

R. B. BRYANT.
RAILWAY ELECTRIC SWITCH.
APPLICATION FILED FEB. 11, 1908.

943,809.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 1.

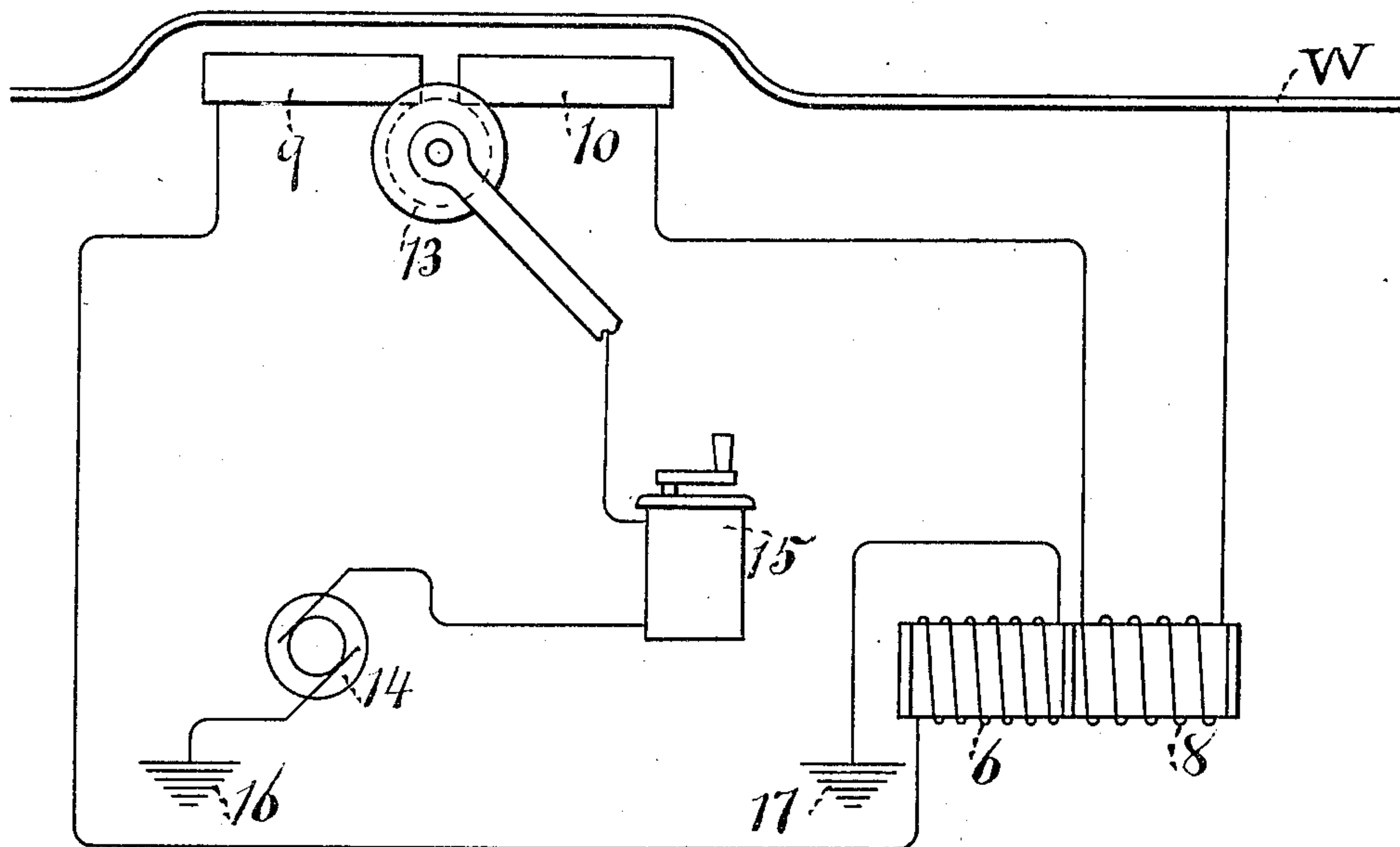


Fig. 1

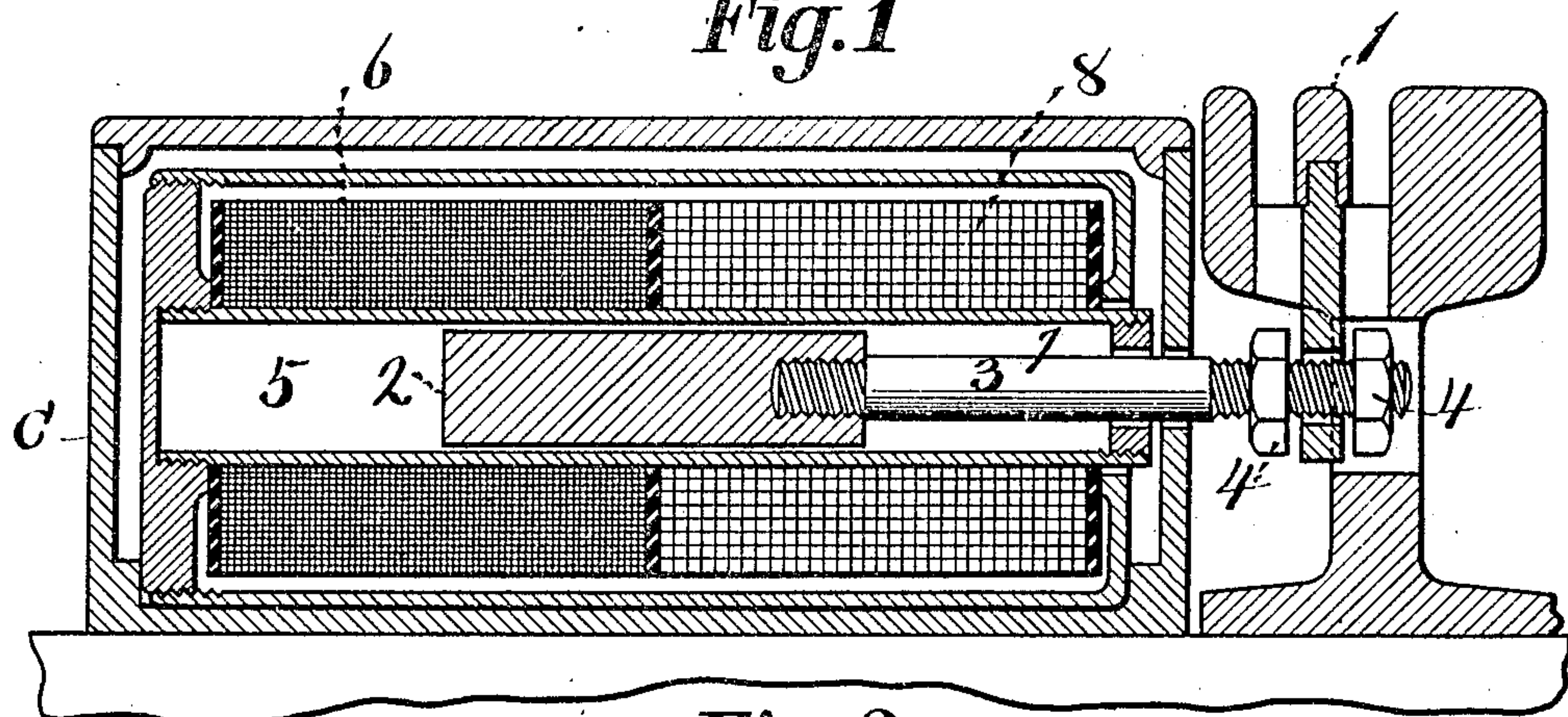


Fig. 2

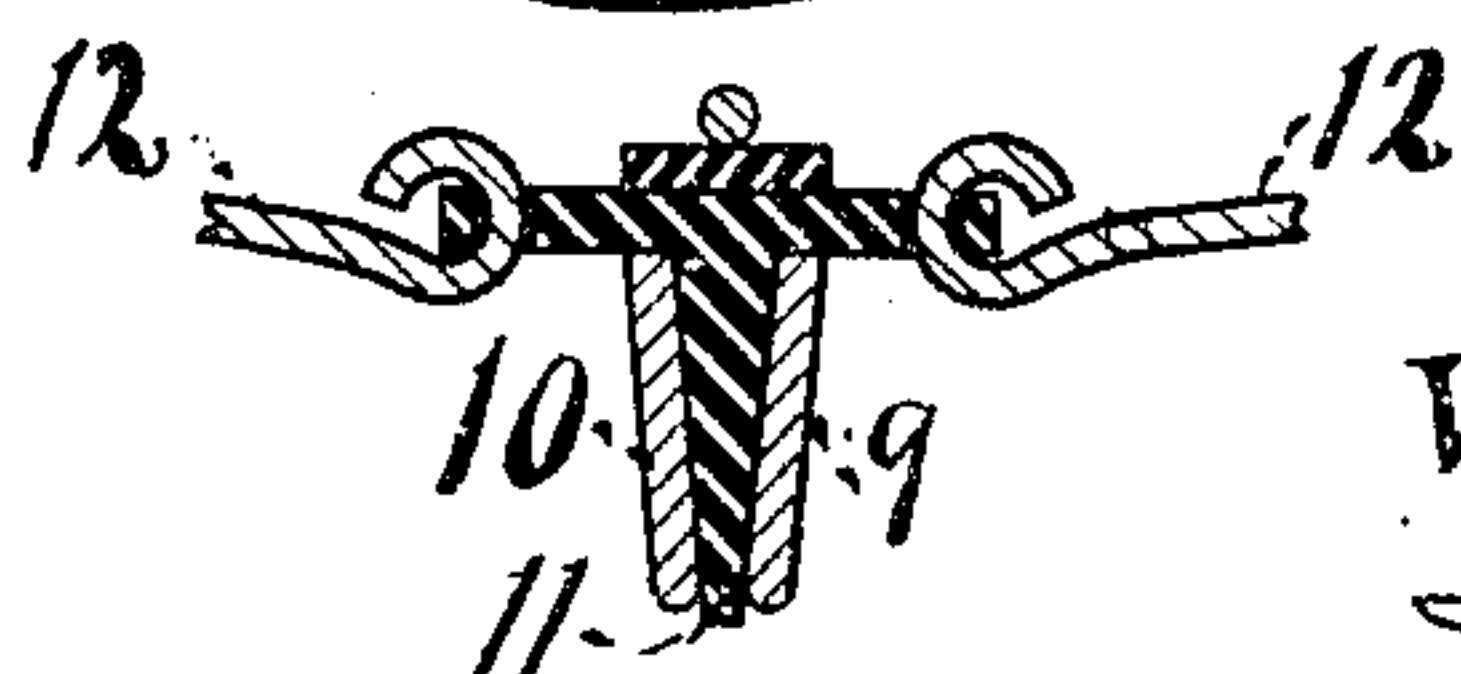


Fig. 4

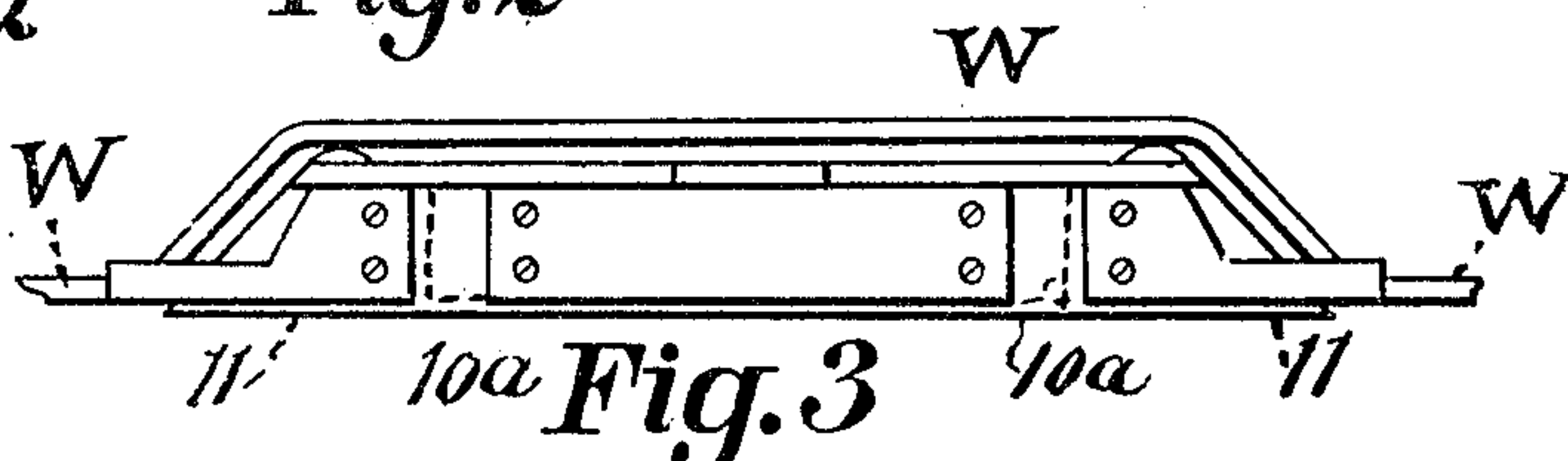


Fig. 3

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2 SHEETS—SHEET 2.

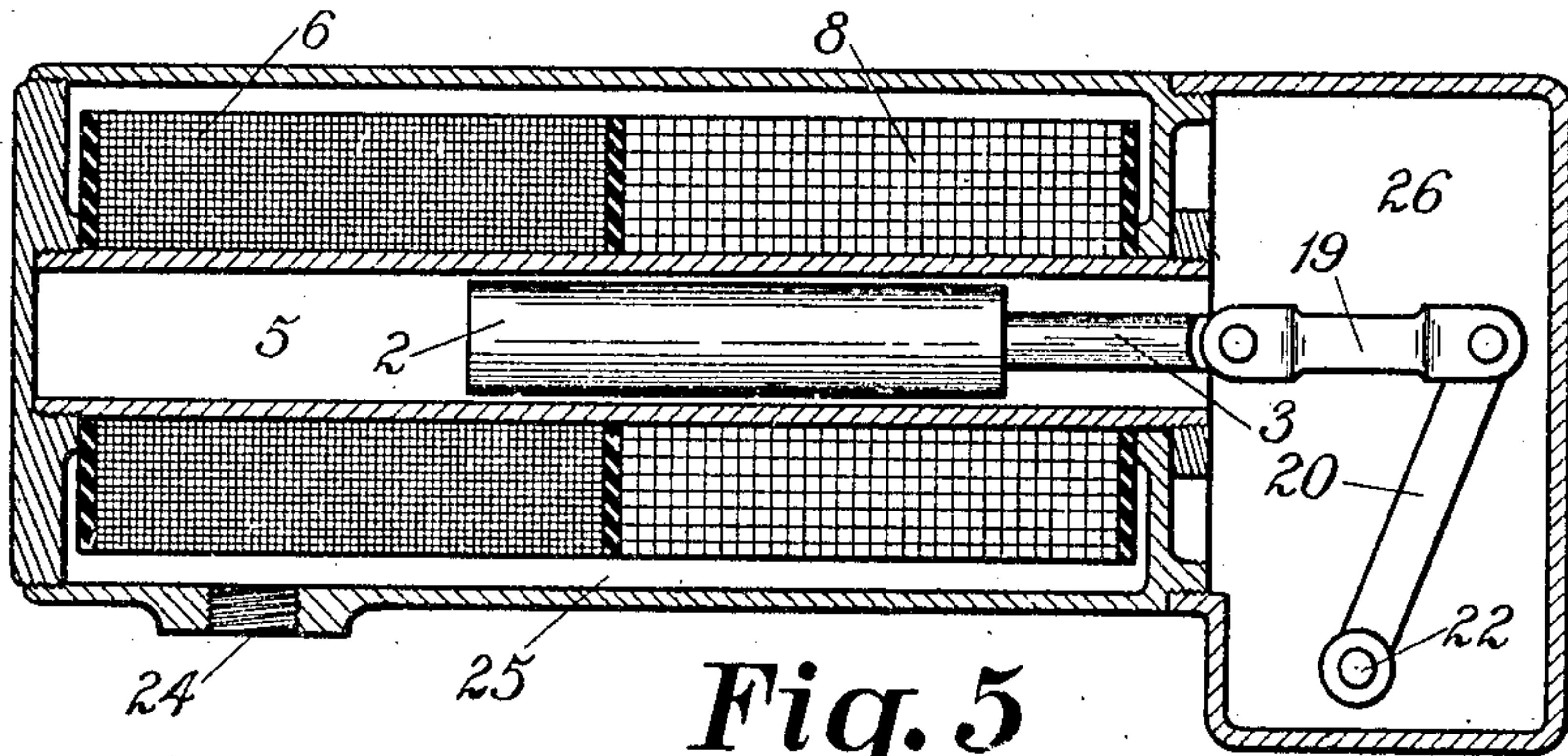


Fig. 5

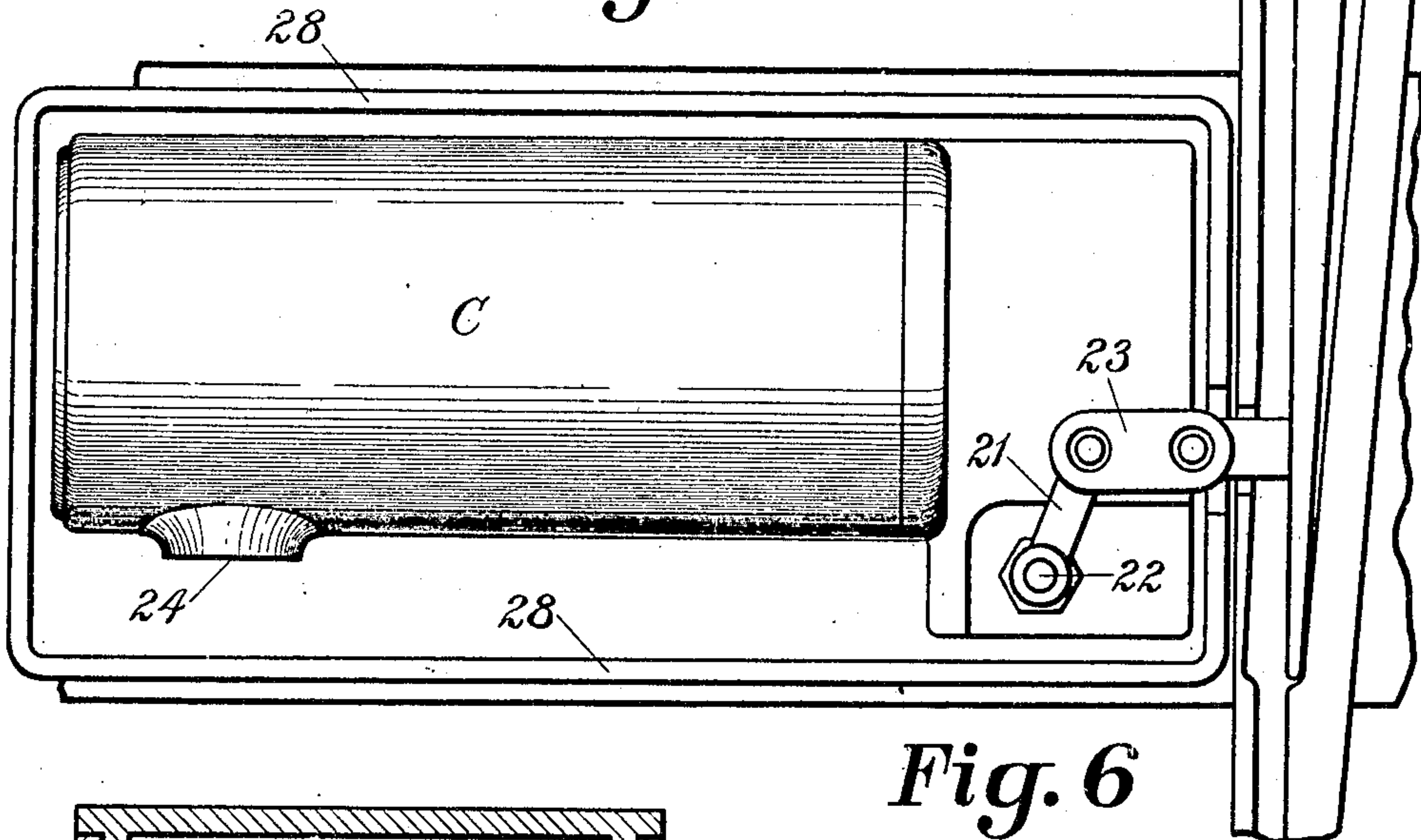


Fig. 6

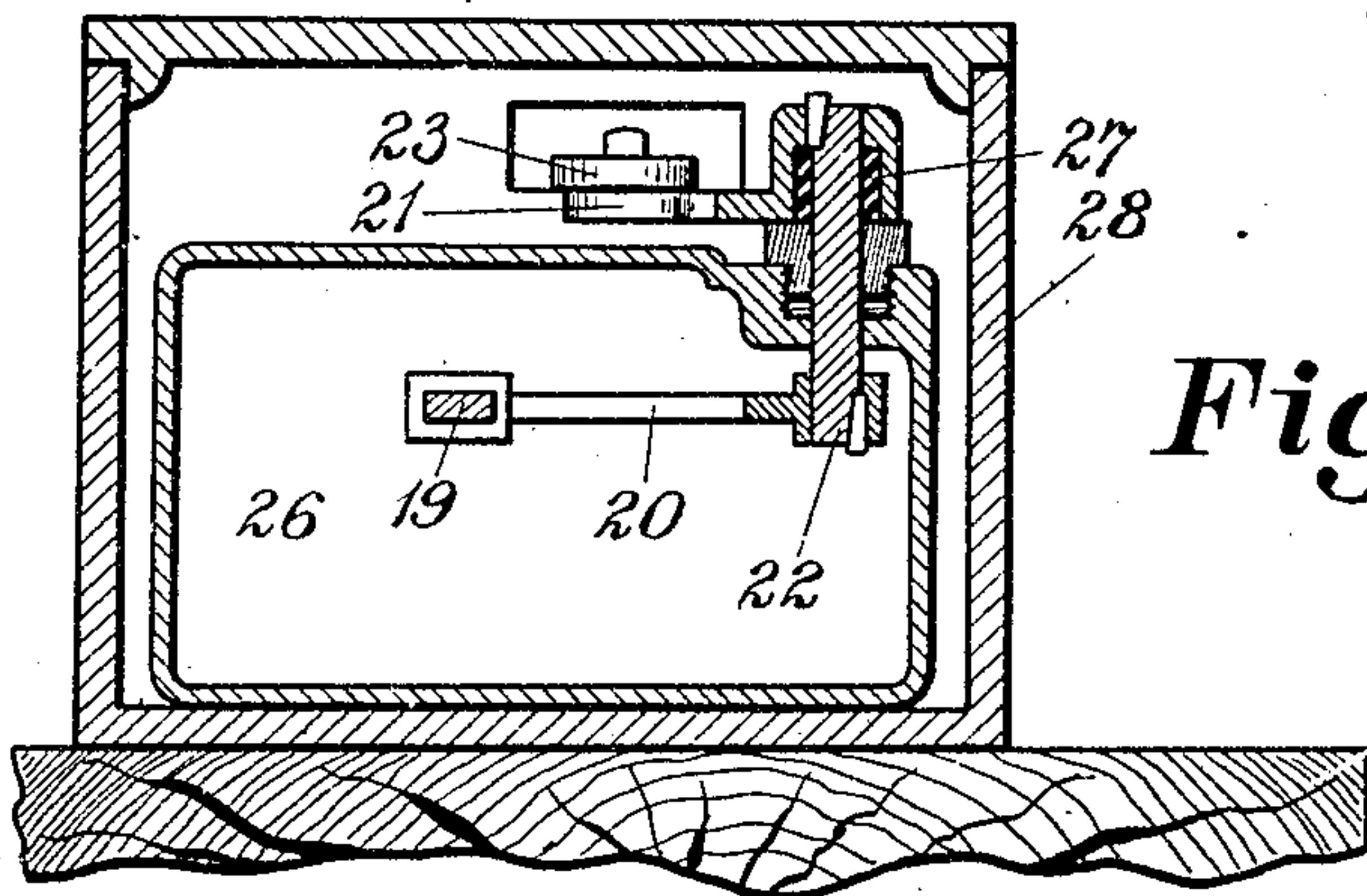


Fig. 7

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ROY B. BRYANT, OF NASHVILLE, ARKANSAS.

RAILWAY ELECTRIC SWITCH.

943,809.

Specification of Letters Patent.

Patented Dec. 21, 1909.

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To all whom it may concern:

Be it known that I, ROY B. BRYANT, a citizen of the United States of America, and resident of Nashville, in the county of Howard and State of Arkansas, have invented certain new and useful Improvements in Railway Electric Switches, of which the following is a specification.

My present invention relates to an electric device for enabling a motorman to open or close a railway switch, without leaving his car.

The special objects of the invention are to dispense with all relays, circuit changers, and other auxiliary apparatus usually employed in electric automatic railway switches of this class.

Without describing the various scopes of invention, which are attended to in the claims, the practical form of my conception comprises a railway switch, a solenoid plunger for operating said switch, a low resistance solenoid for operating the plunger in one direction; a high resistance solenoid for operating the plunger in the opposite direction; a trolley wheel, contacts for being electrically connected by said wheel; a car motor and motorman's electric controller in series circuit between the ground and said trolley wheel; a trolley wire, the low resistance solenoid being connected between said trolley wire and one of said contacts, and the high resistance solenoid being connected between the ground and the other contact.

Figure 1 is a mere diagram of the circuits with a conventional representation of parts of the electrical apparatus included. The contacts which are to be electrically connected by the trolley wheel are represented as relatively displaced, as it is only desired, in this figure to indicate in what manner the wheel may act as a circuit closer. Fig. 2 is a vertical section of the railway switch and the solenoid and plunger for operating the same. Fig. 3 is a side elevation of the trolley pan to indicate the true relative positions of the contacts named above. Fig. 4 is a cross section of Fig. 3 with tie wires added. Figs. 5, 6 and 7, are views of a modification.

The swinging railway switch is shown at I. A solenoid core or plunger 2, is connected to said switch by a rod 3, and adjusting nuts 4. The plunger 2 is common to two solenoids, the high resistance one 5, being wound with many coils 6, and the other low resistance one 7, being wound with

fewer coils 8. A protecting casing C is provided for the solenoids.

At the trolley pan are the trolley wire W and contacts 9 and 10 attached to opposite sides of the insulating support 11, which may be steadied by the wires 12. Both contacts 9 and 10 are in the path of the trolley wheel 13, which may therefore act as a circuit closer to the contacts 9 and 10.

The car motor 14 and motorman's electric controller 15, are represented as connected in series circuit between the ground 16 and the trolley wheel 13.

The coils 6 are in circuit between the ground 17 and the contact 9. The coil 8 is in circuit between the trolley wire W and the contact 10.

The *modus operandi* is as follows: As the coil 6 should be wound with very small wire, conveniently, No. 22, to 24, it has sufficient resistance to obtain the desired current from the line. It operates on about one ampere, in practice, usually. As the coil 8 is of comparatively low resistance, say constructed of No. 12 or 10, it operates on about 15 or 20 amperes. The current that passes through the coil 6, is much limited by the high resistance thereof, while the current that passes through the coil 8, is limited only by the amount of current that the car takes. It is evident therefore that the coil 8 can predominate over the coil 6, if the car is taking sufficient current. The strip 10 coming into contact with the trolley wheel first, gives the coil 8, a chance to operate before the coil 6 is energized; so that in case the car motor is taking current, the switch is actually thrown before the coil 6 has a chance to interfere. After the switch is thrown, the coil 8 prevents the coil 6 from drawing the plunger 2 back. The action enables the switch to operate on 12 or 15 amperes, or one or two points on the controller 15. If the strips 9 and 10 were of the same length, the coil 8 would simply have to overcome the coil 6, which of course would require more current.

Of course, the coil 8 is always energized when the trolley wheel is under the pan, but not enough to effect the switch, unless the motor is taking current, as it is evident that the coil 8 is but slightly affected by the current that operates the coil 6.

My invention may be modified without departing from the spirit thereof; thus the contact 10, connected to the coil 8 may be

longer than the contact 9, as indicated in Fig. 3 at 10^a. Therefore, if the motor 14 is taking current, the coil 8 will act before the coil 6 is magnetized.

5 My invention may be modified without departing from the spirit thereof. I will set forth how the means for connecting the plunger to the railway switch may be altered for the better, as the working parts are all inclosed water tight, and thus freezing of the
10 parts to ice prevented. In Figs. 5, 6, and 7, the stem 3 of the plunger 2 is connected to a link, which in turn is pivoted to a crank arm 20, radiating from an arbor, which
15 arbor carries another crank arm 21, the arbor being numbered 22. Finally the crank 21 is connected to the railway switch 1 by a link 23. By taking off this link at any time, the whole mechanism may be removed from the
20 switch 1.

The casing C containing the solenoids 6 and 8, are in a water tight box 28 which is in two divisions, one of which contains the solenoids 6 and 8, and the other the various
25 parts as already numbered 19, 20, 22. The wires for the solenoids may be led in through a hole 24 to the solenoids, in a water-tight manner. The two divisions named above are numbered 25 and 26. Packing 27 around the arbor 22 seals the
30 division 26 from the outside.

I claim as my invention:—

1. The combination of a railway switch, electro magnetic means, a first coil of said
35 means for operating the switch in one direction; a second coil of said means for operating said switch in the opposite direction, the first coil being of few turns, and the second coil being of more turns, and the first coil
40 being in circuit with the car motor, and the second coil being in circuit with the first coil, a trolley wire and a trolley wheel and motorman's controller for opening and closing said circuits between the ground and said
45 trolley wire, and through said coils.

2. The combination of a railway switch, a trolley wheel, a motorman's controller and two coils, whose energizing currents are applied differentially to said solenoids by the
50 action of said controller and trolley wheel, said coils being in series circuit with each other, and a device for permitting a current to pass through one coil before the other.

3. The combination of a railway switch, a link 23 connected thereto, a solenoid plunger 2, a stem 3 for the plunger, an arbor 22, two cranks 20 and 21 for said arbor, a link 19 joining said stem 3 to the crank 20, and the other crank 21 being connected to
60 the link 23, and a water tight box, having two divisions, one of which contains the plunger, and the other, the link 19, crank 20, and part of the stem 22; and solenoids 6 and 8, in the watertight box for actuating
65 said plunger 2.

4. In an electric switch, the combination of a magnet for throwing the switch tongue in one direction, a magnet for throwing the switch tongue in the opposite direction, one of the magnets being adapted to develop a
70 stronger field than the other, and means to reduce the current in the said one of the magnets relatively to the other.

5. In an electric switch, the combination of a magnet for throwing the switch tongue
75 in one direction, a magnet for throwing the switch tongue in the opposite direction arranged in series with the first named magnet and adapted to develop a stronger field than the first named magnet with the same
80 amount of current, and connections whereby the current through the second named magnet may be relatively decreased.

6. In an electric switch, the combination of a magnet for throwing the switch tongue
85 in one direction, a magnet for throwing the switch tongue in the opposite direction arranged in series with the first named magnet and adapted to develop a stronger field than the first named magnet with the same
90 amount of current, and a circuit arranged in parallel with the second named magnet whereby the current through the second named magnet may be relatively decreased.

7. The combination with electrically operated mechanism, of an electric switch having two magnets arranged in series relation with each other, one of the magnets being adapted to develop a stronger field than the other and to be placed in parallel with said
100 mechanism.

8. The combination with electrically operated mechanism, and a circuit controller, of an electric switch having two magnets arranged in series relation with each other,
105 one of the magnets being adapted to develop a stronger field than the other, and said circuit controller being adapted to place said electrically operated mechanism and said one of the magnets in parallel. 110

9. The combination with electrically operated mechanism having a terminal member to receive the power, and a circuit controller having two contact members which said terminal member is adapted to bridge,
115 of an electric switch having two magnets one of which is adapted to develop a stronger field than the other, said magnets being arranged in series relation with each other and with said two contact members, 120 and the said one of the two magnets being in parallel with the electrically operated mechanism when the contact members are bridged by the terminal member and power is delivered to the electrically operated
125 mechanism.

10. The combination with electrically operated mechanism having a terminal member to receive the power, and a circuit controller having two contact members which said ter-
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minal member is adapted to bridge, of an electric switch having two magnets one of which is adapted to develop a stronger field than the other, a connection from a source of electric power to the other of the magnets, a connection from said other magnet to one of the contact members, a connection from the other contact member to said one of the magnets and a return connection from said one of the magnets back to the source of power.

11. In an electric switch, the combination

of a magnet for throwing the switch tongue in one direction, a magnet having a finer winding for throwing the switch tongue in the opposite direction, and means to reduce the current in the magnet having the finer winding, relatively to that in the other magnet.

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Witnesses:

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