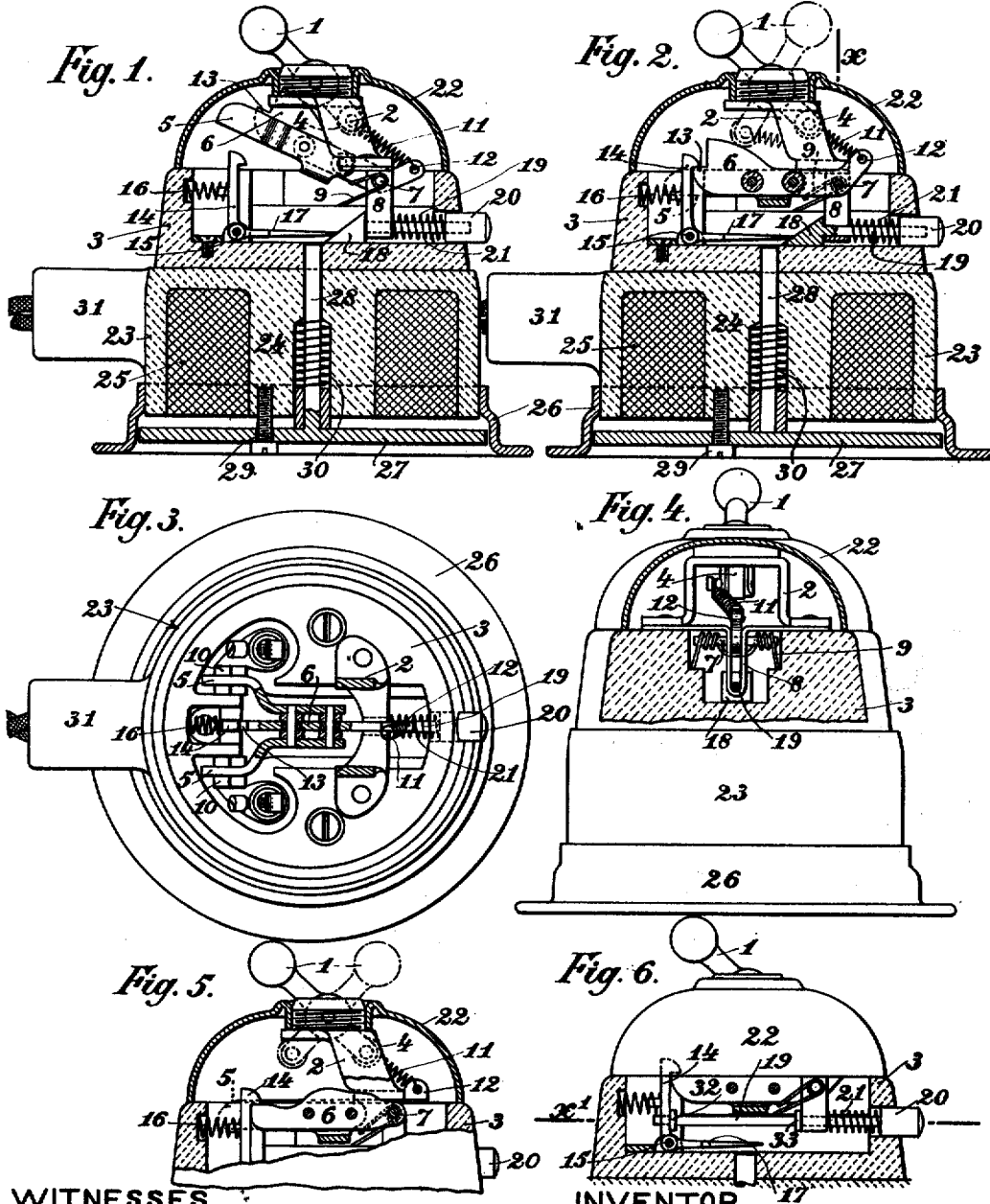


997,759.

Patented July 11, 1911.

2 SHEETS—SHEET 1.



WITNESSES

E. Blandford Hester
J. B. Keeler

INVENTOR

Claude W. Denny
James L. Morris

Fig. 7.

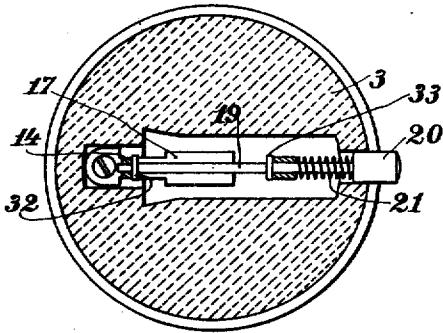


Fig. 8.

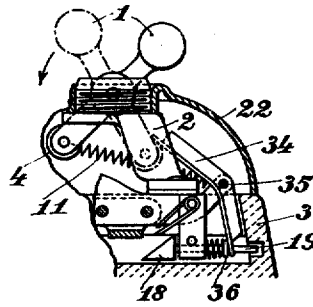


Fig. 9.

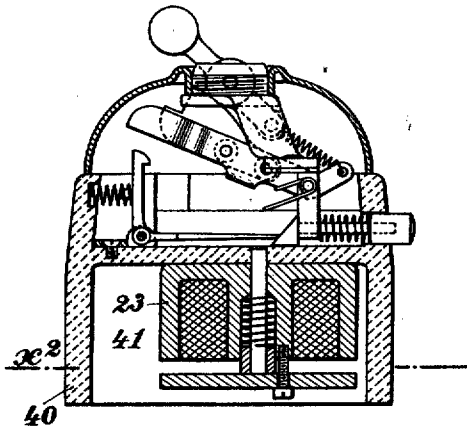
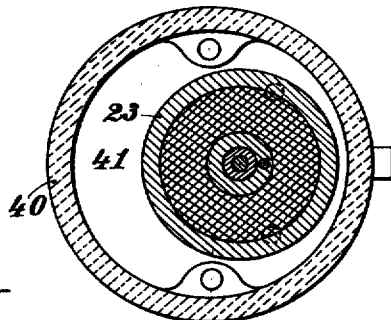


Fig. 10.



WITNESSES

Claude W. Denny
James L. Norris, Jr.

INVENTOR

Claude W. Denny
By *James L. Norris, Jr.*

UNITED STATES PATENT OFFICE.

CLAUDE WILLIAM DENNY, OF KENSINGTON, LONDON, ENGLAND.

ELECTRIC SWITCH.

997,759.

Specification of Letters Patent. Patented July 11, 1911.

Application filed July 30, 1910. Serial No. 574,714.

To all whom it may concern:

Be it known that I, CLAUDE WILLIAM DENNY, a subject of the King of Great Britain, residing at 2 Pembroke Cottages, 5 Edward's Square, Kensington, London, England, electrical engineer, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

10 This invention relates to electric switches of that type commonly known as tumbler switches which are employed for controlling lighting, or small power circuits.

The principal object of the present invention is to provide an automatic tumbler switch which will automatically open the circuit should the current passing there-through exceed a predetermined value, thereby obviating the necessity of providing fuses or other separate circuit-opening devices, which are usually difficult and troublesome to replace.

By the use of automatic tumbler switches according to the present invention the cost and size of distribution boards (and consequently the wall space occupied by such boards) is also considerably reduced.

Figure 1 of the accompanying drawings represents a section, partly in elevation, 30 through an automatic tumbler switch constructed and arranged in accordance with this invention. This view shows the switch in its "off" position. Fig. 2 is a vertical section showing the switch closed. Fig. 3 35 represents a sectional plan with the cover removed and the switch in its "on" position. Fig. 4 shows a vertical transverse section on line x Fig. 2. Fig. 5 illustrates a modification in which provision is made 40 whereby it is impossible for the operating lever to be held on and the switch kept closed when the circuit is overloaded. Fig. 6 represents an alternative method of releasing the switch by hand. Fig. 7 is a 45 horizontal section on line x^1 Fig. 6. Fig. 8 shows another form of trip device wherein the push-button employed in the previous forms is dispensed with. Fig. 9 represents a vertical section and Fig. 10 a horizontal 50 section upon the dotted line x^2 Fig. 9, of a modification of the arrangement of the pot magnet.

Referring to Figs. 1 to 4, the improved switch comprises a loose controlling handle 55 or knob 1, pivotally mounted upon a frame or bracket 2 fixed upon the porcelain base 3,

and carrying at its inner end a roller 4. A pair of contact blades 5 are employed which are carried upon the opposite sides of a central lever or rocking member 6 pivoted at 7 60 between the sides of a U-shaped hanging bracket 8 suspended from the base 3. The member 6 is of the shape shown, having an inclined upper edge, and is normally pressed upward into the position shown in 65 Fig. 1 by a spring 9. In switching on, the roller 4 carried by the knob 1 is arranged to engage with the edge of the cam member 6 so as to depress same and cause the contact blades 5 to engage with the fixed contacts 10 70 upon the base. After being released the knob 1 is returned to its original position by a spring 11 attached to the tail end 12 of the lever 6. As the latter is being depressed to complete the circuit, its nose or fore-end 13 75 wipes over and is engaged by the hook end of a catch 14 pivoted at 15 and acted upon by a spring 16. This catch thus holds the switch in its "on" position. It also carries an arm 17 at right angles whose extremity engages 80 with a sliding wedge 18 carried by a shank 19 whose outer end extends through the base 3 and is fitted with a push-button or knob 20. By pressing in this knob, which is normally forced outward by the spring 21, 85 the wedge 18 lifts the arm 17 and releases the catch 14, allowing the switch to fly open. This arrangement thus provides a simple and ready means of opening the switch by hand. 90

The mechanism above described is enclosed by the ordinary switch cover 22, and the whole is mounted upon the top of a circular electro-magnet 23 of the type usually known as a "pot" magnet. It comprises a 95 central core 24 and an outer annular edge, and the winding 25 which is in series with the switch and the circuit controlled thereby, is situated within the space or channel between said edge and central core, as 100 shown. A foot ring or flange 26 is fitted to the magnet to provide the means of attachment to a wall or the like. If desired this flange may be in one piece with the magnet. 105

27 is a circular iron armature immediately below or opposite to the inner face of the magnet, but normally separated therefrom by an intervening space. This armature 27 carries a central plunger 28 which passes through a hole bored centrally 110 through the magnet and switch base 3, and whose inner end normally comes just below

the releasing arm 17 of the catch device. The armature is normally forced away from the magnet, against an adjustable stop 29, by means of a spring 30. The stop is shown as being in the form of a screw. By adjusting this screw the normal distance of the armature from the magnet can be increased or decreased, and thus the value of the current necessary for attracting the armature can be varied as required.

31 is a branch upon one side of the magnet through which the connections are brought out.

The action of the switch is as follows:—

To close the switch the knob 1 is operated in the ordinary manner, when the roller 2, as above described, engages with the central lever or blade member 6 and depresses the latter so as to take the contact blades 5 into engagement with the contacts 10, and complete the circuit, the nose end 13 of said member 6 wiping over and being engaged by the spring catch member 14, which holds the switch in its "on" position. On releasing the knob 1 it is returned by the spring 11 to its normal position. The switch is represented in this position in Fig. 2. Should the current now rise above a predetermined value, or a short-circuit occur, the armature 27 will be attracted to the magnet face causing the plunger 28 to rise, and its inner end to strike and lift the arm 17, so releasing the catch 14. The contact blades 5 are immediately returned to the "off" position (Fig. 1) by means of the spring 9, thus breaking the circuit and releasing the armature 27. To open the switch by hand (as previously described) it is only necessary to push in the button 20, when the wedge 18 releases the catch.

In order to prevent the switch being held on after the circuit has been overloaded, the center blade or lever member 6 may be made of the shape shown in Fig. 5, so that after switching on, if the operator insists upon holding down the knob 1 in the position indicated in dotted lines, the switch blades can rise when the catch 14 is released by the magnet, and thus break the circuit.

In the modified form of hand releasing device shown in Figs. 6 and 7, the catch 14 is split or divided (see Fig. 7), and the push button or knob 20, instead of acting on this catch through the medium of a wedge, acts directly upon same. For this purpose the shank 19 is extended so that its end passes through the catch as shown. When the push 20 is operated a collar 32 upon the shank 19 engages with the said catch and releases same, allowing the switch to open. The spring 21 returns the knob 20 to its normal position after being released. 33 is a collar acting as a stop.

In the further alternative form of trip gear illustrated in Fig. 8, 34 is a lever piv-

oted at 35, and whose lower end engages with a collar 36 upon the spindle 19 which carries the wedge 18. After switching on, the operating lever or knob 1 is returned by the action of the spring 11, into the position shown in dotted lines. When it is desired to open the switch the said knob is pushed farther forward in the direction of the arrow, the roller 4 engaging with the end of the lever 34 and turning same upon its pivot, thus pushing forward the wedge 18 so as to release the catch, in the same manner as in Figs. 1 to 4.

Fig. 9 is a vertical section and Fig. 10 a horizontal section upon the dotted line x^2 of Fig. 9, of a switch having a modified form of pot magnet. The pot-magnet 23 is similar in every respect to the pot magnets in the previously described arrangements, but it is made considerably smaller and is mounted inside a hollow or chambered porcelain base 40. The magnet may be arranged either eccentrically as shown, or centrally. This arrangement greatly facilitates the wiring up of the switch as the connections can be brought from the underside of the base direct to the terminals.

For use with alternating currents the magnet would be made up of thin laminations or stampings which may be clamped together by a three-legged spider arrangement. It is understood that the magnet may either be round as shown or it may be square or other shape, and it may either be sunk into the wall or fixed upon same.

An indicator, may be arranged to appear on the switch cover when the switch is open or closed. For instance a disk or indicator may be fixed to the contact blades and arranged to appear behind a hole in the switch cover.

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

1. A self-contained automatic tumbler switch comprising a base having fixed contacts thereon, a pivoted lever movable in a plane at right angles to the base and carrying contacts for engagement with said fixed contacts, a spring acting upon said lever to move the same away from the base, an operating lever for moving the first-named lever toward the base whereby to establish the engagement of said contacts, a casing inclosing the operating parts and having an opening through which the operating lever projects, a pivoted catch mounted on the base and adapted to engage over the free end of the first-named lever and to thereby lock the latter in position to maintain the engagement of said contacts, an electro-magnet arranged below the switch mechanism, and operable in the event of an overload to attract its armature, and a device carried by the armature and operable when the latter is

attracted toward the magnet to effect a movement of the catch and to thereby cause the latter to disengage said first-named lever.

5 2. A self-contained automatic tumbler switch comprising a base having fixed contacts thereon, a pivoted lever movable in a plane at right angles to the base and carrying contacts for engagement with said fixed
10 contacts, a spring acting upon said lever to move the same away from the base, the lever having an inclined upper edge, an operating lever movable in the plane of the
15 inclined upper edge of the latter, a spring connecting the operating lever and a tail extension of the first-named lever, a casing inclosing the operating parts and having an opening through which the operating lever

projects, a pivoted catch mounted on the base and adapted to engage over the free end of the first-named lever and to thereby lock the latter in position to maintain the engagement of said contacts, an electro-magnet arranged below the switch mechanism and operable in the event of an overload to attract its armature, and a device carried by the armature and operable when the latter is attracted toward the magnet to effect a movement of the catch and to thereby cause the latter to disengage said first-named lever.

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

CLAUDE WILLIAM DENNY.

Witnesses:

H. D. JAMESON,
H. V. PUMFREY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."