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(54) **ELECTRIC FLASHER**

(57) **Abstract:**

(54) **ECLATEUR ELECTRIQUE**

*This First Page has been artificially created and is not part of the CIPO Official Publication*

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S P E C I F I C A T I O N .

To all whom it may concern:

Be it known, that we, Gisbert L. Bossard, a resident of Troy, County of Rensselaer, and State of New York, U. S. A., and Rudolf Zaugg, a resident of Berne, Switzerland, both Engineers, and citizens of Switzerland, having jointly invented certain new and useful improvements in Electric-Flashers, do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to automatic intermittently acting electric switches of the kind comprising a tube carried by an oscillatory armature of an electromagnet and containing means for determining energizing and de-energizing of the magnet in virtue of the oscillatory movements of the tube, thereby producing successive changes of state in the circuit controlled by the switch.

Switches of this kind are adapted for the automatic control of an electric current for the intermittent lighting of electric lamps, when they are known as flasher switches.

The primary objects of the invention are to provide a simple and reliable device for the purpose stated and to provide for substantially accurate regulation of the operating mechanism with respect to the frequency of operation and the intervals during which the current is interrupted.

7

The switch according to the present invention is of the kind above outlined, and is essentially characterized by the tube being mounted with freedom of motion in one direction to the limit induced by energization of the magnet, and in the other direction by gravity, thereby eliminating stops which are the cause of annoying noise and jar in the operation of the switch.

A further feature of the invention consists in the armature of the electromagnet being an unwound body of magnetic material adapted to maintain an air-gap of constant width between itself and the poles of the electromagnet, whereby the magnet ampere-turns need be only sufficient to move the armature by direct magnetic pull at any point, no excess ampere-turns being necessary to start the armature movement.

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Other features and objects of our invention will be apparent from the following description and claims.

In order that the invention may be understood there will now be described by way of example, a construction of a flasher switch and several circuit arrangements in which it is used.

Fig. 1 is a view in side elevation of the current-interrupting-mechanism enclosed within a casing broken away and shown in section, showing a pendulous member which carries the circuit-making-and-breaking tube in deflected position.

Fig. 2 is a diagrammatic view of the same connected in circuit with a plurality of lamps adapted to be intermittently lighted by the device.

Fig. 3 is a vertical cross-section taken on the broken line 3-3 in Fig. 1, with the pendulous member in normal position.

Fig. 4 is a diagrammatic view illustrating another mode of connecting the apparatus in circuit. The tube is shown in deflected position with the mercury connecting its contacts.

Fig. 5 is a similar diagrammatic view illustrating another form of circuit.

Referring to Figs. 1, 2, and 3 of the drawings, 1 is a casing, containing the circuit-interrupting-mechanism. Mounted upon a suitable support within the casing is a field-magnet, 2, the pole-pieces, 3, and 4, of which project upwardly.

An armature, 5, is rotatively mounted between, and within the magnetic field of said pole-pieces, said armature being fixed upon a shaft, 6, which is rotatively mounted in bearings in brackets, 7, erected from the bottom of the casing, 1.

A pendulous member, 8, is fixed upon the armature shaft, 6, whereby said armature and pendulous member are adapted to oscillate in unison with each other.

A tube-holder, 9, is mounted upon said pendulous member, 8; by means of screws, 10, inserted through slots, 11, in the tube-holder into said pendulous member, whereby lateral adjustment of said tube-holder relatively to the pendulous member can be accomplished.

A tube, 12, of insulating material, such as glass, hard-rubber or the like, is mounted upon said tube-holder, 9, by means of screw-fastened straps, 13, whereby said tube is supported in fixed relation to said pendulous member, 8, and partakes of the oscillating movement thereof.

9

As shown, said tube is in the general form of an arc of a circle of substantial dimensions and is provided in its bottom portion with separated pockets, 14 and 15, one preferably near the middle of the tube and the other preferably near one end of the tube.

Electrical contacts, 16 and 17, project interiorly of said tube into the respective pockets, 14 and 15.

The tube is partly filled with a body, 18, of electrically conductive liquid, preferably mercury, sufficient when the pendulous member, 8, is in normal position to fill said pockets, 14 and 15, and substantially cover the intervening space between said pockets, but the quantity of which is so limited that said liquid will be withdrawn from a portion of the bottom of the tube, 12, at a point between said pockets when the pendulous member is deflected to a substantial degree by movement of the armature, 5, caused by energization of the field-magnet, 2.

A main electric circuit, 19, and 20, has one of its terminals connected with the contact, 16, and its other terminal connected with the contact, 17.

A line connection, 21, extends from the side, 19, of said main electric circuit through the field-magnet, 2, to the contact, 17, whereby the field-magnet is energized by current passing through the body of liquid within the tube when the tube is in normal position. In this form of the invention the field-magnet windings are in parallel with the lamp or lamps, 23, to which the current is supplied by the line wires, 19 and 20, but the mercury tube is in series with the thus connected windings and the lamps. This constitutes a series parallel connection and the tube cuts in and out both circuits instantaneously.

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The main electric circuit may include any electrically operated devices which are to be intermittently energized, such as electric-lamps, 23.

The operation of the device is as follows:

When it is desired to intermittently operate the lamps, 23, electric current is supplied to the main circuit, 19 and 20, from a suitable source (not shown). The pendulous member, 8, being in normal position, the liquid body, 18, not only fills the pockets, 14 and 15, but covers the intervening bottom surface of the tube forming an electrical connection between said contacts, and closing the main circuit through the lamps, 23, causing them to be illuminated. At the same time the circuit is closed by said body of liquid, 18, through the line-connection, 21, to energize the electromagnet, 2, thereby causing a rotative movement of the armature, 5, and an accompanying swinging movement of the pendulous member, 8, oppositely to the direction of the arrow, 24, into the position shown in Fig. 1.

Inertia and gravity however, cause the body of mercury, 18, to maintain a level position so that as the pendulous member is deflected the mercury will be withdrawn toward the lower end of the tube, leaving a portion of the tube uncovered between said contacts, 16 and 17, and thus interrupting not only the main circuit, 19 and 20, but the line-connection, 21, as well.

As the main circuit is thus interrupted the lamps, 23, are extinguished and the pendulous member yields to the action of gravitation by which it is returned, swinging in the direction of the arrow, 24, (Fig. 1), to normal position whereupon the circuits are again closed by the body of mercury, 18, connecting together the contacts, 16 and 17, thus

again illuminating the lamps and causing the pendulous member to be again deflected by the electromagnet.

The intermittent lighting of the lamps may be thus continued indefinitely.

The throw of the pendulous member can be varied by rotative adjustment of the armature, 5, upon its shaft, 6, the armature being secured in adjusted position upon the shaft by means of a screw, 25.

The timing of the circuit-interruptions can also be varied by adjustment of the tube-holder upon the pendulous member in the manner above described.

The swinging of the pendulous member can also be regulated by means of a weight, 26, capable of adjustment longitudinally thereof.

In interrupting the circuit in the manner above described it is not necessary that either of the pockets should be emptied, as a limited quantity of mercury or the like remaining in the isolated pocket when the circuit is broken is in effect a part of the contact within said pocket.

While the tube, 12, is preferably made of insulating material, it is not necessary for certain purposes of the invention that the whole tube should be so made, but merely that the two contacts, 16 and 17, should be so insulated from each other that the circuit is closed between them by the body of mercury or the like in substantially the manner above described.

The tube-and-tube-holder of the device represents a unit, as many of which units as may be desired may be mounted upon the same pendulous member, 8.

12

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In Fig. 4, the main circuit, 19 and 20, armature, 5, the pendulous member, 8, and the parts carried thereby are substantially the same as those shown in Figs. 1, 2 and 3, and above described, except that the tube is so positioned upon the pendulous member that the circuit between contacts, 16 and 17, is open instead of closed when the pendulous member is in normal position. In Fig. 4, the tube is shown in deflected position and it moves anti-clockwise to return to normal position.

In this form of the invention however, the electromagnet, 2a, is permanently in the main circuit, but has a substantially higher resistance than that part of the circuit of which the contacts, 16 and 17, and body of mercury, 18, form a part.

The operation of this form of the invention is as follows:

Electric current being supplied to the main circuit, 19 and 20, passes through the electromagnet, 2a, to actuate the armature, 5, the resistance of the electromagnet however being such that the current so passing is insufficient to illuminate the lamps, 23, although passing through said lamps. The energization of the electromagnet thus caused actuates the armature and swings the pendulous member in the clockwise direction until the body of mercury connects together the two contacts, 16 and 17, as shown in Fig. 4.

The resistance of the shunt-circuit thus formed through the body of mercury being substantially less than that of the electromagnet, in effect short-circuits the electromagnet causing the main body of current to flow through the body of mercury and thus to illuminate the lamps, 23. This short-circuiting of the electromagnet deenergizes, the same, permitting the pendulous member to swing back, in the direction of the arrow



(Fig. 4) to normal position.

The operation just described may be repeated indefinitely.

For certain purposes of the invention any desired number of contacts similar to the contacts, 16 and 17, may be mounted upon the tube, 12, in substantially the manner above described, whereby any desired number of circuits may be interrupted by the swinging movements of the pendulous member.

By having the ends of the tube enlarged as shown, a larger body of gas may be provided at the ends of the tube if gas filled, whereby the impact of the body of mercury upon the ends of the tube will be somewhat cushioned or relieved.

In the modification shown in Fig. 5, the arrangement and operation of the parts with respect to the intermittent movement of the pendulous member, 8, and mercury-tube, 12, are the same as in the construction shown in Figs. 1, 2 and 3, except that in Fig. 5, the electromagnets, 2b and 2c, are arranged in parallel instead of in series.

In Fig. 5, however, is shown a shunt-connection, 27, including a resistance, 28, through which the lamps, 23, are continuously supplied with lighting current, but more or less dimmed due to the resistance, 28, except when the contacts, 16 and 17, are connected by the body of mercury in the tube, 12.

WHAT WE CLAIM AS OUR INVENTION IS:

1. In an automatic intermittently acting electric switch, an electro-magnet, an oscillating tube mounted with freedom for movement in one direction to the limit induced by energization of the magnet, and by gravity in the opposite direction.

2. In a switch as claimed in claim 1, an armature comprising an unwound body of magnetic material adapted to maintain an air gap of constant width between itself and the poles of the electro-magnet.

3. A switch as claimed in claim 1 characterized by the windings of the electro-magnet being designed for parallel connection with the load circuit, and the tube being in series with the thus connected windings and load.

4. In an electric switch of the character described, a tube, an oscillatory armature, and means for adjusting the angular setting of the tube relatively to the armature axis for connecting the tube to said armature.

5. The switch as claimed in claim 4 in which a pendulum is attached to the armature, and with angular adjustment on the axis thereof, and a tube mounted on the pendulum.

6. In a switch of the character described, a tube, an armature, and a pendulum comprising a bar-shaped member suspended from the armature pivot shaft.

7. The device as claimed in claim 4 in which means are provided for adjusting the tube longitudinally with respect to the armature.

8. In a switch of the character described, the combination with a tube and an oscillatory armature, of a resistance in shunt relation to the connection made by the liquid within the tube.

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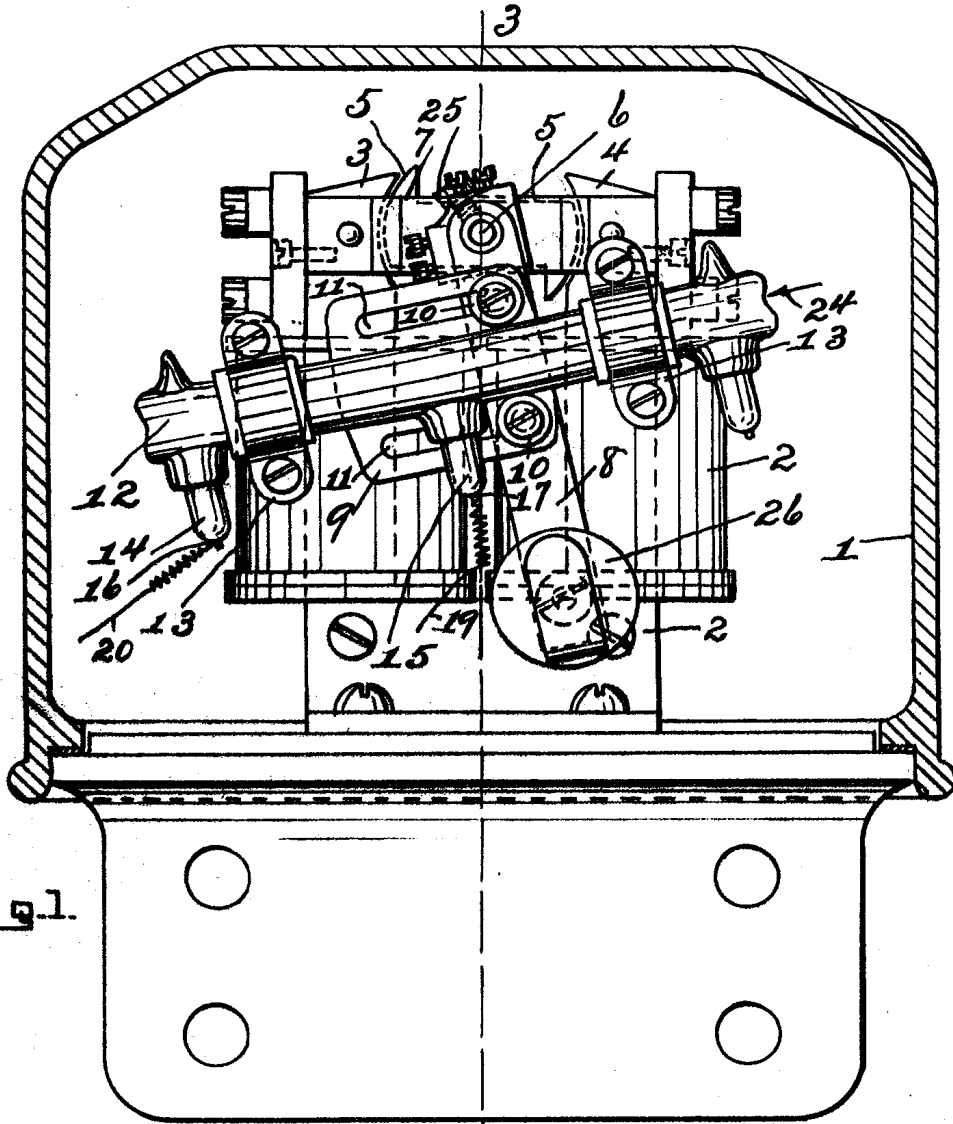


Fig. 1.

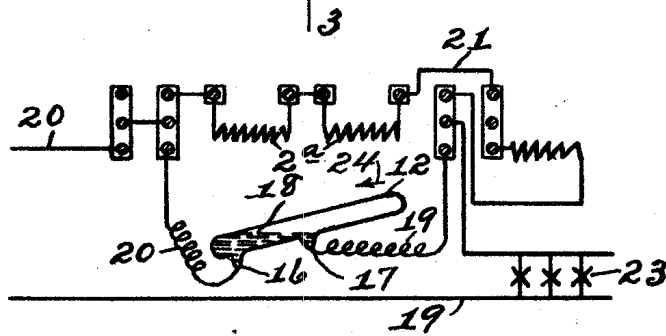


Fig. 4.

WITNESSES

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Certified to be the drawings referred to in the specification hereunto annexed.  
 Troy, N. Y., March 17, 1921.

By *Frank C. Curtis*  
 ATTORNEY.

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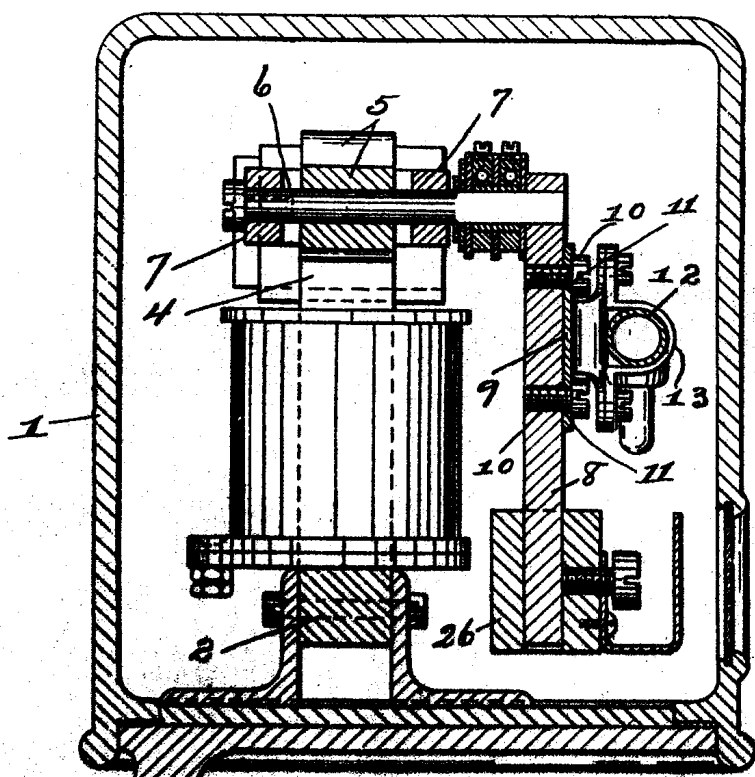


Fig. 1.

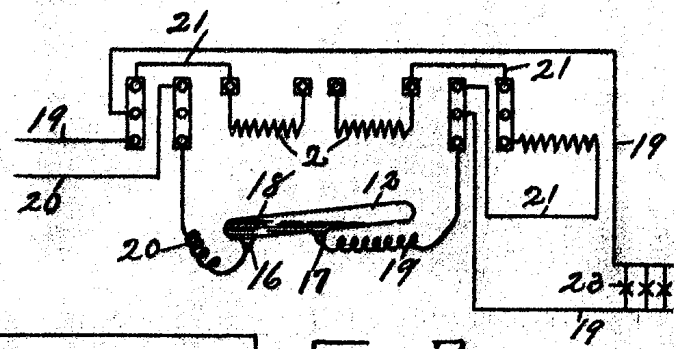


Fig. 2.

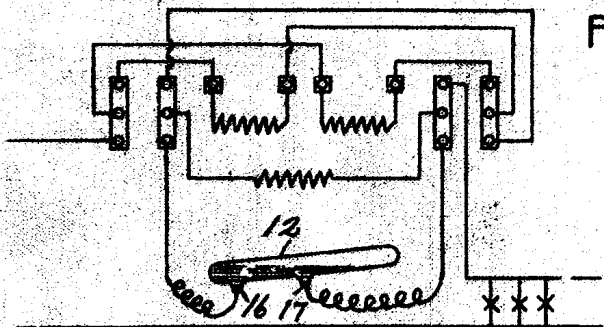


Fig. 3.

WITNESSES

Elizabeth A. Ray  
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Certified to be the drawing referred  
 to in the specification hereunto annexed.

Troy, N. Y., March 17, 1922

INVENTOR

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