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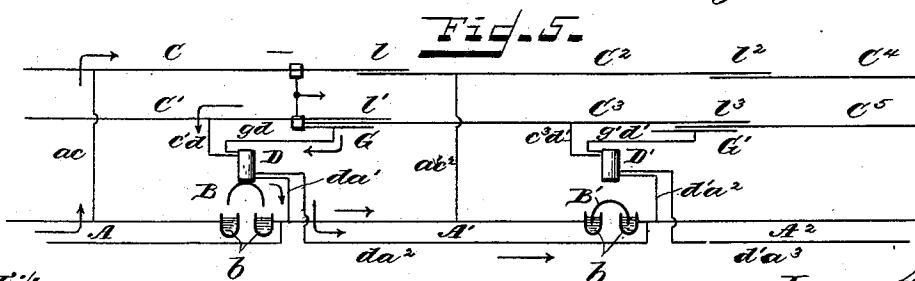
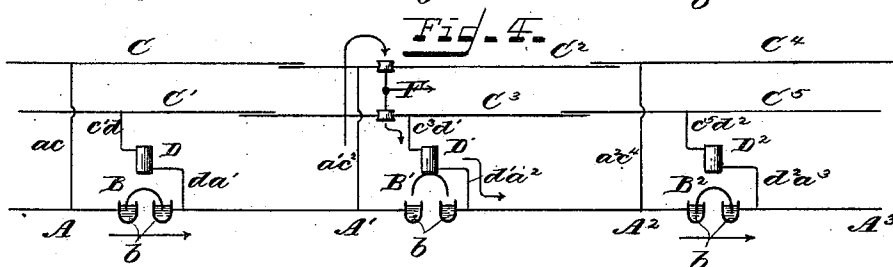
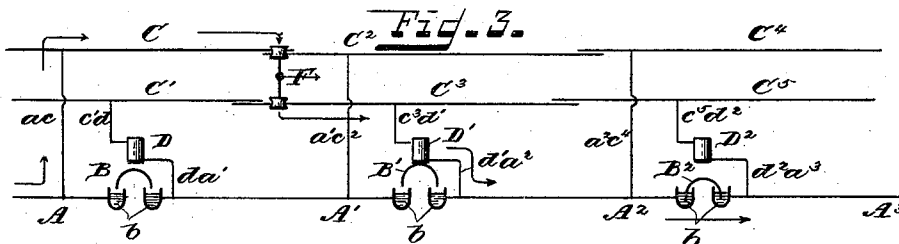
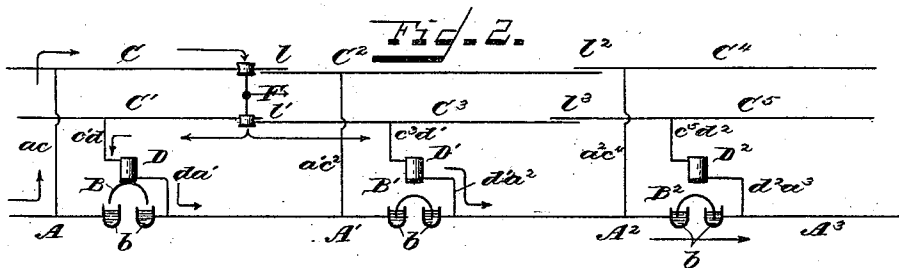
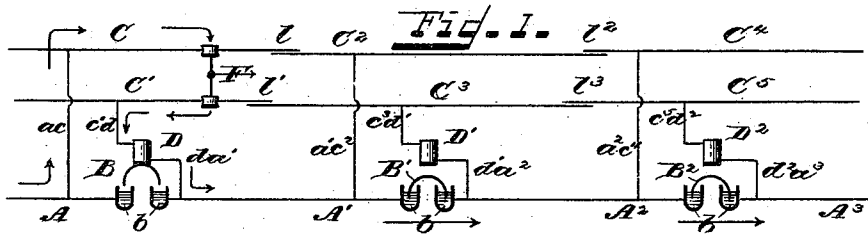
4 Sheets—Sheet 1.

N. W. PERRY.

SYSTEM OF ELECTRIC DISTRIBUTION FOR MOVING TRANSLATING DEVICES.

No. 466,368.

Patented Jan. 5, 1892.



Witnesses.

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Inventor.

Nelson W. Perry,
per
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(No Model.)

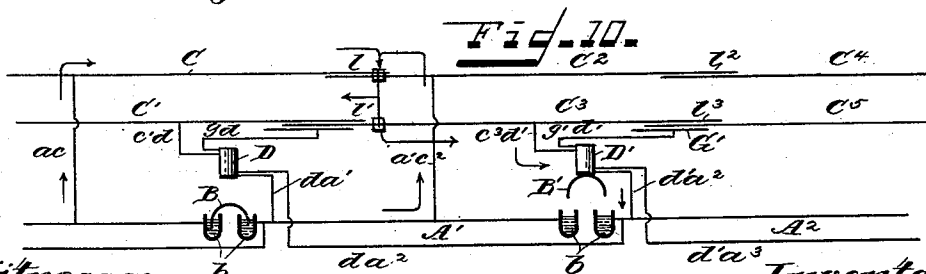
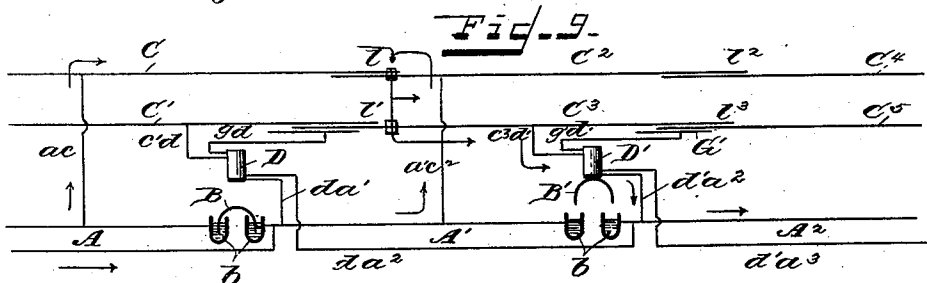
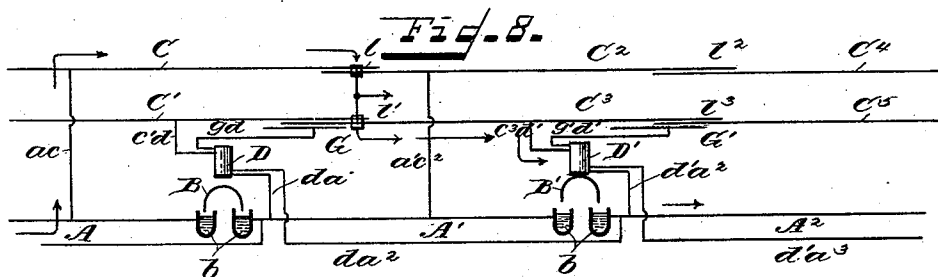
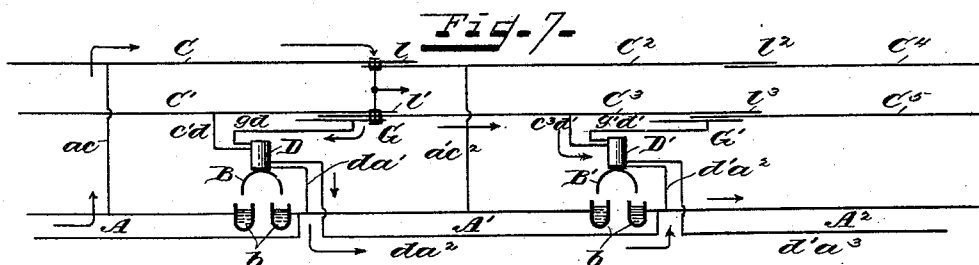
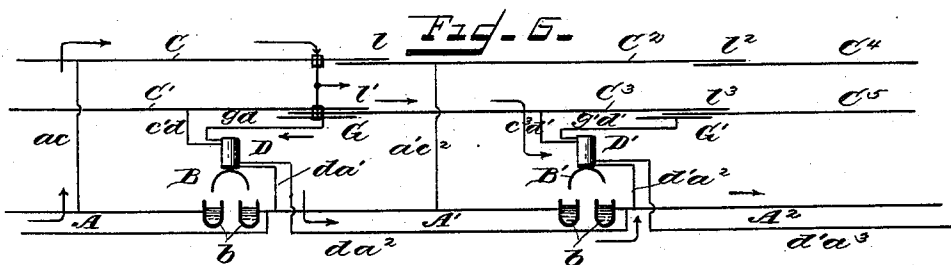
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(No Model.)

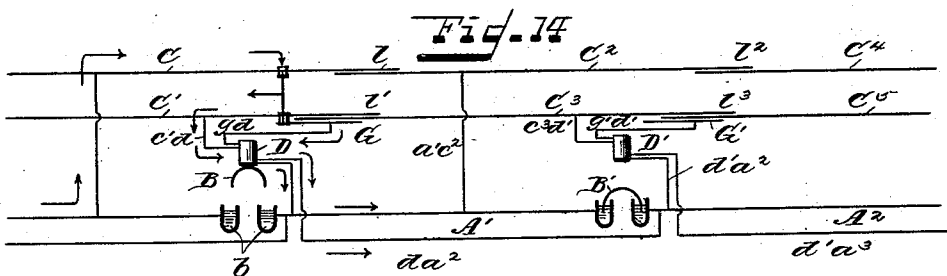
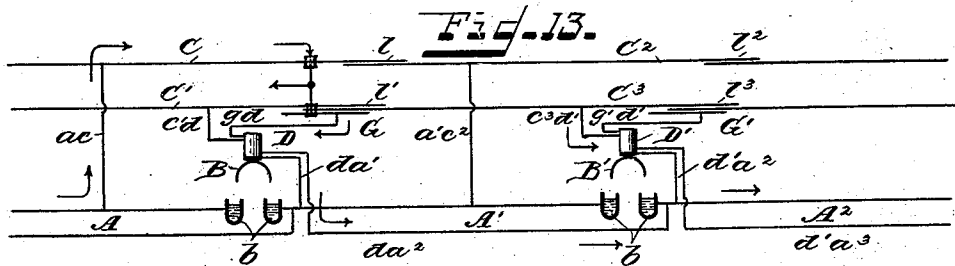
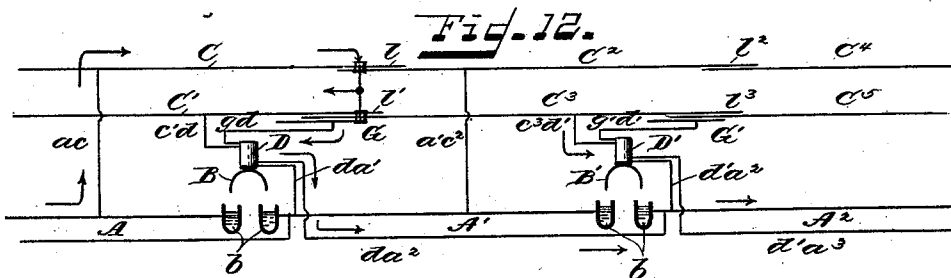
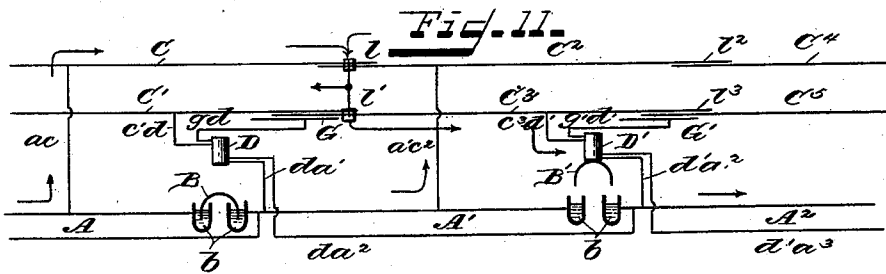
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SYSTEM OF ELECTRIC DISTRIBUTION FOR MOVING TRANSLATING DEVICES

No. 466,368.

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(No Model.)

4 Sheets—Sheet 4.

N. W. PERRY.

SYSTEM OF ELECTRIC DISTRIBUTION FOR MOVING TRANSLATING DEVICES.

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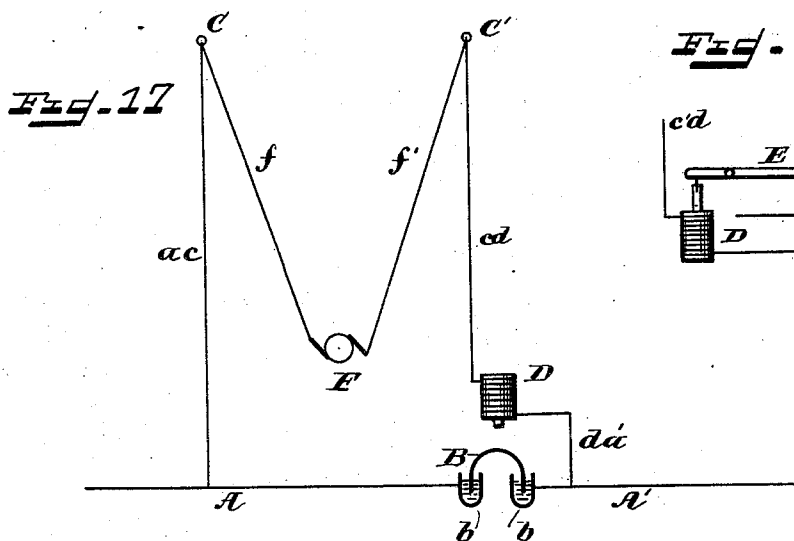


Fig. 15.

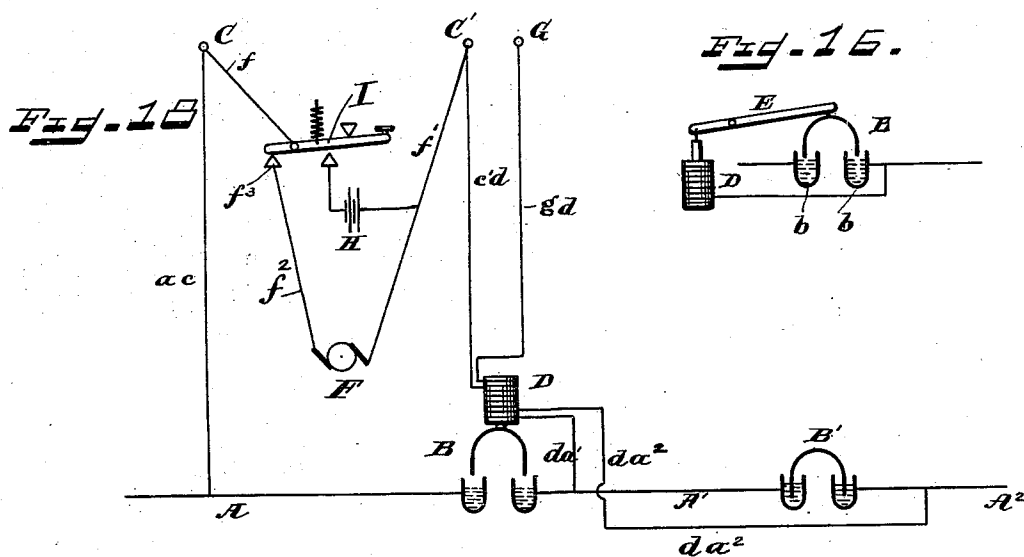
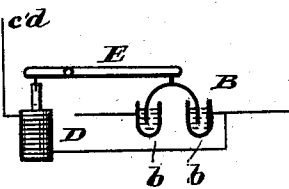
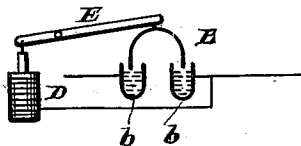


Fig. 16.



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UNITED STATES PATENT OFFICE.

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SYSTEM OF ELECTRIC DISTRIBUTION FOR MOVING TRANSLATING DEVICES.

SPECIFICATION forming part of Letters Patent No. 466,368, dated January 5, 1892.

Application filed April 2, 1891. Serial No. 387,330. (No model.)

To all whom it may concern:

Be it known that I, NELSON W. PERRY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Systems of Electric Distribution for Moving Translating Devices, of which the following is a specification.

My invention relates to the distribution of electricity by a current which remains constant in quantity, while the transmitting devices are arranged in series with each other and with the dynamos.

In my application for Letters Patent of the United States for an improvement in systems of electric distribution filed March 2, 1891, Serial No. 383,350, I have described a system of electric distribution which involves the employment of a current-conveyer made in sections, each section being normally connected electrically with the adjacent sections, two lines of working conductors arranged in pairs, each working conductor being normally insulated from the others, switches normally connecting the sections of the main current-conveyer, provisions for automatically opening the switches and diverting the current from the main current-conveyer in such manner that it will pass through the translating device and return to the normal circuit, and means for maintaining the continuity of the current.

The present invention is designed as an improvement upon the system therein set forth; and it consists in the improved system of distribution hereinafter set forth and in the various circuits and instrumentalities employed in the practical operation of the system.

I have illustrated my invention as applied to an electric railway.

In the drawings, Figure 1 is a diagrammatic view representing my invention applied to a double-track road and showing several sections of the main current-conveyer and several pairs of the working conductors with their connections. Figs. 2, 3, and 4 are like views showing the motor in different positions relatively to the switches which connect the sections of the main current-conveyer. Figs. 5, 6, 7, 8, and 9 are diagrammatic views representing my invention as applied to a single-track road and showing the paths of the

current with the motor in several positions relatively to the switches as it travels from left to right. Figs. 10, 11, 12, 13, and 14 are like views showing the paths of the current as the motor travels from right to left. Fig. 15 shows a preferred form of switch. Fig. 16 shows the switch open. Fig. 17 is a diagrammatic view showing the trolley and switch connections. Fig. 18 is a like view showing also a local battery.

A A' A² represent sections of the main current-conveyer or normal circuit. Each of these sections has at its ends mercury-cups *b*, separated by a space from the cups at the ends of the adjacent sections. Into the pairs of adjacent cups normally take U-shaped double-pole contacts B B' B², &c., which bridge the spaces between the sections and render them electrically continuous.

C C² C⁴, &c., represent one line of working conductors, and C' C³ C⁵, &c., another line. Each line of working conductors may be made mechanically continuous by connecting the adjacent ends with insulating material.

D D' D², &c., are solenoid magnets, whose armatures are connected with levers E, with which the forks B are also connected. These magnets are adapted when vitalized to lift the forks from the mercury-cups, thereby opening the switches.

Section A of the main conveyer is electrically connected with working conductor C by means of a wire *ac*, and section A' with working conductor C² by a wire *a'c²*, &c. Working conductor C' is connected with section A' of the main conveyer through wire *c'd*, magnet D, and wire *da*, and working conductor C³ with section A² through wire *c³d'*, magnet D', and wire *d'a²*.

F is a motor provided with trolleys *f* and *f'* or other current-gathering devices and adapted to contact with one of the lines of working conductors. Each working conductor laps the adjacent conductors of the same line, as shown at *l*, *l²*, *l'*, and *l³*. The laps are so arranged that with the car traveling in the direction of the main current one trolley-wheel will embrace the lap of the wire connected with the switch before the other trolley-wheel reaches the other lap, and that the trolley-wheel first to embrace a lap will not pass from that lap before the other trolley-wheel em-

braces its lap. It results that the motor is never without current. With the electrical connections as above described, and a motor upon the sections C C' of the working conductors and in series with the generator or dynamos, the path of the current will be through section A of the normal circuit, wire ac, working conductor C, trolley f, motor F, trolley f', working conductor C', wire c'd, magnet D, and wire da' to section A' of the normal circuit. When the trolley f' reaches a lap l', the current, after passing through the motor, momentarily divides, part continuing its former course and part going *via* working conductor C³, wire c³d', magnet D', and wire d'a² to the normal circuit. The latter current will energize the magnet D' and open switch B'. When switch B' is opened, the current through magnet D will be cut out of circuit and fork B will drop, closing the switch; but the trolley f will then be in contact with the lap l, and the current will continue through working conductors C and C³ and magnet D' to section A² of the main current-conveyor. When the trolley f passes from its lap l, the switch B being closed and the switch B' open, the path of the current will be through normal circuit-sections A and A', wire a'c², working conductor C², trolley f, motor F, trolley f', working conductor C³, wire c³d', magnet D', and wire d'a² to section A² of the normal circuit.

The arrangement thus far described is applicable when cars are to be run in but one direction, as in belt-lines or double-track roads. To adapt the system for use in running cars in different directions upon the same track additional provisions are requisite. G G' G² are supplemental conductors arranged parallel with but insulated from the working conductors C' C³ C⁵. The supplemental conductors and the laps in the working conductors are so placed relatively to each other that when a car is traveling in the direction of the main current, as the trolleys approach a lap the trolley traveling upon the line of working conductors connected with the switch will contact with the supplemental conductor before reaching the lapping portion of the working conductors, and the companion trolley will reach its lap after the first trolley has reached its lap and before it has passed beyond the supplemental conductor, while with the car traveling in the opposite direction the order will be reversed, the trolley upon the line of working conductors not connected with the switch first reaching its lap, after which its companion trolley reaches first its lap and afterward the supplemental conductor. For example, as the trolleys traveling in the direction of the current approach the laps l l', trolley f' first contacts with supplemental conductor G with the lapping portion of working conductor C³. After f' is in contact with C³ and before it has passed beyond either C' or G, trolley f contacts with the lapping portion of C² and main-

tains its contact with the lap l until f' has passed beyond the supplemental conductor and the lap l'. When the trolleys approach the laps in the opposite direction, the order of contact is reversed, trolley f reaching its lap first and maintaining contact with the lap until trolley f' has reached in succession its lap and the supplemental conductor and passing from its lap before f' has passed from its lap or from the supplemental conductor. The magnets which control the switches are wound with two independent coils of wire, the coils being wound in the same direction and insulated from each other. The connections of one coil (hereinafter called "coil 1") are the same as represented in Figs. 1 and 17. Coil 2 is connected at one end with the supplemental conductor G by a wire gd, and at the other end with the main circuit by a wire da², taking around the switch B⁴, as shown in Figs. 5 and 18, short-circuiting switches B and B'. When the trolleys of a motor traveling with the current are in contact only with opposite sections of the working conductors, the path of the current is the same as shown in Fig. 1. When the trolley f' contacts with G, the current, after passing through the motor, divides, part following its old course through c'd, coil 1, and da' to A', and part passing *via* supplemental conductor G, wire gd, coil 2, and wire da² to A². When the trolleys embrace C, C', C³, and G, three paths are momentarily open to the current, the two just mentioned and a third through C³, wire c³d', coil 1 of magnet E', and wire d'a² to the main circuit. The latter current will vitalize the magnet D' and lift fork B'. This stops the current through coil 1 of magnet D; but the circuit through supplemental conductor G and coil 2 to main circuit-section A² is still closed. When the trolleys embrace the sections C, C², C', and C³ and the supplemental conductor G, the courses of the currents remain the same. When the trolley leaves G, magnet D is cut out of circuit and allows fork B to drop, thereby closing the switch. While the fork is dropping, the circuit is maintained through working conductor C, motor F, working conductor C³, wire c³d', coil 1 of magnet D', and wire d'a² to the main circuit. When the trolley has passed the lap l, the switch B will have closed, and the current passes through sections A and A' of the normal circuit, wire a'c², working conductor C², the motor, working conductor C³, wire c³d', coil 1 of magnet D', and wire d'a² to section A² of the normal circuit. When the car is traveling in the opposite direction, the currents pass through their various paths in reverse order.

To avoid the inconvenience which might result if the trolleys should be disengaged from the working conductors or the motor be in any way cut out of series while the car is between laps, I prefer to provide means for opening the switches from the car. For this purpose one of the trolleys may be provided

with a two-way switch, one of the connections from which is through the motor and the other through a local battery traveling with the car to the other trolley, the normal position of the switch being such as to keep the motor in circuit and the battery out of circuit. In the form shown H, Fig. 19, represents a battery carried by the car. One pole of this battery is connected with trolley f' , while the other is connected with a contact h , adapted to be engaged by a key I, but normally out of engagement therewith. The trolley connection f is divided, one part f being connected with the key I and the other part f^2 being provided with a contact f^3 , normally in engagement with the key I. By actuating the switch the battery is brought into circuit and a current established through the magnet, which controls the section upon which the motor is. The switch is thereby opened, and the key being released the motor is thrown into series.

I claim—

1. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, and two lines of conductors arranged in pairs, the conductors in each line lapping but normally insulated from each other and the members of each pair being connected one with one section and the other with another section of the main conveyer, substantially as and for the purpose specified.

2. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, magnets controlling the switches, and two lines of conductors arranged in pairs, the conductors in each line lapping but normally insulated from each other and the members of each pair being connected one with one section and the other with another section of the main conveyer, substantially as and for the purpose specified.

3. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, magnets controlling the switches, and two lines of conductors arranged in pairs, the conductors in each line lapping but normally insulated from each other and the members of each pair being connected one with one section and the other through the switch-controlling magnet with another section of the main conveyer, substantially as and for the purpose specified.

4. The combination, in a system of distribution for movable translating devices, of a sectional current-conveyer, two lines of working conductors arranged in pairs, the conductors in each line lapping but normally insulated from each other and the members of each pair being connected one with one section and the other with another section of the main

conveyer, and switches normally closing the gaps between the sections of the main conveyer, adapted to be opened as the terminals of a translating device make contact with a pair of working conductors and closed as the terminals break contact with the pair, substantially as and for the purpose specified.

5. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, mercury-cups at the ends of each section thereof, forked arms normally taking into the adjacent mercury-cups, magnets adapted when vitalized to withdraw the forked arms from the mercury-cups, and two lines of conductors arranged in pairs, the members of a pair being connected one to one section and the other to another section of the main conveyer and each conductor lapping the succeeding conductor of the same line, substantially as and for the purpose specified.

6. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, two lines of working conductors arranged in pairs, each conductor lapping the succeeding conductor in the same line but normally insulated therefrom and each member of a pair being connected with a separate section of the main conveyer, supplemental conductors adjacent to but normally insulated from the lapping portions of one line of conductors, and electrical connections between the supplemental conductors and the main conveyer, substantially as and for the purpose specified.

7. The combination, in a system of electric distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, magnets controlling the switches, two lines of working conductors arranged in pairs, each conductor lapping the succeeding conductor in the same line, but normally insulated therefrom, and each member of a pair being connected with a separate section of the main conveyer, supplemental conductors adjacent to but normally insulated from the lapping portions of one line of conductors, and electrical connections between the supplemental conductors and the main conveyer, substantially as and for the purpose specified.

8. The combination, in a system of electrical distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, supplemental conductors adjacent to but normally insulated from the lapping portions of one line of conductors and electrical connections between the supplemental conductors and the main conveyer, magnets wound with two coils of wire controlling the switches, two lines of working conductors arranged in pairs, each conductor lapping the succeeding conductor in the same line, but insulated therefrom, a connection between one member of

each pair and one section of the main conveyer, a connection between the other member of the pair through one coil of the switch-controlling magnet and another section of the main conveyer, supplemental conductors adjacent to but normally insulated from the lapping portion of one line of working conductors, and a connection between the supplemental conductors and the main conveyer through the other coil of the switch-controlling magnet, substantially as and for the purpose specified.

9. The combination, in a system of electrical distribution for movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, magnets wound with two coils of wire controlling the switches, two lines of working conductors arranged in pairs, each conductor lapping the succeeding conductor in the same line but insulated therefrom, a connection between one member of each pair and one section of the main conveyer, a connection between the other member of the pair through one coil of the switch-controlling magnet and another section of the main conveyer, supplemental conductors adjacent to but normally

insulated from the lapping portions of one line of working conductors, and a connection between the supplemental conductors and the main conveyer through the other coil of the switch-controlling magnet, short-circuiting a second switch and taking around the next adjacent switch, substantially as and for the purpose specified.

10. The combination, in a system of electric distribution of movable translating devices, of a sectional current-conveyer, switches normally closing the gaps between the sections, magnets controlling the switches, two lines of conductors arranged in pairs, the conductors in each line lapping but normally insulated from each other and the members of each pair being connected one with one section and the other with another section of the main conveyer, and a source of electricity traveling with the translating device adapted to be thrown in circuit with the switch-controlling magnets, substantially as and for the purpose specified.

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Witnesses.

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