

(No Model.)

R. R. ZELL.  
ELECTRIC RAILWAY CONDUIT.

No. 502,842.

Patented Aug. 8, 1893.

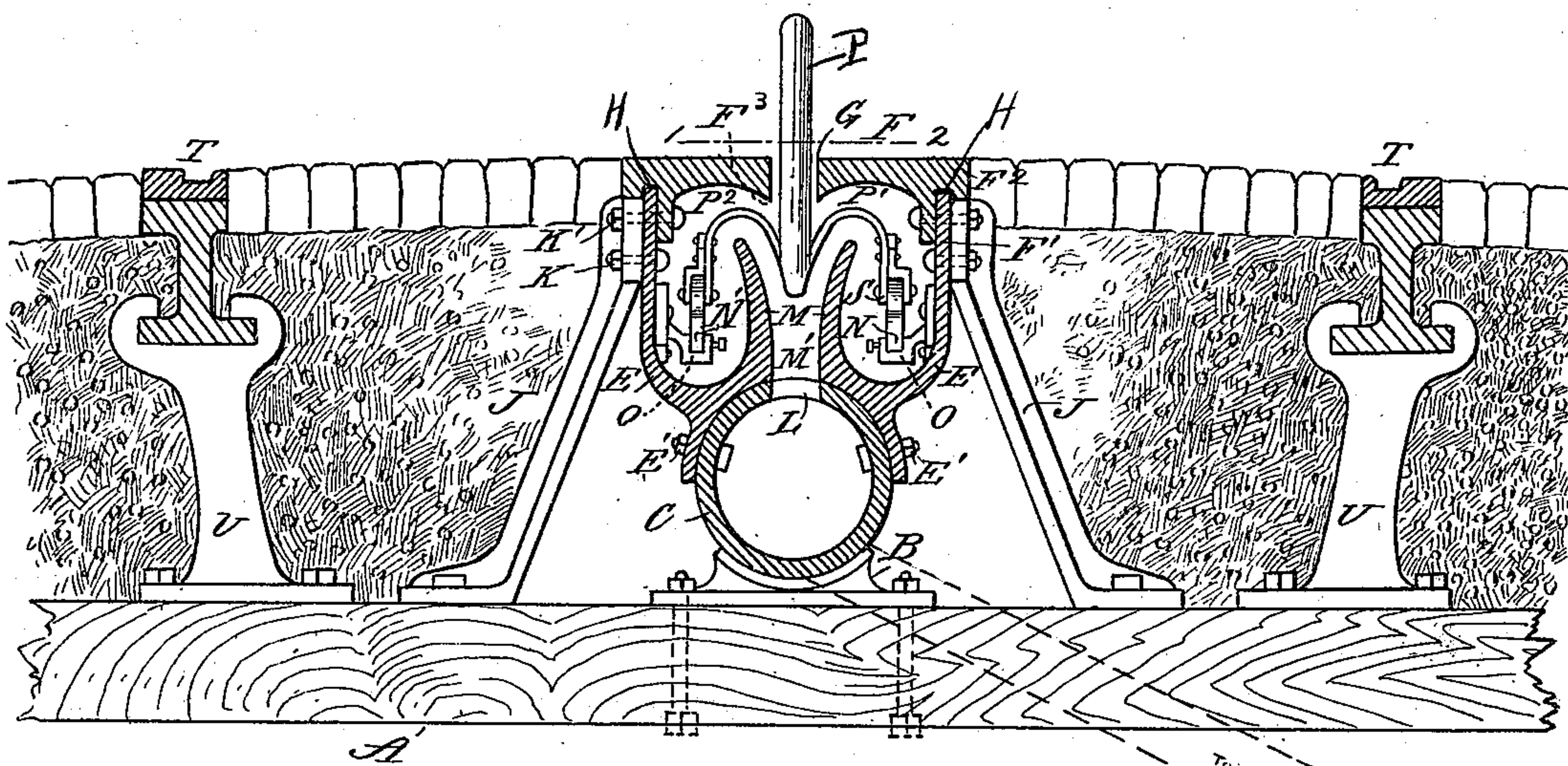


Fig. 1.

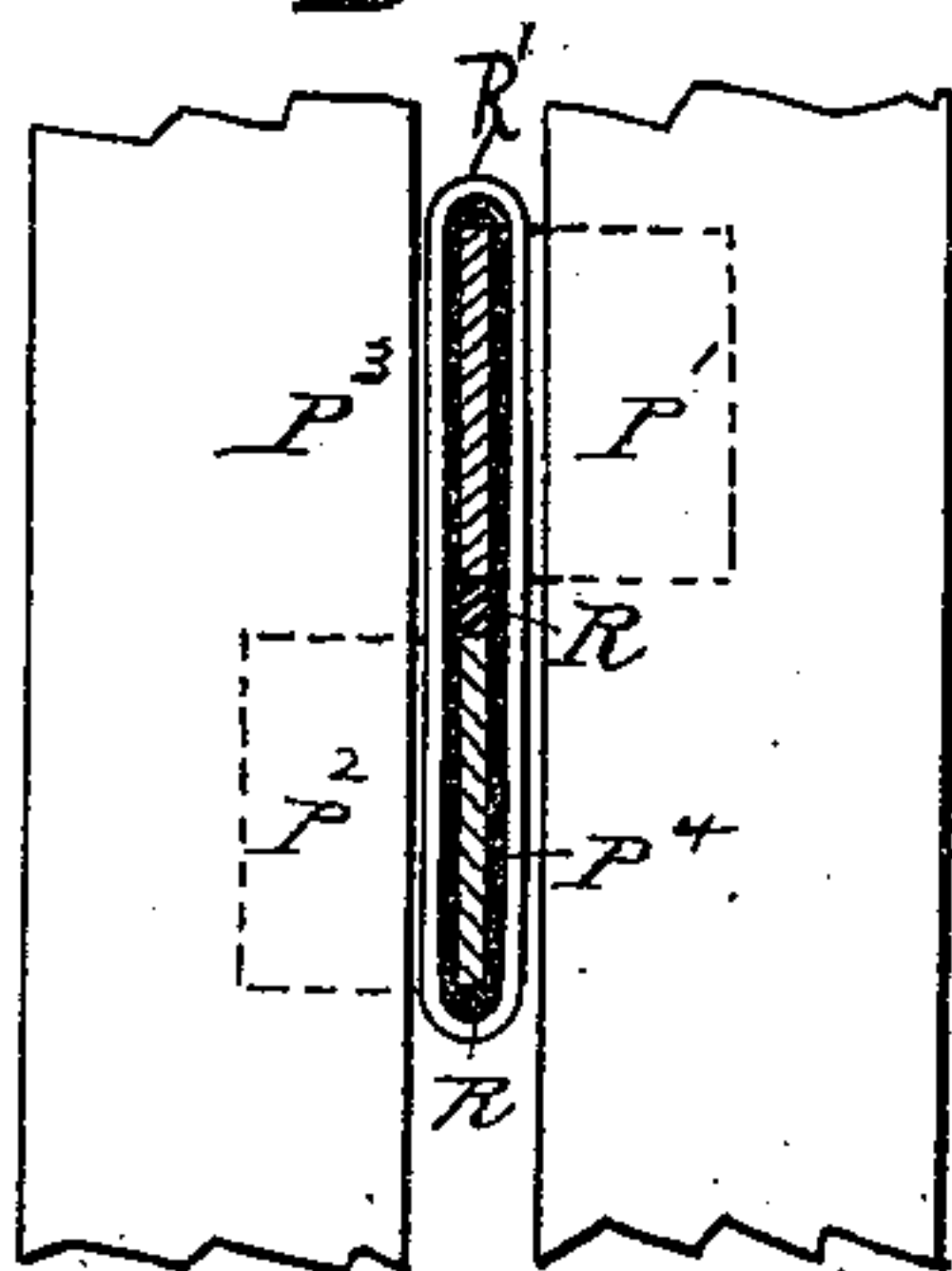


Fig. 2.

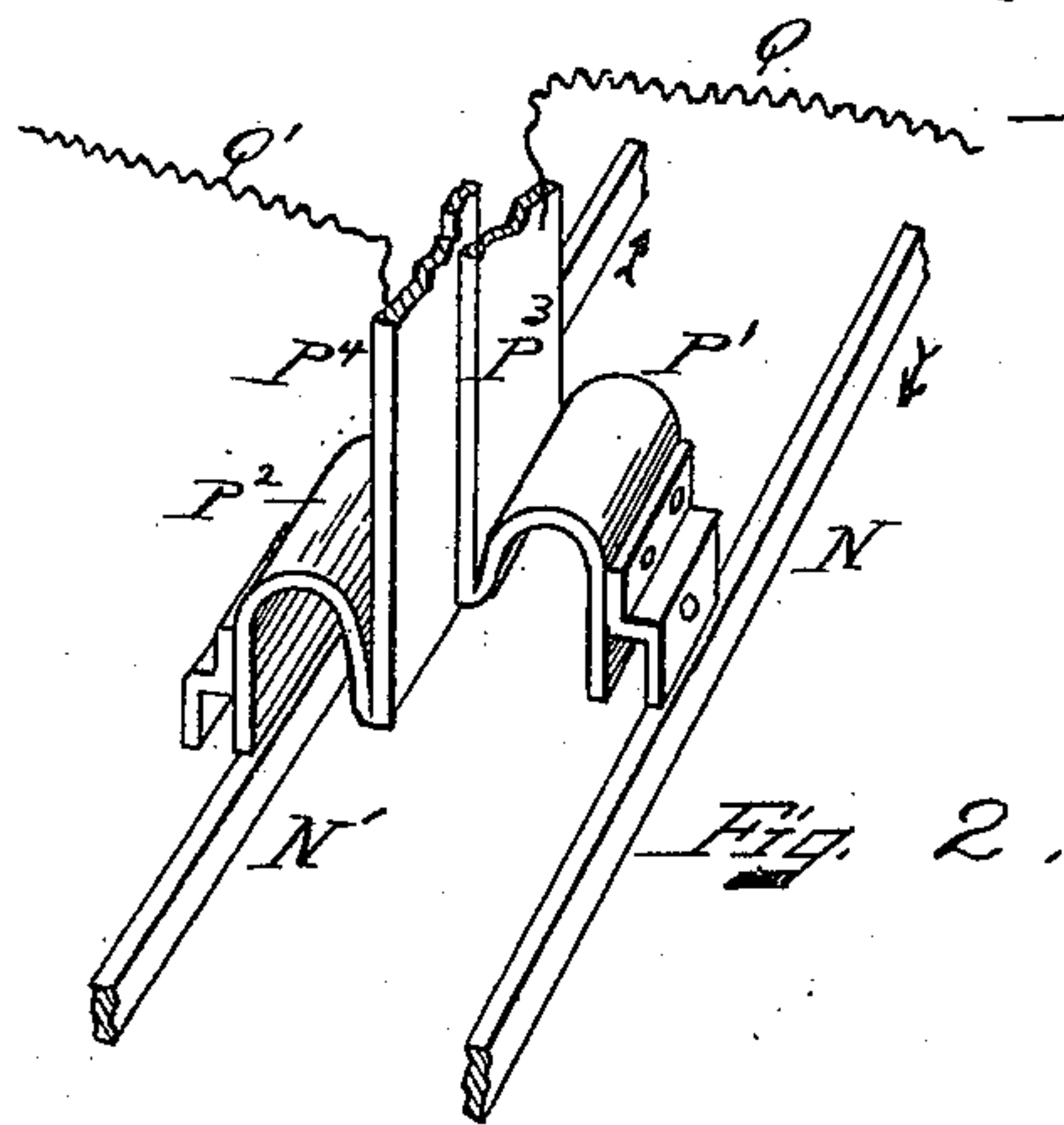


Fig. 3.

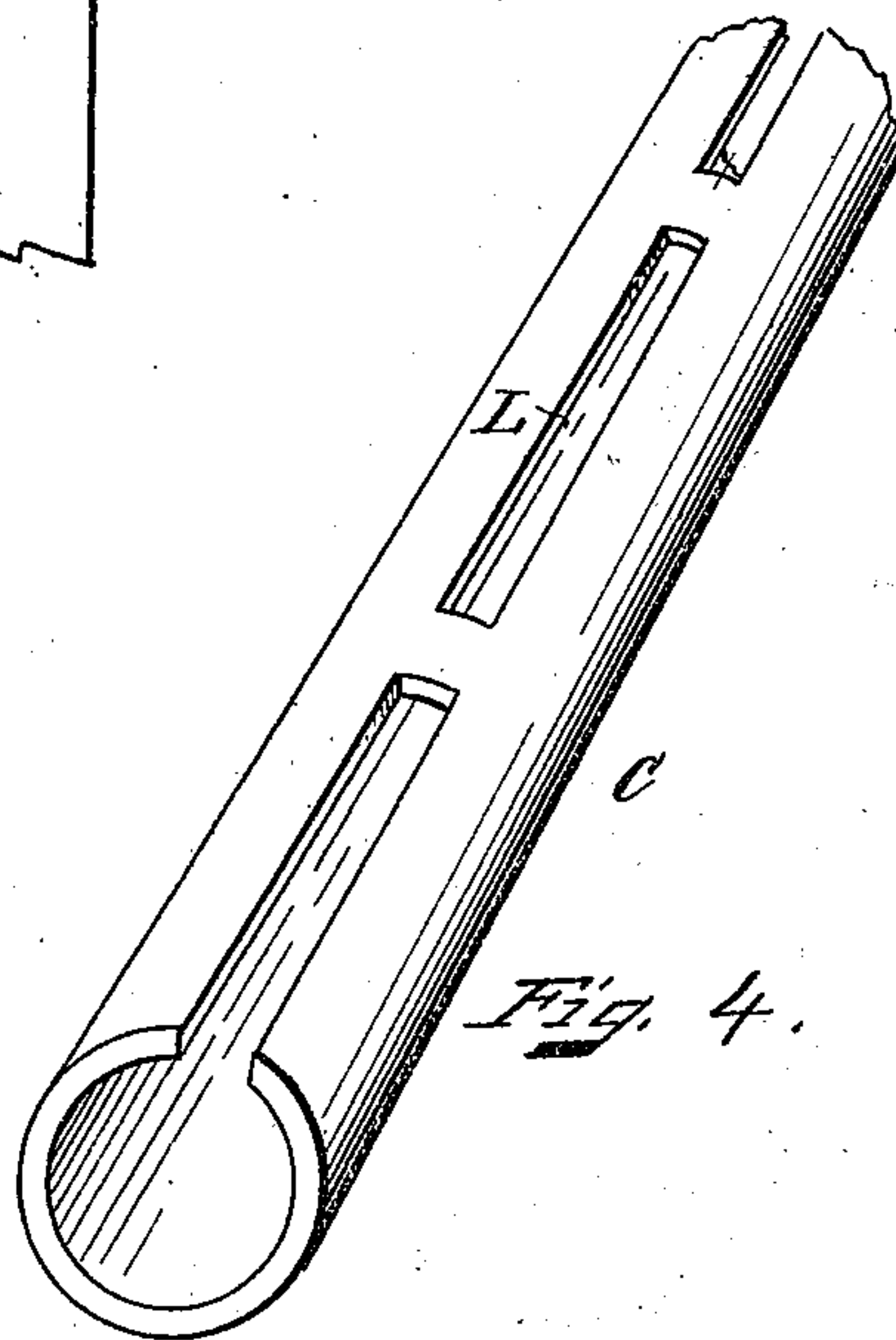


Fig. 4.

Witnesses  
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# UNITED STATES PATENT OFFICE.

ROBERT R. ZELL, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF TO  
HENRY C. KIRK, JR., OF SAME PLACE.

## ELECTRIC-RAILWAY CONDUIT.

SPECIFICATION forming part of Letters Patent No. 502,842, dated August 8, 1893.

Application filed August 8, 1892. Serial No. 442,517. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT R. ZELL, of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Electric Conduits, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to a new and improved electric conduit which is especially adapted for conduit systems for propelling street cars by electricity.

An object of my invention is to produce a new and useful electric conduit in which provision is made to carry off the water so as to prevent it coming in contact with the trolley rods through which the current of electricity is passing.

Another object of my invention is to provide in a conduit system a metallic circuit so as to avoid loss of power as is usual in the present over-head systems by returning the current through the track, whereas in my device after the current has passed from one trolley rod up to and through the motor, it then returns by a branch arm to the other trolley rod and then back to the powerhouse.

Another object is to produce an electric conduit which is simple in construction and inexpensive as compared with the present under-ground conduits as it requires no concrete work and is entirely of cast iron which is indestructible under-ground.

These and other objects are accomplished by constructions hereinafter shown and particularly pointed out in the claims.

From investigation I have found that loss of energy is not due so much to improper insulation in under-ground conduits as to improper provision for preventing water entering through the slot rail from coming in contact with the electric lines, which causes short circuits.

I am aware that devices have been heretofore provided which endeavor to prevent the water from running into the slot but in my device I do not attempt to prevent the water from running in the slot, but make provision to catch the water as it passes through said slot and lead it to a drain pipe and then to a sewer, thereby preventing it from coming in

contact with the rods through which the electric current is being passed.

My invention consists of certain novel features, combinations, and constructions hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, which illustrate my invention,—Figure 1 represents a vertical cross-section through an electric conduit and road bed. Fig. 2 is a detail perspective view of the trolley, trolley wheels and rods upon which the said trolley wheels move, with the sheet mica and insulating material omitted. Fig. 3 is a horizontal section through the trolley rod taken on the line 1—2 of Fig. 2. Fig. 4 is a perspective view of the drain pipe showing the perforations in the top.

Like letters of reference refer to like parts throughout the several views.

Upon the ties A located under the bed of the street, there is secured a saddle B which extends the entire length of the road bed. Upon the said saddle there rests a drain pipe C which also extends the entire length of the road. A pipe D, shown in dotted lines Fig. 1, leads from the said drain pipe to a sewer. Upon the top of the said drain pipe there are secured castings E on each side by bolts E'. Upon the upper edge of the said castings a slot rail F is placed having a central opening G and vertical depending flanges F' and F'' between which the upper edge of the said castings is placed, and in order to prevent the water from working from the earth through the connection between the said rail and castings, I have placed felt H in the upper edge of the said castings, as shown in the drawings. At suitable distances apart, cast iron brackets J are secured to the ties and extend upwardly against the sides of the said castings E and are secured thereto by bolts K—K', the bolts K' also passing through the flanges F' of the slot rail F so as to hold all the parts in proper position.

The upper part of the drain pipe C has perforations L preferably oblong in shape and on the sides of said perforations extend upwardly the deflectors M forming part of the castings E, as shown in Fig. 1, for the purpose of deflecting the water which may enter



the opening G in the slot rail F, running down into the drain pipe C and from there to the sewer by which means I prevent the water coming in contact with the copper rods N—N', and thereby causing a loss of electric current through the said rods. These rods are supported upon suitable insulating brackets O. It will be seen that the slot rails F at the central opening G are extended downwardly to points F<sup>3</sup>, the purpose of which is to prevent the water running along the under side of the said slot rails, passing down, and coming in contact with the said trolley rods; but by bringing the said rails to points, as shown, the water runs to said points and drips down through the funnel M' formed by the deflectors M, into the drain pipe C.

The trolley P is rectangular in shape, as shown, and at its lower end has two branch arms P' and P<sup>2</sup>, to the former of which the positive current passes from the copper rod N up to and through the right-hand portion P<sup>3</sup> of the vertical trolley frame and to the motor and after passing through the motor passes down the left-hand portion P<sup>4</sup> of the trolley frame to the arm P<sup>2</sup>, and then to the discharge copper wire N'.

The trolley frame and arms are made of sheet mica and plate copper, to the ends of which the positive and negative wires Q and Q' are connected.

Suitable insulating material R is placed between the sheet mica R' and the copper, and the vertical portion of the trolley is divided at the center by the said insulating material, as shown in Fig. 3, the arm P' being connected to the portion P<sup>3</sup> through which the positive current passes, and the arm P<sup>2</sup> being connected to the portion P<sup>4</sup> through which the negative or discharge current passes. The positive current passes over the said copper rod N to the trolley wheels S and from their journals which contact with the interior plate copper, said current passes up and through the motor and down through the trolley frame, arm and trolley wheel to the negative copper discharge rod N'. The car rails T are supported by the chairs U which rest upon the tie rods A. It will thus be seen by my apparatus that I have provided means for keeping the water from contacting with the trolley rods so as to avoid loss of power, and further

that by making a metallic circuit I avoid loss of power which is incident to the present overhead systems.

While I have shown and described my apparatus as adapted for electrical purposes, and especially for electrical trolley systems, yet I would have it understood that it could be used for any under-ground system where it is desired to conduct and carry away water which may enter through the slot rail.

I do not limit myself to the exact construction shown as the same may be varied without departing from the spirit of my invention.

Having thus ascertained the nature and set forth the construction of my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a system for propelling cars an underground conduit having a continuous drain pipe with perforations along the top of said pipe, and a slot rail, in combination with water deflectors attached to said drain pipe and adapted to deflect and guide the water entering through said slot rail to the said drain pipe, substantially as set forth.

2. In an electric conduit in combination a drain pipe having perforations along its top, a slot rail, water deflectors attached to said drain pipe and adapted to deflect and guide the water entering through said slot rail to the said drain pipe, trolley rods located in said conduit, and a trolley adapted to contact with said rods in said conduit, and suitable insulators for the said rods, substantially as set forth.

3. In an electric conduit a drain pipe having perforations along its top, a slot rail, water deflectors attached to said drain pipe and adapted to deflect and guide the water entering through said slot rail to the said drain pipe, the said slot rail along the slot being pointed to assist in directing the water to the said drain pipe, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of June, A. D. 1892.

ROBERT R. ZELL.

Witnesses:

H. LINDEN ZELL,  
EDWARD C. KNORR.