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SWITCH

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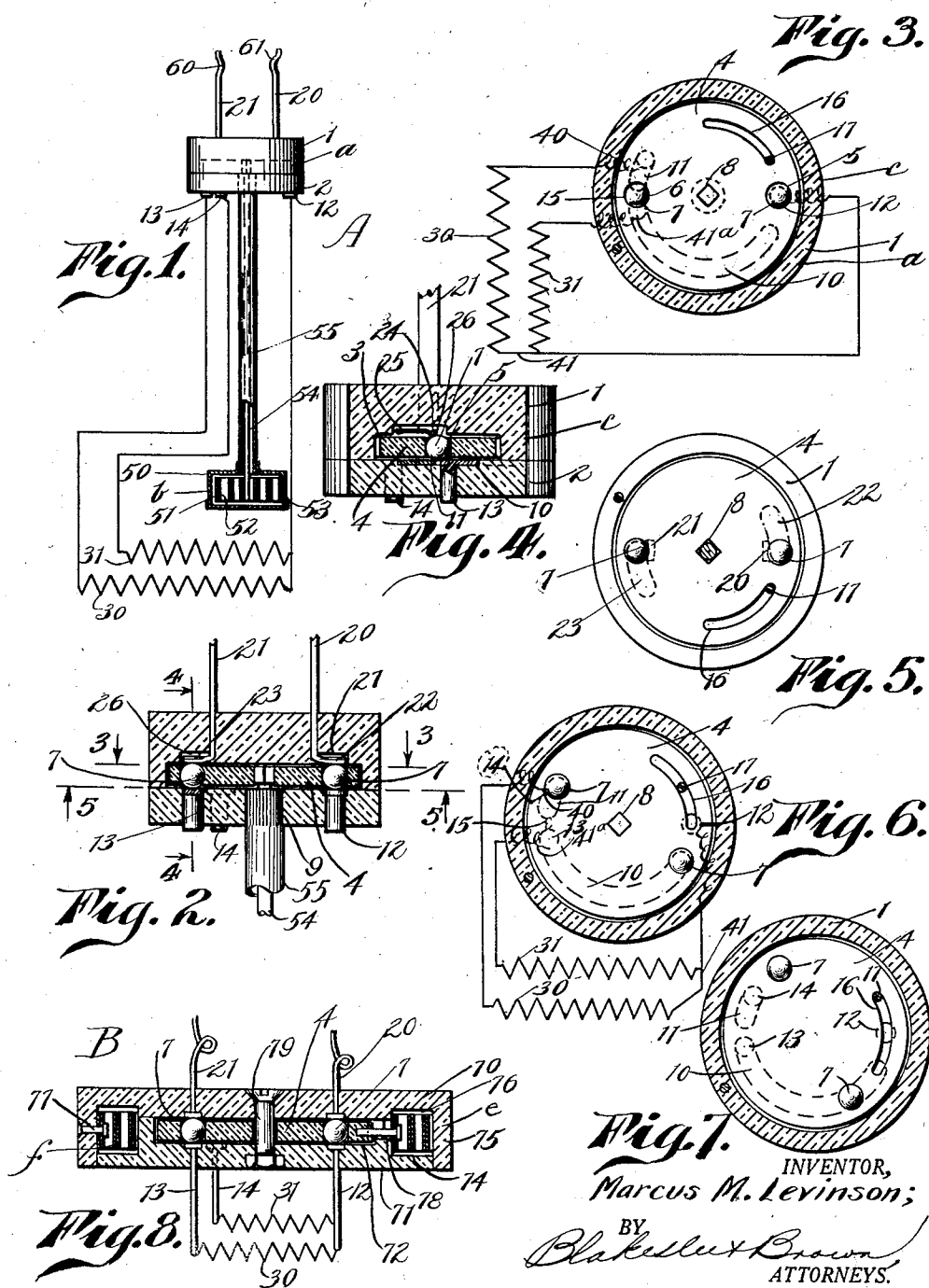


Fig. 1.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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## UNITED STATES PATENT OFFICE.

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## SWITCH.

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This invention relates to switches and particularly to that class of switch which may be automatically operated to control various electrical circuits responsive to actuation of such switch by heat-sensitive means such as a thermostat. The switch may be so arranged as to control various resistance units such as used in electric irons, curling irons, water heaters, electrically-controlled carburetors and the like in such a manner as to have certain windings arranged in series upon one operation of the switch, a parallel arrangement upon a second operation of the switch and an "off" position.

The invention provides an article of manufacture which is simple of construction, easy to manufacture, fool-proof in operation and generally superior as regards utility and adaptability to various purposes.

With the above and other objects in view, the invention consists in the novel and useful provision, construction, formation, association and relative arrangement of parts, members and features, all as shown in certain of its embodiments in the accompanying drawing, described generally and more particularly pointed out in the appended claims.

In the drawing:

Figure 1 is a fragmentary view, partly in section, of the improved device as an entirety and showing certain electrical resistance units which may be associated with the switch element of the device;

Figure 2 is a fragmentary cross sectional view on an enlarged scale and showing the interior construction of the switch box unit;

Figure 3 is a cross sectional view on the line 3—3 of Figure 2;

Figure 4 is a fragmentary cross sectional view on the line 4—4 of Figure 2;

Figure 5 is a cross sectional view on the line 5—5 of Figure 2;

Figure 6 is a view similar to Figure 3 and showing a second position of the movable part of the switch;

Figure 7 is a cross sectional view showing further movement of the movable part of the switch in what may be termed an "off" position; and

Figure 8 is a fragmentary cross sectional view showing a modified form of the switch, the heat-sensitive element being included within the switch box.

Corresponding parts in all the figures are represented by the same reference characters.

Referring with particularity to the draw-

ing, of which I have illustrated two forms of my device, I have designated such forms by A and B respectively. Both forms work on the same principle, the difference residing in the placement of the heat-sensitive element with respect to the switch proper. In Figure 1 I have illustrated the complete form of the device as A, in which *a* represents as an entirety the switch, and *b* the heat-sensitive element adapted to actuate the switch. The switch includes a casing *c* which may be formed in two parts as 1 and 2, and the part 1 is formed with an annular chamber 3. Within such annular chamber is a movable member 4 of the switch, which movable member may be in the form of a circular disc and bored transversely as shown at 5 and 6 to accommodate roller members 7. The movable member is likewise provided with a central squared bore 8. The general form of the casing *c* may be circular, and the part 2 thereof is formed with a central bore 9; such part 2 is likewise provided with segmental contact pieces 10 and 11. The contact piece 10 is of greater length than the contact piece 11, and such member 2 is also provided with a contact member 12 and terminal members 13 and 14 associated with the members 10 and 11 respectively. The contact member 12 does not carry a segmental piece. The contact member 12 is located diametrically opposite a gap portion as 15 between adjacent ends of the segmental pieces 10 and 11, as best illustrated in Figure 3. The movable member 4 is provided with a segmental slot 16 and the casing member 2 carries a pin 17 received through such slot so as to limit the movement of such member 4.

Terminal members 20 and 21 are passed through the casing member 1 and such terminal members 20 and 21 carry plate portions 22 and 23. The general form of such plates is shown in Figures 2 and 4, in which it will be noted that they are slightly beaded as shown at 24 and 25. The plate portions 22 and 23 are received in small recesses 26 and 27 opening into the chamber 3 of the casing part 1. The casing part 1 is substantially circular and the terminal members 20 and 21 are arranged diametrically opposite. The plates 22 and 23 are in reality contact pieces or plates, and against which the roller members 7 are adapted to bear during certain movements of the movable member 4. The beaded portions shown at 24 and 25 are adapted to contact with such roller members so as to

"snap" the movable member into different positions. Before describing further details of the invention the circuit shown in Figs. 3 and 6 will be described. If we have two resistance elements as 30 and 31 and desire to associate them either in a series or a parallel relation through the medium of the switch member we may do so by connecting a terminal of the resistance element 30 with the terminal member 14 as shown at 40, with ends of the resistance elements 30 and 31 connected as shown at 41 and a lead or connection from such connected ends 41 associated with the terminal 12. The opposite terminal of the resistance element or coil 31 is connected with the terminal 13, as shown at 41<sup>a</sup>. If the movable member of the switch is turned so that one of the roller members 7 spans the gap 15 so as to touch the segments 10 and 11, the other roller member will rest upon the terminal member 12 and the resistance elements will be connected in parallel. If the movable member is turned to a second position as illustrated in Figure 6, one of the roller members will rest on the segmental piece 11 and the other on the segmental piece 10, and the resistance elements or coils will be connected in series. If the movable member is turned further to the position shown in Figure 7, one of the roller members will ride upon the movable member without contact with any metal piece, and it is intended, of course, that such movable member should be formed of some insulating material. It is to be noted that a turning of the movable member, as before stated, is limited as to its rotation by the position of the pin 17 within the slot 16, and further that the plates 22 and 23 are of a length sufficient to engage the roller member 7 during a turning of the movable member to place the resistance elements 30 and 31 in either a series relation or a parallel relation.

The heat-sensitive element designated generally by *b* may be contained within a casing 50, said heat-sensitive element being a thermostat formed of two dissimilar metals having different rates of expansion, such metal members being shown at 51 and 52, and which metal members 51 and 52 are coupled together and then spirally wound within the casing 50. One end of such spiral is connected with the casing 50 as shown at 53, and the opposite end may be connected with a shaft 54 contained within a tube 55, which tube is connected with the casing and with the part 2 of the switch casing *c*, as illustrated in Fig. 1. The shaft 54 is squared at one end so as to be received in the square opening 8 of the movable member 4. Thus as the coils forming such thermostat expand and contract the shaft 54 will rotate and in doing so will rotate the movable member.

The form of the device shown in Figure 1 may be utilized for various purposes such as

the heating of water or the like where the heating elements 30 and 31 are suitably contained within a casing or the like placed in a vessel containing water, and the heat-sensitive element *b* is likewise placed in the water so that the heating effect of the coils 30 and 31 on the water may be regulated. For instance, if the thermostat was set so as to boil the water, and if the water should be completely evaporated the heat would rise above 100 degrees centigrade, and the coils of the thermostat would continue to turn until the switch member was snapped to an "off" position, thus preventing damage to the vessel. In this connection a device similar to that shown in Figure 1 could be installed in an electric iron, the thermostat being so regulated as to turn off or turn the movable member to a series position so as to hold the iron at a given heat, or if desired, turn the current off entirely through the heating coils of the electric iron. One notable feature of this switch with its heat-sensitive element to control movement thereof is that it can be so regulated as to again turn on when the heat of the object being heated, drops below a determined point. The inventor is aware of the fact that certain forms of thermostatically-controlled electric irons are now on the market, but to his knowledge there are no irons on the market which will turn the electric current on again when the temperature of the iron falls below a selected point. The invention lends itself to so many adaptations that no particular adaptations will be described, the general principle being to provide a switch which will connect various heating coils in either a series or a parallel arrangement or an "off" position, and again turn the current on from such "off" position when the temperature of the article to be heated drops below a certain selected point or points. The terminal members 20 and 21 of the showing of Figure 1 are bent as shown at 60 and 61 so as to snap within a socket member, as is the usual practice with terminals of this form.

The modification of the device designated as B as shown in Figure 8 does not differ essentially, so far as operative features are concerned, from the showing of Figures 1 to 7 inclusive, the main difference residing in the fact that the thermostat coils are confined in the same casing with the switch member. The device B includes a casing *e* formed in two parts, as shown at 70 and 71, one of such parts, as 71, being formed with a circular chamber 72, and confined within such circular chamber is a disc which will be designated as 4, as it corresponds in all details with the disc 4 of the showing of Figs. 1 to 7 inclusive. Like reference characters will therefore be applied to the said disc and the roller members. The casing member 71 is formed with an annular flange 74 and the

casing member 70 is likewise flanged as shown at 75, the flanges 74 and 75 being substantially at right angles to each other and forming between themselves and the body portions of the casing members 70 and 71 an annular chamber 76. The coils of the thermostat designated as *f* are confined within such annular chamber with one of the thermostat coils connected by a pin 77 with the flange 75 of the casing member 70. The casing member 71 is slotted for a portion, as shown at 78, and a pin is passed through such slot and connected with the inner end of such thermostat coils and with the disc 4. In addition, a bolt 79 is passed through both casing members and a central opening in the disc member 4. This bolt likewise tends to hold the casing members in working relation and acts likewise as a central pivot member for the movable member 4. Terminal members 12, 13 and 14 are provided, as before, as are likewise the heating elements 30 and 31, and terminal members similar to the terminal members 20 and 21 are provided. The device shown in Fig. 8 is exceedingly compact and may be utilized within a given member such as an electric iron, if desired, so that there are no protruding or external members on the iron casing.

The operation of the form shown in Fig. 8 is identical with the operation of the device shown in Figs. 1 to 7 inclusive.

It is obvious that various changes and modifications and variations may be made in practicing the invention, in departure from the particular showing of the drawing, without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. In a switch including a casing, a disk rotatably mounted in said casing, contacts on said disk, contacts in said casing to be engaged by said disk contacts and a thermostatic element in said casing surrounding said disk and connected to the periphery of the disk to rotate the same to cause said disk

contacts to engage or disengage said casing contacts.

2. In a switch, a casing, a member rotatably mounted in said casing, contacts on said member, contacts in said casing to be engaged by said member contacts, and a thermostatic element in said casing concentric with the axis of rotation of said member and connected to the latter to rotate the same.

3. In a switch, a casing formed of complementary parts which are cut away to form jointly two concentric chambers, a rotatable contact member mounted in one of said chambers, contacts carried by the casing parts within the last mentioned chamber and adapted to be engaged by the member contacts, and a thermostatic element located in the second chamber and connected with the rotating member to rotate the latter.

4. In a switch, a casing formed with a pair of concentric chambers and having a slot connecting said chambers, a member rotatably mounted in one of said chambers, contacts on said member, contacts in said last mentioned chamber to be engaged by said member contacts, a thermostatic element mounted in the second chamber, and a pin movably positioned within the slot and connecting the thermostatic element to the rotatable member whereby operation of the thermostatic element will rotate the member.

5. In a switch, a casing formed of complementary parts shaped to jointly form in their meeting faces two concentric chambers, a pin passing through one of said chambers and both casing parts to interconnect the latter, a member rotatably mounted upon said pin within the chamber through which the pin passes, contacts on said member, contacts in said last mentioned chamber to be engaged by said member contacts, and a thermostatic element in said second chamber and operatively connected to the rotatable member.

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

MARCUS M. LEVINSON.