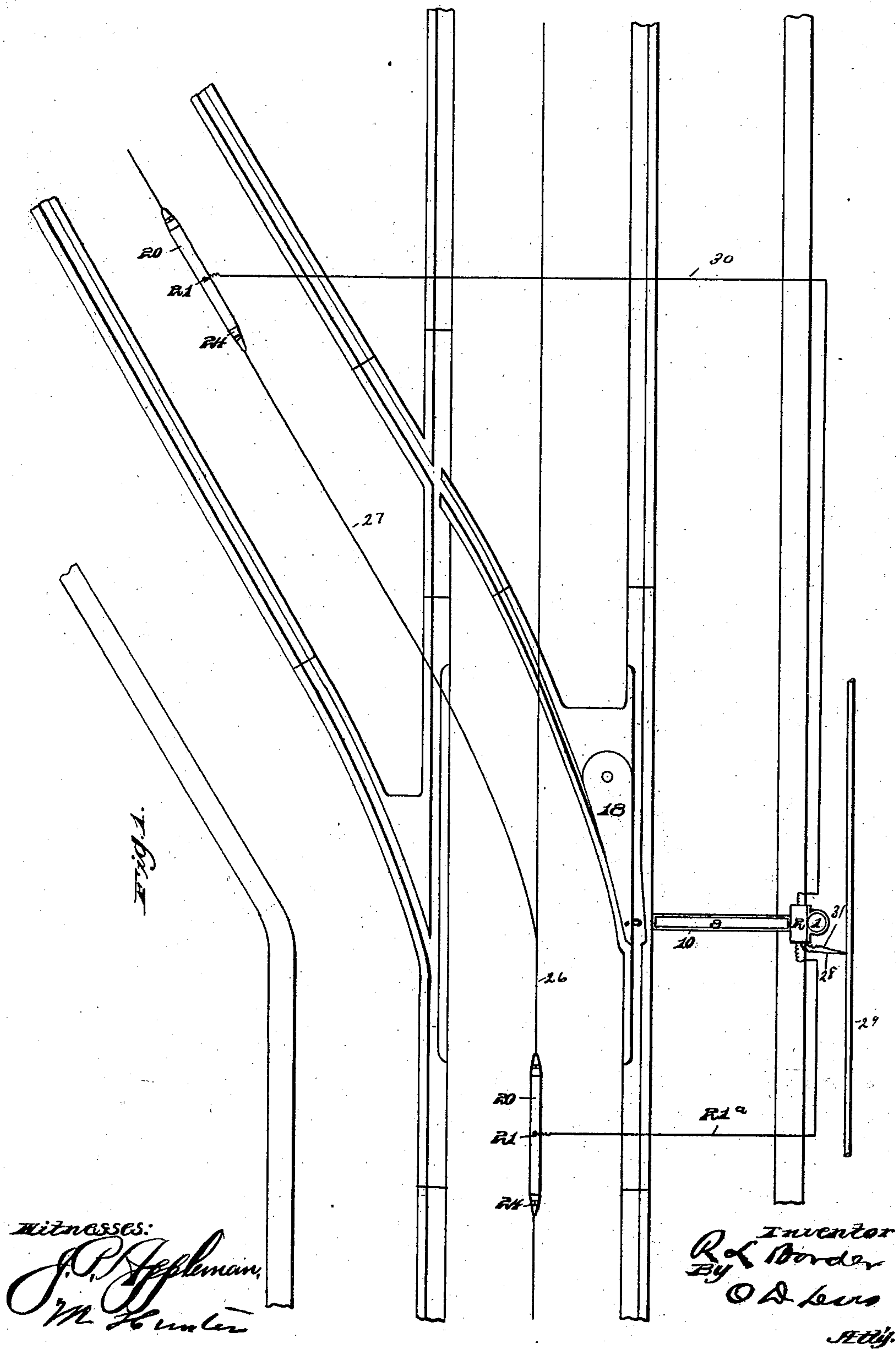


R. L. BORDER.
ELECTRICAL SWITCH.

(Application filed July 15, 1901.)

(No Model.)

4 Sheets—Sheet 1.



No. 695,440.

Patented Mar. 18, 1902.

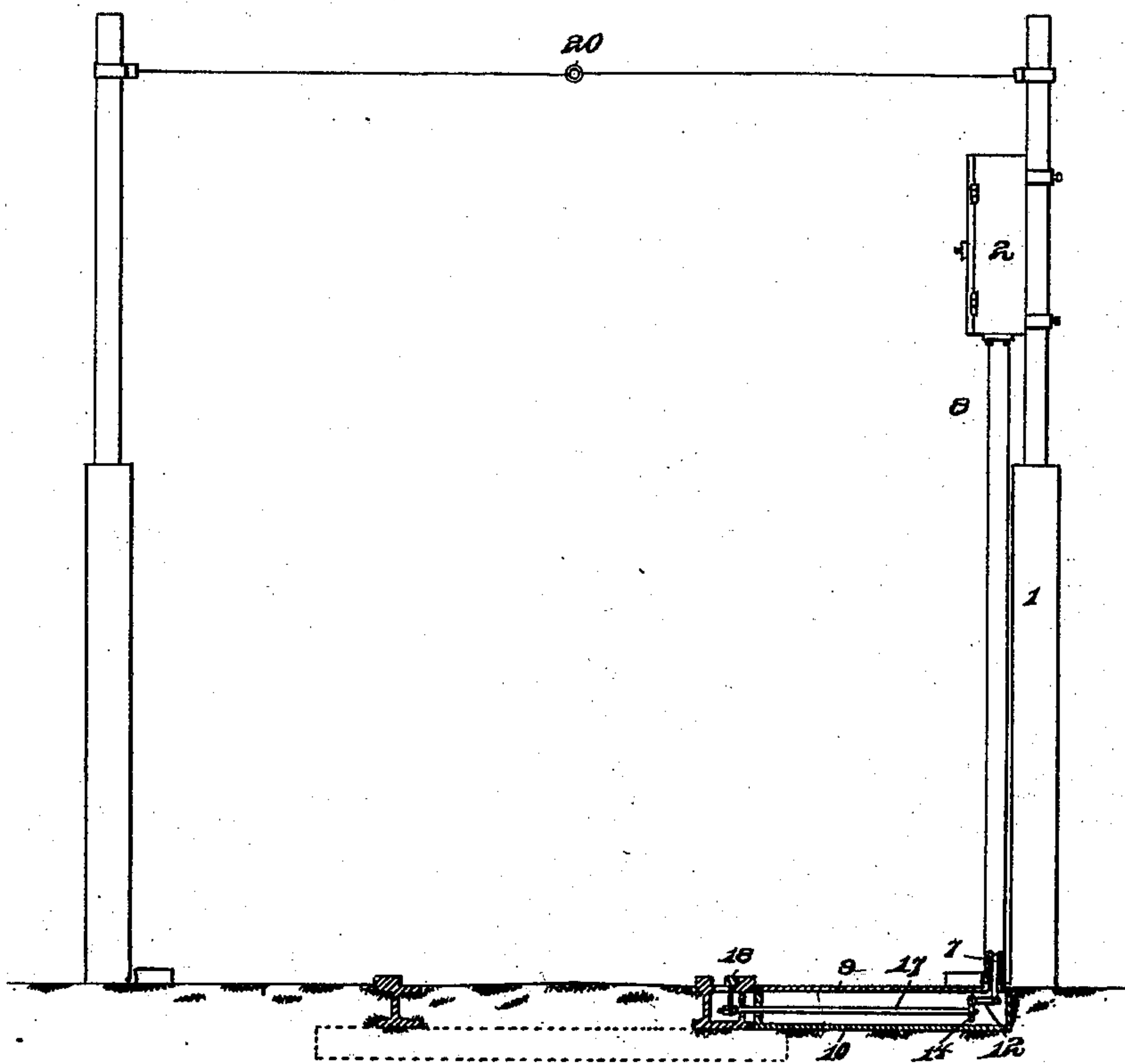
R. L. BORDER.
ELECTRICAL SWITCH.

(Application filed July 15, 1901.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 2.



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Patented Mar. 18, 1902.

R. L. BORDER.
ELECTRICAL SWITCH.

(Application filed July 15, 1901.)

(No Model.)

4 Sheets—Sheet 3.

Fig. 5.

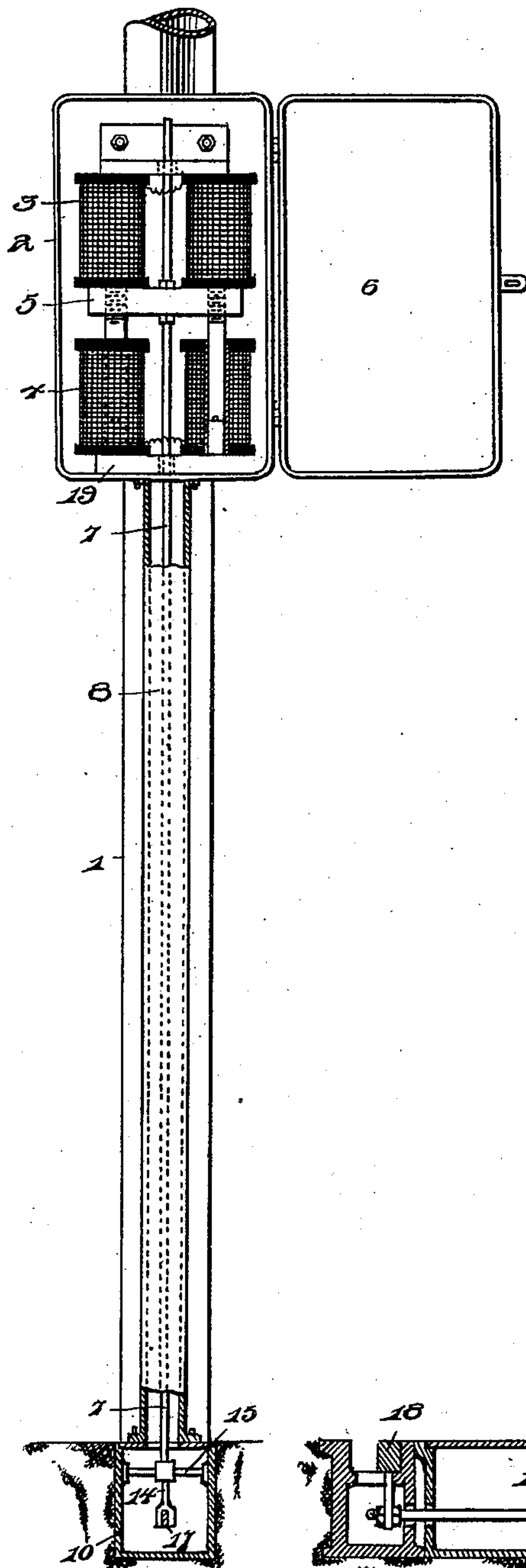
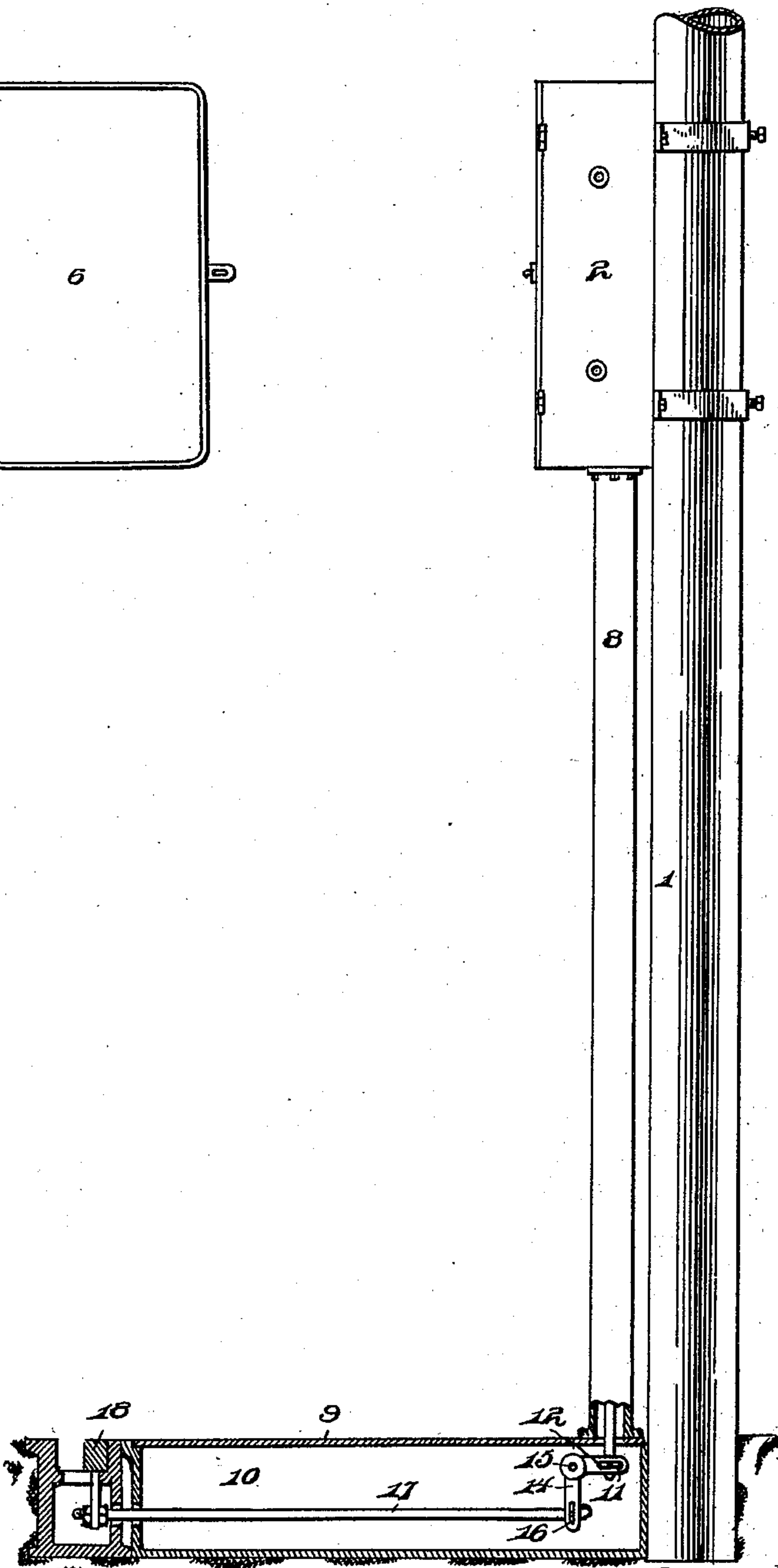


Fig. 4.



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R. L. BORDER.
ELECTRICAL SWITCH.

(Application filed July 15, 1901.)

(No Model.)

4 Sheets—Sheet 4.

Fig. 5.

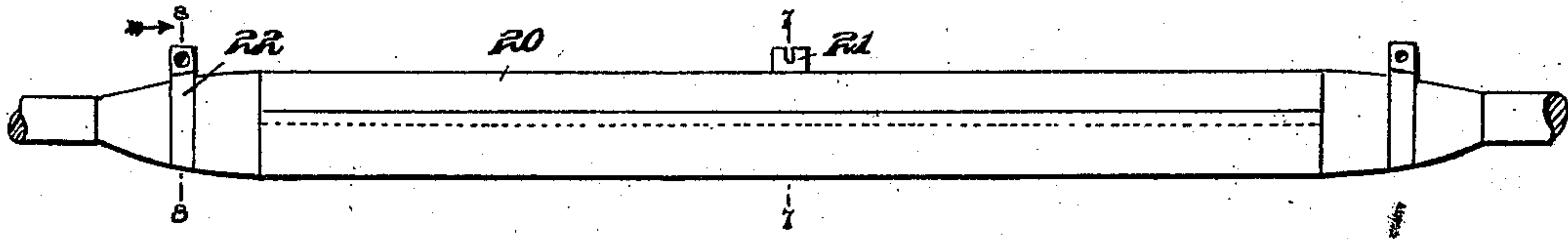


Fig. 6.



Fig. 7.

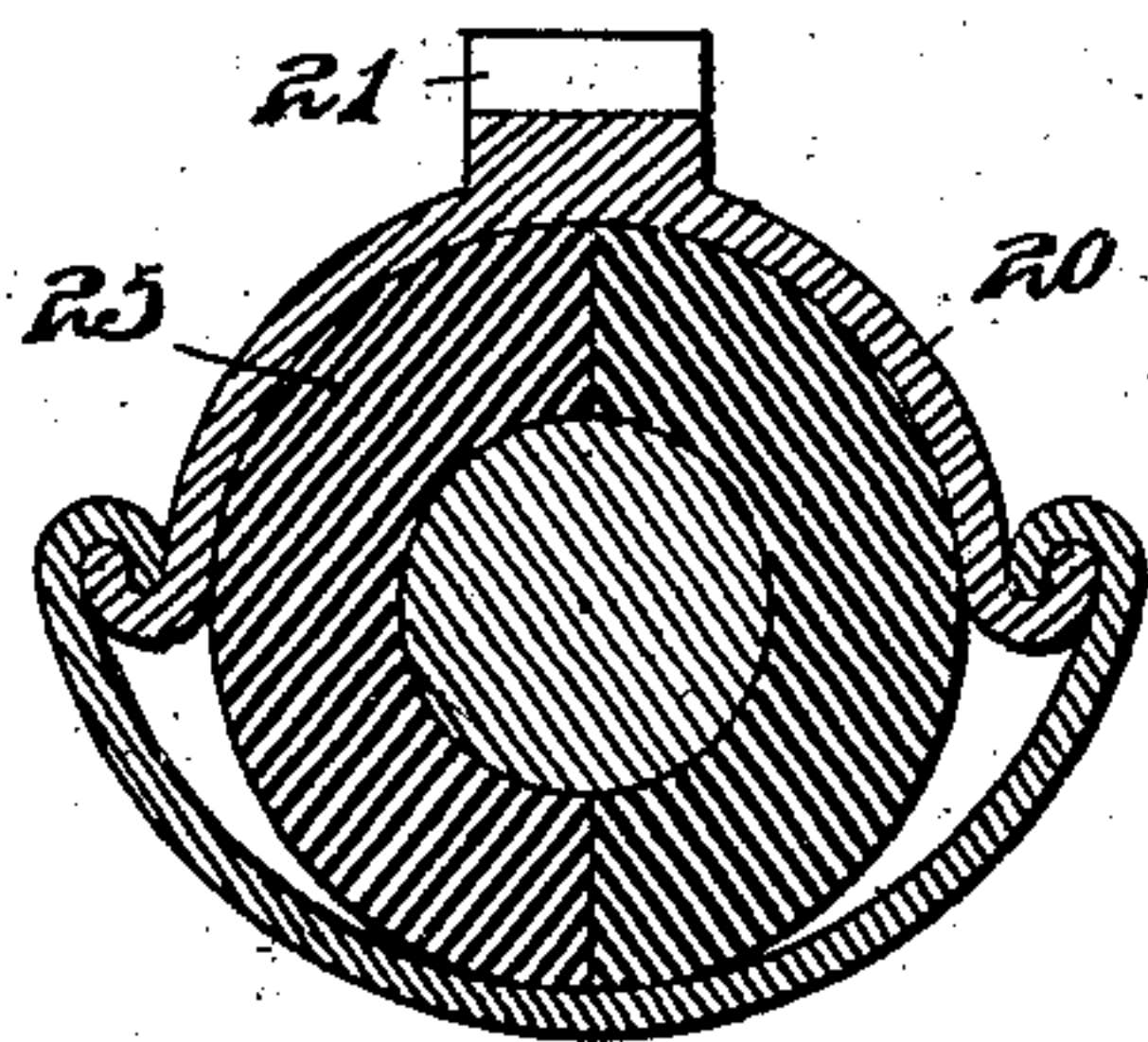


Fig. 8.

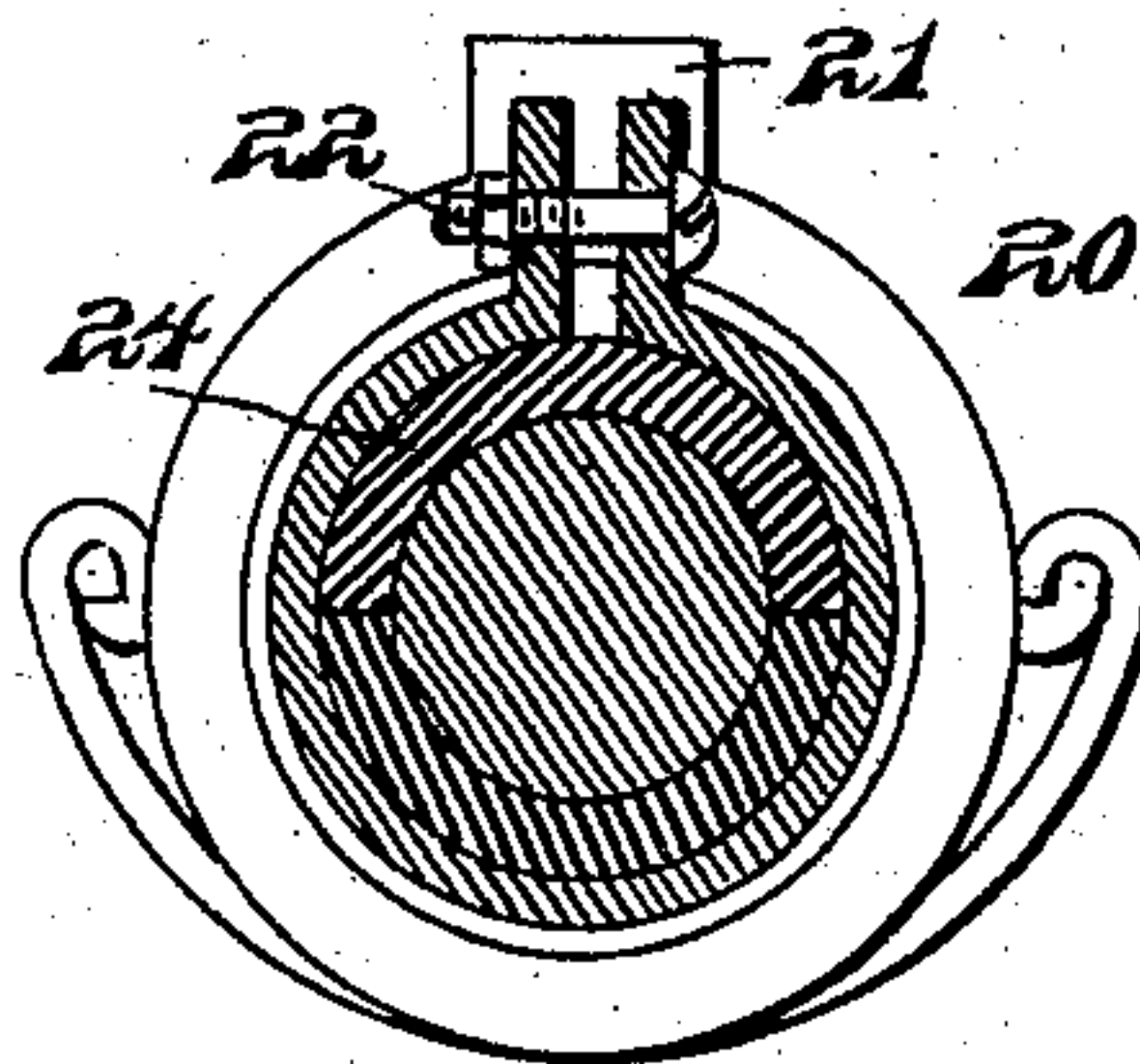


Fig. 9.

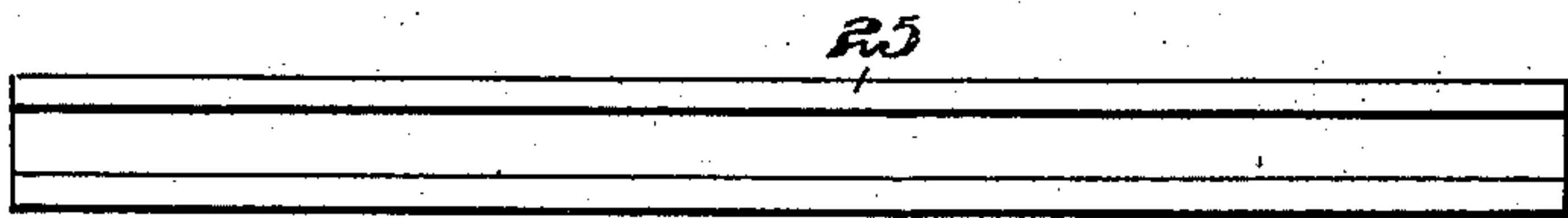


Fig. 10.



Fig. 11.

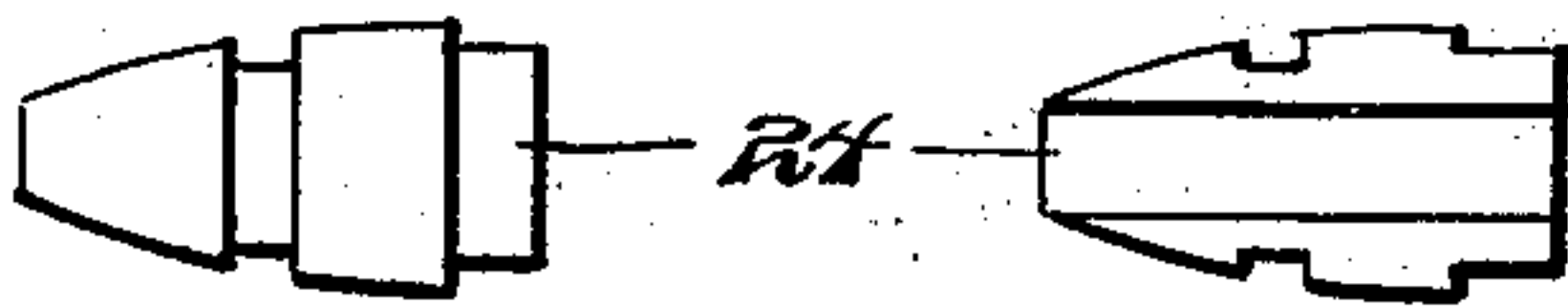


Fig. 12.



Fig. 13.

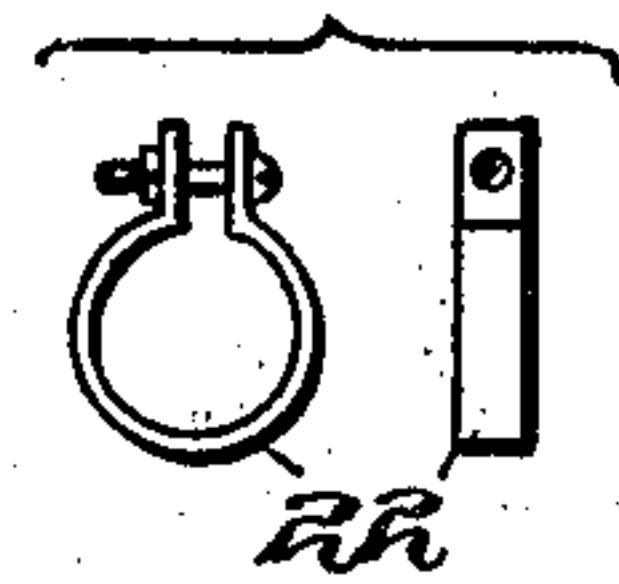
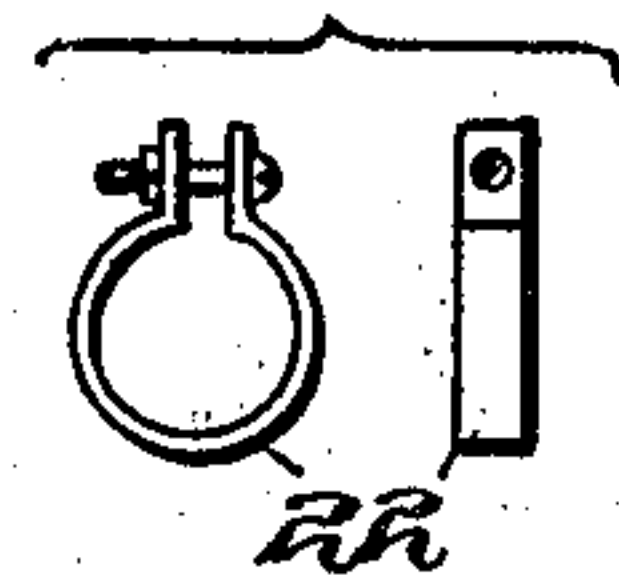


Fig. 14.



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UNITED STATES PATENT OFFICE.

RUPERT L. BORDER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILBUR H. TUDOR, OF PITTSBURG, PENNSYLVANIA.

ELECTRICAL SWITCH.

SPECIFICATION forming part of Letters Patent No. 695,440, dated March 18, 1902.

Application filed July 15, 1901. Serial No. 68,351. (No model.)

To all whom it may concern:

Be it known that I, RUPERT L. BORDER, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Switches; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in electric switches, and has for its object to construct a switch particularly adapted for use in connection with electrically-operated street-railways, whereby the motorman may throw the switch-tongue to either side, as desired.

The present invention has for its object to provide means operated electrically and connected to the ordinary switch-tongue that will be under the control of the motorman of the car and one that will assure a free and easy operation of the switch-tongue to open and close the same as desired; furthermore, to provide means whereby a car will pass over the switch without operating the tongue in case the latter has been previously placed in proper position.

The invention is particularly adapted for use in connection with overhead-trolley systems, but is by no means limited to such use, as the same may readily be adapted to underground or conduit systems of electrically-operated railways. However, in the present illustration of my invention I have shown the same in connection with the overhead system.

Briefly described, the invention consists of interposing in or connecting to the feed line or wire of each track a sleeve which is electrically connected to the electromagnets, supported upon a suitable base at the side of the track. These electromagnets have their solenoids or cores connected by a rod which extends through the support of the electromagnets and at its lower end is connected by a rod or lever to the switch-tongue, suitable mechanism connecting the two rods so that they will operate, the one vertically and the other horizontally, to effect a movement of the switch-tongue.

The invention has for its object to dispense with breakers that are usually employed in constructions of this character and provide therefor sleeves that form an independent switch-throwing circuit when the current is applied by the motorman; furthermore, with all the currents which are usually conducted over the feed-wires, trolley-wires, and complete their circuit through the rails. All of this construction, together with other details entering into my invention, will be hereinafter more fully described, and specifically pointed out in the claim, and in describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate corresponding parts throughout the several views, in which—

Figure 1 is a top plan view of a portion of the main and switch sections of a railway-track, showing the arrangement of my switch-operating device. Fig. 2 is a front elevation showing the arrangement of my mechanism above and below the surface of the street and also showing a transverse vertical sectional view of the railway-track at the junction of the switch-tongue. Fig. 3 is a front elevation of a part of the supporting-post for the electromagnets, showing these magnets in side elevation, the door of the casing being open and the track being in transverse vertical section. Fig. 4 is a side elevation of the supporting-post for the electromagnets, showing the case for containing these magnets and illustrating in vertical sectional view the casing and switch-tongue connected. Fig. 5 is a side elevation of the sleeve forming the independent switch-throwing circuit. Fig. 6 is a vertical sectional view thereof. Fig. 7 is a vertical sectional view taken on the line 7 7 of Fig. 5. Fig. 8 is a similar view taken on the line 8 8, Fig. 5, looking in the direction of the arrow. Fig. 9 is a longitudinal view of the insulating material, which is formed in two sections. Fig. 10 is an end view thereof. Fig. 11 is a side elevation of the cone end. Fig. 12 is a similar view as it appears on the other side. Fig. 13 is an end elevation thereof. Fig. 14 is a front and side elevation of the clamp.

Placed at the side of the track is a post or

support 1, which has secured thereto a suitable box or casing 2, in which the electromagnets 3 4 are suitably placed. These magnets are arranged within the box or casing 2, one above the other, and the armature 5 thereof is provided with double cores, the one set of cores projecting into the magnets 3 and the other set of cores projecting into the magnets 4. The armature 5 of these electromagnets has connected thereto a rod 7, which extends downwardly through the tube 8, placed adjacent to the post 1, said rod at its lower end extending downwardly through the lid 9 of a suitable box or casing 10, which is sunk in the road-bed of the track. Near its lower end the rod 7 carries a pin 11, which engages in the slot 12, provided therefor in one arm of the bell-crank 14. This bell-crank 14 is mounted upon a rod or shaft 15, which is journaled in the walls of the box or casing 10. The other arm of the bell-crank 14 is provided with a slot 16 to receive the pin carried on the end of the rod 17, the other end of which extends through the end of the box or casing and through the web of the rail and connected to the switch-tongue 18. The rod 7 is preferably passed through one or more bearings 19 within the box or casing 2 to guide this rod in its movement.

20 designates one of the contacts, located on the main line 26, and 20^x designates a second contact in the trolley-wire over the siding. Both contacts are suitably grounded through the rails. Contact 20 is electrically connected by wire 21⁹ with the electromagnet 3, Fig. 3, said magnet being connected, by means of wire 28, to the feed-wire 29. When car-trolley comes into touch with contact 20 on trolley-wire and the motorman wishes to move switch-tongue, he throws the lever which operates the car and makes connection complete between feed-wire and rail, thus inducing a current in magnet 3, which completes the operation. The completing of this circuit in no way affects the magnet 4, as the current is broken between contact 20^x and the rail. When the car has passed through the switch and continues around on the siding, the trolley-wheel comes in touch with contact 20^x.

The motorman again completes the circuit as before, but between rail and contact 20^x, through wire 30, electromagnet 4, and wire 31, Fig. 1, to feed-wire, thus completing the second operation. It is intended that the car that opens the switch will close it again, thus keeping the switch set for one track at all times. The contacts are supported by a sleeve, which may be suitably supported by clamps 22, to which suspension-wires may be attached. The said sleeve is formed of an outer sleeve of copper or other conducting material 23, the end pieces 24 and inner section 25 being made of mica or other insulating material.

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

A trolley-switch mechanism, comprising in combination with the main and branching trolley-lines and contacts in each, electromagnets, mounted one above the other, and casing supporting the same, electrical connections between said contacts and magnets, a boxing, on which said trolley-supporting casing rests, an armature working between said electromagnets, a rod connected to said armature, and guide-plates through which said rod works, a shaft 15 pivoted in the walls thereof, an angle-lever mounted on said shaft and having slotted arms, a pin carried by said rod and having a play in said slot, the rod 17 and pin at one end thereof, which pin works in a slot in the other arm of said angle-lever, the switch-point-supporting casing at the end of said box, registering apertures in the adjacent walls of said box and switch-point-supporting casing, through which apertures, the rod 17 is guided, the pivoted switch-point and connection between the same and said rod, all arranged substantially as shown and described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

RUPERT L. BORDER.

Witnesses:

JOHN GROETZINGER,
FRANK WALLACE.