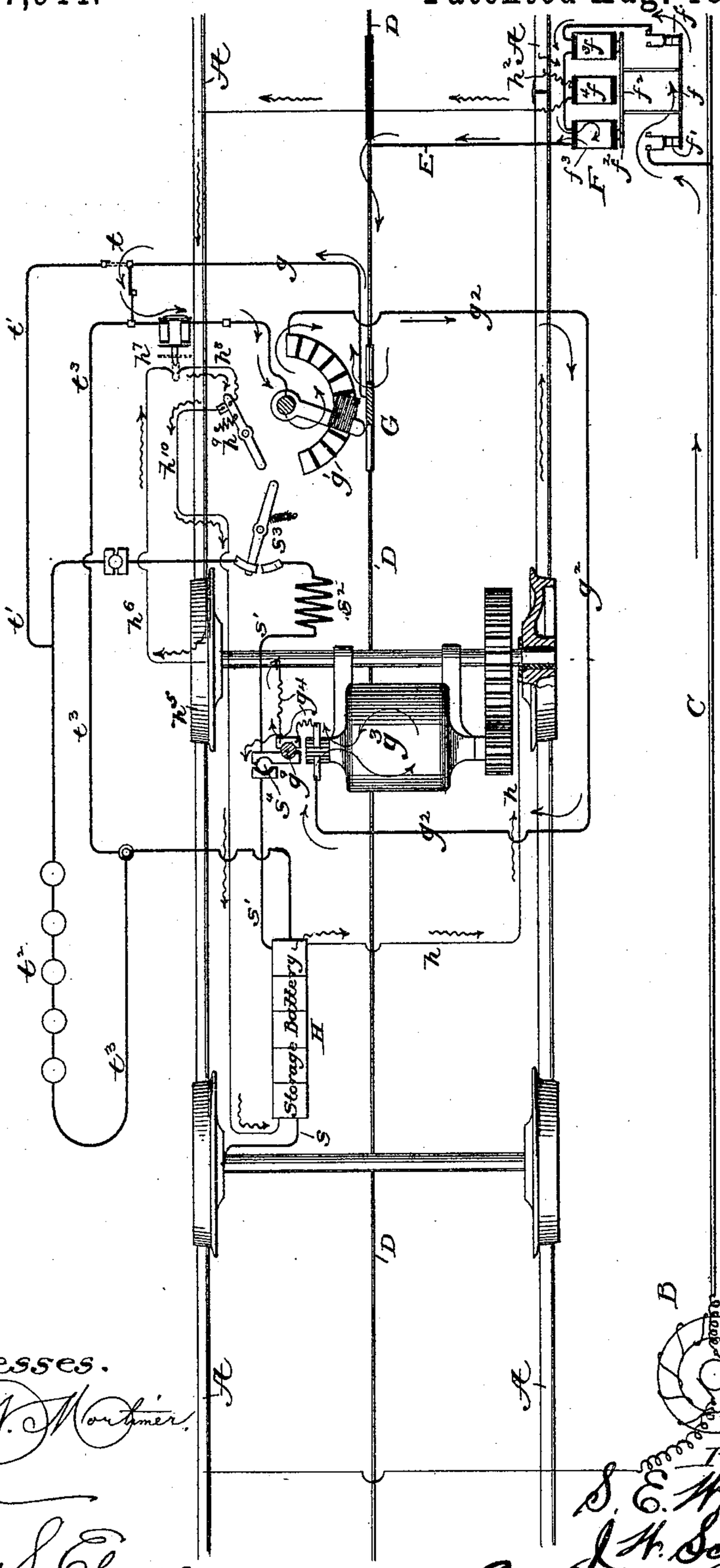
(No Model.) 4 Sheets—Sheet 1.

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

ELECTRIC RAILWAY SYSTEM.

No. 457,944. Patented Aug. 18, 1891.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

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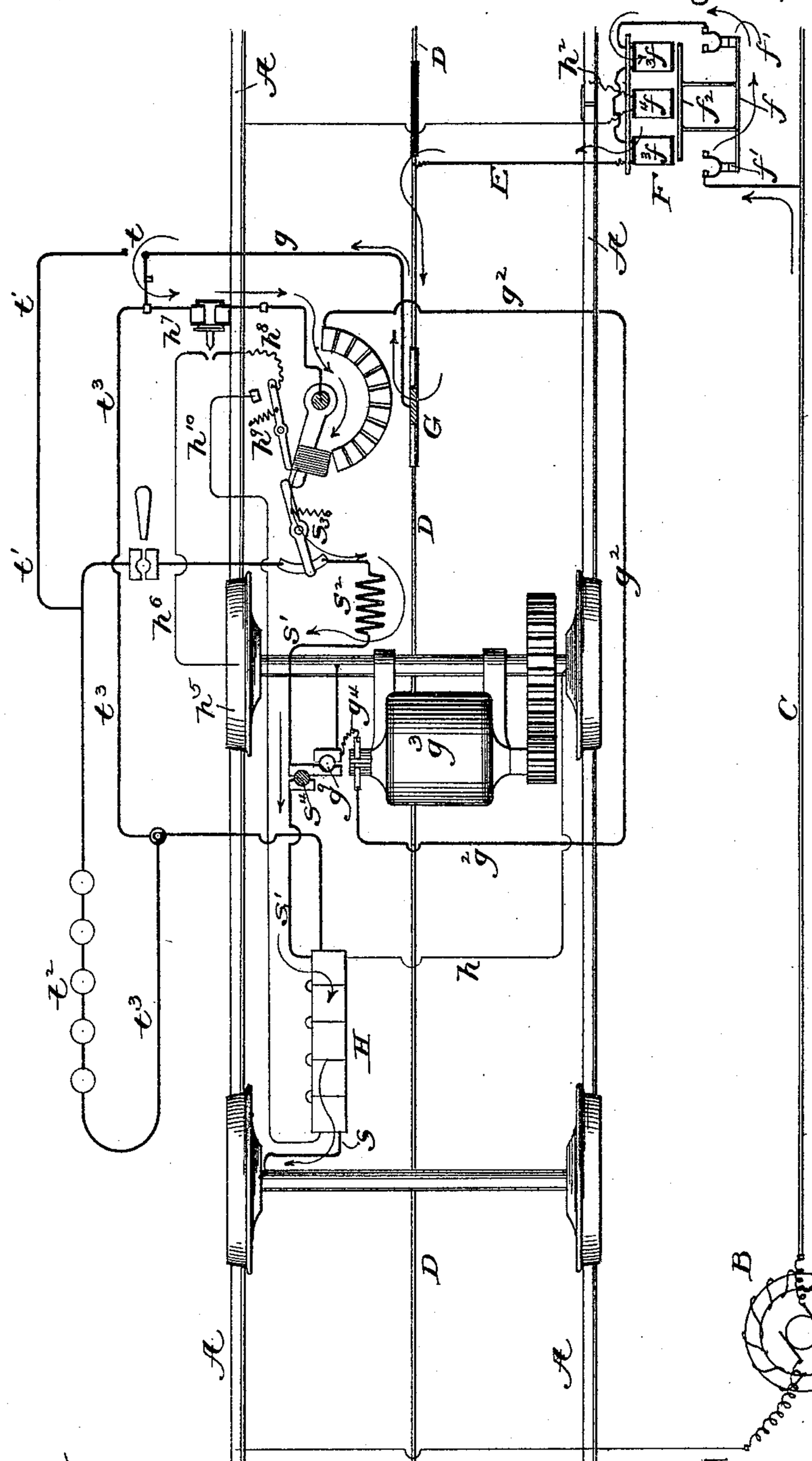
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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

ELECTRIC RAILWAY SYSTEM.

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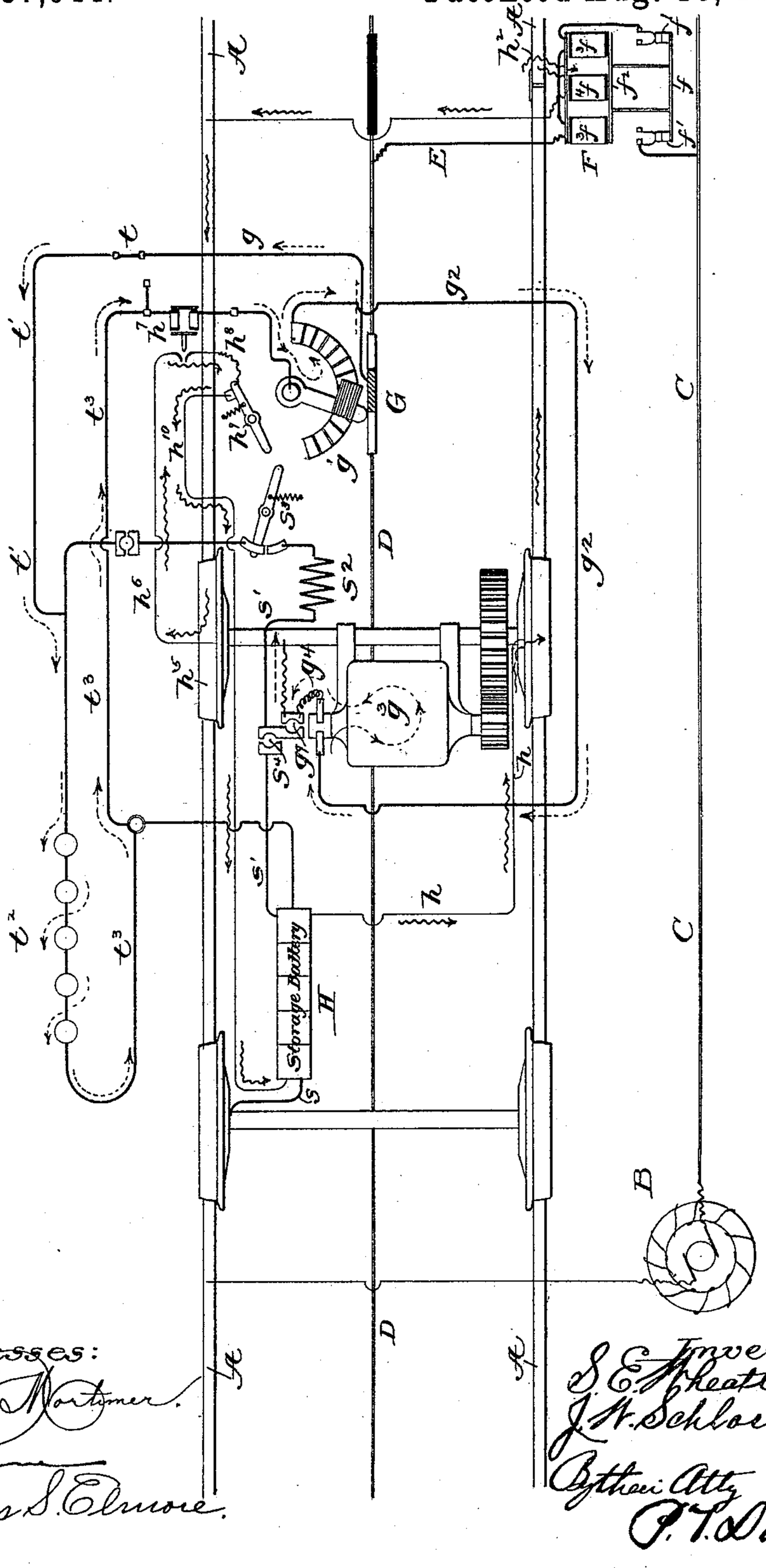
Fig. 3.



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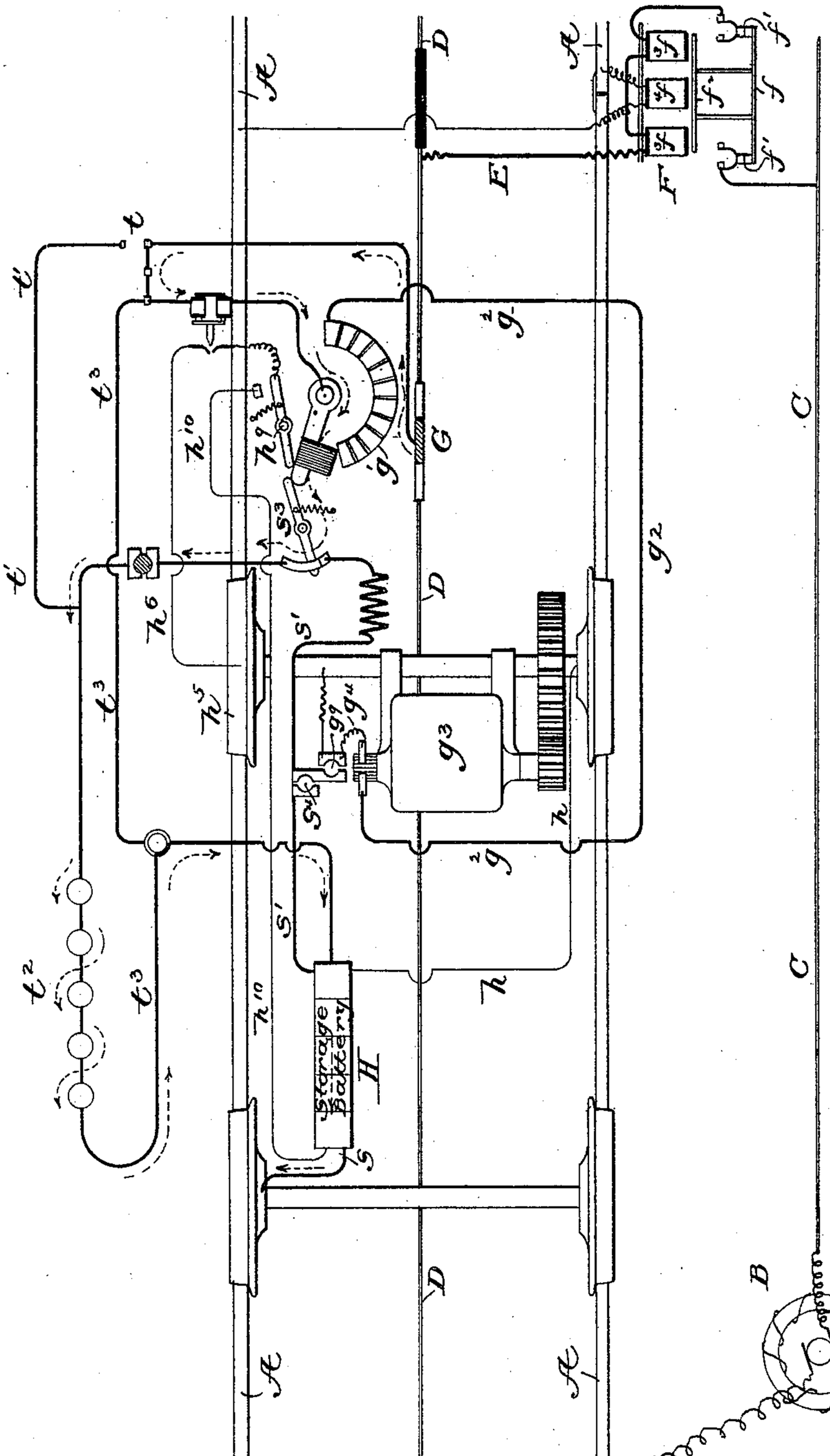
(No Model.) 4 Sheets—Sheet 4.

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

ELECTRIC RAILWAY SYSTEM.

No. 457,944. Patented Aug. 18, 1891.

Fig. 4.



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 SYSTEM.

SPECIFICATION forming part of Letters Patent No. 457,944, dated August 18, 1891.

Application filed April 15, 1891. Serial No. 389,025. (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 a new and useful Improvement in Electric-Railway Systems, of which the following is a specification.

This invention relates to that system of electric propulsion wherein each car is provided with an electromotor receiving a current through a brush or contact device traveling upon a working conductor which is divided into independent insulated sections, which latter are in turn connected successively through magnetic switches with the main conductor or supply-line extending from the generator throughout the length of the road, the arrangement being such that each section of the working conductor is connected with the main conductor only during the time that a car is passing over. In this system, as heretofore constructed, the closure of the switch has been effected as the car enters upon a working section by means of a local circuit, including a battery, upon the car, and connections for establishing a momentary circuit through one of the switch-magnets, the closure of the switch being followed by the interruption of the local circuit and the switch thereafter held in a closed condition by the working circuit until the car has passed beyond the section. Heretofore the opening of the circuit through the motor—that is to say, of the working circuit—was followed by the opening of the switch between the main and working conductors, so that it was necessary to re-establish the local circuit in order to again close the working circuit before the car could proceed, the working circuit being opened and closed each time that the car was stopped and started..

The present invention relates to improvements having in view the maintenance of the connection between the working conductor and the main-line conductor during the entire time that the car is passing over the section and without regard to the stopping and starting of the car, or, in other words, it has as its object to vitalize the working conductor continuously during the passage of the car thereover, and this in order, first, that the current may be used to continuously operate lamps upon the car, and, second, that a storage-battery may be used for the local circuit on the car and charged at will from the main or power line.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating a section of a road constructed on our plan with a car moving thereover. Fig. 2 is a similar view showing the position of the parts when the car is at rest. Fig. 3 is a similar view showing the position of the parts with the car in motion and the lighting-circuit completed. Fig. 4 is a similar view showing the position of the parts when the car is at rest and the lighting-circuit completed.

Referring to the drawings, A A represent the track-rails; B, the dynamo or generator; C, the main conductor extending from the generator throughout the length of the road, either above or below the surface, and D D the naked insulated independent sections of the working conductor; E, the normally-open conductors connecting the working conductors at one end with the main-line conductor each through its individual magnetic switch F.

The switch proper consists of a conductor-bar *f*, arranged at its two ends with the terminals *f' f'*. The switch-bar *f* is connected to an armature f^2 in the field of electro-magnets f^3, which are included in the working circuit, so that whenever a circuit is established from the main to the working conductor the magnets f^3 hold the switch closed and maintain the connection. The switch-armature is also subjected to the influence of a third electro-magnet f^4, located in an independent local circuit, hereinafter described, for the purpose of closing the switch in order to establish the working circuit.

The car is provided with a brush or conductor-arm G, which rides constantly on the working conductor and from which the working circuit is completed through the wire *g* to the usual rheostatic switch *g'*, and thence through wire g^2 to the electromotor g^3, geared to the car-wheels, as usual, and from the mo-

tor through wire g^4 and the car axle and wheel to one of the track-rails, through which or the ground the circuit is completed to the generator.

The local circuit for closing the main switch and establishing the connection between the main line and the working conductor as the car enters on the latter is arranged as follows: A storage-battery H is located on the car and connects on one side through conductor h and one of the car-wheels, which is insulated from the axle, as shown in Fig. 1, or through contact with one of the track-rails, and thence through wire h^2 and the middle switch-magnet f^4 with the opposite track-rail, and thence through one of the car-wheels h^5, wire h^6, magnetic switch h^7, wire h^8, switch h^9, and wire h^{10} to the battery. The switch h^7 has its controlling-magnet located in the main or working circuit, so that when the working circuit through the motor is closed the local circuit is held open at h^7. When, however, the main or working circuit is broken by the brush G passing from the end of one working conductor to the next, the switch h^7 is released and closes the local circuit through the main switch-magnet f^4, thereby establishing the connection between the main line and the working conductor on which the car is entering. The instant that the main switch is thus closed it establishes the circuit, it will be remembered, through the magnets f^3, thereby maintaining the working circuit, and at the same time causing switch h^7 to again interrupt the local circuit. In this manner the magnets f^3 and f^4 are brought into action alternately, so that one or the other of them will maintain the connection between the main line and the working conductor as long as the car remains upon the latter.

In order that the current from the main line may be utilized to charge the battery when the car is at rest, we ground the battery on one side through the conductor s, and on the opposite side connect it through conductor s' and resistance-coil s^2 with a switch-lever s^3, arranged to contact with and to receive the current from the conducting-arm of the rheostat g' whenever the latter is opened to cut off the current from the motor and stop the car. When the rheostat is thus opened, as shown in Fig. 2, to stop the car, the main-line current passes from its arm through switch s^3, resistance s^2, and conductor s', and thence through the battery to the ground. A cut-off s^4 is located in this charging-circuit, so that the charging connection may be severed at will.

In order that the car may be lighted from the main line, we provide the conductor g, forming part of the working circuit, with a switch t, by which the circuit may be interrupted and the current directed through the conductor t' and thence through the series of lamps t^2 and conductor t^3 to the rheostat, as before. It will be observed that under this arrangement the working circuit is the same as before described, except that it is made to include the lighting-circuit; or instead of conducting the current from the motor to the ground the line may be opened at g^9 and completed through the cut-out s^4, conductor s', and the battery to the ground. When the parts are thus arranged, the current will pass from the brush G, through conductor g, switch t, conductor t', the lamps, and conductor t^3 to the rheostat, and thence through the motor to the ground by way of conductor g^4. When the rheostat is opened to stop the car, the lighting-circuit is completed from the brush G through conductors g and t' to the lamps, and thence through conductor t^3 to the arm of the rheostat, and through switch s^3 and resistance s^2 and cut-out g^9 by line g^4 to the ground. By opening the ground-line at g^9 and closing the line at s^4 to the battery, the line may be completed through the latter to the ground.

From the foregoing it will be understood that the current may be passed from the main line through the lamps with or without passing through the battery while the car is in motion as well as when it is at rest, the effect of opening the rheostat being practically to shunt the current past the battery while retaining its course through the lamps.

Having thus described our invention, what we claim is—

1. In combination with the main conductor, the sectional working conductor, the car provided with an electromotor and circuit connections from the working conductor through the motor, the local circuit, including the storage-battery on the car, a switch for each section of the working conductor to connect the same with the main line, said switch including closing magnets, one in the working circuit and the other in the local circuit, a rheostatic switch controlling the working circuit through the motor, lamps upon the car, and circuit connections through which the current from the working conductor is directed through the lamps, both when the rheostat is open and when it is closed.

2. In an electric-railway system, a main-line conductor, a sectional working conductor, a switch for each section of the working conductor to connect the same with the main line, the car provided with an electromotor, the local circuit including a storage-battery on the car, and a switch-closing magnet, a working circuit, including the electromotor, a switch-closing magnet, and a brush or conductor traveling on the working conductor, a rheostatic switch controlling the circuit through the motor, and connections whereby the circuit is completed through the storage-battery on opening the motor-circuit.

3. In an electric-railway system comprising the main-line conductor, sectional conductors and magnetic switches to establish connection between the main line and the

working conductors successively, a car provided with an electromotor, a storage-battery and battery connections for closing the aforesaid switch, and connections whereby said battery may be charged through the working conductor on the main line.

In testimony whereof we hereunto set our hands, this 11th day of April, 1891, in the presence of two attesting witnesses.

SAMUEL E. WHEATLEY.
JOHN W. SCHLOSSER.

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