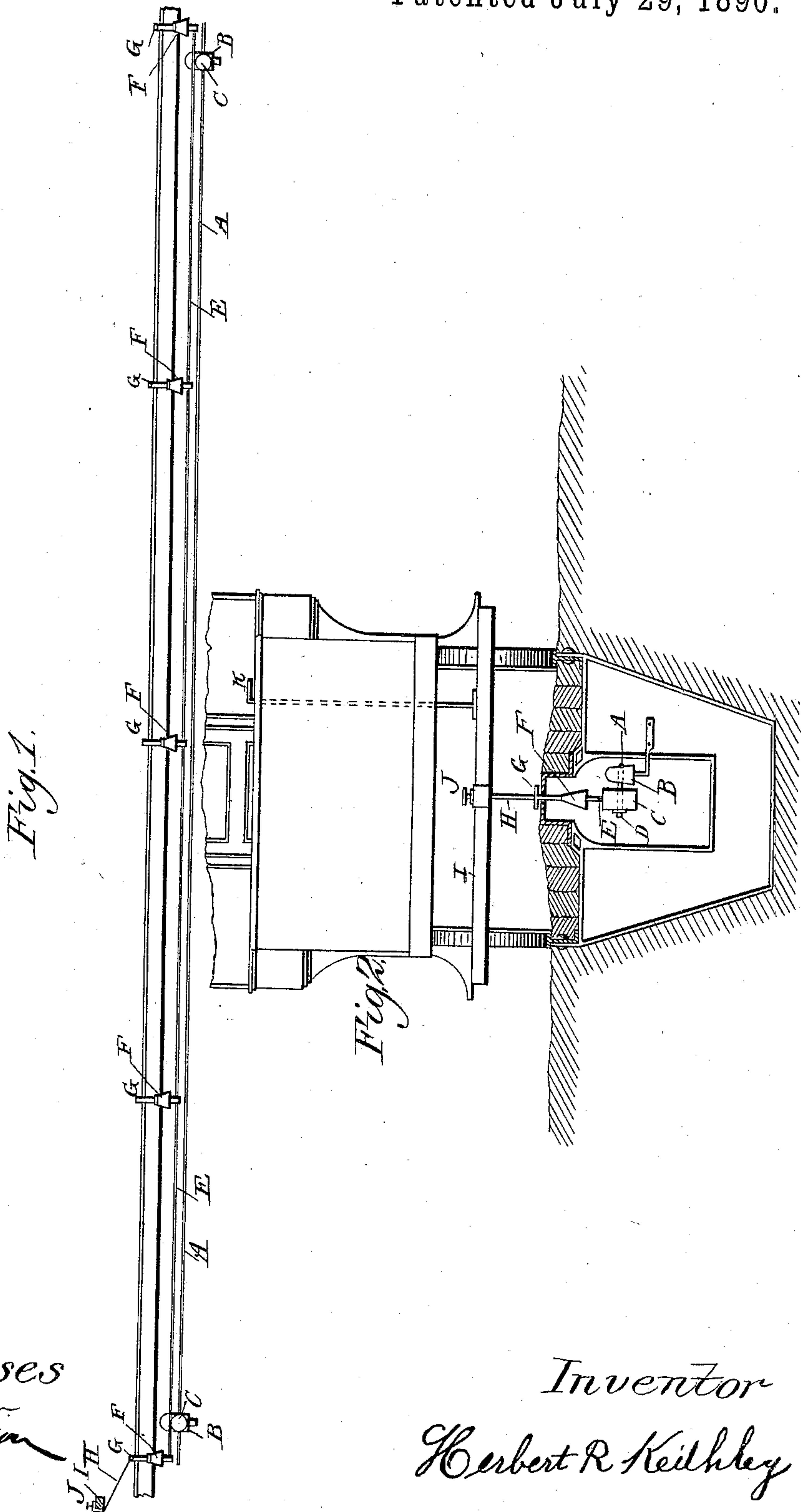


(No Model.)

H. R. KEITHLEY.
ELECTRIC RAILWAY.

No. 433,409.

Patented July 29, 1890.



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HERBERT R. KEITHLEY, OF DENVER, COLORADO.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 433,409, dated July 29, 1890.

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To all whom it may concern:

Be it known that I, HERBERT R. KEITHLEY, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

My invention relates to that class of electric railways in which the current is taken from a supply-conductor inclosed in a slotted conduit; and it consists in details of construction of a contact device to be used in maintaining the connection between a moving vehicle and an insulated supply-conductor inclosed in a slotted conduit.

It also consists in adapting the insulated conductor and contact device to use in any form of slotted conduit now in use by electric or cable street-railways.

In the accompanying drawings, Figure 1 is a side elevation of a contact device and insulated supply-wire. Fig. 2 is an end elevation and detail view of the same, showing a transverse section of a slotted conduit and car-track and end view of a car.

On crowded business streets it is essential that the supply-conductors of an electric railway be inclosed in a slotted conduit, and it is of great importance that the supply-conductors be insulated as perfectly as possible from the surrounding mass of iron, moist earth, and atmospheric moisture, which are the best of conductors, and cause a continual waste or leakage of current from a poorly-insulated conductor.

The object of my invention is, first, to reduce this leakage of current to a minimum by using a continuous wire, heavily insulated with india-rubber or other water-proof insulating material, for a supply-conductor in the slotted conduit, and by supporting this supply-wire on large glass insulators placed about forty-two feet apart on brackets firmly fastened to the yokes of the conduit; second, to provide this insulated supply-wire with copper contact-pulleys connected to the wire through each glass insulator by spindles which are soldered firmly to the wire and support the copper pulley on the opposite side of the insulator, and, third, to provide a contact device to conduct the electric current from the

bare copper pulleys on the insulated supply-wire to the motor on the car with the least possible loss of current.

Referring now to the drawings, in Fig. 1 A is a continuous insulated supply-conductor inclosed in a slotted conduit. This supply-conductor is a copper wire covered with a heavy coating of india-rubber or other water-proof insulating material, and is supported by glass insulators B B, placed about forty-two feet apart. Through these glass insulators B B the supply-wire A A is connected to the copper contact-pulleys C C by the spindle D, as shown in Fig. 2. In putting up this supply-wire the insulators are placed on brackets fastened to the conduit-yokes. The supply-wire is stretched in the conduit and an inch of insulation removed from it opposite each insulator, where the spindle is firmly soldered to the wire. The spindle is then placed through a hole in the glass insulator and firmly secured by a nut and rubber washer. The copper pulley is then placed on the spindle and secured by another washer and nut.

The contact device is composed of a flexible contact-rod E E, made of steel and about forty-four feet in length, suspended in the conduit by the insulated T-shaped supports G, which are firmly fastened to the rod and extend through the slot and rest upon the surface-rails of the conduit, as shown in Fig. 2, and this contact device is connected to a car by the insulated connecting-rod H and wood cross-piece I, which is firmly bolted underneath the forward car-steps and connects the rod H with the feed-wire leading to the motor on the car. Thus when the car is in motion, the contact-rod E E, being held firmly in place by the insulated T-shaped supports G, rolls in contact with the copper contact-pulleys C, from which it conducts the electric current through the connecting-rod H to the motor on the car. This contact device, being supported on the conduit-rails entirely independent of the car, to which it is connected at only one point by the rod H, slides perfectly free along the conduit-slot underneath the cars, and being a flexible rod, held in place by the insulated T-shaped supports G, which work in the conduit-slot, it must inevitably bend parallel to every curve of the con-

duit-slot, thus making perfect contact at every curve and on all points of the line with the copper contact-pulleys on the supply-wire.

The advantages which I claim for my invention are—

First. It provides an almost perfectly-insulated supply-conductor for electric-railway conduits.

Second. It provides a contact device which will work in a slotted conduit entirely independent of the car except at one point of contact, which gives the contact device perfect lateral motion and entire freedom of movement on all curves.

Third. This contact device and insulated conductor are adapted to use in any slotted conduit now in use by electric or cable street-railways.

Fourth. By using rolling contact the constant and rapid wearing of the conducting-wire is entirely obviated, and the wear is confined to parts which can be easily replaced.

Fifth. This contact device and insulated conductor is adapted to every requirement of street-railway work, for it will turn any curve and can be switched in the conduit at the end of the line and either end of the contact device attached to the car. It will also work in connection with the overhead electric systems, and with it a perfect crossing can be effected with any system of street-railway, for a copper pulley can be placed on either side of the center of the crossing and the supply-wire curved entirely below the tracks or a cable.

The return-circuit can be made by the rails or ground in using this system, for the glass insulators B on the supply-wire and the inverted cup-shaped insulators F F, Figs. 1 and 2, on the T-shaped supports G will insulate the supply-wire A A and contact-rod E E perfectly from the ground and rails.

In Fig. 2 K, is a rod and cut-out switch on the cross-piece I, which enables the driver to open and close the circuit between the contact-rod E E and the motor.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an electric railway, the combination of a continuous insulated supply-conductor with copper contact-pulleys and spindles and glass insulating-supports, all inclosed in a slotted conduit, substantially as described.

2. In a contact device for an electric railway, the combination of a flexible contact-rod with insulators and supports extending through the slot and supported by the surface-rails of the conduit, as set forth.

3. In a contact device for an electric railway, the combination of a flexible contact-rod suspended from the conduit-rails by insulated supports, with copper contact-pulleys, spindles, glass insulators, and insulated supply-wire, substantially as set forth.

4. In a contact device for an electric railway, the combination of a flexible contact-rod, insulators, and supports, with a protected insulated conducting-rod and cross-piece bolted to the car-steps, and feed-wire leading to the motor on the car, substantially as described.

5. In an electric railway, the combination of an electric car with a connecting-rod and contact device supported entirely by the surface-rails of a conduit and working in the slot independent of all lateral motion of the car when turning curves, substantially as set forth.

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