V. G. APPLE.

AUTOMATIC CUT-OUT.

APPLICATION FILED DEC. 21, 1908.

968,310. Patented Aug. 23, 1910.

Fig. 1.

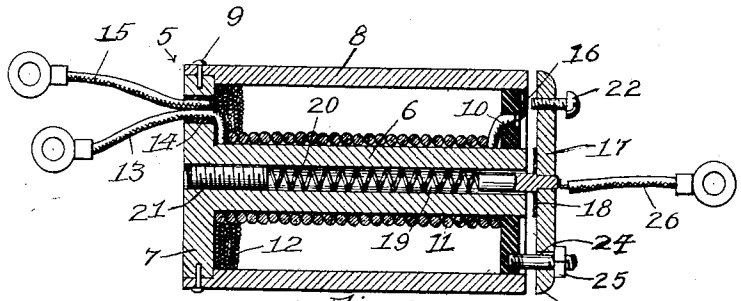


Fig. 4.

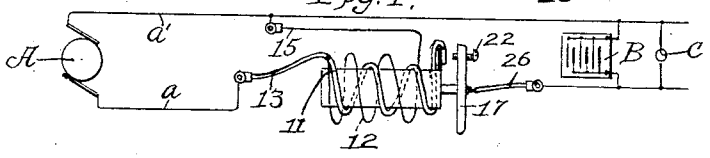


Fig. 2.

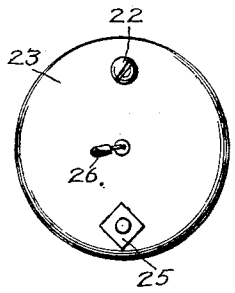
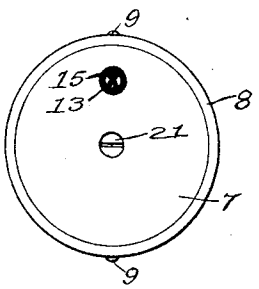


Fig. 3.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CUT-OUT.

968,310. Specification of Letters Patent. Patented Aug. 23, 1910.

Application filed December 21, 1908. Serial No. 468,514.

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Automatic Cut-Outs, of which the following is a specification.

My invention relates to improvements in automatic cut-outs, adapted for inclusion in a line between the dynamo and storage battery, to prevent reverse flow of current from the storage battery to the dynamo in the event the dynamo voltage drops below that of the battery.

My invention consists in the mechanical construction hereinafter more fully described and specified in the claims.

In the drawing, wherein I have illustrated an operative embodiment of my invention; Figure 1 is a longitudinal cross section; Fig. 2 is an elevation of the armature; Fig. 3 an elevation of the opposite end of the cut-out, and; Fig. 4 a diagram illustrating its connection in a circuit.

The structure disclosed comprises a circular iron-clad electromagnet having wound thereon a low resistance coil and a high resistance coil, having one terminal of each arranged for connection to a single extraneous point, the high resistance winding having its opposite terminal likewise arranged for connection to an extraneous point, and the low resistance winding having its terminal disposed at the end of the magnet structure for coöperation with a contact mounted on the said armature, the low resistance winding being preferably provided with a suitable terminal for connection with an extraneous point.

Specifically 5 indicates a magnet comprising a core 6, preferably made integral with the yoke or head 7 which carries a shell 8, concentric with the core and preferably coextensive longitudinally therewith, the head 7 and shell 8 being intimately connected for magnetic continuity, and retained in associated relation as by pins 9. At their opposite extremities the core 6 and shell 8 support, and are closed by, an insulating, diamagnetic washer 10. Wound upon the core 6 is a low resistance winding 11, and superposed thereon is a high resistance winding 12, each of said windings being of insulated wire, such as enameled wire. Like extremities of both of said windings 11 and 12 are connected with a terminal wire 13 extending through an insulated aperture 14 in the head 7, through which likewise extends a terminal wire 15 connected with the opposite extremity of the high resistance coil. The remaining extremity of the low resistance coil is projected through the insulating washer 10 and connected with an exposed flat terminal or contact point 16 upon such washer.

17 indicates a circular armature, preferably of substantially the same diameter as the shell 8, having projecting centrally therefrom a stud 18, preferably of diamagnetic material, such as brass, extending into a longitudinal bore 19 in the core 6, to be acted on by a compression spring 20 therein, which at its opposite extremity bears against an adjusting screw 21 threaded into the end of the bore through the head 7. The armature carries an adjustable contact screw 22 in suitable position for coaction with the contact 16, and is secured against rotation, and guided by a stem 23 secured in the insulating washer 10, said stem passing through an aperture 24 in the armature and provided with an adjustable nut 25 for preventing removal of the armature therefrom. The armature may also be provided with a flexible terminal attaching cord 26, for convenient connection with an extraneous wire.

In practice the cut-out construction, as above described, is generally employed in a circuit substantially as shown in Fig. 4, wherein A indicates a dynamo, a and a' line wires leading therefrom, B a battery, and C suitable translating devices, the battery and translating devices being bridged across the line.

The cut-out is disposed with its terminals 13 and 26 connected in the line wire a and its terminal 15 connected to the opposite line wire a', both between the battery and the dynamo, so that the line is closed between the battery and the dynamo only when the armature 17 is attracted, and the contacts 16 and 22 are closed, while the high resistance winding 12 stands always connected in a shunt across the line.

It will be understood that, in operation, when the dynamo voltage is sufficiently high, the energization of the high resistance coil 12 attracts the armature 17, thereby closing the line circuit between contacts 22 and 16, so that the dynamo may charge the storage battery, but when the dynamo volt-

age drops below that of the storage battery so that there is a reversal of flow through the low resistance coil 11, the said coil tends to demagnetize the electromagnet and causes the release of the armature, which is pushed back by the action of the spring 20, so opening the line. I have found in practice that the low resistance coil may be wound so low that when the dynamo is at rest accidental movement of the armature 17 to close contacts 16 and 22 will not result in "freezing" of the armature in such position, as the magnetizing effect of the coil 11 is not sufficiently great to overcome the action of spring 20.

Having described my invention, what I claim is:

1. In an automatic cutout, a core providing a circular head integral therewith, said core having a central bore extending therethrough screw-threaded at the head-end of the core, a compression spring in the central bore, a screw in the screw-threaded end of the bore adjustable against the spring, a low resistance electric coil, a high resistance electric coil over the low resistance coil, a magnetically susceptible shell over the high resistance coil secured to the head of the core, and a circular armature provided with a central stud extending into the core against the compression spring therein, a contact on the armature, and a coacting terminal contact of one terminal of the low resistance coil.

2. In an automatic cutout, the combination with a low and a high resistance coil, of a core providing at one end thereof a circular head integral therewith, said head having an aperture therethrough, and said core having extending from end to end thereof a central bore, the bore being screw-threaded at the head-end of the core; a screw adjustable in the bore; a compression spring in the bore at one end abutting against the adjustable screw, a circular armature provided with a central diamagnetic stud extending into the bore and abutting against the free end of the compression spring, the armature having at one end an aperture and at the diametrically opposite end an adjustable contact electrically connected to the armature; a magnetically susceptible shell surrounding the low and high resistance coils, at one end secured to the head of the core and at the other end spaced from the core; a diamagnetic washer bridging the space between the shell and the core at the latter said end thereof; a screw on one end of the diamagnetic washer of smaller diameter than the aperture in the armature adapted to support the armature for pivotal movement on the screw; a contact on the diametrically opposite end of the washer connected to a terminal of the low resistance coil and arranged for coaction with the adjustable contact on the armature, the remaining terminal of the low resistance coil and a terminal of the high resistance coil being connected to a single wire and passing, with the other high resistance terminal wire, through the aperture in the head of the core; and flexible attaching cords running from said last two mentioned wires and from the armature adapted for appropriate connection in an electric circuit.

3. In an automatic cutout, a core, a low and a high resistance electric coil thereover, a shell over the coils, an integral head on one end of the core for supporting said shell at one end thereof, a diamagnetic washer supporting the shell at the other end thereof, an armature, a spring therefor, and suitable connections whereby predetermined energization of the high resistance coil empowers it to move the armature to close a circuit through the low resistance coil, thereafter maintained energized by its own action upon the armature.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

VINCENT G. APPLE.

In the presence of—

E. V. MARTIN,

N. E. SNYDER.