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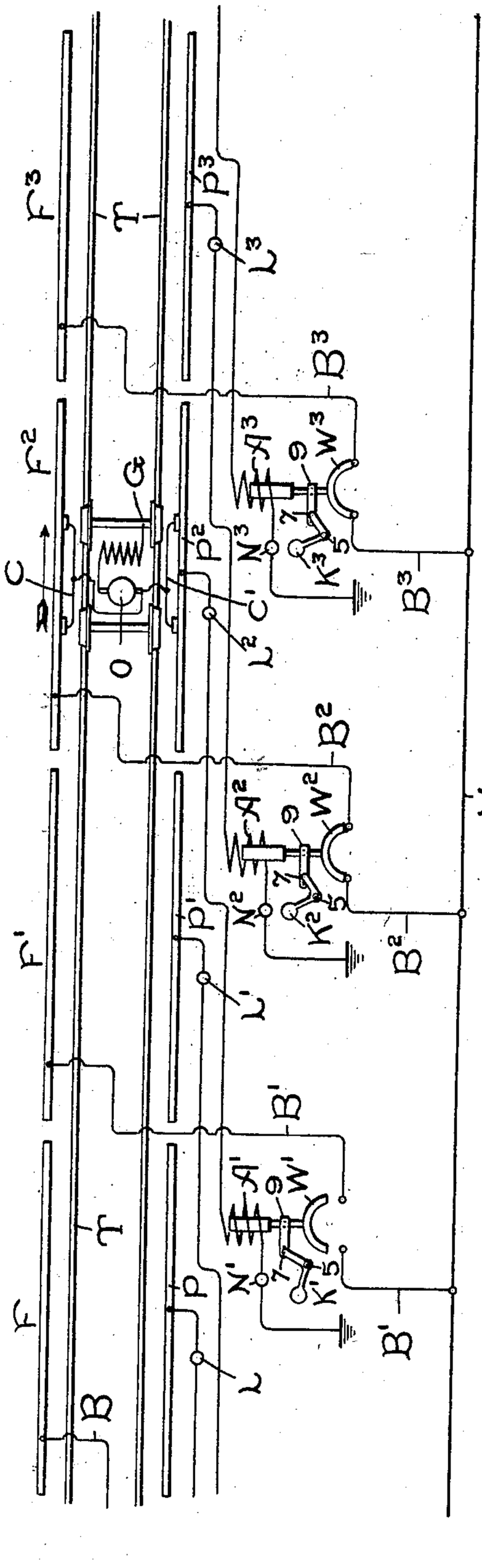
W. B. POTTER.

ELECTRIC RAILWAY.

APPLICATION FILED AUG. 2, 1901.

NO MODEL.



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No. 745,382. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM B. POTTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 745,382, dated December 1, 1903.

Application filed August 2, 1901. Serial No. 70,590. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. POTTER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

This invention relates to improvements in electric railways of the well-known third-rail class and of the particular type wherein the third rail is continuously alive and may be provided with any desirable protecting means to prevent accidents from shock.

In accordance with this invention the normally energized third rail is divided into a number of blocks, one or more of which adjacent to a block over which a car or train is passing being automatically cut out of circuit, so that danger of collisions between cars or trains is avoided.

The drawing is a diagrammatic illustration of a railway constructed in accordance with the invention.

The object of the invention is accomplished by dividing the third rail into sections, the lengths of which are proportioned according to the distance at which it is safe for trains to approach one another. The sections will therefore usually vary in length at different portions of the road, being longer where high speeds are maintained and shorter where cars or trains must go more slowly. As shown, however, the sections are of the same length. The sections of the third rail are indicated at F, F′, F^2, and F^3, and they are connected to the main M by branches B, B′, B^2, and B^3. These branches are normally closed by switches—such as W′, W^2, and W^3—so that the sections F F′, &c., are continuously alive. Electromagnet-coils A′, A^2, and A^3 are arranged to control the respective switches, so that when a coil is energized by the passage of a car or train the switch which normally connects with the main a section other than the one over which the car or train is passing is opened. Thus it is impossible for another train which may arrive at such dead-section to proceed farther and come in collision with the first train.

In the specific embodiment of the invention shown in the drawing the sections F F′, &c., are located on one side of the track-rails T, which will preferably, although not necessarily, constitute the return for the motor O, carried by the car. At portions of the road which pass through cities, where danger of electrolysis is to be avoided, any other suitable return may be employed. The car carries on one side a collector C, which engages with the sectional conductor F F′. For the purpose of providing a circuit for the electromagnets A′, &c., an auxiliary sectional conductor P, P′, P^2, and P^3 is located on the opposite side of the track-rails, and a collector C′, carried by the car on the side opposite from the collector C, engages with this auxiliary sectional conductor. The collectors C and C′ are connected together, and the motor O is connected between this cross connection and the car-axle, where it may be grounded at G, so that the auxiliary conductor is in shunt to the car-motor. The electromagnet-coils A′, &c., are included in connections between the sections of the auxiliary conductor and a suitable return, as shown.

The connections shown are especially adapted for the travel of the car or train in the direction shown by the arrow, and the car has just carried the collector C upon the section F^2, so that the motor O is taking current from the main M through the switch W^2 and branch connection B^2. The other collector, C′, in derivation to the motor-circuit, is also energized to complete a circuit through the magnet-coil A′, so that the switch W′ is actuated to break the continuity of the branch B′, which normally connects the main M with the conductor-section F′. Thus in case a following car or train arrives at this rear section F′ it will be deprived of current and cannot proceed farther, thus avoiding all danger of collision with the forward car. The section F′ is of such length, in accordance with the local conditions, that the car or train

will not be carried by momentum dangerously near to another train. The arrangement shown is especially advantageous, because the car shown can, if desired, back up or proceed in the direction opposite to that indicated by the arrow—that is to say, assuming that the car is moved from the position toward the left, when the collector C engages the section F′, it will not, of course, receive current therefrom, because the switch W′ is yet open; but as soon as the collector C has passed off from the section F^2 the section F′ will be immediately made to be alive by the dropping of the switch W′, so that the motor O will be supplied with current from the section F′ instead of from the section F^2. In effect, therefore, the arrangement shown provides not only against rear-end collisions, but against head-on collisions, for as soon as the collector C engages the section F′ the shoe C′ will of course engage the section P′, and therefore the section F will be disconnected from the main, so that a car or train coming from the left could not get current. Such car or train moving to the right could, however, before reaching the dead-section, back up without difficulty to get out of the way of the car or train moving to the left.

A further advantage of the arrangement shown in the drawing is that no battery is required to be carried by the car for the purpose of initially energizing an electromagnet to connect a conductor-section with the main, as is usual in sectional third-rail systems. This advantage is made possible because the switches W′, &c., normally connect the conductor-sections with the main, so that such sections are continuously alive.

In addition to the above-described power connections electrically-operated signals are provided for the purpose of indicating to the motorman the position of the train which his train may be approaching or which may be approaching his train. These signals are preferably located at or immediately before the end of a section and are indicated at N′, &c., and K′, &c., N′ being electric lamps for night service and K′ being electrically-operated semaphores for day service. As shown, the lamp N′ is connected in circuit with the magnet-coil A′. The semaphores may be actuated by any suitable mechanism, such as bell-cranks pivoted at 5, the end thereof being pivoted at 7 to a projection 9, carried by the switch W′, so that the operation of the semaphore is controlled by the operation of the switch. As a further precaution and to make more nearly certain that the motorman shall become aware of the fact that the section in advance of his train is disconnected from the feeder a lamp or other suitable signal L′ may be connected in the circuit of the electromagnet at a point between the section P′ and the magnet-coil A′, this signal being located far enough from any of the preceding sections to properly indicate the condition of the preceding section.

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

1. A safety-block electric railway, which comprises a feeder or main, a return, a sectional service or power conductor, branch connections between the sections thereof and the main, switches which normally close said connections, an auxiliary sectional conductor, electromagnets connected between the sections of said auxiliary conductor and the return and energized successively as the car or train proceeds, to open the switches of sections other than that from which the car or train is taking current, and signals connected in circuit with said auxiliary conductor.

2. A safety-block electric railway, which comprises a feeder or main, a return, a sectional power-conductor, branch connections between the sections thereof and the main, switches which normally close said connections, an auxiliary sectional conductor, collecting means engaging both sectional conductors, electromagnets connected between the sections of the auxiliary conductor and the return in shunt to the motor-circuit and energized successively as the car proceeds, to open the switches of sections other than that from which the car or train is taking current, and signals in circuit with said auxiliary conductor, one of said signals being located adjacent to each section of the auxiliary conductor and another signal located adjacent to the switch controlled by that section.

3. A safety-block electric railway, which comprises a feeder or main, a sectional conductor, branch connections between the sections thereof and the main, switches which normally close said connections, electromagnets energized successively as the car proceeds, to open the switches of sections other than that from which the car or train is taking current, and signals mechanically connected with the switches.

4. A safety-block railway system, which comprises a feeder or main, track or service rails, a sectional power-conductor on one side of said track-rails independent of said rails, branch connections between the sections thereof and the main, switches which normally close the said connections, an auxiliary sectional conductor on the other side of the said track-rails independent of said rails, collectors on opposite sides of the car and interconnected so as to connect the two sectional conductors together, and electromagnets connected with said auxiliary conductor and energized successively as the car or train proceeds, to open the switches of sections other than that from which the car or train is taking current.

5. A safety-block electric railway, which

comprises a feeder or main, a sectional conductor, electromagnetic switches which normally connect the sections thereof with the main, suitable connections for the electromagnets whereby the switches are automatically opened upon the passage of a car or train to prevent the too close approach of two cars or trains, and signals mechanically connected to said switches for the purpose of indicating the condition of the sections controlled by said switches.

In witness whereof I have hereunto set my hand this 30th day of July, 1901.

WILLIAM B. POTTER.

Witnesses:
BENJAMIN B. HULL,
MARGARET E. WOOLLEY.