March 14, 1933. L. A. KEMPTON 1,901,653

ELECTRIC SWITCH

Filed Aug. 28, 1931

Fig. 1.

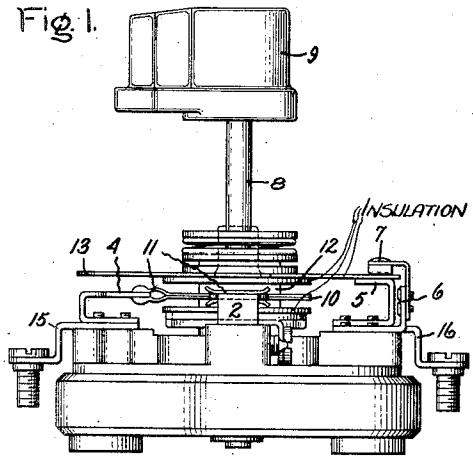


Fig. 2.

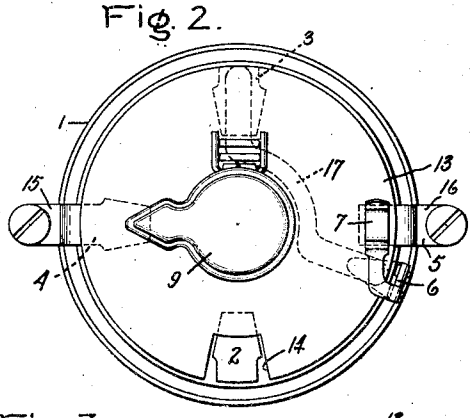


Fig. 3.

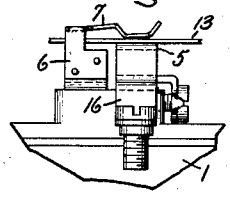
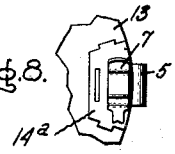


Fig. 8.



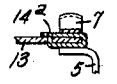


Fig. 9.

Fig. 4.

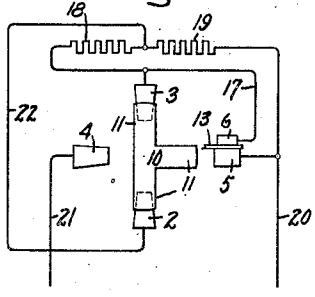


Fig. 5.

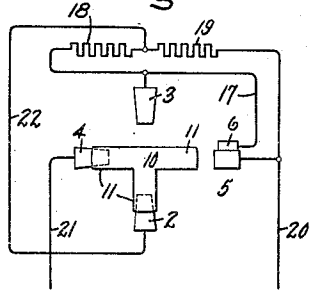


Fig. 6.

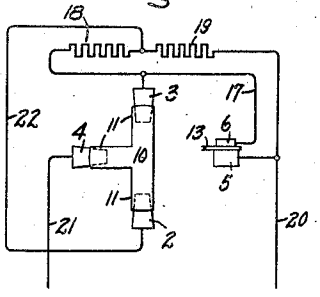
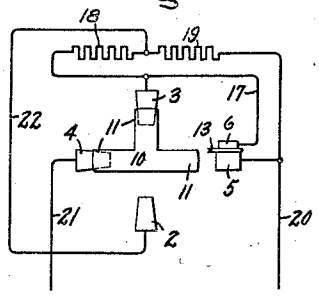


Fig. 7.



Inventor:
Leslie A. Kempton:
by Charles O'Mullen
His Attorney.

Patented Mar. 14, 1933 1,901,653

UNITED STATES PATENT OFFICE

LESLIE A. KEMPTON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

ELECTRIC SWITCH

Application filed August 28, 1931. Serial No. 559,958.

My invention relates to electric switches and especially to such switches which may be used to control the rate of heat generation of a plurality of heating units by changing the circuit connections of the heating units to the supply source.

The heat generated by a plurality of heating units may be varied by connecting the heat units in parallel, connecting a lesser number of the units in circuit, and connecting the units in series. The change of the circuit connections has been accomplished by providing a switch with a plurality of stationary and rotary contacts mounted in different planes to separate the contacts utilized in making the different connections.

The object of my invention is to provide a switch for the above purpose which shall be simple in construction, easy to assemble, rugged and economical.

What I believe to be novel and my invention will be better understood by reference to the specification, accompanying drawing, and appended claims.

Fig. 1 is a side elevation of the switch with the cover removed; Fig. 2 is a plan view; Fig. 3 is a fragmentary detail view of a portion of the switch; Figs. 4, 5, 6 and 7 are circuit diagrams with the different connections made by the switch when in different positions and Figs. 8 and 9 are detail views of a modification of part of the switch.

Base 1 is of molded insulating material. Three stationary contacts 2, 3 and 4 are secured to base 1, 90° apart, with their contact surfaces disposed in a common plane. Stationary contact 5 is secured to the base opposite contact 4 but its contact surface is disposed in a plane above the common plane of contacts 2, 3 and 4. Auxiliary stationary contact 6 is secured adjacent contact 5 and carries a spring contact member 7 which projects over the contact surface of stationary contact 5 and is bent to be in engagement with said contact surface. Base 1 has a central opening with a bushing secured therein to provide a bearing surface for shaft 8 on which the rotor members are mounted. A handle 9 is connected to the upper end of shaft 8 and pointed to serve as an operating and indicating handle. A movable polepiece 10 is provided with three radial arms 11 and mounted on a hub 12 of insulating material which fits loosely on the shaft 8 and is moved with a snap action from one position to another by suitable operating mechanism, examples of which are well known in the art.

The polepiece 10 is of the usual construction with two resilient laminæ shaped to form arms 11 which are adapted to straddle the contact portions of the stationary contacts 2, 3 and 4 to interconnect them in different combinations.

Instead of using a second rotating polepiece which requires additional insulation and space, the stationary contacts 5 and 6 are biased toward each other as shown in Figs. 2 and 3 but are separated and insulated from each other by a disc 13 of insulating material. Disc 13 is secured to the hub 12 on which the polepiece 10 is mounted and adapted to be moved therewith. A slot 14 is provided to permit the engagement of stationary contacts 5 and 6 when the polepiece is in one of its four operative positions. In place of the slot 14, I may use a piece of metal secured to the edge of the insulating disc 13 to complete the electrical connection between stationary contacts 5 and 6 as shown in Figs. 8 and 9. This method of making the connection between the contacts 5 and 6 is accomplished by bending a flat piece of metal 14^a around the edge of the insulating disc 13 providing contact surfaces on both sides. To secure the metal piece 14^a to the insulating disc 13 a projection is provided on one end which is bent and passed through corresponding openings in the insulating disc 13 and the other end of metal piece 14^a and expanded in the latter opening. Projections are also provided on the sides, bent and inserted in openings in the insulating disc 13 to assist in preventing lateral movement or twisting of the metal piece 14^a with respect to the disc. When this method of making the connection between contacts 5 and 6 is used, it is not necessary to have the spring contact member 7 biased to normal engagement with contact 5 but it may be

arranged above contact 5 such a distance that there will be sufficient contact pressure exerted by the spring contact member 7 when metal piece 14a is in position between contacts 5 and 6. With this modification there is the advantage that the spring contact member 7 does not normally engage the insulating disc 13 so does not have any tendency to retard the movement of the rotor member.

Contact strips 15 and 16 are connected to stationary contacts 4 and 5 respectively and are provided with threaded apertures for the reception of binding screws. Stationary contacts 3 and 6 are connected by means of a connector 17 which is mounted in a suitable manner, as in a recess in the underside of base 1. Stationary contacts 2, 3 and 5 are provided with projections from one side having threaded apertures for the reception of binding screws as may be seen in part in Figs. 1 and 3.

The operation of the switch may best be understood by reference to Figs. 4, 5, 6 and 7. The supply wires 20 and 21 are connected to the stationary contacts 5 and 4 by means of the binding screws threaded in the strips 15 and 16. Two heating units 18 and 19 are connected together at one end and by means of conductor 22 connected to stationary contact 2. The other end of heating unit 18 is connected to stationary contacts 3 and 6. The other end of heating unit 19 is connected to stationary contact 5. When the polepiece 10 is in the position indicated in Fig. 4, stationary contact 4 is not engaged and so no current is supplied to the heating units 18 and 19. This is the off-position of the switch.

When the polepiece 10 is turned in a clockwise direction 90° to its next position (Fig. 5) stationary contacts 2 and 4 are connected through the radial arms 11. Slot 14 or metal piece 14a is in such position that a circuit is completed through stationary contacts 5 and 6. Thus a connection is made from supply conductor 20 through heating units 18 and 19 in parallel to supply conductor 21. This is the high-heat position of the switch.

When the polepiece 10 is rotated again in a clockwise direction 90° (Fig. 6) the stationary contacts 2, 3 and 4 are interconnected by means of radial arms 11. Stationary contacts 5 and 6 are separated by the insulating disc 13. Thus a connection is made from supply conductor 20 through the heating unit or resistor 19 to supply conductor 21. The two sides of the heating unit or resistor 18 are connected together so there is no current flow through it. This is the medium-heat position of the switch.

When the polepiece 10 is again rotated in a clockwise direction 90° (Fig. 7) stationary contacts 3 and 4 are connected by radial arms 11 and stationary contacts 5 and 6 are separated by insulating disc 13. Thus a connection is made from supply conductor 20 through the heating units or resistors 19 and 18 in series to supply conductor 21. This is the low-heat position of the switch.

The circuit connections for the three different rates of heat generation are accomplished by a polepiece which controls the connection of the comomn ends of the heating units and the other end of one heating unit to one supply conductor, the other end of the remaining heating unit is permanently connected to the other supply conductor and the insulating disc 13 prevents the connection of the opposite ends of the heating units together except in the high-heat position when they are connected in parallel

Thus by the use of the disc 13 a switch having only one polepiece may be utilized to control the connections of heating units to generate heat at three different rates which makes it possible to make the switch small, of few parts, easy to assemble and simple in construction.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An electric switch comprising a base of insulating material, three stationary contacts secured to said base 90° apart and having contact surfaces in the same plane, a polepiece having three radial projecting arms and adapted to engage the contact surfaces of said three stationary contacts in different combinations, a fourth stationary contact secured to the base opposite one of the three stationary contacts with its contact surface in a different plane from the common plane of the three stationary contacts, an auxiliary stationary contact secured adjacent the fourth stationary contact having a resilient arm projecting over the contact surface of said fourth stationary contact, and a disc of insulating material separating said fourth and auxiliary contacts except in one position.

2. An electric switch comprising a base of insulating material, a rotor journalled in said base, four stationary contacts secured to said base 90° apart with the contact surfaces of three contacts projecting inwardly in the same plane, a polepiece mounted on said rotor and having three radial arms adapted to engage the three stationary contacts with their contact surfaces in the same plane, an auxiliary stationary contact secured to the base adjacent the fourth stationary contact having a resilient arm projecting over the contact surface of said fourth stationary contact surface, and a disc of insulating material mounted on said rotor and separating said fourth and auxiliary contacts except in one position.

3. An electric switch comprising a base of insulating material, stationary contacts mounted on the base, a rotary member, a

polepiece carried by the member to establish circuits through the contacts from a source of current supply, a pair of stationary contacts arranged one above the other, and a disc mounted on the member to turn therewith and extending between said pair of stationary contacts to insulate them from each other except in a predetermined position of the member.

4. An electric switch comprising a base of insulating material, angularly spaced stationary contacts mounted on the base, a rotary member, a polepiece carried by the member for successively engaging the stationary contacts to establish a circuit through them from a source of supply, a pair of stationary contacts arranged one above the other, a thin disc of insulating material carried by the member and movable between the pair of contacts to normally insulate them from each other, and means associated with the disc to establish a circuit at some predetermined position of the member through said pair of contacts.

In witness whereof, I have hereunto set my hand.

LESLIE A. KEMPTON.