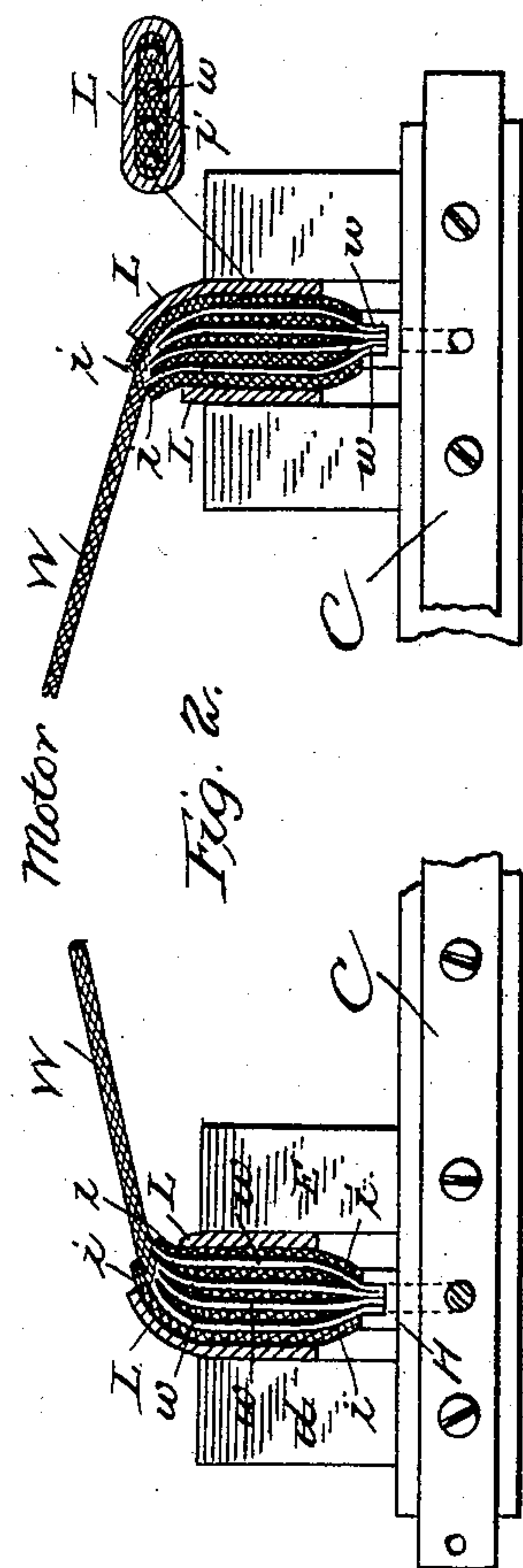
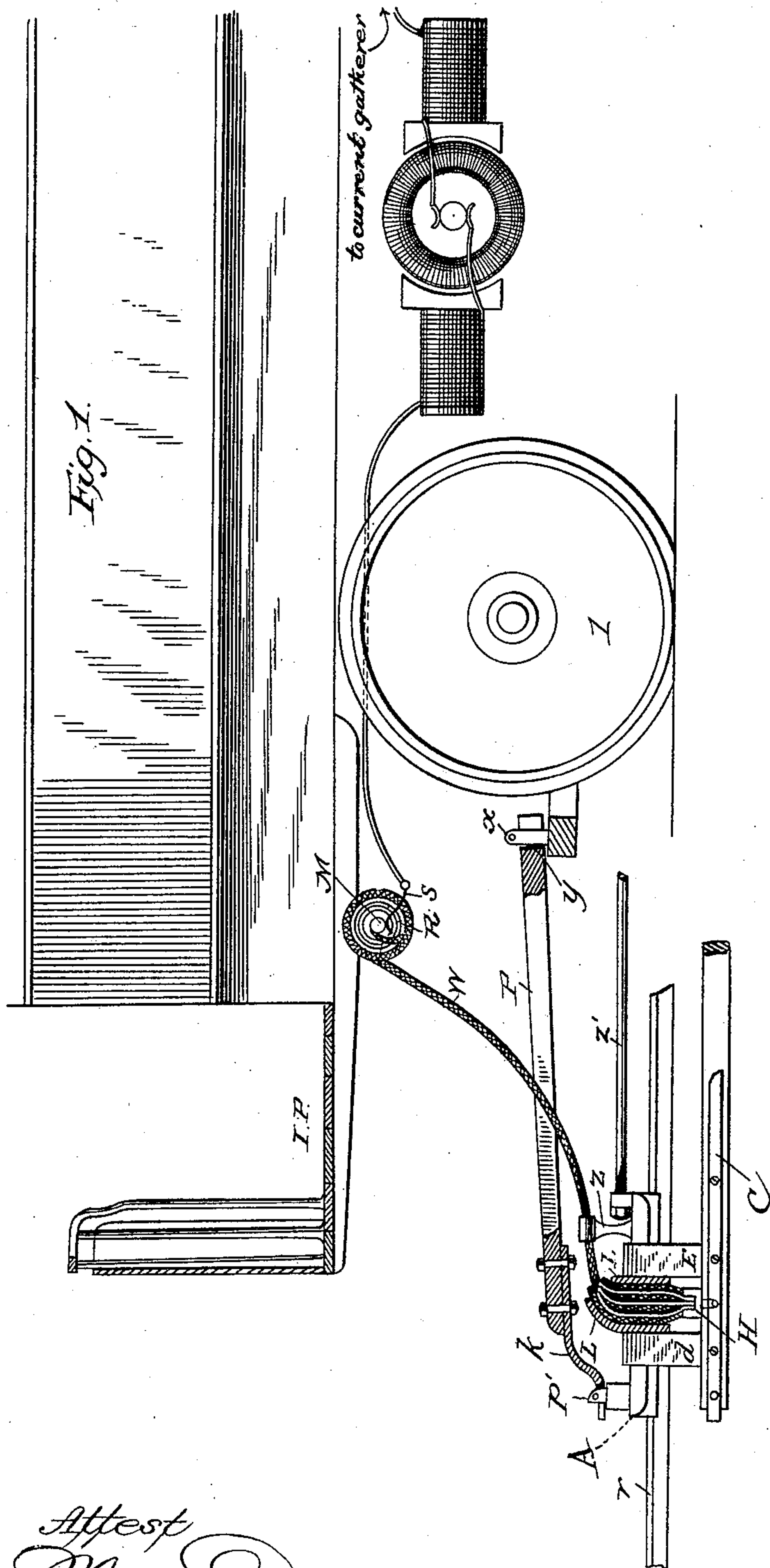


(No Model.)

S. H. SHORT.
ELECTRICAL RAILWAY.

No. 407,496.

Patented July 23, 1889.



Attest
Hall & Duane
J. L. Middleton

Inventor
Sidney H. Short
by *Elli Spear*
Atty.

UNITED STATES PATENT OFFICE.

SIDNEY HOWE SHORT, OF DENVER, COLORADO, ASSIGNOR TO THE UNITED STATES ELECTRIC COMPANY, OF SAME PLACE.

ELECTRICAL RAILWAY.

SPECIFICATION forming part of Letters Patent No. 407,496, dated July 23, 1889.

Application filed February 19, 1887. Serial No. 228,223. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY HOWE SHORT, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Improvement in Electrical Railways; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in electric railways, and particularly to the current-collector and means for connecting the same with the car.

The object of my invention is, first, to provide a suitable connection between the current-collector within the conduit and the car, whereby the said collector is operated or moved with the movement of the car.

A second object is to provide a detachable connecting device, so that in case the car should run off the track or an obstruction be met within the conduit or slot the parts will be disconnected and rupture of the electrical connections prevented.

A further object is to provide means whereby in case an accident occurs—such as the car being displaced or an obstruction being met with—the electrical connection will be kept unbroken.

The invention consists of the devices and the combination of devices hereinafter fully described.

In the drawings I have shown but one end of the car and the improved connections. It will be obvious that the opposite end is arranged in like manner.

Figure 1 represents the current-collector in the slot with the electrical connections to the motor and the improved devices for moving the current-collector with the car. Fig. 2 shows the sections of the current-collector and its electrical connections, this figure also showing the manner in which the conductor is arranged in order to pass up through the slot to the motor.

In Fig. 1, I P is the platform of the car, one of the wheels being shown at 1. C represents one end of the long current-collector carried in the slot by the supports d and E, which are fastened to the shoe A, resting on the edge of the slot r, and this collector is electrically connected to the motor by a cable W, which

is coiled around a reel R, from which connection is made directly to the motor, as shown. This reel is under spring-tension, and normally keeps the cable practically taut from the point where it leaves the slot in the conduit. The shoe is pushed forward by the connecting rod or driver P, which is forked at the inner end y, and rests over a pin x on the car-frame. To the other end of the driver is bolted a curved piece k, its outer end being slotted, so as to fit over a projection P' on the shoe A, where it is held by a pin. Should the shoe or current-collector C meet an obstruction sufficient to stop it, the holding-pin is cut off, the piece k slips over the face of P', and the car will move on without the collector. This action will cause the rod P at the opposite end of the car to drop away from the pin corresponding to x, and the collector is thus loosened from all car connections except by the cable. This cable W, which passes up to the motor from the collector C, will remain in connection with both the collector and motor. The cable is coiled on a reel R under the car-body and carried on the shaft M, which is in electrical connection with both cable and motor. When the collector is stopped, the car moves on and unreels the cable, which retains its connections. When the car is stopped and the lever controlling the motor reversed, the car moves back until again over the current-collector, when the obstacle can be removed and the attachments of the collector replaced and the car moves on as before. Coiled springs inside of the reel R rewind the cable as the car moves back to its place. The current is taken from the underground conductors by the collector C, thence passes through the cable W around the reel R to the shaft M, through the connection S to the motor, and out to the underground conductors again through similar connections at the opposite end of the car.

In Fig. 2 is shown the manner in which the cable or wires are connected with the current-collector.

The cable W is made up of a number of small wires twisted together and provided with insulation of rubber and cotton in a manner well known to the art. When, however, the wires from the motor reach the place

where they must pass down through the slot, they are untwisted and the strands carefully insulated. They are then laid side by side in a line parallel with the slot, in order to pass
 5 down between the supports *d* and *E* to the point *H*, where they are attached to the current-collector *C*. These wires are shown at *w w* and the insulation at *i' i'*. Over this insulation is placed a metal casing *L L*, to
 10 protect the insulation from wear against the edge of the slot. At *H* these wires are connected to the metal strip on the side of the current-collector.

The shoes above the conduit are connected
 15 together by a rod *z'*, which tends to strengthen the structure of the collector and take up the strain. This is desirable on account of the length of the collector.

I am aware that it is old to provide a shoe
 20 for electric railways connected to the car by a flexible connection, and I do not claim such as my invention.

I claim as my invention—

1. In an electrical railway, the combination,
 25 with a car, of a current-collector within the conduit, a shoe for supporting the same, electrical connections to the car, and a driver between the car and shoe, said driver having both ends forked and detachably connected
 30 to the car and shoe, the said connection being adapted to be broken in case an obstruction is met with, substantially as described.

2. In an electrical railway, the combination,
 with a car, of a current-collector, a shoe sup-
 35 porting the same, a driver or rod between the car and shoe, and extensible electrical connections between the car and collector, substantially as described.

3. In an electrical railway, the combination,
 40 with a car, of a current-collector, a shoe supporting the same, a detachable driver or rod between the car and shoe, a spring-roller suitably supported and in connection with the motor on the car, and a wire or cable con-

nected at one end to the current-collector and
 45 secured at the other end to the spring-roller, substantially as described.

4. In an electrical railway, the combination,
 with a car, of a current-collector, extensible
 50 electrical connections between the collector and each end of the car, suitable supports for the collector, and a driver or rod connecting the car at each end with the collector-sup-
 port, substantially as described.

5. In an electrical railway, the combination,
 55 with a car, of a current-collector supported on shoes, extensible electrical connections at each end of the car with the collector, a detachable driver or rod connecting the car at each end with the supporting-shoes, and a
 60 rod *z'*, connecting the shoes, substantially as described.

6. In an electrical railway, the combination,
 with the car, of a current-collector within the
 65 conduit and a cable for connecting electrically the collector with the car, the said cable being composed of a series of wires, these wires being separated and insulated from each other and arranged side by side at the
 70 point where they pass through the conduit-slot, substantially as described.

7. The combination, with an electrical rail-
 way, of a current-collector within the conduit-
 75 supports *d E*, connecting the same with a shoe traveling in the slot, a cable for electrically connecting the collector with the car, com-
 80 posed of a series of wires, said wires being separated, insulated from each other, and arranged side by side between the supports *d E* in the slot and an outer protecting covering
L, substantially as described.

In testimony whereof I have signed my name
 to this specification in the presence of two sub-
 scribing witnesses.

SIDNEY HOWE SHORT.

Witnesses:

WM. N. BYERS,
 RODNEY CURTIS.