

(No Model.)

M. W. DEWEY.

CONVERTER SYSTEM FOR ELECTRIC RAILWAYS.

No. 465,359.

Patented Dec. 15, 1891.

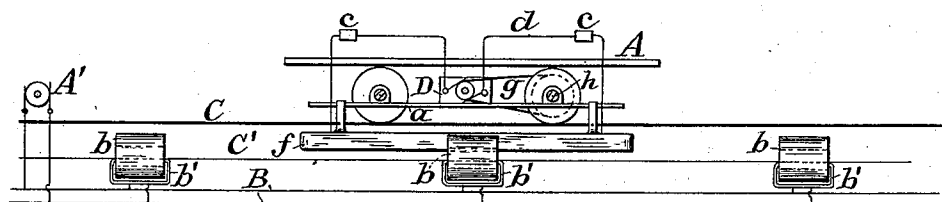


Fig. 1.

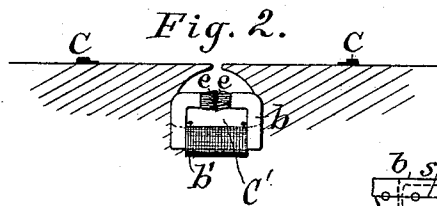


Fig. 2.

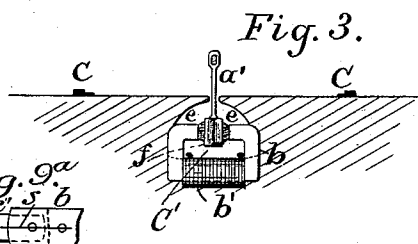


Fig. 3.



Fig. 9a.

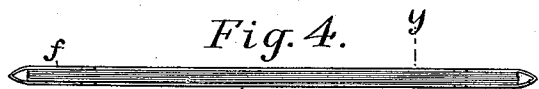


Fig. 4.



Fig. 5.

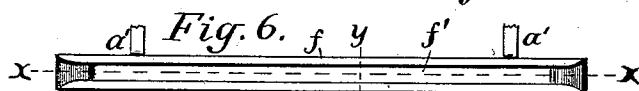


Fig. 6.



Fig. 8.

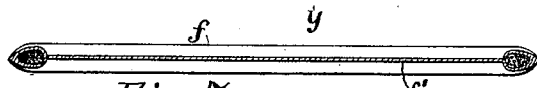


Fig. 7.

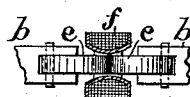


Fig. 9.

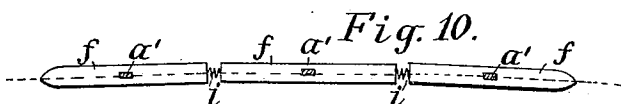


Fig. 10.

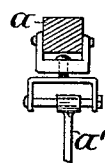


Fig. 12.

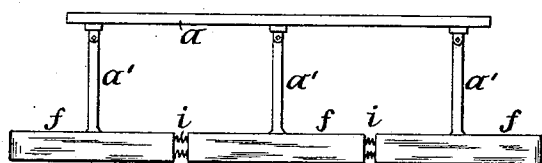


Fig. 11.



Fig. 13.

WITNESSES:

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INVENTOR,

Mark W. Dewey,
By Quell, Loasby & Quell,
his ATTORNEYS.

UNITED STATES PATENT OFFICE.

MARK W. DEWEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE DEWEY CORPORATION, OF SAME PLACE.

CONVERTER SYSTEM FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 465,359, dated December 15, 1891.

Application filed May 11, 1891. Serial No. 392,263. (No model.)

To all whom it may concern:

Be it known that I, MARK W. DEWEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Electric Railways, (Case No. 91,) of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to electric induction railways the same or similar to that shown and described in a prior application of mine, Serial No. 315,457, filed June 25, 1889; and the object is to provide cores for the primary or road-bed coils that will form and maintain closed magnetic circuits.

By employing normally-closed magnetic circuits of proper conductivity for the primary coils there is less waste of energy, as the counter electro-motive force generated thereby in the said coils render them virtually non-conductors, and therefore prevent, to a great extent, the alternating current short-circuiting through them. These cores are constructed so that the secondary coil on the vehicle and its core also, if one is used, may be placed in proper inductual relation to them successively, as set forth in my system above referred to. When the secondary coil is brought in inductual relation to one or more of the primary cores and the circuit containing the secondary coil is closed, the counter electro-motive force is decreased or neutralized to a great extent, proportionally to the amount of work being done, and current is generated in the secondary circuit, as required.

To this end my invention consists in the combination, in an electric railway, of a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a vehicle, a conductor upon the vehicle to be placed in inductual relation to the magnetic circuits successively, and an electric motor to move the vehicle in circuit with the latter conductor.

My invention consists, further, in the combination of a source of irregular or alternating currents, conductors extending therefrom,

a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a vehicle, circuit on the vehicle, a coil in the circuit, a magnetizable core in the coil, suitable devices to permit the said core to be placed in the magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

My invention consists, still further, in an electric railway, of a source of irregular or alternating currents, conductors extending therefrom along the railway, a series of coils placed at intervals along said railway and connected in parallel with said conductors, a slotted conduit along the railway, slotted iron cores for the coils, iron brushes to maintain normally-closed magnetic circuits, a vehicle, a circuit carried by the vehicle and in the conduit to enter the slotted cores successively, and an electric motor in the circuit to move the vehicle.

My invention consists, also, in certain other combinations of parts hereinafter described, and specifically set forth in the claims.

In the drawings, Figure 1 is a side elevation, partly in section, of an electric railway and a motor-car embodying my invention. Fig. 2 is a cross-section of the railway, showing a core when in its normal condition or when the vehicle-circuit is not in inductual relation. Fig. 3 is also a cross-section of the railway, but with the vehicle-coil in inductual relation to the core. Fig. 4 is a plan view of a vehicle-coil. Fig. 5 is a cross-section of Fig. 4 on line *yy*. Fig. 6 is a side elevation of another form of vehicle-coil and core. Fig. 7 is a sectional view on line *xx* of Fig. 6. Fig. 8 is a cross-section on line *yy* of Fig. 6. Fig. 9 shows a cross-section of a coreless vehicle-coil and a modified construction to maintain a normally-closed magnetic circuit. Fig. 9^a is a plan view of the ends of a stationary core having iron bars pivoted thereto. Fig. 10 is a plan view of a sectional vehicle-coil. Fig. 11 is a side elevation of the same. Fig. 12 is a form of hanger for the vehicle-coil, and Fig. 13 shows a form of coupling for the sections.

Referring specifically to the drawings, A in the figures represents the vehicle or car,

A' the source of irregular or alternating currents, and B the supply or line conductors connected to the source and extending along the railway or track C.

5 *b b b* are rectangular iron cores or closed magnetic circuits placed at intervals along the railway, preferably equal distances apart and at right angles to the rails. Said cores are preferably placed within or partially
10 within a slotted conduit C', running parallel with the railway and between the rails thereof.

I do not limit myself to any particular distance between two of said cores; but they
15 may be placed apart about the length of a car with good results. A yielding passage is provided through the upper side of each of said cores to allow the secondary coil or coils *f*, suspended from the car A, to enter, in order
20 that said coil or coils *f* may be in proper inductive relation to the primary cores during the movement of the car. The said yielding passage is preferably made by fixing iron brushes *e e* to the ends of the solid portion of
25 the core *b*, so that they will extend toward and be in contact with each other when in their normal condition or when a vehicle-core is not between them. *b' b' b'* are coils wound upon the said cores. These coils are con-
30 nected in parallel with the line conductors.

d is the vehicle-conductor or the secondary circuit upon the car.

D is the electric motor in the vehicle-conductor, and *c c* indicate current-regulators.
35 The motor is shown connected to the driving-axle *h* by a belt or chain *g*; but said motor may be of course connected to the driving-axle by any suitable gearing or means.

In the vehicle-circuit is an elongated coil *f*
40 about the length of the vehicle and suspended in a horizontal position in the conduit from the truck-frame *a* of the vehicle. The coil is made long, so that the primary coils may be placed farther apart, and to allow the car to
45 be moved a considerable distance while its coil is in inductive relation to a single primary coil. The vehicle-coil is made narrow, so that the conduit may be small, and in order that the yielding paths through the cores may
50 be narrow and the brushes short. The coil is provided with pointed ends to obviate resistance when entering between the brushes. A vehicle-core *f'* may or may not be provided for the coil *f*.

55 In Figs. 4 and 5 the core is shown as long as the width of the coil; but in Figs. 6, 7, and 8 it is very thin or I-shaped, to further decrease resistance to its movement, except at its ends, where the coil necessarily occupies more space.

60 In Fig. 9 a vehicle-coil is shown without a core to still further decrease resistance and to obtain a very light construction or to allow a larger coil to be used. In the same figure I show iron bars *e' e'* pivoted to the ends of the
65 core *b* in the place of the brushes. These bars will be attracted toward each other by the magnetism therein and will keep the cir-

cuit closed; but suitable springs *s s* may be used to assist their movement, if desired, as indicated in Fig. 9^a.

In railways having curves and primary
70 cores distributed widely apart I divide the vehicle-coil into sections or several small coils, as desired, and place flexible couplings or connections between the sections, so that the
75 coil may conform to the curve and readily enter the yielding paths through the primary cores.

In Figs. 10 and 11, springs *i* are shown between the sections to allow the required flexi-
80 bility; but in Fig. 13 said sections are connected together by a slotted pivoted joint. As it is necessary when employing a sectional coil to make provision for the movements of the hangers *a'* supporting the coil, I provide
85 a jointed hanger the same or similar to that shown in Fig. 12. Each section of coil is suspended from the truck-frame *a* by a hanger extending downward therefrom to the center of the section. Said hanger is jointed at its
90 upper end in any well-known manner, so that it will remain perpendicular, but be capable of movement from side to side and upon a vertical axis.

I do not limit myself to the precise details
95 of construction shown and described herein, as they may be modified in various ways without departing from my invention.

Having shown and described herein sub-
ject-matters not claimed, I wish it to be under-
100 stood that any such matters are not dedicated to the public, but form the subject-matter of claims of pending applications, Serial Nos. 296,119 and 313,457, of 1889, and No. 369,002, of 1890.

Having described my invention, what I
claim as new, and desire to secure by Letters
Patent, is—

1. In an electric railway, a source of irregu-
lar or alternating currents, conductors extend-
110 ing therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a vehicle, a
115 conductor upon the vehicle to be placed in inductive relation to the magnetic circuits successively, said conductor being entirely movable, and an electric motor to move the vehicle in circuit with the latter conductor.

2. In an electric railway, a source of irregu-
lar or alternating currents, conductors extend-
120 ing therefrom, a stationary coil connected in circuit with said conductors, a normally-closed magnetic circuit for said coil, a vehicle, a circuit carried entirely upon the vehicle, suit-
125 able devices whereby the latter circuit may be moved in inductive relation to the said magnetic circuit, and an electric motor in the circuit on the vehicle to move the same.

3. In an electric railway, a source of irregu-
lar or alternating currents, conductors extend-
130 ing therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed

magnetic circuit for the coils, a vehicle, a circuit on the vehicle, a coil in the circuit, suitable devices to allow the coil to move into and out of inductive relation with the said magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

4. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuit for the coils, a vehicle, a circuit on the vehicle, a coil in the circuit, a magnetizable core in the coil, suitable devices to permit the said core to be placed in the magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

5. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom along the railway, a series of coils placed at intervals along said railway and connected in parallel with said conductors, a slotted conduit along the railway, normally-closed magnetic circuits for the coils within the conduit, a vehicle, a circuit on the vehicle, a coil in the circuit, suitable devices to allow the coil to move into and out of inductive relation with the said magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

6. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a flexible or yielding path through each magnetic circuit, a vehicle, a conductor on the vehicle and in said path, and an electric motor to move the vehicle in circuit with the latter conductor.

7. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom along the railway, a series of coils placed at intervals along said railway and connected in parallel with said conductors, a slotted conduit along the railway, normally-closed magnetic circuits for the coils within the conduit, a flexible or yielding path through each magnetic circuit in the conduit, a vehicle, a circuit carried by the vehicle and in said path, and an electric motor in the circuit to move the vehicle.

8. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, slotted iron cores for the coils, iron brushes to maintain

normally-closed magnetic circuits, a vehicle, a circuit carried by the vehicle to enter the slotted cores successively, and an electric motor in the circuit to move the vehicle.

9. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom along the railway, a series of coils placed at intervals along said railway and connected in parallel with said conductors, a slotted conduit along the railway, slotted iron cores for the coils, iron brushes to maintain normally-closed magnetic circuits, a vehicle, a circuit carried by the vehicle and in the conduit to enter the slotted cores successively, and an electric motor in the circuit to move the vehicle.

10. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a vehicle, a circuit on the vehicle, a coil divided into sections in the circuit, suitable devices to allow the coil to move into and out of inductive relation with the said magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

11. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, normally-closed magnetic circuits for the coils, a vehicle, a circuit on the vehicle, a coil divided into sections in the circuit, flexible or yielding couplings between the sections, suitable devices to allow the coil to move into and out of inductive relation with the said magnetic circuits successively, and an electric motor in the circuit to move the vehicle.

12. In an electric railway, a source of irregular or alternating currents, conductors extending therefrom, a series of coils placed at intervals along said railway and connected in parallel with said conductors, slotted iron cores for the coils, iron brushes to maintain normally-closed magnetic circuits, a vehicle, a circuit carried by the vehicle, a coil in the circuit, an iron core in the coil to enter the slotted cores successively, and an electric motor in the circuit to move the vehicle.

In testimony whereof I have hereunto signed my name this 8th day of May, 1891.

MARK W. DEWEY. [L. S.]

Witnesses:

C. L. BENDIXON,
H. M. SEAMANS.