

H. P. DODGE.
BRAKE ACTUATED MOTOR CONTROL.
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1,043,002.

Patented Oct. 29, 1912.

Fig. 1.

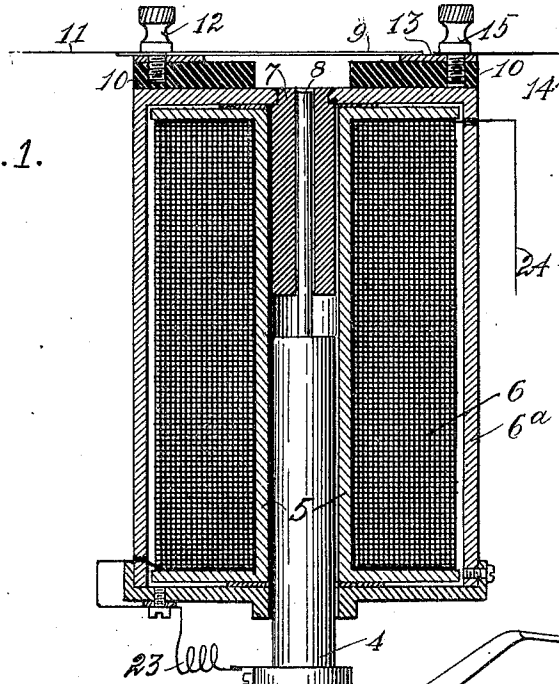
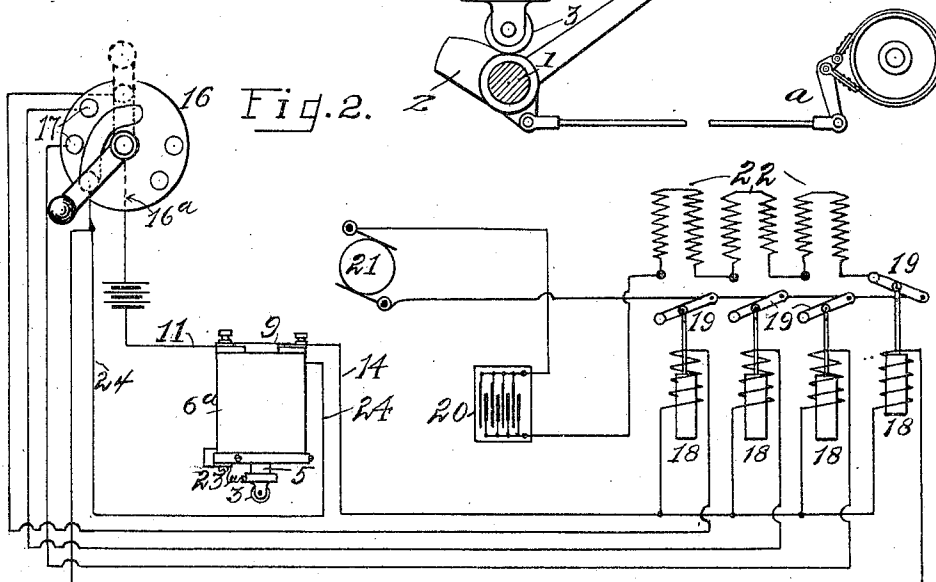


Fig. 2.



WITNESSES:

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Henry P. Dodge,
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UNITED STATES PATENT OFFICE.

HENRY P. DODGE, OF TOLEDO, OHIO, ASSIGNOR TO THE OHIO ELECTRIC CAR COMPANY,
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BRAKE-ACTUATED MOTOR CONTROL.

1,043,002.

Specification of Letters Patent.

Patented Oct. 29, 1912.

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To all whom it may concern:

Be it known that I, HENRY P. DODGE, a citizen of the United States; residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Brake-Actuated Motor Controls; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

In the operation of electrically driven machinery, especially electric automobiles, the objections to applying a brake while the motor is under full current are well understood. Various methods of overcoming these objections have been proposed, such as mechanically connecting the brake with a switch which opens the motor circuit, or by the use of magnetic cut-outs. These devices, however, have not proved satisfactory, having been found either unsafe or uncertain.

My invention is designed to provide devices by means of which the application of a brake to electrically driven machinery shall automatically open the motor circuit and which will prevent the closing of the circuit by the mere releasing of the brake, compelling the return of the controller to neutral position before the current can be again turned on. I attain these objects by means of the devices, construction and arrangement of parts hereinafter described, and shown and illustrated in the accompanying drawings, in which,—

Figure 1 is a central vertical sectional elevation of my device, and Fig. 2, a diagrammatic illustration of a plan of wiring which may be employed in connection with my device.

In the drawings, 1 is a shaft which carries a pedal or foot-lever and which is connected with and actuates a suitable brake-mechanism as indicated on a greatly reduced scale, as at *a*, Fig. 1, which parts will be well understood without further illustration or explanation. The shaft 1 carries a cam 2 upon which rides a roller 3 journaled upon the lower end of a soft iron plunger or armature 4.

5 is a special wound with magnet wire to

form a magnetic helix or solenoid magnet 6. The solenoid is inclosed within a case 6^a, the top of which carries a soft iron core 7, projecting, as shown, into the hollow of the solenoid. Through the center of the core 7 is a bore in which reciprocates vertically a rod 8 secured at its lower end to the top of the plunger 4. A flat spring 9, preferably, of bronze, extends across the top of the solenoid in the path of the upper end of the rod 8 and is insulated from the magnet and its case by insulator 10. One end of the spring is secured upon the insulator and is connected with inleading wire 11, by binding screw 12. The opposite free end of the spring rests normally upon insulated contact-piece 13 connected with outleading wire 14 by binding post 15.

16 is a controller electrically connected through a series of contact-points 17 with solenoids or other magnets 18 for actuating switches 19 to throw into and out of circuit with the storage battery 20,—or other source of electrical energy,—the motor 21 and the resistances 22. It will be seen that when either of the make-and-break devices 19 is in position to transmit the motor current to the motor, the control circuit is through the wires 11—14 and the spring 9, and that when, by a part turn of the shaft 1, the plunger 4 is—through the cam 2 and roller 3—lifted, the upper end of the rod 8 strikes the under side of the spring 9 lifting the spring, thus breaking the control circuit. The magnet 18 which happens to be energized at the beginning of this operation, now instantly becomes inactive and its switch 19 drops into open position, thus throwing the motor out of circuit.

When the upper end of the rod 8 strikes and lifts the spring 9, the circuit is shunted through the spring, the rod, the plunger 4, the wire 23 and through the helix 6 and the outleading wire 24. The solenoid being now energized and the plunger 4 being lifted and held in close contact with the core 7, the release of the brake by the backward turn of the shaft 1 does not cause the plunger 4 to fall, as the plunger will still be held fast by the magnet until the control circuit is broken by the moving of the arm of the controller into neutral position, as at 16^a. The control circuit being thus opened, the plunger 4 is now permitted to drop, restoring the

spring 9 to its normal position so that the controller 16 is now connected with the switch controlling magnets 18.

The advantages of the device here described are that by its employment the circuit is mechanically opened thus shutting off all power from the motor; that the current is shut off from the motor when the brake is applied and then cannot be turned on until after the brake is released; that in case of disarrangement of the automatic brake-control the motor circuit is not affected and,—in the case of an electric automobile, for which this device is particularly adapted,—the operation of the vehicle would not in such case be interfered with, and that very slight current may be used to energize magnet 6 inasmuch as the plunger 4 is primarily mechanically moved in contact with the core 7, there being no air gap to overcome.

I do not, of course, limit my invention to the particular form of magnet shown, nor to the specific armature illustrated, nor to the identical means for mechanically actuating the armature, as other forms of these devices, for carrying out the principle here illustrated, will suggest themselves to those skilled in the art.

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

1. In a device of the described character, a motor circuit, devices which control the motor circuit, a control circuit carrying a current which actuates said controlling devices, a controller in said control circuit, means for mechanically opening said control circuit and means governed solely by the controller for closing said control circuit.

2. In a device of the described character, a motor circuit, an electric motor therein; a

brake-mechanism; a control circuit which includes devices for governing the motor circuit, a controller electrically connected with said governing devices, a make-and-break device, a switch, an electro-magnet, and an armature; devices controlled by the movement of the brake-mechanism for opening said make-and-break device—to open said motor circuit—and for simultaneously actuating said switch to energize said magnet, whereby the make-and-break device is held open independently of the brake-mechanism.

3. In a device of the described character, a motor circuit, a control circuit, means governed by the control circuit for controlling the motor circuit, a controller electrically connected with said governing means, mechanically actuated devices which open but do not close the control circuit, and means governed by the controller for closing the control circuit independently of circuit opening devices.

4. In a device of the described character, a brake-mechanism, a solenoid magnet, a plunger, means actuated by the movement of the brake-mechanism for lifting the plunger in the solenoid, a motor-controlling circuit, in said circuit a make-and-break device which is opened by said movement of the plunger, and connections whereby the opening of said circuit shunts the circuit through the solenoid to attract the plunger to and hold the make-and-break device open independently of the movement of the brake-mechanism.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY P. DODGE.

Witnesses:

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LEONA KIBURTZ.