(No Model.) 2 Sheets—Sheet 1.

S. E. WHEATLEY & J. W. SCHLOSSER.

ELECTRIC RAILWAY.

No. 457,240. Patented Aug. 4, 1891.

Fig. 1.

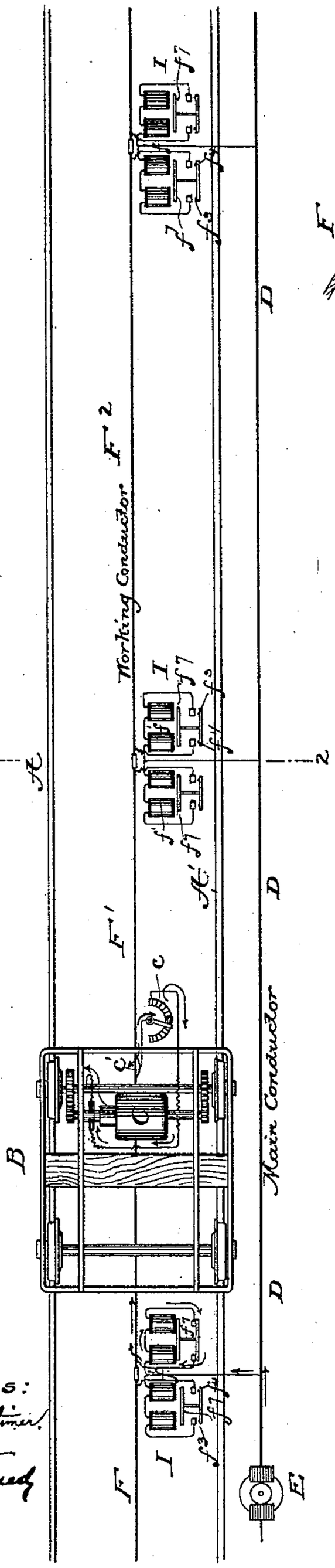


Fig. 3.

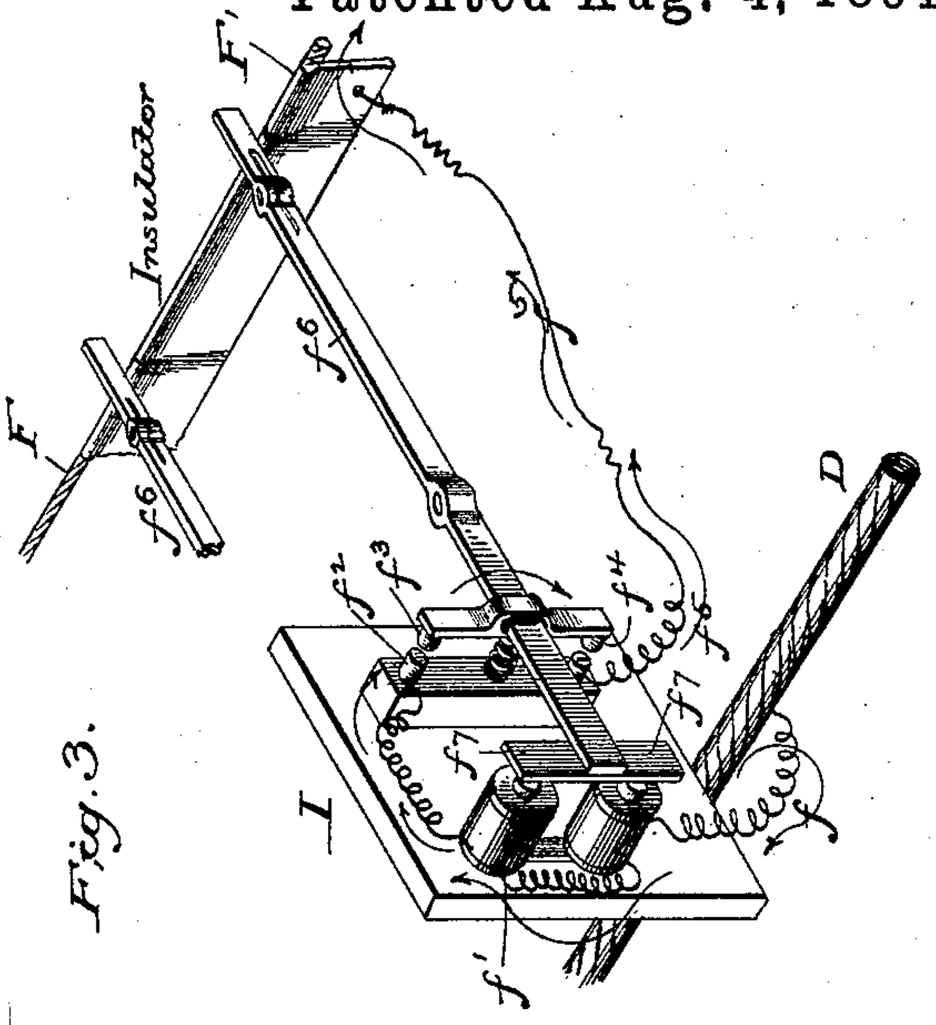
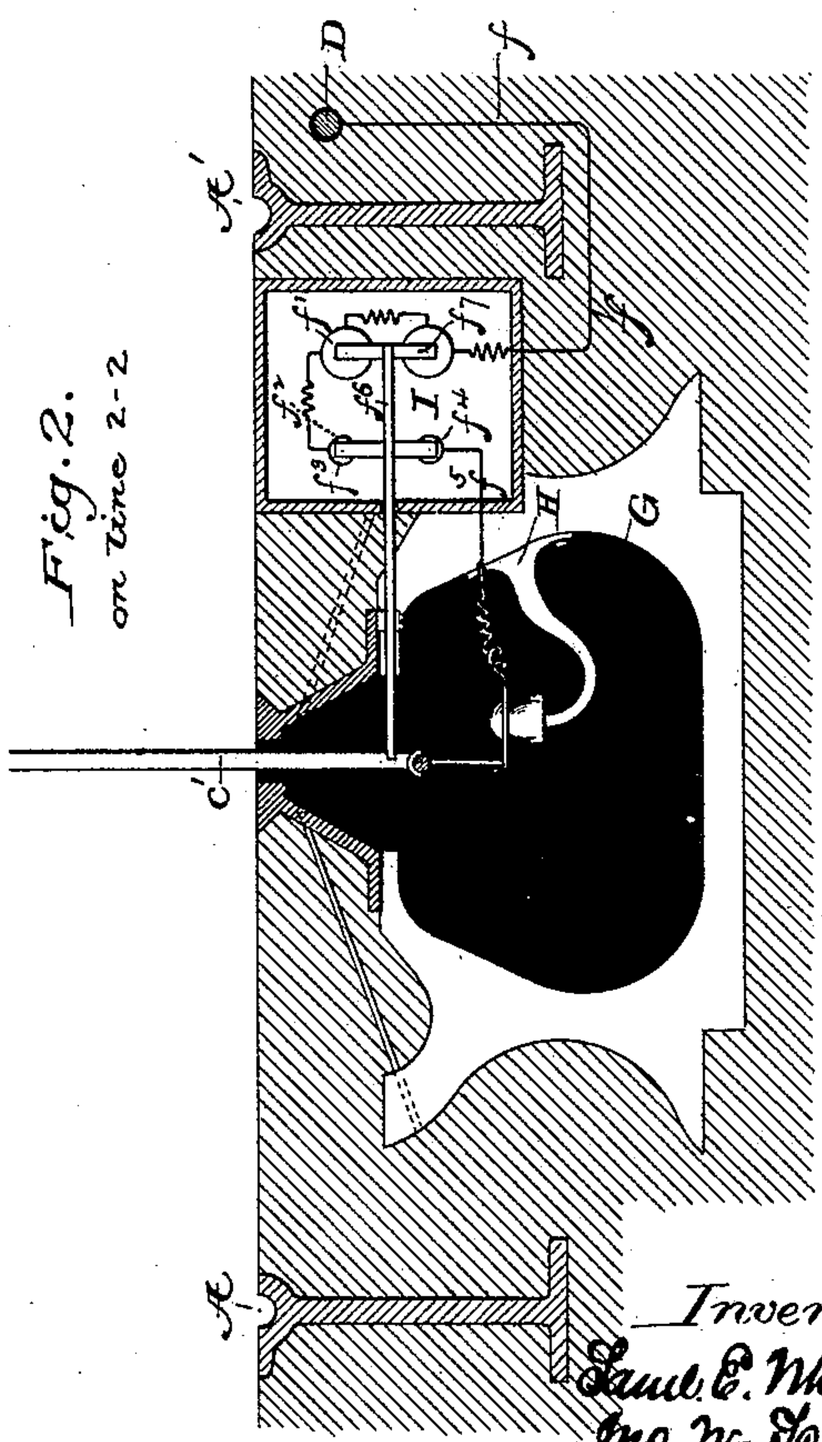


Fig. 2.
on line 2-2



Witnesses:
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H. R. Kennedy

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Fig. 4.

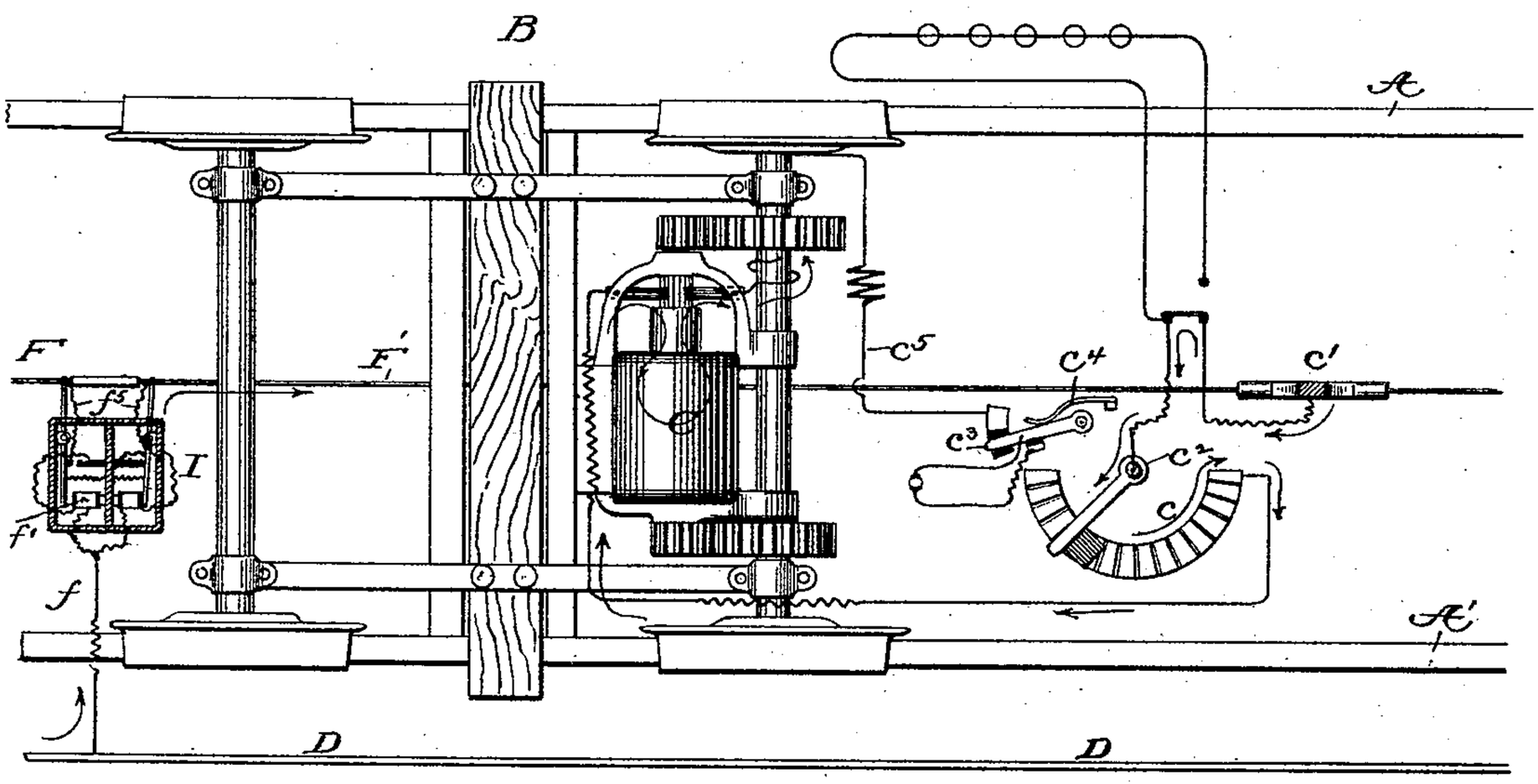
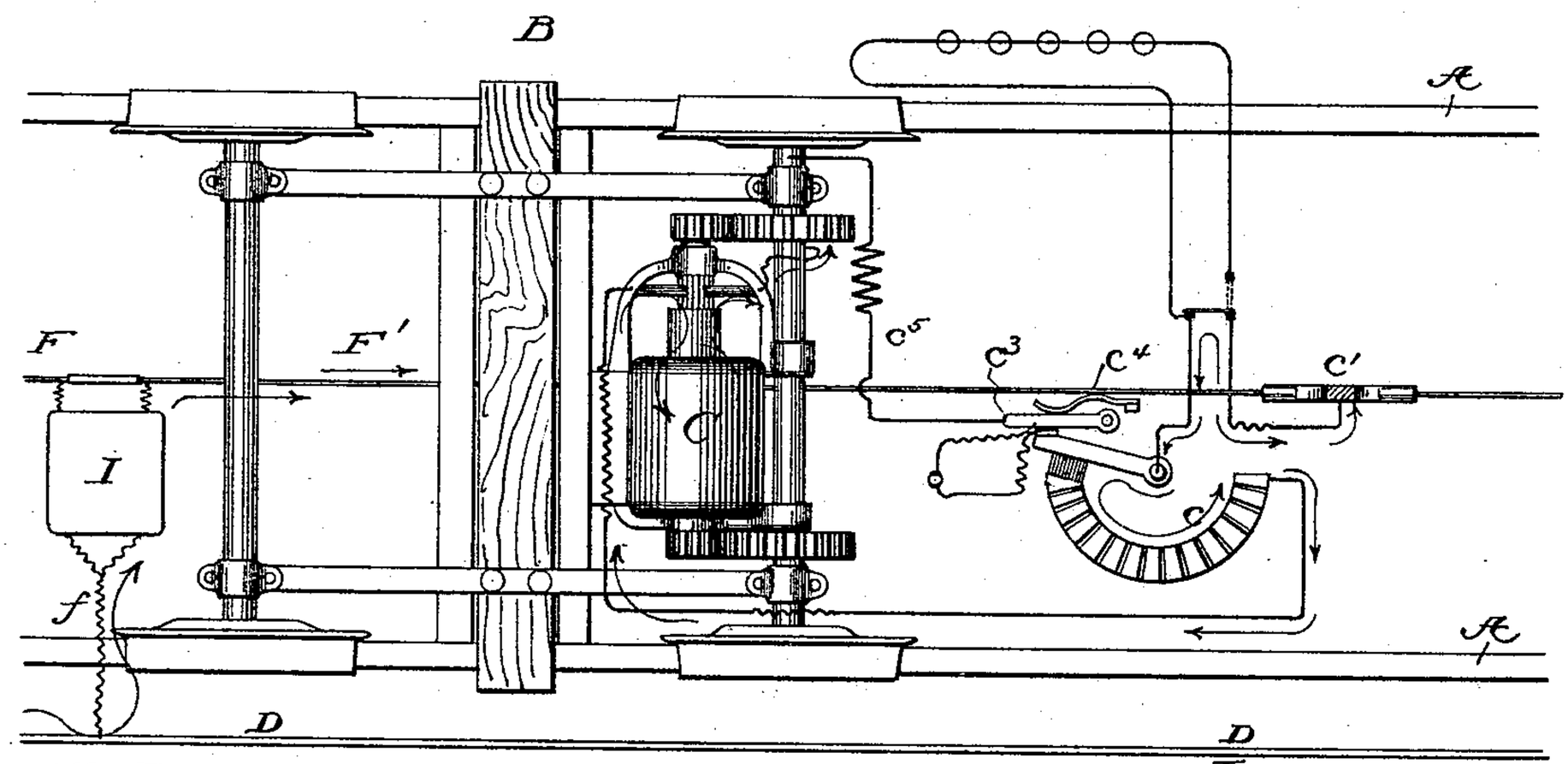


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

SAMUEL E. WHEATLEY AND JOHN W. SCHLOSSER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNORS TO THE WHELESS ELECTRIC RAILWAY COMPANY, OF SAME PLACE.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 457,240, dated August 4, 1891.

Application filed April 2, 1891. Serial No. 387,388. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL E. WHEATLEY and JOHN W. SCHLOSSER, of Washington, in the District of Columbia, have invented certain Improvements in Electric Railways, of which the following is a specification.

Our invention relates to that class of electric railways in which a working conductor extending lengthwise of the road is divided into short lengths or sections, each of which is fed during the time that the car is passing over it from a continuous main lead or conductor through an automatic switch. Heretofore the automatic switch has been controlled in part by a local circuit, including a battery on the car, so that when the circuit through the motor was interrupted the connection between the working conductor and the main line was also interrupted.

The aim of the present invention is mainly to do away with the necessity for the local circuit and battery and provide for controlling the switch which connects the working conductor with the main line by means of the main current and the mechanical appliances on the car. To this end we provide a lever or equivalent device through which the trolley or other projection on the car acts mechanically to close the switch and connect the working conductor with the main line, the switch being provided with one or more magnets included in the circuit to hold the switch in a closed position. This motor-circuit is completed from the working conductor through the motor to one of the tram-rails to the ground or otherwise. When the motor is to be stopped, the current is shunted past it, leaving the circuit still closed, so that the connection with the main line remains until the circuit is finally opened by the trolley passing from the end of the section.

Our improvements are applicable alike to railways in which overhead and underground conductors are employed. We prefer, however, to use an underground conduit, and have accordingly represented this system in the drawings.

In the accompanying drawings, Figure 1 is a diagram illustrating the arrangement of the circuits and the construction and arrangement of the car and its connections to operate therewith. Fig. 2 is a vertical cross-section on the line 2 2 of Fig. 1, showing particularly the devices for closing the main switch and keeping the same closed. Fig. 3 is a perspective view of the switch and its connections. Fig. 4 is a top plan view of the car with the motor, conductor, and other parts in operative positions. Fig. 5 is a similar view with the parts in the position occupied when the car is at rest.

Referring to the drawings, A and A′ represent the ordinary track-rails; B, a car movable thereon and provided with an ordinary electric motor C, geared to one of its axles, the motor-circuit connecting on one side, as usual, with one of the wheels or an equivalent conductor to one of the track-rails and connecting on the opposite side with a rheostat *c* to a trolley or brush *c′*, intended to travel on the working conductor.

D is the main conductor or lead extending uninterruptedly from the dynamo or other source of supply E throughout the length of the road. This main lead is commonly insulated and buried in the earth outside of the track; but it may be arranged in any other suitable position.

F F′ F², &c., are the sections of the working conductor on which the brush or trolley rides, arranged in a conduit or tunnel G, located beneath the track-rails or in any other convenient position. These working conductors or sections, having a naked surface, are arranged end to end throughout the length of the road, being sustained by brackets H or otherwise and insulated from each other and from the other parts of the system. Each of these working conductors F F′ is connected at its two ends through an electro-magnet switch I with the main line or feeder D. These switches stand normally in an open position, so that each of the working conductors is disconnected from the main line at both ends.

The details of the switch are shown in Figs. 2 and 3. *f* represents a branch wire from the main conductor leading through an electro-magnet *f′* to an electrode *f*², which is connected when required through conductor *f*³

with electrode f^4, from which the branch wire f^5 extends to the working conductor F'. When therefore the conductor f^3 is closed against the electrodes, the circuit is completed between the main conductor D and the working conductor F. The switch-conductor f^3 is carried by a horizontally-swinging lever f^6, one end of which is provided with an armature f^7 in the field of magnet f', while the opposite end of the lever is projected into the path of the trolley or brush c' on the car. When therefore the car leaving the end of one working section approaches the end of the next, it acts upon the end of lever f^6 and causes the same to close the switch, so as to connect the next working section with the main line. At the instant this occurs the circuit is completed from the main line through the switch to the working conductor, and thence through the motor on the car to the track-rail. As the circuit embraces the magnets f', it acts to hold the switch in a closed position, and thus maintains the connection between the working conductor and the main line as long as the car remains upon the section.

It is obvious that if a circuit were interrupted in order to stop the motor the magnet would release the switch and render it impossible to close the circuit from the car. We therefore provide for shunting the current past the motor without interrupting the circuit. This may be effected by any form of switch which will shunt the current past the motor. In Figs. 4 and 5 of the drawings we have represented a very simple and efficient arrangement. The rotary arm c^2 of an ordinary rheostat, such as now generally used on electric cars, and through which the current enters from the trolley or brush, is arranged to contact with a switch c^3, which is held normally open by a spring c^4. When the arm c^2 is turned back to cut off the circuit through the motor, it contacts with switch c^3, carrying the same back until it establishes connection through the shunt-circuit c^5 with the wheel or other ground connection. It follows, therefore, that although the current may be cut off from the motor to arrest the car the circuit is maintained from the working conductor through the switch, which latter acts to maintain the connection of the working conductor with the main line. As the car passes over that end of the working conductor which is most remote from the switch in action it opens the circuit and the switch is at once opened by the spring, so that each conductor-section is disconnected from the main line as the car leaves it. As the switches are arranged in duplicate at both ends of the working conductors, one with its operating-lever movable to the right and the other with the lever movable to the left, the system is adapted for cars moving in both directions.

In case of a double-track road requiring cars to be moved only in one direction over each track it will only be necessary to use a single switch on each section at the end where the car enters on the section.

While we have represented herein a satisfactory form of switch, it is to be understood that the switch, its controlling-magnet, and the mechanical device through which the car acts to close the switch may be modified in form and arrangement at will, the only essential requirement being that the car in passing shall close the switch and complete the circuit, and that the magnet to hold the switch closed shall be included in the circuit thus established.

As shown in the drawings, each of the switch-operating levers is provided at one end with a hinged spring-supported section adapted to yield in one direction, so that the cars moving in one direction over the road will close only the alternate switches, those at the beginning of the working conductors.

Having thus described our invention, what we claim is—

1. In an electric-railway system, a continuous main-line conductor or lead from the generator, in combination with a series of working conductors arranged end to end, a switch for each working conductor to connect the same temporarily with the main line, a mechanism actuated by the advancing car to close the switch, and an electro-magnet in the working circuit to hold the switch in a closed condition until said circuit is opened at another point.

2. In an electric-railway system, a main-line conductor extending from the generator throughout the length of the road, a series of relatively-short insulated working conductors, a switch for each working conductor to connect the same temporarily with the main line, a track-lever for each switch, through which the advancing car acts to close the switch as it approaches the working conductor, a magnet in each working circuit to keep its switch closed for the time being, and a car provided with an electric motor with conductors for directing the current from the working conductor through the motor and with means for shunting the circuit past the motor, whereby each working conductor is mechanically switched into action as the car approaches it and maintained in action by the working current until the car leaves the conductor.

In testimony whereof we hereunto set our hands, this 1st day of April, 1891, in the presence of two attesting witnesses.

SAMUEL E. WHEATLEY.
JOHN W. SCHLOSSER.

Witnesses:
W. R. KENNEDY,
FABIUS STANLY ELMORE.