SLOTTED SWITCH POSITION INDICATOR

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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This invention relates to a domestic appliance and more particularly, to control and indicating systems for various types of electric heaters and ranges.

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These and other objects are attained in the forms shown in the drawings in which a multi-position switch means is connected to a surface heater. A rotary knob is provided for turning the switch means to various positions, permitting different heating rates. The knob shaft is provided with a cam which moves a movable plate provided with indications or legends indicating the various heating rates provided. These indications or legends are so located that they appear in one or more windows when the knob is turned to provide the corresponding heating rate.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a perspective view of the upper part of a range provided with a control and indicating system embodying one form of my invention;

Figure 2 is a fragmentary enlarged view, in elevation, of Figure 1 with a major portion of the front broken away;

Figure 3 is a vertical sectional view taken along the line 3—3 of Figure 2;

Figure 4 is a fragmentary vertical sectional view taken along the line 4—4 of Figure 3;

Figure 5 is a fragmentary vertical sectional view taken along the line 5—5 of Figure 3;

Figure 6 is a simplified wiring diagram for the control shown in Figures 1—5;

Figure 7 is a modified form of control and indicating system shown applied to a different form of surface heater unit;

Figure 8 is an exploded perspective view of the control and indicating means shown in Figure 7;

Figure 9 is a front view of another control tower embodying another form of my invention;

Figure 10 is a fragmentary vertical sectional view taken along the line 10—10 of Figure 9;

Figure 11 is a vertical sectional view taken along the line 11—11 of Figure 9;

Figure 12 is a horizontal sectional view taken along the line 12—12 of Figure 9;

Figure 13 is a fragmentary vertical sectional view taken along the line 13—13 of Figure 11; and

Figure 14 is an enlarged front view of the glass front of the control tower shown in Figure 9.

Referring now to the drawings, and more particularly to Figure 1, there is shown a domestic electric range 20 provided with a range top 22 having an integral raised back splash portion 24. The range top 22 is provided with a spiral sheathed type of electric surface heater 26 connected by the three conductors 28 to a multi-position switch unit 30.

Referring now more particularly to Figure 6, the surface heater 26 may be divided into two sections 32 and 34 connected by the three conductors 28 to the switch members 36, 38 and 40 of the switch unit 30. The contacts 44 and 46 are connected by conductors through the live supply conductor 48. The contact 50 is connected to the live supply conductor 52 while the contact 54 is connected to the neutral supply conductor 56. The switch members 36, 38 and 40 are operated by suitable cams 58, 60 and 62 provided upon the knob shaft 64 of the switch unit 30. The knob shaft 64 is provided with a suitable knob 66 for turning the shaft and the cams to the various angular positions indicated in Figure 2 to provide the various heating rates designated in Figure 2.

For example, in the High position the cams will move the switch member 36 into engagement with contact 44 and the switch member 40 into engagement with the contact 46 and the switch member 38 into engagement with the contact 50 to energize the heaters 32 and 34 at their maximum capacity upon 256 and 118 volts respectively. For the Simmer position, the switch member 36 remains in contact with contact 44, the switch member 38 is moved away from the contact 50 and the switch member 40 remains in contact with the contact 46 to connect both sections 32 and 34 in series across the conductors 48 and 56 to supply a voltage of 118 volts. For the Low position the switch member 36 is moved to an Intermediate position while the switch member 38 is moved into contact with the contact 50 and the switch member 40 is moved into contact with the contact 54. This connects the section 34 across the conductors 52 and 56 at 118 volts. For the Medium Low position the switch member 36 is moved into contact with the contact 50 and the switch member 40 is moved into contact with the contact 46. This connects the sections 32 and 34 in series across the conductors 48 and 52 at 236 volts. In the Medium High position the cams move the switch member 38 into contact with the contact 50 and the switch member 40 into contact with the contact 46. This connects the section 34 alone across the conductors 48 and 52 at 236 volts. The additional cam 70 closes a switch connecting to pilot light 196 whenever the knob 66 is turned away from the "off" position. These connections illustrate one form of switching arrangement to which my invention may be applied. However, other forms of switching arrangements and circuit connections may also be used with my invention.

According to my invention, upon the switch knob shaft 64 I provide a cam 72. A movable indicating plate 74 is held by the tension spring 76 into engagement with the periphery of the cam 72 so that it acts as a follower. This spring extends between an ear 78 on the plate 74 and a pin 80 upon a back plate 82 provided behind the back splash portion 24 as shown in Figures 1 and 3. It is provided with offset flanges 84 fastened to the back splash portion arranged so that the intervening portion is spaced from the back splash panel to receive the indicator plate 74. The indicating plate 74 is provided with a plurality of pins 86 extending rearwardly into inclined parallel slots 88 in the member 82. These pins 86 guide the indicating plate 74 upwardly and downwardly as it is pushed back and forth by the cam 72 and the spring 76. The indicating plate 74 is provided with Off, High, Simmer, Low, Medium Low and Medium High indications arranged in an echelon formation. The cam 72 is pro-
vided with such a contour that these indications appear within the window or slot 90 provided in the back splatter plate 124, as shown in Figures 1 and 2. When the knob 66 is turned to provide the corresponding heating rate. This provides a novel, clear and ornamental indication of the heating rate in a very simple and effective manner.

In Figures 7 and 8 another form is provided for a somewhat different form of surface heater unit. In this form the surface heater 126 is connected by conductors 128 to a multi-position control switch 130 which is controlled by a knob 166 in a manner similar to the surface heater 26 and the switch 30 in Figures 1 and 6. The electrical circuits and switching mechanisms may be like that in Figure 6. The surface heater 126 is a part of a pivoted heating unit 127 which is hinged at the rear end and which is adapted to be lifted up to a vertical position like the unit 227 shown at its right side. The unit 227 is provided with a surface heater connected to a control switch 230 controlled by a knob 266 in the same manner as the surface heater 126 and arranged like the circuits in Figure 6.

On opposite sides of the units 127 and 227 are the control towers 192 and 292. The switches 130 and 230 are provided in the lower portion of these towers with the knobs 166 and 266 protruding from the front. Above these knobs the towers are each provided with a series of windows 194 and 294. Within the control tower 192 behind the windows 194 there is provided a vertically slideable plate 174 provided with vertical upper and lower guide slots 188 mounted upon the upper and lower pins 186 supported by the vertical bracket 182. This vertical bracket 182 is provided with upwardly extending offset flanges 184 which pass to inner portions of the control tower and serve to space the central portion away from the portion containing the windows 194 to provide a guide-way for the indicating plate 174.

The indicating plate 174 is provided with five windows 198. These windows may be provided with various colored lenses to indicate the various heats provided in the surface heater 126 according to the heating rates provided by the circuit and switching arrangements shown in Figure 6. In addition, these lenses may have the names of the heats thereon similar to those shown in Figure 2. No window or lens is provided for designating the Off position, since this is indicated by a black spot lettered Off. These lenses are illuminated by a vertical electric light 196 supported by the back member 182 which is provided with a suitable opening 198 through which the light from the bulb 196 passes over the lenses 190. This light 196 may be connected to the switch member controlled by the cam 70 in Figure 6 so that it is illuminated whenever the knob 166 is turned away from the Off position to any one of the energized positions.

The knob shaft 164 is provided with a cam 172 which will move the indicating plate 174 to a position in which the lens corresponding to the heat selected by the knob 166 registers with one of the windows 194. As is best shown in Figure 7, the windows 194 are spaced a uniform distance apart. The lenses 190 are successively spaced apart greater distances from bottom to top. This difference in spacing is approximately equal to the vertical height of one of the windows. With this arrangement, as the indicating plate 174 is moved upwardly the lenses 190 appear successively beginning from the bottom and upwardly until the uppermost lens 190 is positioned in the uppermost window or slot. This makes a neat, attractive, ornamental indicating arrangement for a control tower of the type shown in Figure 7.

In Figures 9 to 14 there is a modification of the control tower 192 and 292 shown in Figure 7. This preferably includes the circuit and switching arrangements as shown in Figure 6. However a different form of knob 366 provides a distinctive novel ornamental appearance.

This knob is connected by a shaft to a control switch 330 incorporating the switching arrangements of Figure 6. The rotation of the knob 366 rotates the cam and moves the switches forming a part of the control 330 to provide the Off, High, Simmer, Low, Medium Low and Medium High heating rates as provided in Figure 6. The modified control tower 392 is provided with a front glass 393 provided with six translucent portions 395 on which the designated heating rates are named in dark letters as shown in Figures 9 and 14. On either side of these translucent portions 395 are narrow indicating portions 397 of clear glass. The remaining portions of the glass 393 are provided with an opaque coating. The translucent portions 395 may be provided with translucent ceramic coating while the opaque coating may be formed of a heavy ceramic coating. The portions 395 and 397 are symmetrically and evenly spaced from top to bottom. The glass 393 is held in place and connected to the rear portion of the control tower 392 by an ornamental rectangular frame 399.

Behind the glass 393 there is provided a vertically movable slotted member 374 provided with a large central opening 375. The bottom of the member 374 is provided with a rearwardly turned flange 377. This flange is engaged by a cam 373 connecting the knob 366 with the control means 330. The member 374 is also provided with side flanges 379 which are guided by the side members 381 held by the ornamental frame 399. The member 374 is provided with 6 horizontal slots 390 along each edge. These slots are narrow and more closely spaced than the clear glass portions 397 shown in Figures 9 and 14. The five upper slots on each side are covered by a strip of red transparent plastic adhesive tape 391. The bottom slots on each side are covered by pieces of green transparent plastic adhesive tape 389. If desired five different colored strips of transparent plastic may be provided for each different heat. For example strips of blue, lavender, orange, pink and red may cover successively the five upper slots.

Behind the member 374, there is provided an illuminating light 396 which may be controlled by the cam and switch 70 as indicated in the connection of the light 196 in Figure 6. This lamp is supported upon a bracket 296 fastened to the curved reflector 384 which is fastened at the top and bottom to the rear portion of the frame 399.

The cam 372 is so shaped that when the knob 366 is turned to any position, one of these slots 390 in the member 374 is positioned immediately behind the clear glass portions positioned laterally of the designated position. In the Off position, the light 396 is extinguished by the opening of the switch controlled by the cam 70. In the other positions the switch controlled by the cam 70 is closed to light the light 396. The large opening 375 in the member 374 allows the light 396 to illuminate all the translucent portions 395 so that all the positions indicated on the glass 393 are illuminated whenever the surface heater 126 is energized. The control position to which the knob 366 is turned is indicated by the light passing through the registering slot 390 and the clear glass portion 397 at the end of the translucent portion 395 bearing the name of the particular position to which the knob 366 is turned.

The cam 372 is provided with such a contour that the lowermost slot 390 registers with the clear glass portions at the ends of the Off position when the knob 366 for the control 330 is in the Off position. When the knob is turned clockwise to the next position, which is the high position, the lowermost slot 390 will move upwardly out of registration with the clear glass portions at the end of the Off position while the second slot 390 will register with the clear glass portions at the ends of the high position on the glass 393. The turning of the knob 366 and 372 to the third or Simmer position will bring the third
slot 390 counting from the bottom into registration with the clear glass portions at the ends of the Simmer position on the glass 393. In a similar manner continuous turning of the knob 366 and the cam 372 will bring the fourth, fifth and sixth slots 390 successively into registration with the clear glass portions at the ends of the Low, Medium Low and Medium High positions 395 indicated on the glass 393. At all times no more than one set of slots will be in registration. All of the other slots will be out of registration due to the closer spacing of the slots 390. This will be apparent from the enlarged cross-sectional view shown in Figure 10.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination, a control means having a plurality of control positions, means having an exposed surface provided with a series of spaced window means, a movable sheet member located behind and concealed behind said exposed surface and having a series of spaced indicating means with a different spacing than said first mentioned series, and means responsive to the operation of said control means to various control positions for moving each of said indicating means successively into registration with a different window means of said exposed surface.

2. In combination, a control means having a plurality of control positions, means having an exposed surface provided with a first series of uniformly spaced window means, a movable sheet member located behind said exposed surface and having a second series of uniformly spaced window means spaced more closely than said first series of window means, illuminating means behind the window means of both series, means responsive to the operation of said control means for lighting said illuminating means, and means responsive to the operation of said control means to various control positions for moving each of said window means of said second series successively into registration with a different window means of said first series.

3. In combination, a control means having a plurality of control positions, means having an exposed surface provided with a first series of uniformly spaced window means, a legend corresponding to a different control position of said control means associated with each of said first series of window means, a movable sheet member located behind said exposed surface and having a second series of uniformly spaced window means spaced more closely than said first mentioned series of window means, illuminating means behind the window means of both series and means responsive to the operation of said control means to various control positions for moving each of said window means of said second series successively into registration with a different window means of said first series.

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