Feb. 19, 1957 G. C. PEARCE 2,782,403

SLOTTED SWITCH POSITION INDICATOR

Filed March 10, 1955 3 Sheets-Sheet 1

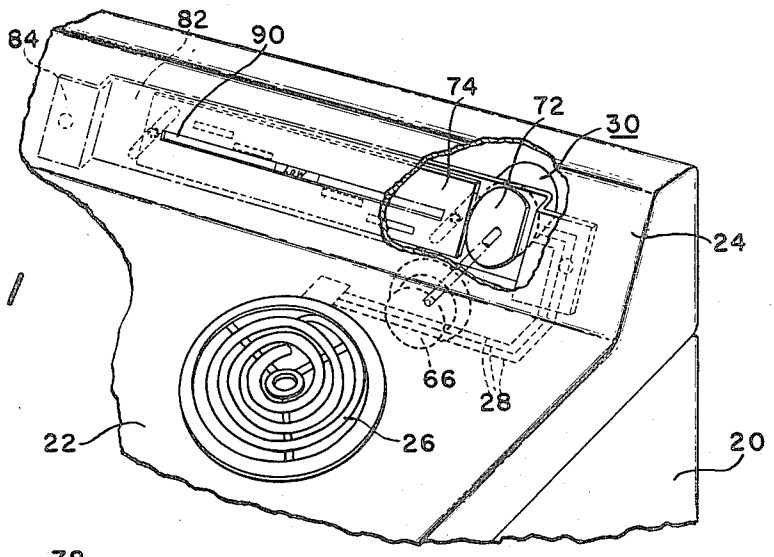


Fig. 1

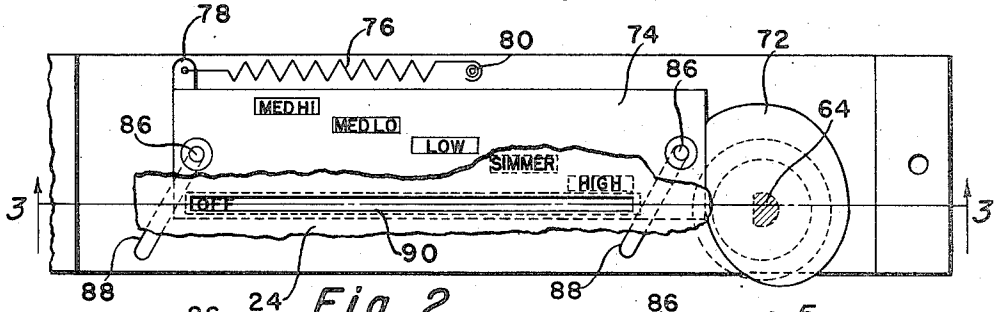


Fig. 2

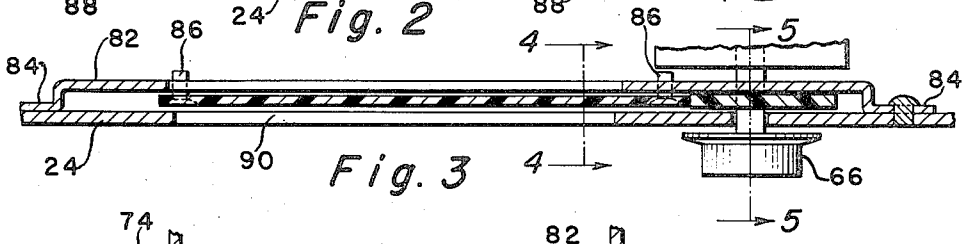


Fig. 3

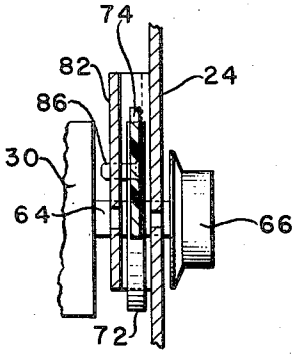


Fig. 4

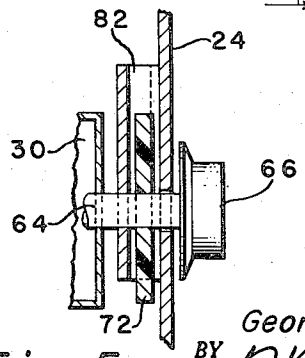


Fig. 5

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Feb. 19, 1957 G. C. PEARCE 2,782,403

SLOTTED SWITCH POSITION INDICATOR

Filed March 10, 1955 3 Sheets-Sheet 2

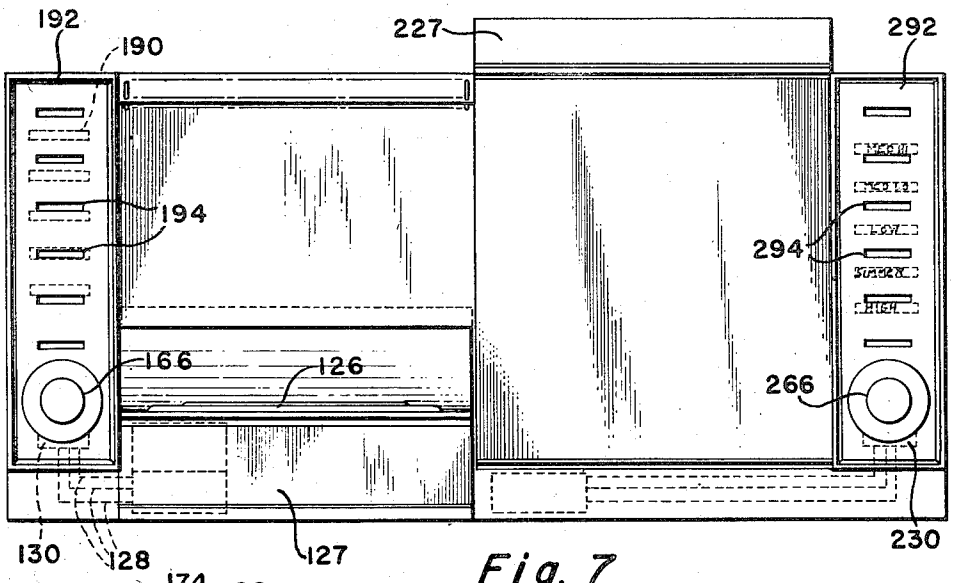


Fig. 7

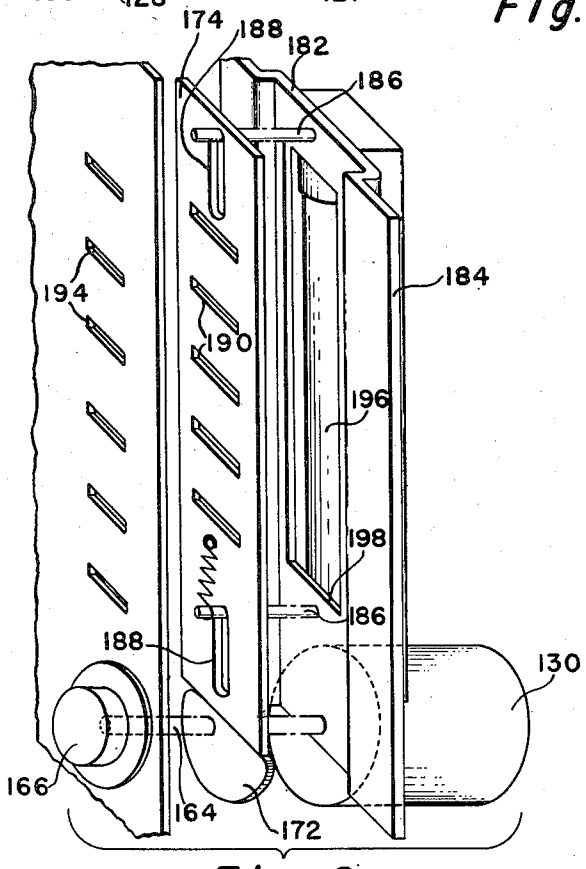


Fig. 8

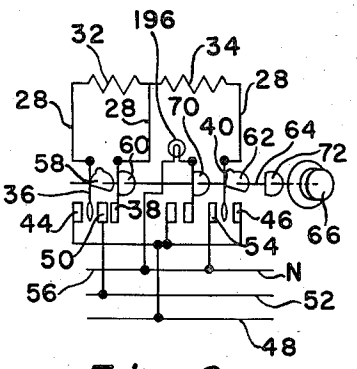


Fig. 6

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SLOTTED SWITCH POSITION INDICATOR

Filed March 10, 1955 3 Sheets-Sheet 3

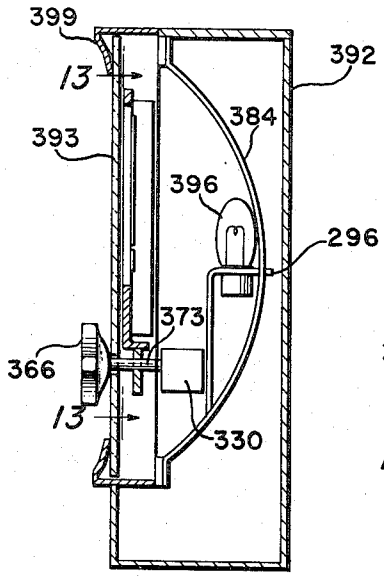


Fig. 11

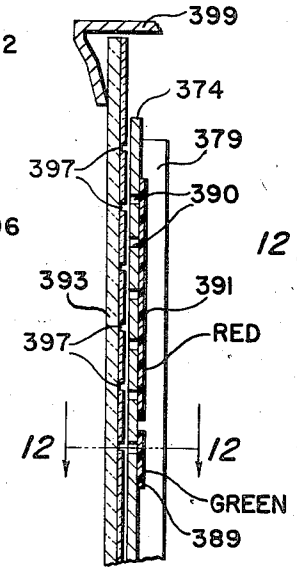


Fig. 10

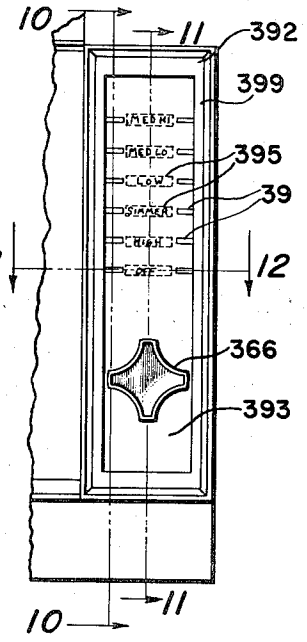


Fig. 9

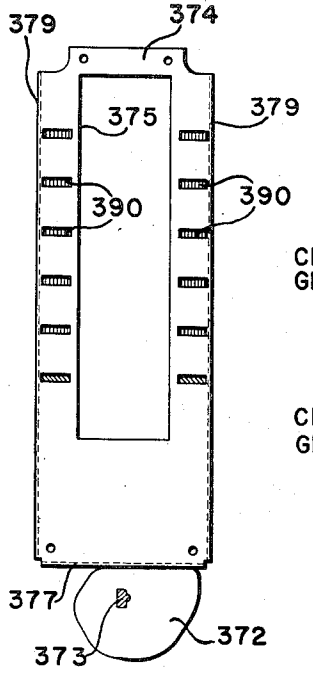


Fig. 13

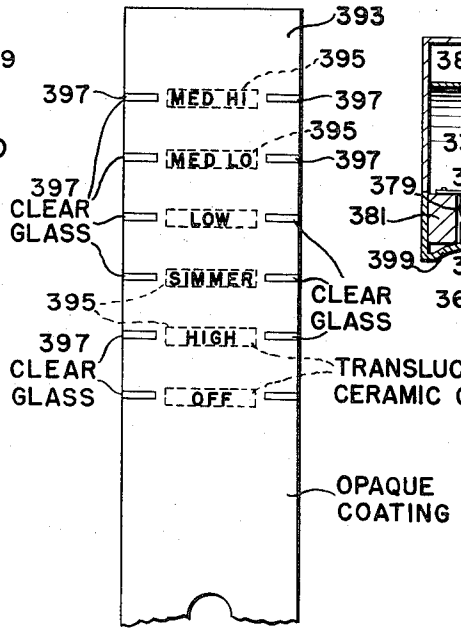


Fig. 14

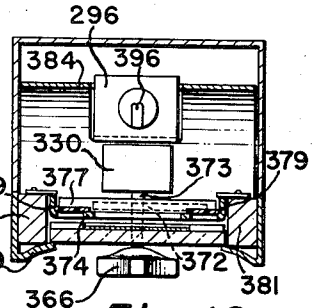


Fig. 12

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United States Patent Office 2,782,403 Patented Feb. 19, 1957

2,782,403

SLOTTED SWITCH POSITION INDICATOR

George C. Pearce, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application March 10, 1955, Serial No. 493,339

3 Claims. (Cl. 340—252)

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

It is an object of this invention to provide a control means for electric heaters and ranges provided with a new, ornamental and attractive illuminated indicating means.

It is an object of this invention to provide a control means for electric heaters and ranges provided with a new, ornamental and attractive illuminated indicating means.

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, providing 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 236 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 apply 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 splasher portion **24**, 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 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 six short horizontal windows **194** and **294**. Within the control tower **192** behind the windows **194** there is provided a vertically slidable 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 inwardly extending offset flanges **184** which fasten 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 **190**. 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 lense 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 to 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 going successively upwardly until the uppermost lens 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 towers **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 cams 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 a 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 **372** mounted upon the shaft **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 portion 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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