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L. E. FREEDLEY.

ELECTRIC OPERATING MECHANISM FOR VEHICLES.

No. 518,781. Patented Apr. 24, 1894.

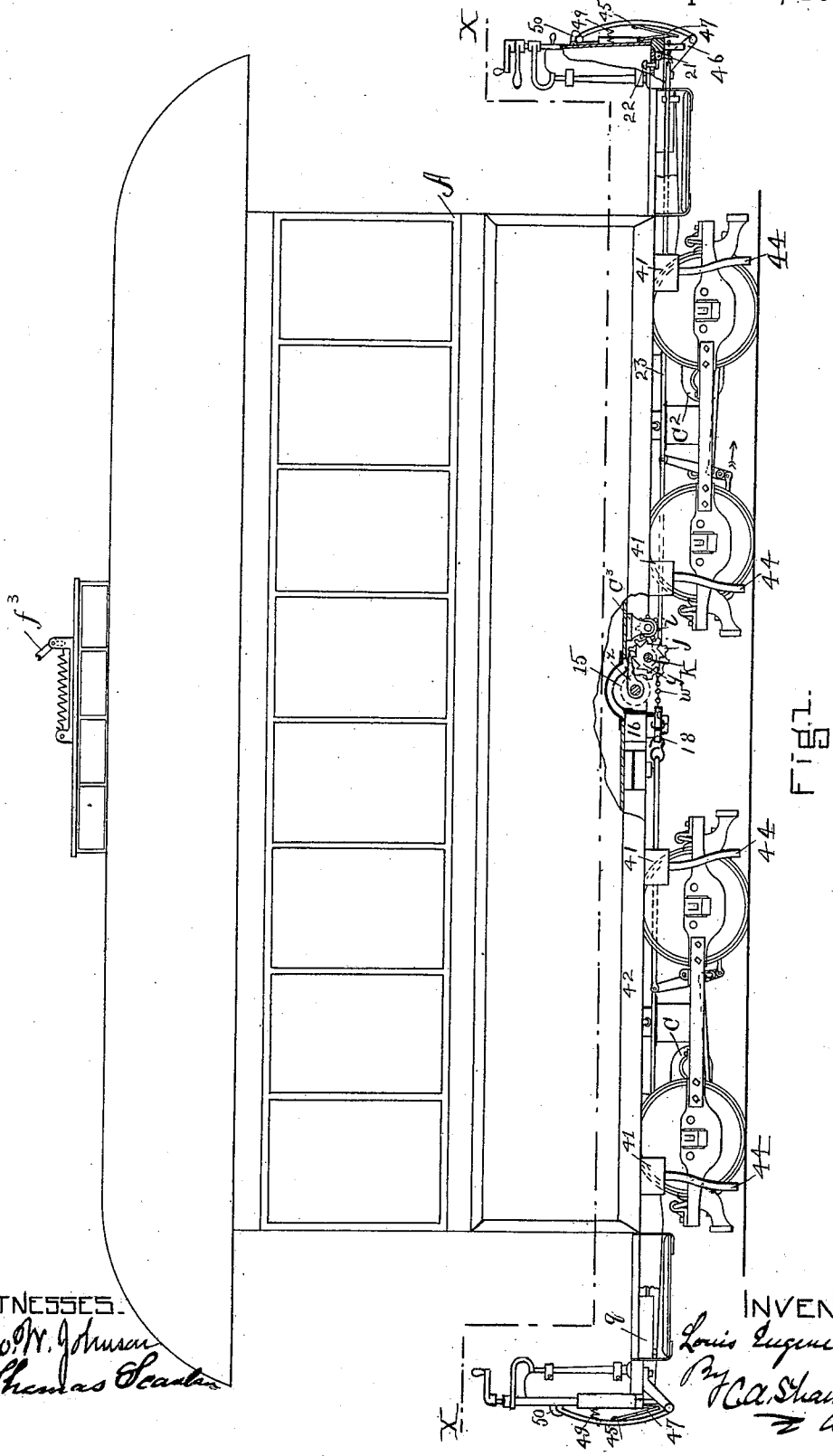

Fig. 1.

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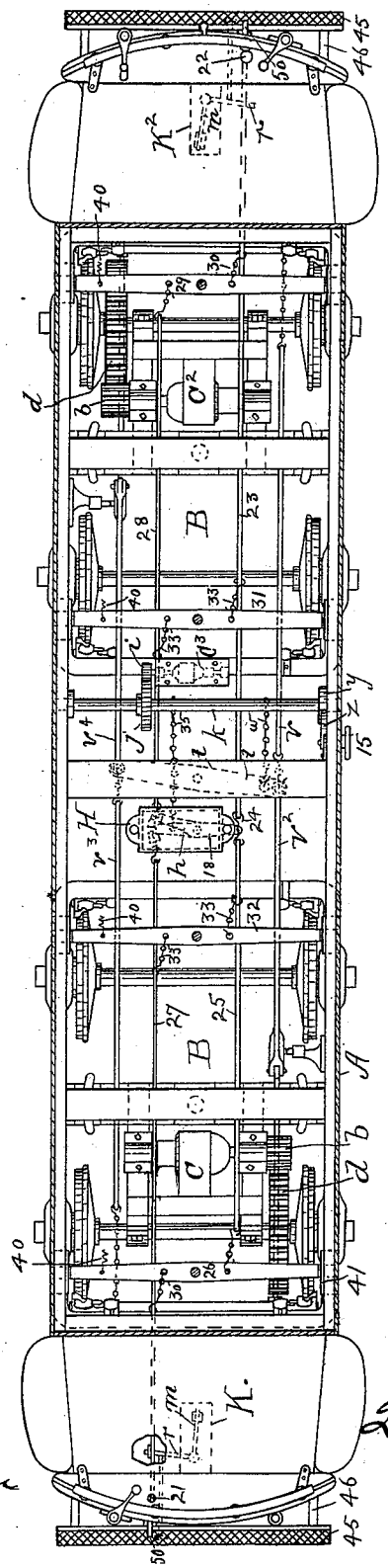

Fig. 2.

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ELECTRIC OPERATING MECHANISM FOR VEHICLES.

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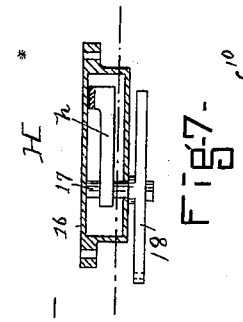

Fig. 7.

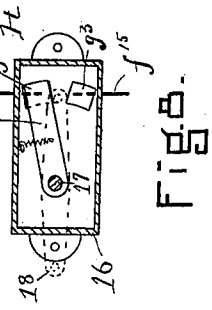

Fig. 8.

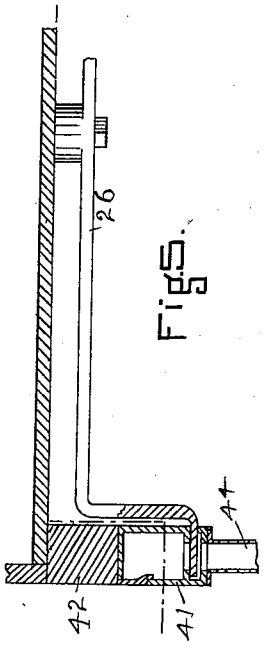

Fig. 5.

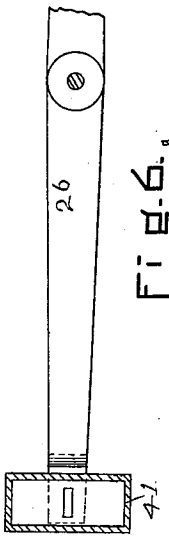

Fig. 6.

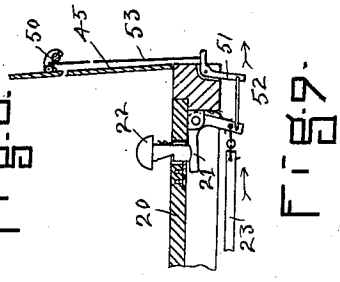

Fig. 9.

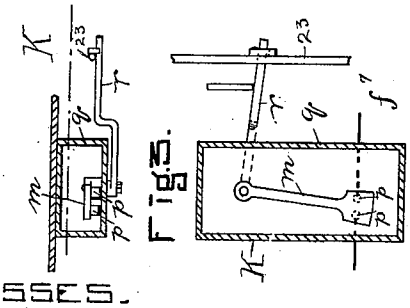

Fig. 3.

Fig. 4.

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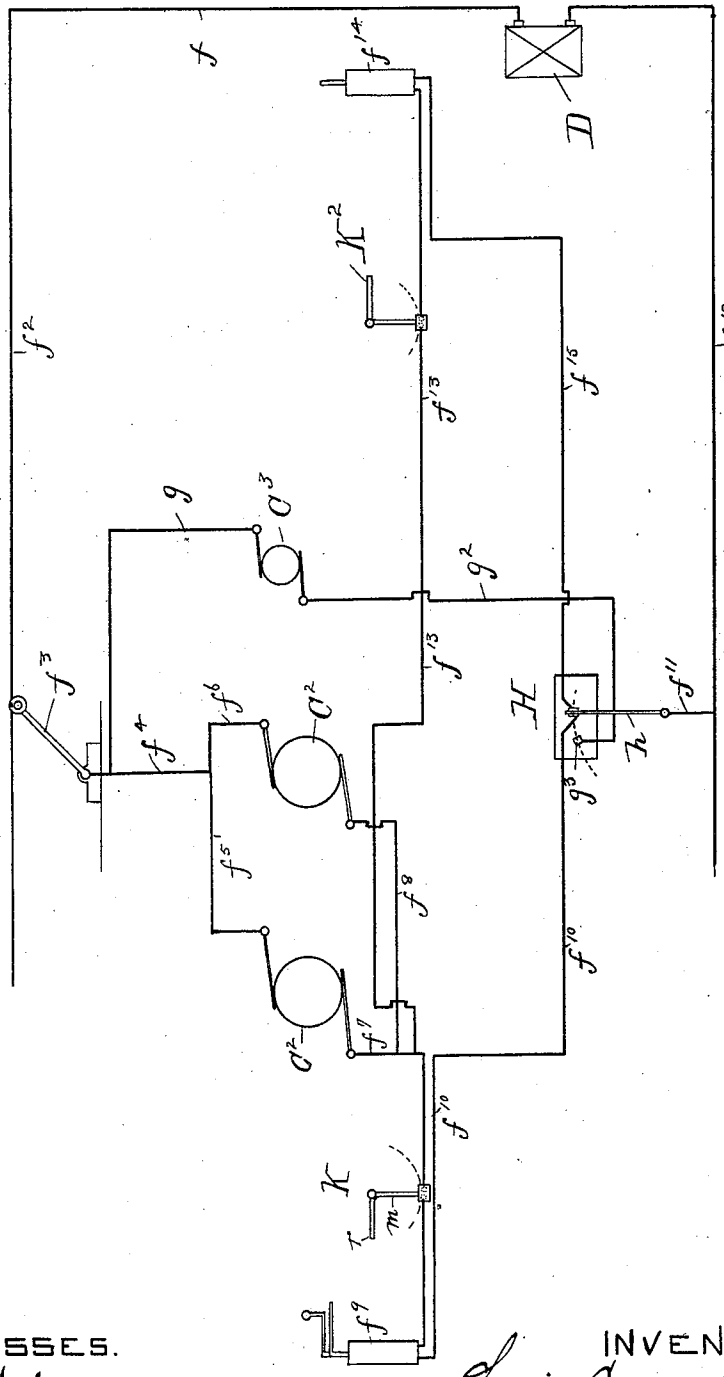

FIG. 10.

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UNITED STATES PATENT OFFICE.

LOUIS EUGENE FREEDLEY, OF BOSTON, MASSACHUSETTS.

ELECTRIC OPERATING MECHANISM FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 518,781, dated April 24, 1894.

Application filed December 29, 1893. Serial No. 495,026. (No model.)

To all whom it may concern:

Be it known that I, LOUIS EUGENE FREEDLEY, of Boston, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Electric Operating Mechanism for Vehicles, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of an electrically propelled street car a portion of the body of the car being represented as broken away to show parts of the brake-mechanism; Fig. 2 a top plan view of the trucks and brake-mechanism the body of the car being shown in horizontal section taken on line, *x*, *x*, in Fig. 1; Figs. 3 and 4 respectively horizontal and vertical sections of the cut out; Figs. 5 and 6 respectively vertical and horizontal sections of the sand-box mechanism; Figs. 7 and 8 like views of the switch; Fig. 9 a sectional elevation of the fender releasing mechanism; and Fig. 10 a diagram illustrating the course of the electric currents in actuating my improved brake-mechanism.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to mechanism for transferring the electric current from the drive-motors of electrically propelled street-cars to a supplemental motor whereby the brake mechanism of the car may be actuated, it being designed particularly for use in case of accident or sudden emergency where it is essential to set the brakes with more rapidity than is practical with the ordinary hand-power brake; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simple, cheap and effective device of this character.

In the drawings, A represents the body of the car which is mounted on the trucks, B, in the usual manner. The drive-motors, C, C^2, are supported on the trucks and wired in the usual way over armature-shafts bearing pinions, *b*, meshing with the gears, *d*, on the car-axles.

The form of car shown in method of applying the current is that of the well known "over-head" trolley system.

In Fig. 10, D, represents the power station from which a line wire, *f*, leads to the trolley-wire, f^2. The trolley, f^3, on the car is in engagement with said wire and the current passes therethrough into the car over wire, f^4, through wires, f^5, and, f^6, to the motors, C, C^2; thence through wires, f^7, and, f^8, to the ordinary rheostat f^9, at one end of the car whereby the current is controlled by the motor-man. Thence through wires, f^{10}, to the switch, H, disposed centrally on the car-bottom and the purpose of which is hereinafter described, thence through wire, f^{11}, to the ground, f^{12}, then, to the power station, D. Or when the cut out is opened at the end of the car described, the current passes from wire, f^7, to wire, f^{13}, to the rheostat, f^{14}, at the opposite end of the car and over wire, f^{15}, to the ground.

In suitable supports on the truck I mount a supplemental motor, C^3, one brush of which is connected by a wire, *g*, with the wire, f^4, the opposite brush being connected by a wire, g^2, with the post, g^3, of the switch, H.

To break the current through the motors, C, C^2, I interpose in wires, f^7, and, f^{13}, cut outs, K, K^2. The construction of these cut outs is shown in detail in Fig. 4. The insulated tongue, *m*, normally connects the post, *p*, so that the current continuously passes therethrough. The cut out is housed in the box, *q*, under the platform of the car and fast to the pivot of its tongue a rod, *r*, projects at right-angles. A pivoted brake-bar, *t*, (see Fig. 2) of the ordinary brake-mechanism is mounted centrally on the truck its ends being connected respectively by rods, *v*, v^2, and, v^3, v^4, with the respective brake-beams, this mechanism being of the ordinary form it is not deemed essential to herein describe it specifically. One shaft, *k*, described, is adjacent said bar and is connected by a chain, *w*, therewith so that when said shaft is rotated it will wind said chain to actuate the bar, *t*. On one end of the shaft a ratchet, *y*, is mounted, engaged by a spring-pushed dog, *z*. The pivot of the dog projects outside the car and a hand-wheel, 15, is mounted thereon whereby the ratchet may be freed after the brakes have

been set. The switch, H, is mounted adjacent the pivoted switch bar, *t*. Said switch is shown in detail in Figs. 7 and 8. The tongue, *h*, is housed in a box, 16, mounted on a pivot, 17, which projects through the bottom of said box. Said tongue is pulled by a spring, and is normally in contact with one of the posts, g^3, or g^4. On the pivot, 17, of the tongue outside the box, 16, a lever, 18, is mounted centrally. Below the car-platform, 20, a bell-crank lever, 21, is pivoted (see Fig. 9). A spring-held plunger, 22, rests upon one arm of said lever and is in position convenient to be depressed by the foot of the motor-man. A rod, 23, is connected with the opposite arm of the bell-crank lever and runs longitudinally of the car, its inner end being linked to one arm of the lever, 18, at, 24. A rod, 25, connects the same arm of said lever with a bar, 26, pivoted on the car body. A similar arrangement of rods, 27, and, 28, connect the bell-crank, 21, at the opposite end of the car and a pivoted rod, 29, respectively with the opposite arm of the switch-lever, 18. The pivoted bars, 26, and, 29, are respectively connected by chains, 30, with the bars, 23 and, 27. Similar pivot-bars, 31, and, 32, are connected by chains, 33, with the rods, 23, 25, 27, and, 28. These pivoted bars are pulled by springs, 40, connected with the bottom of the bar and operate a sand-box mechanism hereinafter described. A flexible strap, preferably in the form of a chain 35, which in connection with the switch tongue constitutes an automatic cut out, connects an arm of the main switch lever, 18, with the winding-shaft, *k*. Said chain is longer than the chain, *w*, and is not designed to be drawn taut by the shaft until after the chain, *w*, has been wound to a determined point, as hereinafter described. Sand-boxes, 41, are mounted on the sills, 42, of the car outside the trucks and from the bottom of each of these boxes a curved spout or discharge pipe, 44, leads, said pipe opening near the track in front of each wheel. The ends of the pivoted bars, 26, are bent or curved downward, and laterally as shown in Fig. 5, and operate as a cut-off for these boxes. Said bars closing the mouth of the discharge, 44, thereof.

To each dasher of the car a curved fender, 45, is pivoted to swing vertically in brackets, 46. Said fender is connected by elbow-levers, 47, with said dasher. A coiled spring, 49, is interposed between the fender and dasher, said spring when the fender is elevated being compressed and tending to throw the same outward. A latch, 50, (see Fig. 9) pivoted on the dasher locks the fender when elevated. A bell-crank lever, 51, pivoted to the platform has one arm connected by a pivoted lever, 52, with the pendent arm of the bell-crank, 21. A vertical rod, 53, connects the opposite arm of the bell-crank, 51, with the latch, 50, so that when the plunger, 22, is depressed by the motor-man said bell-crank, 51, will be operated to release the fender which is thrown outward by its spring, 49, and falls onto the track.

In the use of my improvement, when it is desired to apply power to the brake, the operator depresses the plunger, 22, drawing the rod, 23, or, 27, as the case may be outward. This moves a switch-lever, 18, of the switch, H, until its tongue, *h*, engages the post, g^3, which is out of contact with the wires, f^{10}, and, f^{15}, as shown by the diagram. At the same time the movement of said rod operates the cut out, K^2, throwing its tongue, *m*, out of contact with one of the posts *p*. This breaks the circuit through the motors, C, C^3, throwing the current into the motor, C^3, from the trolley, through wire, *g*, the current passing through wire, g^2, post, g^3, tongue, *h*, and wire, f^{11}, to the ground. Said motor, C^3, is at once set in motion driving the winding shaft, *k*, upon which the chain, *w*, is wound. This actuates the pivoted brake-bar, *t*, moving the brake-rods correspondingly and setting the brakes. Should the motor be driven in this manner too long the chain, *w*, or its connecting mechanism would be liable to become broken or disarranged. To obviate this when the shaft has been rotated sufficiently to set the brakes with a predetermined amount of pressure I arrange the cut-off chain, 35, which simultaneously winds on the shaft, *k*, and at such point will have been taken up sufficiently to move the switch-lever, 18, to the opposite end of which it is connected and disengage its tongue from the post, g^3, breaking the current through the motor, C^3, which at once stops. The shaft, *k*, is held from reciprocating by the dog, *z*, and may be released by means of the hand-wheel, 15. The outward movement of the rod, 23, or, 27, in actuating the mechanism described, has caused the pivoted rod, 29, and the companions connected with said rod, 23, to move in like direction opening the discharges of the sand-boxes, 41, from which sand is delivered immediately onto the tracks in front of the wheels to prevent them from slipping when the brakes have been set as described. When the winding-shaft, *k*, is released from its dog, *z*, the springs, 40, will reciprocate the pivoted rods and close the sand-box.

This invention in its broadest scope is not limited to the use of the sand-boxes or fender, nor to the particular mechanism described for controlling the current or operating the brake-mechanism from the supplemental-motor, the primary feature of my invention being to provide a mechanism for controlling the brakes of an electrically propelled vehicle by means of a supplemental motor charged by an electric current taken from the drive-motors of the vehicle which are simultaneously stopped.

Having thus explained my invention, what I claim is—

1. The combination of a vehicle body, running gear therefor, a driving electric motor

connected with said running gear, a brake mechanism comprising a brake shoe for operating against a wheel of said running gear, a supplemental motor connected with said brake mechanism, electric conductors connected with said motors, mechanism for switching the current alternately into the driving and supplemental motors, mechanism operative from the vehicle body for moving the switch mechanism, and automatic mechanism for breaking the current when the brakes become set, substantially as described.

2. The combination of a vehicle body, running gear therefor, a driving electric motor connected with said running gear, an electric circuit therefor, cut outs therein, a brake mechanism comprising a brake shoe for operating against a wheel of said running gear, a supplemental motor connected with said brake mechanism, a shunt circuit therefor, an electric switch, a spring plunger on the vehicle platform, a bar operated by said plunger and connecting said switch and cut outs to pass the current alternately into the driving and supplemental motors, substantially as described.

3. The combination of a vehicle body, running gear therefor, a driving electric motor connected with said running gear, an electric circuit for said driving motor, a brake mechanism comprising a brake shoe for operating against a wheel of said running gear, a supplemental motor connected with said brake mechanism, a shunt circuit for said supplemental motor, a switch common to both circuits, cut outs for breaking the driving circuit, bars connected at their inner ends with said switch, each bar being connected also with one of said cut outs, and actuators at each end of the car for operating said bars to switch the current alternately into the driving and supplemental motors, substantially as described.

4. The combination of the vehicle body, running gear therefor, a brake mechanism, an electric motor for setting said brake mechanism, an electric circuit passing through said motor, and automatic mechanism for breaking the circuit when the brake becomes set, substantially as described.

5. The combination of a vehicle body, running gear therefor, a brake mechanism comprising a brake for operating against a wheel of said running gear, an electric motor, a rotary winding shaft operated by said motor, a chain connecting said shaft with the brake mechanism, an electric circuit connected with said motor, an electric switch in said circuit, means for operating said motor, and a flexible strap longer than said brake chain connecting said winding shaft with said switch for automatically breaking the circuit when the brake becomes set, substantially as described.

6. The combination of a vehicle body, running gear therefor, a brake mechanism thereon, the shaft, the chain connecting the same with a bar for said brake mechanism, the supplemental motor geared to said shaft, means for shunting the electric current from the drive motor to said supplemental motor, whereby said shaft may be rotated to set the brake, and automatic mechanism for breaking said current when the brake becomes set, substantially as described.

7. The combination of a vehicle body, running gear therefor, a brake mechanism thereon, a switch interposed in the circuit of the drive motor of said vehicle, the supplemental motor having its conducting wires tapping said circuit and connecting with a post of said switch, the rotary winding shaft geared to said supplemental motor, the brake mechanism, a chain connecting a bar of said brake mechanism with said winding shaft, mechanism for operating said switch from the vehicle platform, whereby the current may be shunted to said supplemental motor, and means for connecting said winding shaft with the tongue of said switch, whereby said circuit may be automatically broken, substantially as described.

8. The combination of a vehicle body, running gear therefor, a driving electric motor connected with said running gear, a brake mechanism comprising a brake shoe for operating against a wheel of said running gear, a supplemental motor connected with said brake mechanism, electric conductors connected with said motors, mechanism for switching the current alternately into the driving and supplemental motors, and automatic mechanism for breaking the circuit when the brake becomes set, substantially as described.

9. The combination of a vehicle body, running gear therefor, a brake mechanism thereon, the shaft, the chain connecting the same with a bar of said brake mechanism the supplemental motor geared to said shaft, means for shunting the electric current from the driving motor to said supplemental motor, whereby said shaft may be rotated to set the brake, mechanism for automatically breaking said current, and mechanism for freeing the brake after the same has been set, substantially as described.

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