E.C. ELECTRICITY—CIRCUIT MAKERS AND BREAKERS.
51
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Aug. 25, 1925. 1,551,091

S. DWORKIN

ELECTRIC SWITCH

Filed April 18, 1923

FIG. I.



FIG. II.

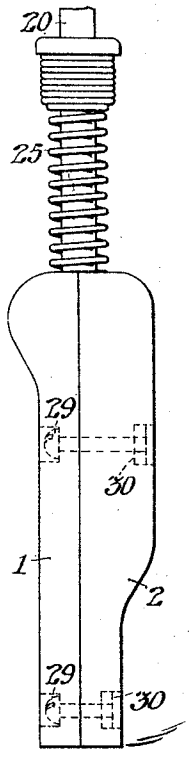


FIG. III.

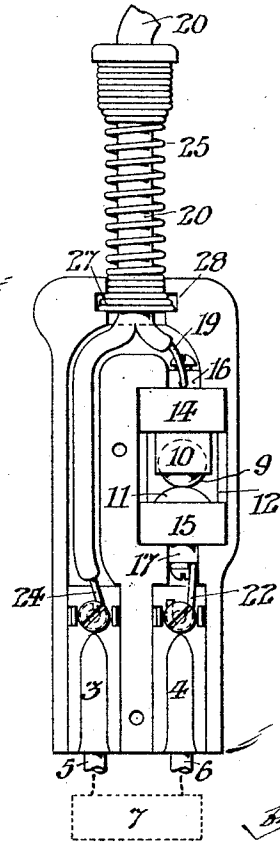
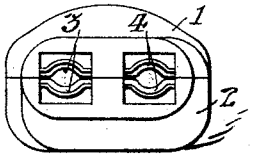


FIG. IV.



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200. ELECTRICITY—CIRCUIT MAKERS AND BREAKERS.
51
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UNITED STATES PATENT OFFICE.

SAMUEL DWORKIN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC SWITCH.

Application filed April 18, 1923. Serial No. 632,821.

To all whom it may concern:

Be it known that I, SAMUEL DWORKIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Electric Switches, whereof the following is a specification, reference being had to the accompanying drawing.

My invention is particularly applicable to switches of the portable automatic cut-out type, adapted for use in connection with electric stoves, sad irons, fans, etc., to detachably connect such devices with a source of energy and to automatically break the circuit if and when any such connected device is upset from its normal position.

As hereinafter described; my invention includes a switch of the portable plug type having recesses and contacts for electrical connection with two parallel pin terminals upon the device which is to be supplied with energy and having a movable switch element which is a ball adapted to gravitate to make and break connection between two terminals in the switch; one of said switch terminals being a tube in which the ball is mounted to roll in continuous contact therewith, and the other terminal being an abutment opposed to the end of said tube in such relation that said ball contacts therewith when the device is in normal position, but rolls away when upset.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings; Fig. I is a front elevation of a switch conveniently embodying my improvement.

Fig. II is a side elevation of said switch.

Fig. III is an elevation of said switch, similar to Fig. I, but with the front section of the switch casing removed to show the interior construction and arrangement.

Fig. IV is an elevation of the lower end of said switch as shown in Fig. I.

In said figures; the switch casing is conveniently formed of two complementary sections 1 and 2 of insulating material. Said sections have recesses arranged to hold two pairs of spring contacts 3 and 4 adapted to resiliently engage the two parallel pin terminals 5 and 6 of the device 7 which is to be supplied with electrical energy.

Said casing is also recessed to hold the movable switch element which is the ball 9 which is adapted to gravitate to make and break connection between the terminals 10 and 11; the latter being a metal tube and the former a metal abutment. Said terminals 10 and 11 are conveniently insulated from each other by cementing them in the cylindrical glass tube 12. Said tube 12 has metallic end closures 14 and 15 respectively in electrical connection with said terminals 10 and 11 and provided with respective binding posts 16 and 17. The contact 11 is convex and opposed to the ball 9 and when the parts are in their normal position, as shown in Fig. III, the convex portion 11 will cause the ball 9 to slightly shift or move laterally to insure a good electrical contact with the inner wall of the tube 10. Thus the ball 9 can move lengthwise or in the direction of the axis of the tube 10 and upon gravitating in contact with the convex terminal 11, the latter, due to its curvature, will cause a slight rolling or shifting movement of the ball laterally to effect said contact of the ball with the inner surface or wall of the tube 10.

Said binding post 16 is electrically connected with the conductor 19 extending into the cable 20 leading to the source of electrical energy. Said binding post 17 is electrically connected with the contacts 4 by the conductor 22. Said contacts 3 are electrically connected with the conductor 24 which also extends in said cable 20.

Said cable 20 is flexible and is provided with the spring guard 25 formed of helically coiled wire, the terminal convolutions 27 of which are of larger diameter than the others and adapted to engage the recess 28 in said casing and prevent accidental removal of said guard. Said cable 20 may be provided at its other end with any suitable electrical connecting means such as an ordinary screw plug adapted for connection with a municipal supply circuit including a source of electrical energy. The bolts 29 and nuts 30 detachably connect said sections 1 and 2.

It is to be understood that when said switch is in the upright position shown in Figs. I to III inclusive; said ball 9 rests upon said abutment terminal 11 which is convex so that said ball tends to gravitate sidewise and maintain its contact with the tubular terminal 10 unless and until said switch is upset to the position indicated in Fig. IV. Whereupon, said ball 9 rolls away

from said abutment terminal 11 and thus breaks the electrical supply circuit which it otherwise continuously maintains.

Of course, the contacts in said switch casing may be arranged and adapted for detachable electrical connection with forms of terminals other than the parallel cylindrical pins above described and, although I have found it convenient to use a piece of cylindrical glass tubing as the insulating medium between the terminals to be connected by the movable ball; other insulating means may be employed. Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein, without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In an electric switch, the combination with a portable casing of two contacts seated in said casing and adapted for detachable connection with a pair of terminals of a device to be supplied with electrical energy; an electric conductor extending from one of said spring contacts into a flexible cable extending exterior to said casing; a movable switch element in said casing, consisting of a metal ball; an insulating tube surrounding said ball; a convex abutment extending into the lower end of said tube; a closure cemented to the lower end of said tube, in electrical connection with said abutment and having a binding post; an electric conductor detachably connecting the other of spring contacts with said binding post; a tubular metallic terminal extending in the upper end of said tube in opposition to said abutment and between said tube and said ball; a closure for the upper end of said tube, in electrical connection with said tubular terminal; a binding post upon said closure in electrical connection with said tubular terminal; a conductor detachably connected with the last named binding post and extending into said cable; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal, by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

2. In an electric switch, the combination with a portable casing; spring contacts seated in said casing, adapted for detachable connection with a pair of terminals of a device to be supplied with electrical energy; an electric conductor extending from one of said spring contacts, into a flexible cable extending exterior to said casing; a movable switch element in said casing, consisting of a metal ball; an insulating tube encircling said ball; a convex abutment extending into the lower end of said tube; a closure for the lower end of said tube, in electrical connection with said abutment; an electric conductor detachably connecting the other of said spring contacts with said abutment; a tubular metallic terminal extending in the upper end of said tube in opposition to said abutment and between said tube and said ball; a closure for the upper end of said tube, in electrical connection with said tubular terminal; and a conductor electrically connected with said tubular terminal and extending into said cable; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

3. In an electric switch, the combination with a portable casing formed of insulating material; of spring contacts seated in said casing, and adapted for detachable connection with terminals of a device to be supplied with electrical energy; an electric conductor extending from one of said spring contacts, into a flexible cable extending exterior to said casing; a movable switch element in said casing, consisting of a metal ball; an insulating tube encircling said ball; a convex abutment extending into the lower end of said tube; a closure for the lower end of said tube, in electrical connection with said abutment; an electric conductor detachably connecting the other spring contact with said abutment; a tubular metallic terminal extending in the upper end of said tube in opposition to said abutment and between said tube and said ball; a closure for the upper end of said tube, in electrical connection with said tubular terminal; and a conductor detachably connected with said tubular terminal and extending into said cable; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal, by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

4. In an electric switch, the combination with a casing having a branched recess, of two contacts respectively mounted in the branches of said recess; a cable leading into said recess and having two conductors, one conductor leading directly through one of the branches to the contact therein; a metallic tubular terminal for the other conductor in said other branch of the recess; an abut-

200 ELECTRICITY—CIRCUIT MAKERS AND BREAKERS.
51

ment in electrical connection with the other of said contacts and held in spaced relation from the lower part of said tubular terminal; and a metallic gravitating member movably engaging within said tubular terminal and adapted, when the casing is in an upright position, to move into engagement with said terminal abutment to electrically bridge the space between the tubular terminal and said abutment.

5. In an electric switch, the combination with a casing; of two contacts carried by said casing, adapted for detachable connection with a device to be supplied with electrical energy; a movable switch element in said casing, consisting of a spherical metal ball; a glass tube encircling said ball; a convex abutment extending into one end of said tube; a closure secured to that end of said tube, in electrical connection with said abutment; a tubular metallic terminal extending in the other end of said tube in opposition to said abutment and between said tube and said ball; a closure for that end of said glass tube, in electrical connection with said tubular terminal; a flexible cable extending from said casing, including two conductors, one leading directly to one of said contacts, and the other conductor connected to said other contact through said switch terminals and ball; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal, by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

6. In an electric switch, the combination with a casing; of two contacts carried by said casing, adapted for detachable connection with a device to be supplied with electrical energy; a movable switch element in said casing, consisting of a metal ball; an insulating tube encircling said ball; a metallic abutment terminal extending into one end of said tube; a closure secured to that end of said tube, in electrical connection with said abutment; a tubular metallic terminal extending in the other end of said tube in opposition to said abutment and between said tube and said ball; a closure for that end of said glass tube, in electrical connection with said tubular terminal; and two conductors, one leading directly to one of said contacts, and the other conductor connected to said other contact through said switch terminals and ball; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal, by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

7. In an electric switch, the combination with a casing; of two contacts carried by said casing, adapted for detachable connection with a device to be supplied with electrical energy; a tubular metal terminal in said casing; a metal ball mounted to roll in said tubular terminal; a convex abutment terminal opposed to said tubular terminal for deflecting the ball laterally into contact with the side wall of said tubular terminal; and two conductors, one leading directly to one of said contacts, and the other conductor connected to said other contact through said terminals and ball; whereby said ball is continuously maintained in electrical connection with said tubular terminal, and is normally maintained in electrical connection with said abutment terminal, by gravitation of said ball, but said ball is automatically separated from said abutment to break the circuit by gravitation of said ball, when said switch is upset to abnormal position.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 12th day of February, 1923.

SAMUEL DWORKIN.