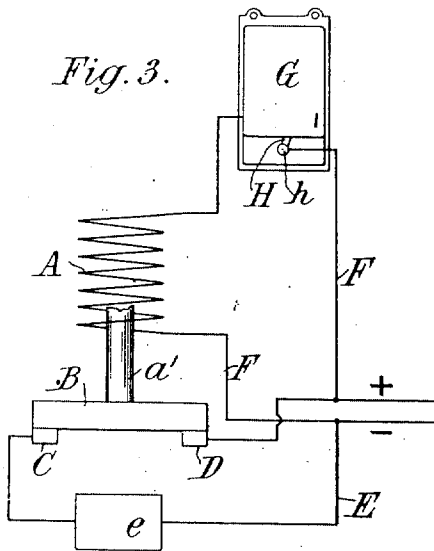
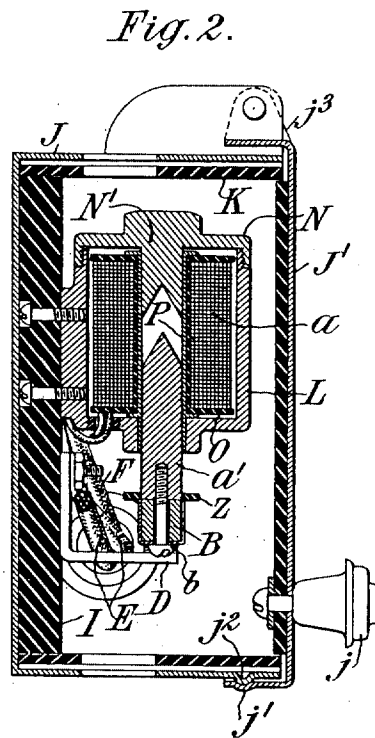
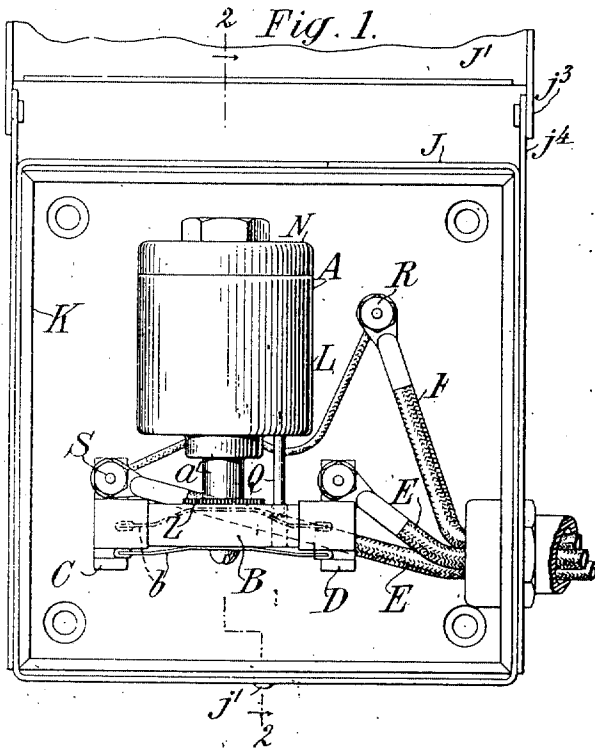


F. A. KUNTZ,  
 AUTOMATIC SWITCH.  
 APPLICATION FILED AUG. 19, 1915.

1,229,294.

Patented June 12, 1917.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC SWITCH.

1,229,294.

Specification of Letters Patent. Patented June 12, 1917.

Application filed August 19, 1915. Serial No. 46,283.

*To all whom it may concern:*

Be it known that I, FRANK A. KUNTZ, a citizen of the United States of America, residing in Richmond Hill, Long Island, county of Queens, and State of New York, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates to automatic switches and has for its object to produce a switch which in itself acts as a magnetic blow-out to destroy arcs.

My invention consists in attaching to the armature or plunger of a magnet a switch or bridge piece of magnetic metal, which is magnetically connected to such armature or plunger and which is adapted to close an electric circuit through two contacts when the magnet is deenergized, and when the magnet is energized and the said bridge piece is attracted away from the contacts the electric circuit is broken and the magnetic flux acts to blow out or extinguish the arcs which would otherwise exist between the bridge and the contacts. A form in which my invention may be constructed is illustrated in the accompanying drawings wherein,—

Figure 1 is a face view of a device containing my invention.

Fig. 2 is a section thereof on the lines 2—2 Fig. 1 looking in the direction of the arrow.

Fig. 3 is a diagram illustrating a use of my invention.

According to my invention the magnetic instrument which is illustrated as an electromagnet A, contains the usual coil *a* and is provided with a core or plunger *a'*, having a core extension or bridge piece B which is formed of magnetic material similar to the core such as iron and which is magnetically connected to the core and is adapted, when the magnet is deenergized, to act as a switch and close an electric circuit through contact pieces C, D. When the magnet A is energized the core or armature *a'* is attracted and the circuit is broken by the withdrawal of the bridge piece B from the contacts C, D. The bridge piece B being formed of magnetic metal and magnetically connected to the core *a'* substantially becomes part thereof and acts to extend the magnetic field so that upon the

withdrawal of the said bridge piece the arcs that would otherwise be created between the bridge piece and the contact pieces C, D are blown out or extinguished by the magnetic flux.

It will be seen that when the bridge piece B is closing the circuit through the contact jaws C, D, the magnet is deenergized and that the instant it is desired to break the said circuit the magnet is energized and at the same time the magnetic flux acts to destroy the arcs. This I have found in actual use to be an extremely efficient form of automatic switch. I have tested a device with the contact points above the bar so that contact was made when the magnet was energized and the electric circuit was then closed, and breaking of the electric circuit was caused by the dropping of the core and bridge when the magnet was deenergized. In a construction of this character I have found that with a current of two amperes the arcing was such that the device would not work, whereas with the device constructed according to my invention an efficient operation is obtained with a current of 40 amperes.

My invention is illustrated as applied to control an electric circuit E. This electric circuit is illustrated as containing a load *e* which may either be an electric heater, a ventilating fan or any other suitable device which it is desired to operate electrically. In the present illustration the device is one which is operated in connection with heating or ventilating systems, and is controlled by the thermostatic conditions in the apartment to be heated or ventilated.

A shunt circuit F is connected to the main circuit E and in this shunt circuit the magnet A is situated. Suitable means for controlling the magnet so that the same shall be energized at desired times are provided, and such means as illustrated comprise a thermostat G which may be any one of many different constructions which are known. The construction of the thermostat forms no part of this invention and therefore the same is not illustrated. The thermostat contains a switch H which makes or breaks the circuit by passing in or out of contact with terminal *h*. When the temperature of the apartment containing the thermostat becomes cold the switch H passes out of contact with the ter-

5 minimal *h* and breaks the shunt circuit. There-  
 upon the magnet A is deenergized and the  
 core *a'* drops causing the bridge B to close  
 the main circuit E through contacts C, D,  
 10 whereupon the apparatus operated in the  
 main circuit is caused to work. When the  
 apartment becomes sufficiently heated the  
 thermostat makes contact by its switch H  
 15 with the terminal *h* energizing the magnet  
 A and retracting the core *a'* and causing  
 bridge B to break the electric circuit at C, D.  
 At this time under ordinary circumstances  
 excessive arcing would take place between  
 20 the bridge and the contact jaws C, D. This  
 is prevented however by my invention  
 through the fact that the bridge piece B is  
 of magnetic metal and is attached to the core  
*a'* so as to substantially form part thereof  
 25 and thereby the magnetic field is extended  
 and the magnetic lines or flux act to extin-  
 guish the arcs which would otherwise be  
 formed between the bridge piece and contact  
 jaws.

25 The magnet A is illustrated as mounted  
 upon an insulated base plate I which may be  
 formed of slate and is located within a suit-  
 able container as for instance the metal  
 cabinet J which may be formed of pressed  
 30 steel and which is lined with a suitable lin-  
 ing K which may be formed of asbestos  
 board. A cover *J'* is provided which has a  
 lifting knob *j* and a catch *j'* in the form of a  
 boss which engages a corresponding boss *j''*  
 35 on the cabinet. The cover is formed with  
 ears *j''* which are pivotally mounted in cor-  
 responding ears *j'* on the body. The magnet  
 A is provided with a shell L having a screw  
 cap N, which parts may be formed with cast  
 40 iron and this cap has an inward extension  
 N<sup>1</sup>. The core or plunger *a'* has a soft rub-  
 ber washer Z which forms a stop for the  
 core. The coil *a* is inclosed on its inside  
 and top and bottom by a bobbin O which  
 45 may be formed of suitable material such as  
 fiber or bakelite and is provided with a brass  
 core sleeve P.

The contact jaws C, D are connected to  
 the main circuit E so that when the bridge  
 B is dropped the said circuit is closed.  
 50 These contact jaws are preferably made of  
 copper and are illustrated as L-shaped as  
 seen in side view in Fig. 2, having at their  
 upper ends connections to the wires of the  
 circuit E.

55 I prefer to provide the bridge B with a  
 spring contact brush *b* which, when the mag-  
 net is energized and the bridge B is with-  
 drawn, springs away from the bridge as  
 shown in dotted lines in Fig. 1. By means  
 60 of the said spring brush *b* a wiping contact  
 is obtained on the contact jaws C, D, which  
 is desirable. The bridge B preferably is  
 provided with means for holding it in  
 proper relation and this may consist of a  
 65 guide rod Q suitably attached to the said

bridge, and which enters a channel in the  
 magnet A. The shunt F is connected to the  
 terminals of the coil *a* at R and S.

The construction illustrated provides for  
 an extension of the magnetic field so that  
 70 the flux acts efficiently to blow out arcs be-  
 tween the bridge and contacts when the  
 magnet is energized. This may be due to  
 the greater magnetic conductivity in the  
 shell compared with the bridge, which  
 75 causes the latter to quickly become satu-  
 rated, or it might be due to an extension  
 of the magnetic field caused by the satura-  
 tion of the parts of the iron circuit. By  
 my construction the magnetic lines of force  
 80 normally pass through the bridge when the  
 magnet is energized, so that the contacts  
 are normally exposed to the magnetic lines  
 of force.

I have described a desirable manner in  
 85 which my invention may be constructed  
 and used, but the use of the invention is not  
 limited to the particular system illustrated  
 nor is it limited in structural features to  
 the details illustrated and described, as  
 90 such details may be changed within the  
 limits of the appended claims.

What I claim is:—

1. An automatic switch comprising an  
 electromagnet, having the terminals of its  
 95 coil adapted for connection in an electric  
 circuit, a magnetic movable member, a  
 pair of stationary contacts adapted to be  
 connected in an electric circuit and lying  
 within the magnetic field, a bridge mag-  
 100 netically connected to the movable member  
 of said magnet and adapted to close the  
 circuit through the said contacts when the  
 magnet is deenergized, and adapted to  
 105 break the circuit through said contacts  
 when the magnet is energized, said last men-  
 tioned circuit normally remaining closed  
 until broken by said bridge, said bridge  
 110 formed of magnetic material and serving  
 to extend the magnetic field to the vicinity  
 of the contacts and acting as a magnetic  
 blow out to extinguish the arcs when the  
 magnet is energized.

2. An automatic switch comprising an  
 electromagnet, having the terminals of its  
 115 coil adapted for connection in an electric  
 circuit, a magnetic core, a pair of station-  
 ary contacts adapted to be connected in an  
 electric circuit, a magnetic metal bridge  
 piece magnetically connected to the core  
 120 and serving to extend the magnetic field  
 to the vicinity of the contacts and adapted  
 when the magnet is deenergized to make  
 electrical connection with said contacts and  
 close an electric circuit therethrough, and  
 125 when the magnet is energized to break said  
 circuit and to blow out the arcs, said  
 last mentioned circuit normally remaining  
 closed until broken by said bridge.

3. An automatic switch comprising a 130

magnet, a movable magnetic core, a pair of stationary contacts adapted to be connected to an electric circuit, a bridge constructed of magnetic metal and magnetically connected to the core of the magnet, said bridge adapted when the magnet is de-energized to close the circuit through said contacts and when the magnet is energized to break said circuit and blow out the arcs.

4. An automatic switch comprising a magnet, a movable magnetic core, a pair of stationary contacts adapted to be connected in an electric circuit, a bridge constructed of magnetic metal and magnetically connected to the core of the magnet, and serving to extend the magnetic field to the vicinity of the contacts, a spring brush carried by the bridge and adapted when the magnet is deenergized to close the circuit through said contacts and when the magnet is energized to break said circuit.

5. An automatic switch comprising an

electromagnet, a central plunger therefor, an electric circuit connected to the coil of said electromagnet, a pair of separated contacts adapted to be connected in an electric circuit, a bridge adapted to make and break connection with said contacts, said bridge formed of magnetic metal and attached to the said plunger and serving to extend the magnetic field to the vicinity of said contacts whereby when the magnet is deenergized the bridge closes the circuit through said contacts, and when the magnet is energized is withdrawn and breaks said circuit and acts as a magnetic blow out to destroy the arcs.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK A. KUNTZ.

Witnesses:

F. T. KITCHEN,  
F. BURNS.