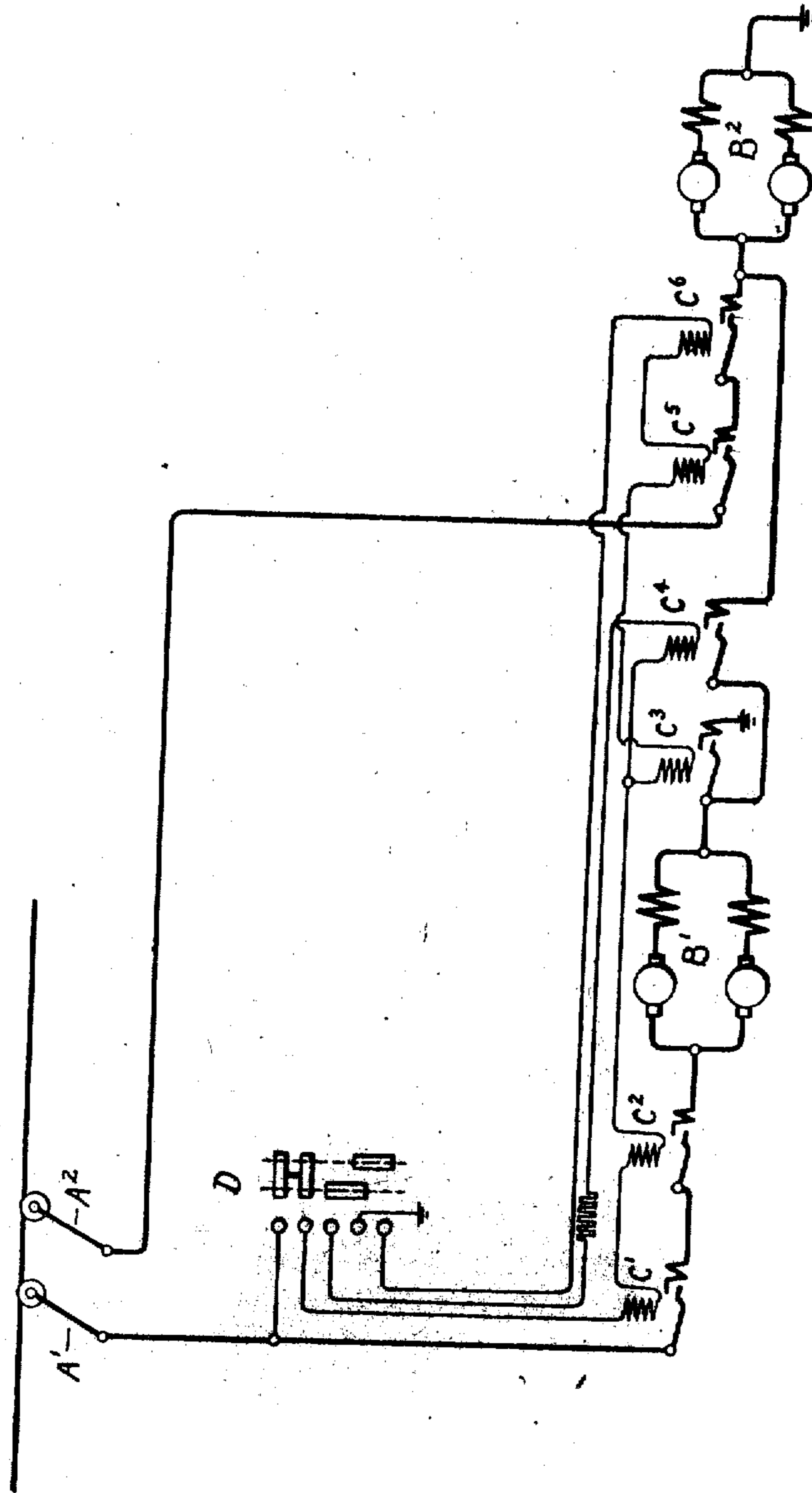


940,511.

Patented Nov. 16, 1909.



WITNESSES:
Lester H. Fulmer.
J. Ellis Allen.

INVENTOR
FRANK E. CASE.
BY *Wm. H. Davis*
ATTY.

UNITED STATES PATENT OFFICE.

FRANK E. CASE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MOTOR-VEHICLE.

940,511.

Specification of Letters Patent.

Patented Nov. 16, 1909.

Application filed October 10, 1906. Serial No. 338,258.

To all whom it may concern:

Be it known that I, FRANK E. CASE, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Motor-Vehicles, of which the following is a specification.

My invention relates to motor-driven vehicles employing a plurality of trolleys or other current-collecting devices, and its object is to provide a novel connection of the trolleys, so as to insure approximately equal division of current between them.

It has been found advisable heretofore in the case of large high-speed electric cars or locomotives supplied from an overhead conductor to employ two trolleys, since a single trolley is not sufficient for properly collecting the large currents required. When two trolleys have been thus used it has been the custom to connect them directly together. This arrangement, while theoretically doubling the effective collecting surface, in practice does not always produce the desired result. Owing to differences in contact-pressure, such as may be developed in running, particularly at high speeds, the current divides unequally between the two trolleys, and at times one of them may be carrying practically the entire current.

My invention consists in providing means for connecting the two trolleys in independent motor circuits, so as to insure an approximately equal division of current between the two.

My invention will best be understood by reference to the accompanying drawing, which shows diagrammatically the circuit arrangements for a motor-driven vehicle arranged in accordance with my invention.

In the drawing, A^1 and A^2 represent two trolleys or other current-collecting devices, through which the current is drawn for operating motors B^1 and B^2 . I have shown two groups of motors, each comprising a pair of motors permanently connected in parallel, since this is the arrangement ordinarily employed on large motor-driven vehicles.

C^1 to C^6 represent magnetically-actuated switches or contactors, which are controlled from the master-controller D. In order to simplify the drawing, the resistance steps on the master-controller and the resistance-controlling contactors have been omitted and only the contact arrangement for series and

parallel connections shown. When the master-controller B is in its first or series position contactors C^1 , C^2 and C^4 are energized, thereby connecting the two groups of motors B^1 and B^2 in series to the collector A^1 . In this position of the switches the collector A^2 is idle. It will, of course, be understood that the controlling switches might be arranged to connect the two trolleys in parallel in the usual manner at starting, if desired, but such a connection is not necessary at starting and at low speeds, and complicates the wiring. In the second position of switch D contactors C^1 , C^2 , C^3 , C^5 and C^6 are energized, thereby connecting motors B^1 between trolley A^1 and ground, and motors B^2 between trolley A^2 and ground. Thus, two independent circuits are established, each including one of the trolleys. Since the two trolleys are wholly independent, each trolley must collect the current for one set of motors, so that a substantially equal division of current between the two trolleys is assured.

It will be understood that the illustration of the controlling switches is purely diagrammatic, and in practice any suitable construction or arrangement of these switches may be employed.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. In a motor driven vehicle, a plurality of current collectors all normally in engagement with the supply conductor under all speed conditions of the motor circuits, a plurality of motors, and a controller for said motors including means for connecting said collectors in independent motor circuits.

2. In a motor driven vehicle, a plurality of current collectors all normally in engagement with the supply conductor under all speed conditions of the motor circuits, a plurality of motors, and a controller for said motors including means for establishing a plurality of independent motor circuits each including one of said collectors.

3. In a motor-driven vehicle, a plurality of current collectors normally in engagement with the supply conductor, a plurality of motors, and motor-controlling switches arranged to connect the motors in series to one collector at starting and to connect them independently to different collectors for running.

4. In a motor-driven vehicle, a plurality of current collectors normally in engagement

ment with the supply conductor, a plurality of motors, and motor-controlling switches arranged to establish a single series circuit for starting comprising one of said collectors, and to establish a plurality of independent parallel circuits for running each including one of said collectors.

In witness whereof, I have hereunto set my hand this 9th day of October, 1906.

FRANK E. CASE.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.