal position after action, and a pivotally mounted wedge-shaped dog arranged to engage and act upon the core to deflect its path of movement whereby the next action of said core throws the switch in the opposite direction, a contact member supported by and insulated from the trolley wire, a contact plate

supported on and insulated from the trolley pole, the same being adapted to come in contact with said member as the car approaches a switch tongue, and means on the car operated at will for controlling the shunted current through said member and plate to said magnet.

In testimony whereof I affix my signature in presence of two witnesses.

HERMAN I. BLATTLE.

Witnesses:
HOWARD E. BARLOW,
E. I. OGDEN.