

March 15, 1932.

S. A. GRISWOLD

1,849,922

ELECTRIC SWITCH

Filed March 26, 1929

2 Sheets-Sheet 1

Fig.1.

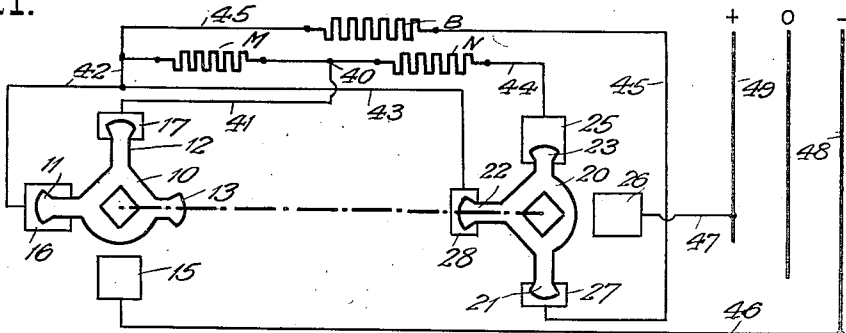


Fig. 2.

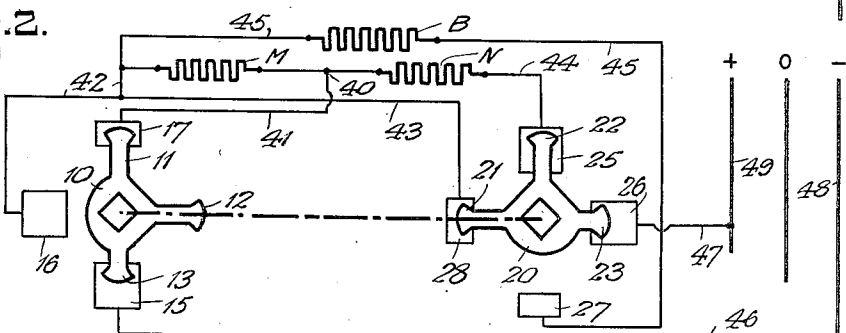
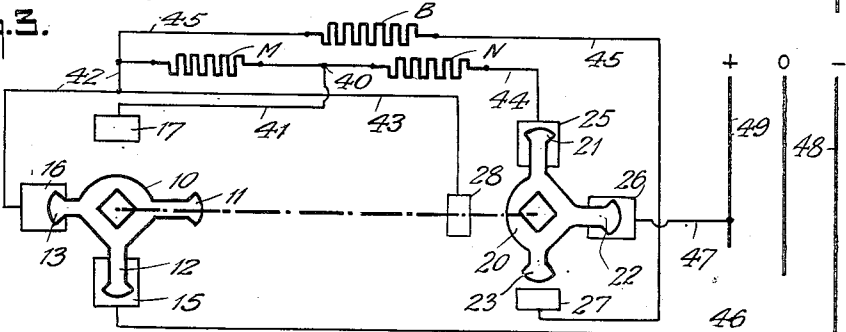
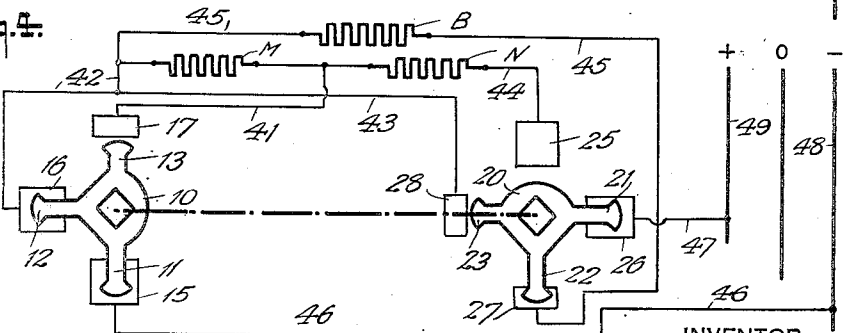


Fig. 3.



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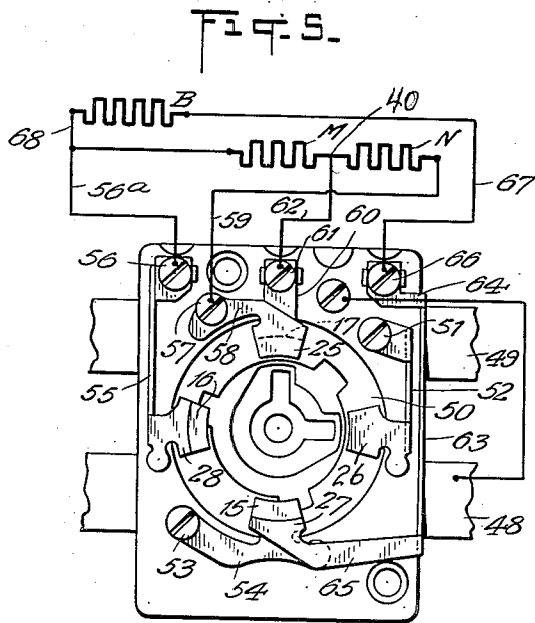
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed March 26, 1929. Serial No. 349,973.

This invention relates to a rotary switch designed particularly to control the flow of current through three resistance heating elements in an oven to give high and low degrees of heat by connecting two of the elements in parallel and in series respectively in two positions of the switch and, in a third position, to encircuit the third element to give a broiling heat. The invention, however, is not in all ways limited to the control of three such elements or translating devices for such a purpose.

According to this invention, three elements may be connected in the manner described across the same two wires for all degrees of heating, whether these be the wires of a two-wire system or two of the wires of three-wire system, e. g. the two outside wires of an Edison three wire system. In its use with the three-wire system, the invention is of particular advantage since there is no possibility of unbalancing the system if a number of units containing such switches are installed on the line. Since the switch is used along with other switches controlling various parts of an electric stove, the common form of connection is across the outside wires of the three-wire system on which the stove operates.

This switch is designed particularly for use in controlling a translating device and in a circuit of the sort shown in the application of Arvid H. Nero, Serial No. 351,053, filed herewith. It may be used in place of the switch shown therein. In said application such use is claimed broadly and in so far as it is claimed therein, I make no claim to it here.

A preferred embodiment of the invention is described hereinafter and is illustrated in the sheet of drawings accompanying this specification.

In the drawings—

Figure 1 is a schematic lay-out showing the relation between the movable contacts and fixed contacts of the switch in its "off" position and showing the relation of the switch to the three resistance elements.

Figure 2 is a similar lay-out of the same arrangement but showing the relation be-

tween the switch contacts in the position giving a high degree of heat generated by the oven units.

Figure 3 represents the position of the switch for a low degree of heating by the oven elements.

Figure 4 represents the position of the switch in which the broiling element is in circuit.

Figure 5 is a plan view of a switch base, with the switch movement removed, showing the arrangement of fixed contacts and terminals together with the connection of the latter to the feeders and to the load.

The general construction of the switch is no part of the invention. It may be such as is shown in the Carlson Patents 1,506,563, 1,669,283, or 1,690,052 wherein the blades are turned in unison in either direction with a snap action through successive quarter turns. In the form illustrated in the accompanying drawings there are two switch blades designed to turn in unison about a common axis through arcs of 90° to co-operate with two sets of fixed contacts on the switch base, one set being in a plane spaced in the direction of the axis of the switch blades from the plane of the other set.

Regarding the switch as being set on a horizontal base, the switch blade 10 which is then the lower of the two has three arms, two of which 11, 12 are long and one of which 13 is short. The upper blade 20 is identical in shape but when mounted on the switch spindle its arms are not in register with the corresponding arms of the lower blade but are turned through 90° in a counter-clockwise direction as viewed from above.

The lower set of fixed contacts consists of two long contacts 15, 16 and one short contact 17 while the upper set consists of two long contacts 25, 26 and two short contacts 27, 28. The two short contacts 27, 28 of the upper set are in register with the two long contacts of the lower set and the short contact 17 of the lower set is spaced 90° is advanced of one long contact 16 and 180° in advance of the other 15 in a clockwise direction when looked at from above.

The relation between the short and long

fixed contacts and the short and long arms on the switch blades is such that a long arm will engage either a short or a long fixed contact and a short arm will engage only a long fixed contact.

The three resistance elements M, N, B are connected to the fixed contacts in the manner shown. The elements M and N are the baking units in the instance serving here as an illustration while the element B is for broiling and would be placed in the upper part of the oven. From an intermediate point 40 between the baking units M, N there is a connection 41 to the short lower contact 17. The outer end of the one baking element M is connected to the long lower contact 16 by a conductor 42 and to the short upper contact 28 by a conductor 43. The outside end of the other baking element is connected to the long upper contact 25 by the line 44. The broiling element B is in a connection 45 between the outside end of the oven element M and the short upper contact 27. In a sense, the three units make up a single resistance with two intermediate connection points, or they may be considered as a two part translating device consisting of the resistance element B and the resistance M, N, the latter having an intermediate connection point.

Conductors 46 and 47 connect the long lower contact 15 and the long upper contact 26 respectively with the feeders or buses 48, 49 which are shown here as being parts of an Edison three-wire system having a neutral wire not connected directly to any part of the switch.

Considering the four diagrams, it will be noted that the upper blade 20 controls the connections between one bus or terminal to both outside ends of the resistance M, N in one switch position (Fig. 2), to one outside end in a second position (Fig. 3) and to one end of the other resistance element B in a third position. In the same positions, the lower blade 10 completes the circuit by establishing connections to the other bus or its connected terminal respectively from the intermediate point 40 of the resistance M, N, (Fig. 2) from the other end of this resistance (Fig. 3) and from the other end of the other resistance element B (Figure 4).

In another view of the action of this switch, treating the oven units as a single resistance having two intermediate connection points forming three resistance elements, the upper blade with its associated contacts controls the connections from one terminal to the ends of the resistance and to one intermediate point while the lower blade and its contacts control connections from the other terminal to both intermediate points for the purpose of giving the high and low degrees of heat from two elements and a broiling heat from the third element alone.

It will be understood that the illustration

in Figures 1 to 4 of the drawings is schematic and that the description above, with reference thereto, is not intended to be more than a description of the electrical connections and of the physical relation between the switch blades and the switch contacts. This subject matter may be embodied in various constructions of rotary switch. A form of switch base having an arrangement of fixed contacts and terminals suitable for establishing the above described connections between the feeders and the switch and between the heating elements and the switch, and suitable also for receiving a rotary switch movement comprising two switch blades of the shape here shown, will now be described, the reference being to Figure 5.

The base is of porcelain or other molded insulating material and has a central well 50 for a rotary switch movement of the type adapted to turn the blades in either direction with a snap action through 90° on each quarter turn of the thumb piece actuator. The base rests on the bus bars 48, 49 which are received in slots in its lower surface.

A screw 51 extends through the base engaging the positive bus 49 and also holding to the base a conductive piece 52 integral with the long upper contact 26 and resting edgewise in a recess in the upper surface of the base. This piece together with the screw 51 forms the connection denoted 47 in the description above. Another screw 53 connects the negative bus 48 with a conductive piece 54 and holds the latter on the base. The long lower contact 15 is integral with this piece 53 from which it will be evident that these parts form the connection 46 described above. The binding post screws for connecting the switch to the heater coils are arranged at one side of the base and each is threaded into a conductive piece extending to the appropriate contact and integral therewith. The connections denoted 42 and 43 above are formed by a single conductive strap 55 resting edgewise in a recess in the base and carrying the upper short contact 28 and the lower long contact 16 at one end and the binding screw 56 at the other end. This permits a wire 56^a secured to the screw 56 to connect with the outside end of the oven element M and the inner end of the element B.

A binding screw 57 threads into a strap 58 carrying the upper long contact 25 on the surface of the base. The connection denoted 44 is completed from this screw 57 by a wire 59 leading to the outside end of the oven element N. The lower short contact 17 which underlies the long contact 25 is at the end of a strap 60 set in a recess in the base and engaged by a binding screw 61 which receives the wire 62 leading to the intermediate point 40 between the oven elements M and N, thus forming the connection denoted 41 above.

Finally, there is a long strap 63 extending along the side of the base and having an offset 64 at one end and a longer offset 65 at the other end to carry the short upper contact 27. The offset 64 is engaged by the binding screw 66 to which is attached the wire 67 leading to the broiler element B, the whole thus making up, with the wire 68, the connection indicated as 45 above.

The base construction as well as the arrangement of fixed and movable contacts may be modified somewhat and such modifications, embodying any of the substance by which this invention advances over the prior art, I wish to include within the fair scope of the following claims.

I claim—

1. In an electrical heating system having a resistance with two intermediate connection points, forming three resistance elements, and receiving current at two supply terminals, a four-position rotary switch comprising two sets of contacts spaced axially of the switch and two switch blades to turn in unison in association respectively with said sets, one of said sets having two long contacts and one short contact and the other having two long contacts and two short contacts, and said blades having each two long arms and a short arm.

2. A resistance unit having two intermediate connection points and current supply terminals, in combination with a switch having fixed contacts and two switch blades movable in unison through three circuit closing positions to cooperate therewith, one blade serving in one switch position to connect one terminal with an end of said unit and with the intermediate point nearer the other end thereof, and to connect said terminal with opposite ends of said unit alternatively in two other switch positions, the other blade serving to connect the other terminal with the other intermediate point in the first position and with the first named intermediate point in the said other two switch positions.

3. In an electrical heating system having a resistance with two intermediate connection points, forming three resistance elements, and receiving current at two supply terminals, a switch having spaced sets of fixed and movable contacts, one set controlling connections from one terminal to the two ends of said resistance and to one intermediate connection point, and the other set controlling connections from the other terminal to both intermediate connection points whereby, in two positions of the switch, two degrees of heat are obtained from two of said elements and, in a third position, the third element alone is heated.

4. In an electrical heating system having a resistance with two intermediate connection points, forming three resistance elements, and receiving current at two supply

terminals, a switch base having a well for the reception of a rotary switch movement, fixed contacts at 90° intervals extending inwardly from the wall of said well and consisting of two long and two short contacts at one level, two long contacts at another level and in register with said two short contacts, and a short contact also at said other level, two power supply terminals, one electrically connected with an upper long contact, the other with a lower long contact, and four lead wire terminals, one connected with the one set of said registering long and short contacts and the other three connected respectively to the remaining contacts, for the purpose described.

In testimony whereof I have signed my name to this specification.

SAMUEL A. GRISWOLD.

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