No. 681,039. Patented Aug. 20, 1901.

W. CHAPMAN.

ELECTRIC RAILWAY.

(Application filed May 29, 1896.)

(No Model.)

Fig. 1.

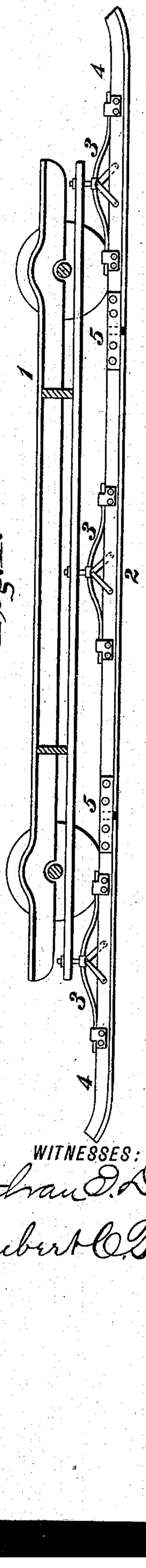
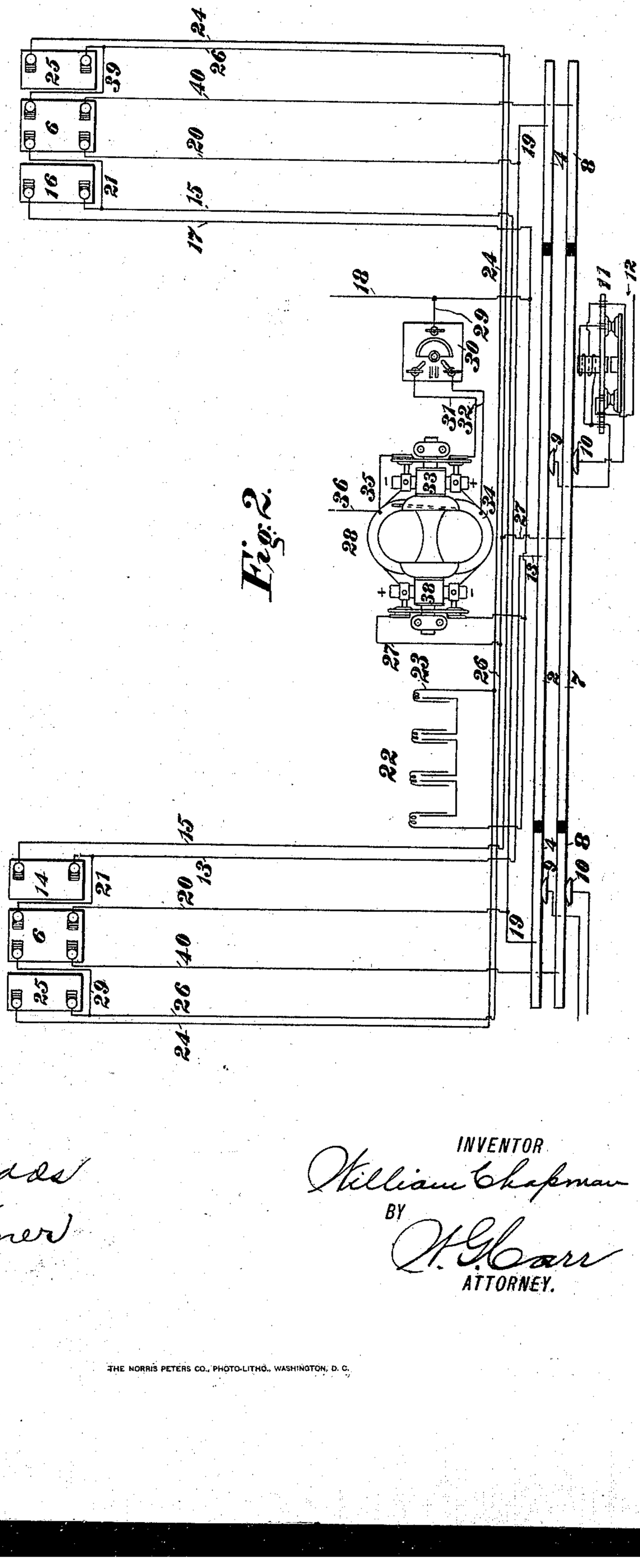


Fig. 2.



WITNESSES:

Ethan D. Dodds

Hubert C. Tener

INVENTOR

William Chapman

BY

H. G. Parr

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM CHAPMAN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE ELECTRO-MAGNETIC TRACTION COMPANY, OF WEST VIRGINIA.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 681,039, dated August 20, 1901.

Application filed May 29, 1896. Serial No. 593,607. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CHAPMAN, a citizen of the United States, residing in Washington, in the District of Columbia, have invented a new and useful Improvement in Electric Railways, (Case No. 705,) (for which patents have been obtained in the following countries: France, No. 250,618, dated September 28, 1895; Belgium, No. 117,658, dated September 28, 1895; Italy, Vol. XXX, No. 39,875, and Vol. LXXVIII, No. 182, dated December 31, 1895, and Spain, No. 18,032, dated January 2, 1896,) of which the following is a specification.

My invention relates to electric railways, and has particular reference to systems in which exposed conductors are located at intervals along the roadway, with which contact is made by conducting devices carried by the car and which are so connected and arranged as to be energized only when in engagement with the traveling contact devices.

The object of my invention is to provide a means whereby the current necessary for the auxiliary circuit employed for energizing the pick-up switches may be derived mainly from the source supplying the current for driving the motors.

My invention is primarily intended for use in connection with the system set forth in the patents to Malone Wheless, No. 524,773, of August 21, 1894, and No. 534,238, of February 12, 1895; but it is adapted for use in connection with other systems in which sectional or isolated contacts are employed and in which an auxiliary energizing-circuit is employed for actuating switches or otherwise supplementing the main current employed for driving the motors.

Referring to the drawings, Figure 1 is a vertical longitudinal section through a car-truck equipped with a contact bar or shoe; and Fig. 2 is a diagram showing a pick-up switch with stationary and traveling contact devices, means for supplying current to the pick-up circuit and the necessary switches and conductors coöperating therewith.

Reference being now had to Fig. 1 of the drawings, 1 is a car-truck of any ordinary or desired construction, and 2 is the contact bar or shoe, supported from the truck by means of suitable supporting devices 3. The contact bar or shoe 2 is shown as made in three lengths or sections, the end sections 4 being separated slightly from the middle section and fastened thereto by means of plates or splices 5, of wood or other insulating material, properly bolted to the said sections. The spaces between the middle and end sections may be left open or they may be filled with some suitable insulating material, as may be desired.

Reference being now had particularly to Fig. 2 of the drawings, 2 is the middle section, and 4 designates the end sections, of the main or feeder contact bar or shoe, which is carried by the car and makes contact with the pins 9 located in the roadway. 7 is the corresponding middle section, and 8 designates the end sections, of the energizing or pick-up contact bar or shoe carried by the same car and preferably located alongside and parallel to the main bar above described. This energizing-bar makes contact with the pins 10 properly located in the roadway. 11 is one of the automatic electromagnetic switches which are employed for opening and closing the main or feeder circuit in the manner fully set forth in the patents hereinbefore referred to. 12 is the main insulated conductor which supplies the current for operating the railway-motors. Located at one end of the car are switches 6, 14, and 25, and at the other end are corresponding switches 6, 16, and 25. The two sides of the double switch 6 at each end of the car are electrically independent, but are preferably mechanically connected, so that they will be opened and closed together. They constitute in effect, therefore, a double-pole switch. The sets of switches at the two ends of the car are really duplicates of each other in order that the circuits may be readily and easily controlled by the motorman from either end, according to the direction of movement of the car. The various circuits leading to and through the switches will be specifically referred to hereinafter in describing the operation of the invention. 22 represents three cells of a battery, preferably a secondary battery; but one of the primary variety may be employed, if desired, and 28 is a motor-generator, designed to take cur-

rent from the main circuit through the rheostat 30 and supply current at a greatly-reduced tension directly to the pick-up circuit.

As the motors, controllers, and reversing switches form no part of my invention, I have deemed it unnecessary to show them in the drawings.

I will now describe the operation of the invention and trace the circuits through the various devices employed, it being assumed that the car is moving from left to right and that switches 6 and 25 at the rear end of the car are open. The current is led from conductor 12 through switch 11, contact 9, collecting-bar 2, and conductor 13 to the switch 14, and from this switch by the conductor 15 to the switch 16, from this switch by the conductor 17 to the conductor 18, and thence through the controllers, reversing-switch, and motors. (Not shown.) It will be observed that in order that the car may be operated the switch 14 and the switch 16 must both be closed. Therefore in order to interrupt the circuit it is merely necessary to open the switch at the forward end of the car. It will also be seen that if either of the double switches 6 is closed and either of the sections 4 of the bar is in contact with a contact-pin 9 the current will pass therefrom by the corresponding conductors 19 and 20 to one side of the switch 6, which is closed, and thence by the corresponding conductor 21 to the conductor 15, through the switch 16 to the conductor 17, and thence through the conductor 18, the controlling apparatus, and the motors. The current necessary for actuating the switch 11 before the main circuit has been completed is provided by the battery 22, the circuit being through conductors 23 and 24 and the switch 25 at the forward end of the car, conductors 26 and 27 to the bar 7, through the switch 11, contact-pin 9 and bar 2, conductor 13, switch 14, conductor 15, switch 16, and conductor 17 back to the battery. When the circuit has once been completed so that the bars 2 and 7 will always be in contact with the contact-pins, the battery may be cut out of circuit by opening the switch 25 at the forward end of the car, the other being already open, and the current necessary for operating the switches may then be derived from the main or feeder circuit, as will be now described. The motor side of the motor-generator 28 receives current from the conductor 18 through conductor 29, rheostat 30, and conductors 31 and 32, the former connecting with the commutator 33 and the latter with the field-magnet 34, the negative brush of the commutator being connected by the wire 35 with the conductor 36, leading from the field-magnet to the ground. By means of this motor-generator the high-potential current of the main circuit and of the motor side is employed to produce a current of low potential which is led by means of the conductor 37 from the positive brush of the commutator 38 to the conductor 26 and thence by the conductor 27 to the energizing-bar 7, the circuit being completed through the conductors and switches, as hereinbefore described. The forward end 8 of the pick-up or energizing bar is energized when the switch 6 at the forward end of the car is closed by current through the conductors 26 and 39, one side of the switch 6, and conductor 40, and thence through the proper switch 11 to the corresponding end 4 of the adjacent collecting-bar, as will be readily understood.

It will be apparent that a small and inexpensive motor-generator may be employed for the purpose above described and that it may be so designed and connected as to take a very small quantity of current and that the necessity of employing a battery of any great capacity or weight will be obviated, only sufficient battery-current being necessary, as has been already stated, to pick up the armature of the first switch 11. The battery then being cut out it will not be again called into service until the contact-bars have passed entirely off the contact-pins at the end of the route.

It will be understood that my invention may be employed in connection with non-sectional contact-bars, if desired, and that I make no claim herein to the specific construction of contact-bars hereinbefore described.

I claim as my invention—

1. In an electromagnetic-railway system having pick-up and feeder circuits, the combination with traveling and stationary contacts and automatic switches for completing the feeder-circuit through said contacts, of a motor-generator taking current from the feeder-circuit and supplying current of lower tension directly to the pick-up circuit.

2. A system of distribution for electric railways comprising pick-up and feeder circuits, traveling and stationary contacts and automatic switches for the pick-up and feeder circuits, a battery for primarily supplying current to the pick-up circuit, means for cutting the same into and out of circuit, and a motor-generator taking current from the feeder-circuit and supplying current of lower tension to the pick-up circuit.

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

WILLIAM CHAPMAN.

Witnesses:
P. W. DAVIES,
F. W. LE TALL.