April 28, 1925.

1,535,622

W. A. MORGAN

BATTERY INDICATOR AND CUT-OUT

Filed Feb. 5, 1921

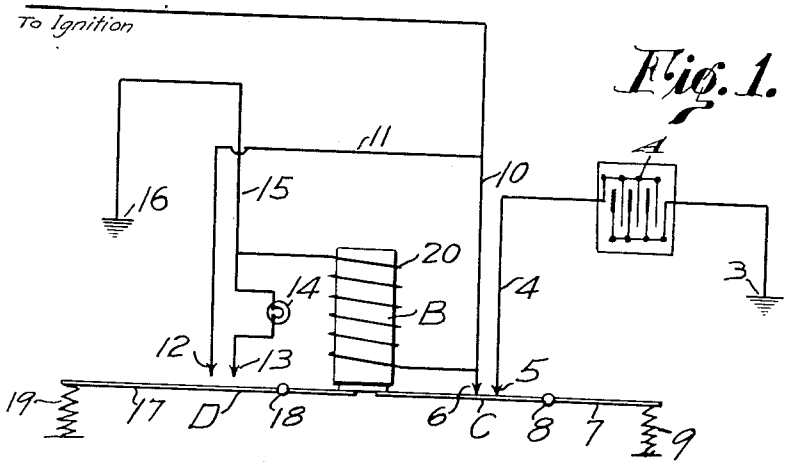


Fig. 1.

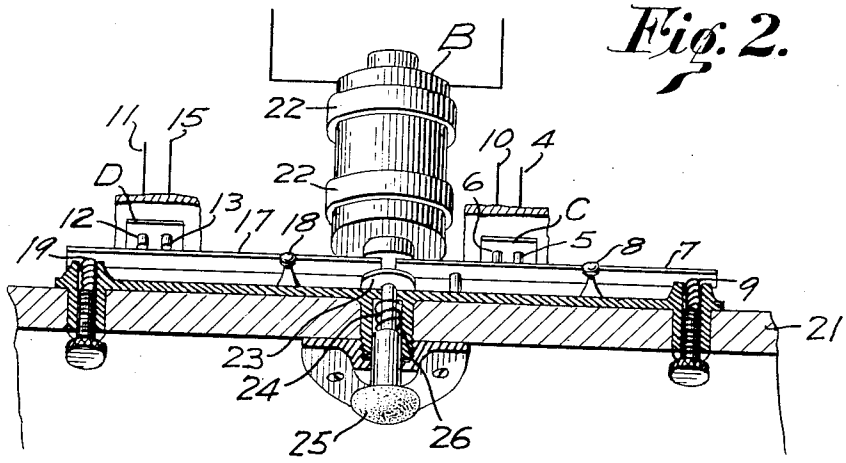


Fig. 2.

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Patented Apr. 28, 1925. 1,535,622

UNITED STATES PATENT OFFICE.

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BATTERY INDICATOR AND CUT-OUT.

Application filed February 5, 1921. Serial No. 442,883.

To all whom it may concern:

Be it known that I, WILLIAM AUNDRAE MORGAN, a citizen of the United States, and resident of Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in a Battery Indicator and Cut-Out, of which the following is a specification.

This invention relates to an indicator for electric batteries, and pertains especially to a voltage indicator and cut-out.

The device disclosed herein is especially useful with secondary batteries, such as are used on automobiles for lighting and ignition systems. Such batteries are liable to be discharged to a point below the critical voltage without the knowledge of the operator. This may cause serious injury to the cells, as is well known in the electrical art. My invention is intended to indicate when the voltage has fallen below the critical point and to cut out the battery from the circuit upon a still further fall of voltage. A further object of this invention is the provision of details whereby a simple, compact structure, easily manipulated is obtained.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Fig. 1 is a wiring diagram showing the circuit, and Fig. 2 is a perspective view partly in section showing the control switch mechanism.

Referring more particularly to Fig. 1, a battery of three cells is indicated by A. In circuit therewith is an electromagnet B, a cut-out switch C and a tell-tale switch D.

As is usual, one side of the battery is grounded as indicated by 3. The other side of the battery is connected by a conductor 4 to one point 5 of the cut-out switch. The cut-out switch is completed by another point 6 and a blade 7. The blade is in the form of a lever having a pivot point 8 and an adjustable compression spring 9 tending to open the switch. The blade is preferably of magnetic material so that the end thereof forms an armature for the electromagnet B.

A conductor 10 leads from the point 6 of the cut-out switch to the ignition and lighting system, the latter not being shown. Connected to the conductor 10 is a branch conductor 11 leading to the point 12 of another switch. The other point 13 of the last mentioned switch is connected in circuit with a tell-tale lamp 14. This tell-tale lamp is intended to be mounted upon the instrument board of the automobile or in any other position in view of the operator of the machine. It is preferably colored, red being a suitable color for the lamp. The other terminal of the tell-tale lamp is connected by a conductor 15 to a ground 16. Completing the tell-tale switch is a blade 17 pivoted at 18 and having an adjustable compression spring 19 tending to close the switch. The blade 17 is extended to form an armature for the electromagnet B. The electromagnet has its winding 20 connected between conductors 10 and 15.

Referring more especially to Fig. 2, the details of the control switch mechanism are shown.

The instrument board is indicated in section and marked 21. The electromagnet B is mounted in suitable supports 22 so that its core registers with a push plate 23. Interposed between the push plate and the core are the ends of blades 7 and 17. The push plate is mounted upon the end of a stem 24 having a button 25 disposed for manipulation by the operator of the machine. The stem is reduced in diameter, and a compression spring 26 normally holds the stem and push plate so that the latter is out of engagement with the blades 7 and 17.

Assume that the circuit is open at the cut-out switch. Blade 17 will close points 12 and 13 of the tell-tale switch, but no current will flow from the battery due to the points of the cut-out switch being open. The system is placed in operation by pressing the button 25 inwardly. This forces the blades 7 and 17 into contact with the core of electromagnet B. The tell-tale switch is thereby opened, and the cut-out switch closed. This causes energization of the electromagnet B, and the blades 7 and 17 are maintained against the core by the magnetic field. This is assuming that the battery is of a voltage sufficient to hold the cut-out switch closed. Assume that the voltage of the battery drops below the critical point. There is a decrease of the current flowing through the winding 20 of electromagnet B sufficient so that the compression spring 19 overcomes the pull of the electromagnet core and blade 17 is rocked to close the tell-

tale switch. This places the tell-tale lamp in parallel with the electromagnet winding, and the lamp is lighted indicating to the operator of the car that the charging of the battery cells should be attended to. If for any reason the battery is still further discharged so that the voltage drops further, spring 9 will overcome the pull of the electromagnet core upon the blade 7. The blade is then rocked to open the cut-out switch, thereby disconnecting the battery from the circuit. It is obvious that the springs 9 and 19 should be adjusted so that spring 19 will open the tell-tale switch first the blade 7 being maintained in its closed position. After a further drop in voltage, spring 9 will open the cut-out switch. To again place the device in operation after the battery has been changed or charged to its proper voltage, button 25 is pressed to close the cut-out switch and open the tell-tale switch. The electromagnet B will then maintain the switches in this condition.

What I claim is:

1. The combination comprising an electromagnet; a cut-out switch having a pivoted blade disposed at right angles to the axis of said electromagnet and forming an armature and a pair of contact points positioned in contacting relation to said armature blade between the pivot and the electromagnet, spring means tending to move said blade to open said switch against the pull of said electromagnet; a tell-tale switch having a pivoted blade forming an armature for said electromagnet disposed in alignment with said cut-out switch blade, spring means tending to move said blade to close said switch against the pull of said electromagnet, and a pair of contacting points positioned in contacting relation to the last mentioned armature blade between the pivot and the spring means, and manually operable means for moving both of said blades toward the core of said electromagnet whereby to close said cut-out switch and open said tell-tale switch.

2. A device of the class described, comprising a circuit including a battery, a cut-out switch having a pair of contact points and a power consuming line, conductors connecting said battery, said pair of contact points and said power consuming line in a closed series loop, an electromagnet having a winding shunted about said power consuming line, said cut-out switch having a pivoted blade forming an armature, said contact points being positioned in contacting relation to said armature blade between the pivot and the electromagnet, spring means tending to move said blade to open said switch against the pull of said electromagnet; a circuit including a tell-tale and a tell-tale switch having a pair of contact points, conductors connecting said tell-tale, the tell-tale switch contacts, the cut-out switch contacts and said battery in a closed series loop; said tell-tale switch having a pivoted blade forming an armature, spring means tending to move said blade to close said switch against the pull of said electromagnet, said last mentioned contact points being positioned in contacting relation to the armature blade of said tell-tale switch between the pivot and the spring means; and manually operable means to move both of said blades toward the core of said electromagnet whereby to close said cut-out switch and open said tell-tale switch.

3. A device of the class described comprising a circuit including a battery, a cut-out switch having a pair of contact points and a power consuming line, conductors connecting said battery, said pair of contact points and said power consuming line in series, a conductor grounding the other side of said battery, an electromagnet having a winding shunted about said power consuming line, said cut-out switch having a pivoted blade forming an armature, said pair of contact points being positioned in contacting relation to said armature blade between the pivot and the electromagnet, spring means tending to move said blade to open said switch against the pull of said electromagnet; and a tell-tale circuit including a tell-tale and a tell-tale switch having a pair of contact points, conductors connecting said tell-tale, the tell-tale switch contacts, the cut-out switch and said battery in series, a conductor grounding said tell-tale on the side remote from said battery, said tell-tale switch having a pivoted blade forming an armature, spring means tending to move said blade to close said switch against the pull of said electromagnet, said tell-tale switch contact points being positioned in contacting relation to the armature blade of said tell-tale switch between the pivot and the spring means; and manually operable means to move both of said blades toward the core of said electromagnet, whereby to close said cut-out switch and open said tell-tale switch, said tell-tale circuit being arranged so that it is shunted about said electromagnet when said tell-tale switch is closed.

In witness that I claim the foregoing I have hereunto subscribed my name this 25th day of January, 1921.

WILLIAM AUNDRAE MORGAN.