

ELECTRIC SWITCH

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2 Sheets-Sheet 1

Fig. 1.

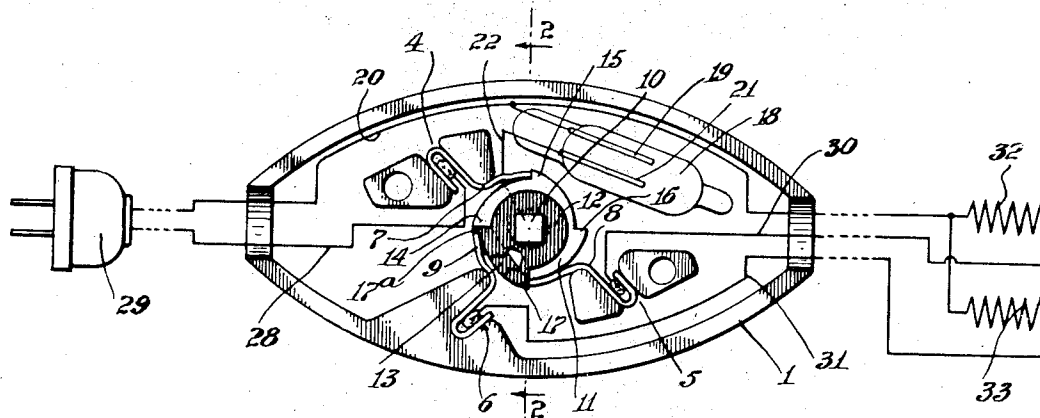


Fig. 2.

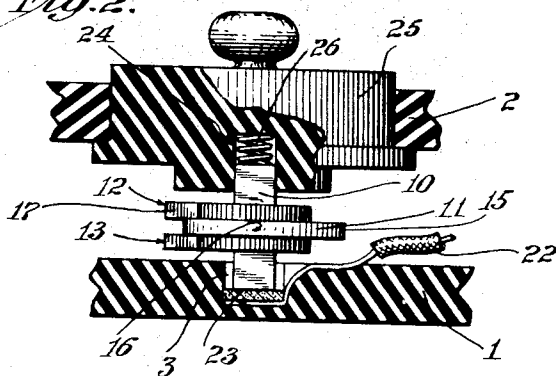


Fig. 3.

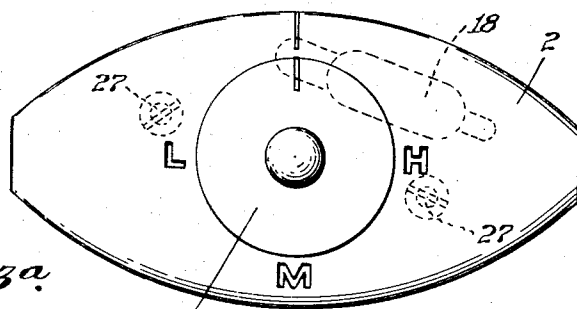
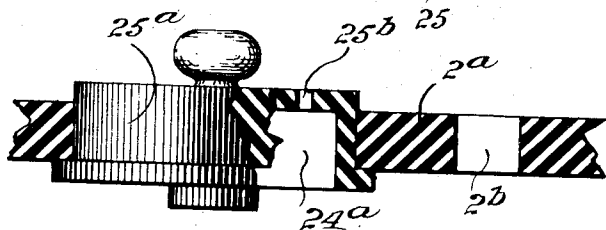


Fig. 3a.



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ELECTRIC SWITCH

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4 Claims. (Cl. 200—6)

This invention relates to new and useful improvements in electric switches and more particularly to a multiple electric snap switch.

It is the object of the present invention to provide a multiple snap switch of simple and inexpensive construction by means of which electrical devices, such as heating pads, may be switched into a plurality of successive operated positions and also disconnected from the current supply. Preferably, an electric lamp is provided which is lighted in all actuated positions of the switch and extinguished in the off position.

In the drawings, Fig. 1 is a plan view of the switch with the cover plate removed and a diagrammatic representation of the circuits;

Fig. 2 is a vertical cross-section along lines 2—2 of Fig. 1;

Fig. 3 is a plan view of the cover plate;

Fig. 3a is a vertical cross-section of a modified switch operating handle;

Fig. 4 is a view corresponding to Fig. 2 of a second embodiment of the invention;

Fig. 5 is a sectional view along lines 5—5 of Fig. 4; and

Fig. 6 is a circuit diagram to illustrate the operation of Figs. 4 and 5.

The switch proper is enclosed within a molded casing composed of a bottom 1 and a cover 2. The bottom portion has formed in it a central cavity 3 and three slots 4, 5, and 6. Within each of these slots is held by friction the double-back end of a contact spring, the free end of each contact spring standing out substantially at right angles. The three contact springs are numbered 7, 8, and 9.

The movable switching or ratchet device consists of a square metal stud 10 on which is mounted a metal disc 11 between preferably two fiber discs 12 and 13. The disc 11 has three cam surfaces 14, 15, and 16 which project outside of the edges of the fiber discs 12 and 13 and may be engaged by the free ends of springs 7, 8, and 9, which project tangentially with respect to the discs and are tensioned so as to press against the cam surfaces towards the stud 10. The two fiber discs have each a cam surface 17, 17a which projects beyond a cutaway portion of the metal disc 11 and on which the contact springs 7, 8, and 9 may ride.

Within a cavity of the bottom half 1 of the casing is placed a small electric lamp 18, in the present instance a gaseous discharge lamp. One of the electrodes 19 of the lamp is connected with a wire 20 which runs through the switch casing to the outside at both ends thereof. The other

electrode 21 is connected with a wire 22, the end of which is placed within the central cavity 3 below a carbon resistor 23. The lower end of the stud 10 rests on resistor 23. The upper end of the stud is held in a square cavity 24 of a rotatable knob 25 mounted within an opening of the cover 2. A coiled spring 26 within the cavity 24 pushes the stud 10 down into contact with the resistor 23 when the two sections 1 and 2 of the casing are clamped together by screws 27.

A wire 28 projects through one end of the casing and terminates with wire 20 in the contacts of a plug 29 through which connection can be established with the power supply. The other end of wire 28 is soldered to the doubled-back portion of spring 7 within slot 4. The end of the wire 20 that projects to the outside through the right-hand end of the casing is formed into a cable with two other wires 30 and 31. The wires 30 and 31 are fastened to contact springs 8 and 9, respectively, in the same manner as wire 28 is fastened to spring 7. The wires are connected with two resistances 32 and 33 of a heat pad or the like. One of these resistances may give low heat, the other medium, and the two together high heat.

When the switch is in the position illustrated in Fig. 1, a circuit is closed from one terminal of the plug 29 over conductor 28, spring 7 resting against cam 15, spring 8 contacting with the cam surface 16 of disc 11 and abutting against the cams 17 of the fiber discs 12 and 13, conductor 30, resistance 32, conductor 20, to the other terminal of the plug 29. The resistance 32 will heat up and in parallel with it the lamp 18 is lighted, the lamp being connected from conductor 20 over the electrodes 19 and 21, conductor 22, resistance 23, stud 10, disc 11, spring 7, to conductor 28.

By rotating the knob 25 in a clockwise direction, one can alter the above traced circuit connections. In the next position, the contact spring 7 will rest on the insulating cam surface 17 against the stop 17a of insulating material and thus no current can flow through the conductor 28. Neither of the resistances 32 and 33 is now energized and the lamp 18 is extinguished.

In the following position, the conductor 28 is connected over spring 7 which is now resting on the cam surface 18 against the fiber cam 17, the disc 11, spring 8 which is resting on cam surface 14, against the cam 15, resistance 32, conductor 20 and back to the other terminal of the plug 29. In parallel with this, a circuit will be closed also through cam 11, spring 9 which is resting

on cam surface 15 against the cam 16, conductor 31, resistance 33, conductor 20. Both resistances 32 and 33 will, therefore, be energized and the lamp 18 will be lighted over the same parallel path that was previously traced.

Upon the rotation of the knob by an additional step, the contact spring 8 will come to rest on the fiber cam 17. This will open the circuit of the resistance 32, but the resistance 33 will remain in the circuit over spring 9.

The letters L, H, and M, which are cut in the cover and covered with a transparent plastic, are illuminated by lamp 18, the rays of which are reflected by the bottom half 1 of the casing. The knob 25 is suitably marked so that the user can determine its angular position with respect to the cut-out letters which indicate low, high, and medium heat.

Instead of the above described arrangement, the visual indication of the position of the on and off positions of the switch can be effected in the manner illustrated in Fig. 3a. As shown in this figure, the handle or knob 25a is divided into four compartments, one of which is 24a. Letters or numerals or other indicia of the switch positions are cut into the handle as indicated at 25b. Since the compartments are shut off from one another by walls, only the cut-out 25b of the compartment which is above the lamp 18 will be illuminated and will thus indicate the position of the switch.

Instead of this arrangement, or in addition thereto, an opening 2b may be cut in the cover 2a through which the illuminated or extinguished condition of the lamp 18 can be determined.

In this case also, the cut-outs should be covered or filled with transparent plastic material to prevent intrusion within the switch casing.

When the device to be controlled has three resistances which must be switched in one after another, then the arrangement shown in Figs. 4-6 may be used. For ready comparison with the embodiment illustrated in Figs. 1-3, we have designated the various parts by adding 100 to each reference numeral.

One of the terminals of plug 129 is connected with wire 120 and the other terminal with wire 128. Wire 120 is connected in parallel with one end of each of three resistances, 132, 133, and 140, and also to one electrode of lamp 118. The other terminal of resistance 132 is connected to a contact spring 107. Similarly, the resistances 133 and 140 are connected to contact springs 108 and 109. The contact springs 107, 108, and 109 are arranged in the same manner as contact springs 7, 8, and 9 in Fig. 1. In addition to these contact springs, there is a third contact spring 141 mounted in the lower half of the casing 101. The contact spring 141 is permanently connected with the conductor 123 and rests against a circular brass disc 142 mounted on square stud shaft 110 just below fiber disc 113. The contact spring 141 will engage the contact disc 142 at all times and complete the circuit therethrough except in the off-position where spring 141 engages an insulated portion 143 of the disc.

The arrangement of the fiber discs 113 and 112, and a brass disc 111 held between the two fiber discs on the stud 110, is substantially the converse of the one illustrated in Fig. 1. The brass disc 111 is provided with a single cam surface 117 with which the contact springs 107, 108,

and 119 can come into engagement while the ratchet is being rotated. On the other hand, the two fiber discs 112 and 113 are provided with three such cam surfaces, 114, 115, and 116. Whichever spring is in engagement with the cam surface 117 will connect its associated resistance 132, 133, or 140 with the disc 111 and, thence, through shaft 110, disc 142, contact spring 141, and conductor 128, to the plug 129.

Thus, one resistance after the other can be connected in circuits in parallel with the lamp 118. In the off position of the switch in which the three springs 107-109, rest on the cam surfaces of the fiber discs, the spring 141 rests on insulated segment 143 of the disc 142, breaking the circuit of the lamp 118.

It will be obvious to those skilled in the art that the invention may be modified in many respects without departing from the spirit thereof. For example, the electric lamp may be omitted, the switch may be used to control other devices than heating pads equipped with two or three resistances, the number of switch positions may be increased or decreased, etc.

What is claimed is:

1. In an electric snap switch, a casing of insulating material consisting of a bottom and a cover, a central cavity and a plurality of slots in the bottom, a resistor within said central cavity, and a flat contact spring frictionally held in each slot, a rotatable knob mounted in the cover, a stud of conducting material positioned within said central cavity in contact with said resistor and engaging said knob to be rotated thereby, a ratchet consisting of a disc of conducting material and at least one disc of insulating material above and below the conducting disc mounted on said stud to be rotated therewith, cam surfaces on said discs in engagement with said contact springs so cut as to permit rotation of the ratchet only in one direction, a second conducting disc on said shaft, an electric lamp within said casing and visible from the outside through openings cut in said cover, a connection from said lamp to said resistor, and a plurality of conductors, one for each spring and one for the lamp, projecting from said casing.

2. In an electric snap switch, a casing of insulating material consisting of a bottom and a cover, a central cavity and a plurality of slots in the bottom, a resistor within said central cavity, and a flat contact spring frictionally held in each slot, a knob mounted in the cover and rotatable from the outside, a stud of conducting material positioned within said central cavity in contact with said resistor and engaging said knob to be rotated thereby, a ratchet consisting of a disc of conducting material and at least one disc of insulating material above and below the conducting disc mounted on said stud to be rotated therewith, cam surfaces on said discs in engagement with said contact springs so cut as to permit rotation of the ratchet only in one direction, a second conducting disc on said shaft, an additional contact spring mounted in the bottom and resting against the second disc, an insulating segment in the second disc arranged to engage said additional contact spring in a certain angular position of said stud, an electric lamp within said casing and visible from the outside through openings cut in said cover, a connection from said lamp to said resistor, and a plurality of conductors, one for each spring and one for the lamp, projecting from said casing.

3. In an electric snap switch, a casing of insulating material, a resistor and a plurality of contact springs in said casing, a rotatable knob mounted on the casing, a stud of conducting material in contact with said resistor and engaged by said knob to be rotated thereby, a ratchet consisting of a disc of conducting material and a disc of insulating material mounted on said stud to be rotated therewith, cam surfaces on said discs in engagement with said contact springs so cut as to permit rotation of the ratchet only in one direction, an electric lamp within said casing and visible from the outside through openings cut in said cover, a connection from said lamp to said resistor, and a plurality of conductors, one for each spring and one for the lamp, projecting from said casing.

4. In an electric snap switch, a casing of insulating material consisting of a bottom and a 20

cover, a resistor and a plurality of contact springs frictionally held in said bottom, a rotatable knob mounted on the cover, a stud of conducting material in contact with said resistor and engaging said knob to be rotated thereby, a ratchet consisting of a disc of conducting material and at least one disc of insulating material above and below the conducting disc mounted on said stud to be rotated therewith, cam surfaces on said discs in engagement with said contact springs so cut as to permit rotation of the ratchet only in one direction, an electric lamp within said casing and visible from the outside through openings cut in said cover, a connection from said lamp to said resistor, and a plurality of conductors, one for each spring and one for the lamp, projecting from said casing.

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