July 12, 1955 R. N. SLATE 2,713,103

SWITCH POSITIONING MEANS

Filed Jan. 29, 1953 2 Sheets-Sheet 1

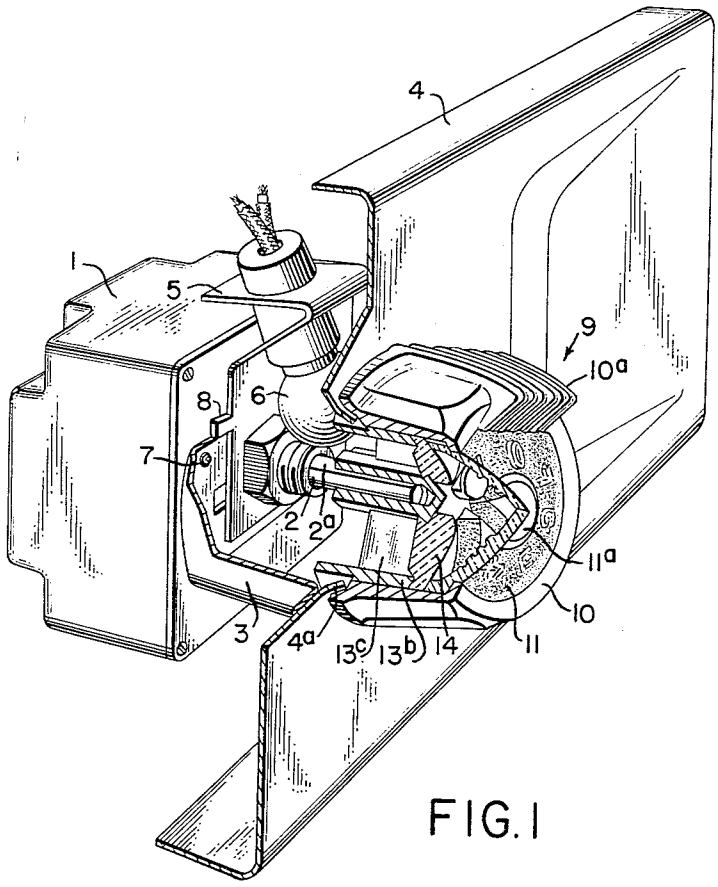


FIG. 1

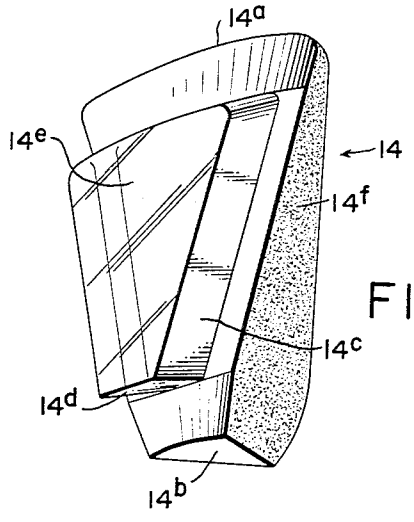


FIG. 4

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SWITCH POSITIONING MEANS

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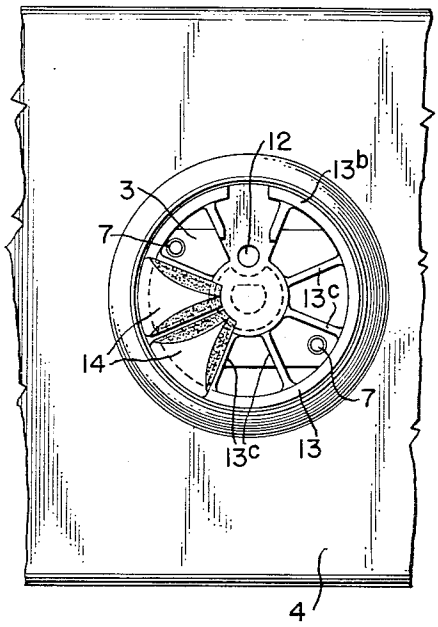


FIG.2

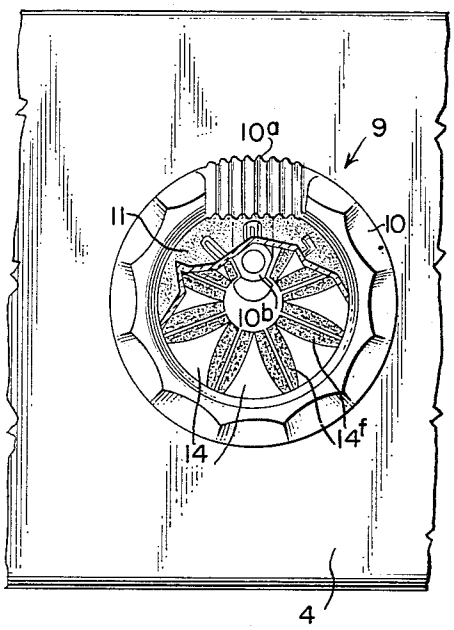


FIG.3

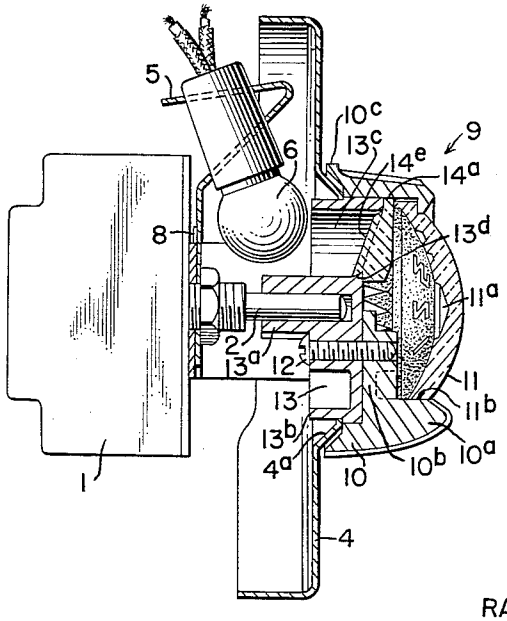


FIG.5

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SWITCH POSITIONING MEANS

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Application January 29, 1953, Serial No. 333,957

17 Claims. (Cl. 200—167)

This invention relates to switch positioning means, and more particularly to an illuminated switch control knob.

It is an object of the invention to provide a switch positioning means having a striking and ornamental illuminated switch position indicator.

Another object is to provide an illuminated switch positioning means that is easily fabricated, assembled and dismantled.

The precise scope of the invention is set forth in the appended claims, but a detailed description of a preferred embodiment will now be given with reference to the accompanying drawings in which:

Fig. 1 is a perspective partly sectional view of an electric switch having an illuminated switch control knob assembly mounted on the control panel of an electric stove, the switch being in one of its "On" positions;

Fig. 2 is a front view of the apparatus of Fig. 1 but with the manipulating ring, indicator dial, and a few of the light filters of the knob assembly removed, the switch being in the "Off" position;

Fig. 3 is a front view of the apparatus of Fig. 1 with the indicator dial partly broken away, the switch again being in the "Off" position;

Fig. 4 is a rear perspective view of one of the light filters; and

Fig. 5 is a side view of the switch with the knob assembly of Fig. 1 in longitudinal section, the switch being in another of the "On" positions.

Projecting from the front of the housing **1** of a conventional rotary switch having an "Off" position and seven "On" positions is a split shaft **2** by means of which the switch is rotated from position to position. The switch is supported by a bracket **3** at the rear of a panel **4**, and a resilient clip **5** suspends a lamp **6** over the shaft **2**. The bracket **3** and clip **5** are prevented from rotating by small pins or ears **7** and **8** respectively.

The shaft **2** projects through a circular opening in the panel **4**, the panel having a forwardly extending flange **4***a* which cooperates with a control knob **9** on the shaft **2** to form a light trap which prevents light from the lamp **6** from escaping around the periphery of the knob.

The control knob **9** consists of a generally cylindrical manipulating ring **10** in the front end of which is set an indicator dial **11**. The ring **10** is peripherally fluted so that it can be grasped easily, and has a forwardly projecting ornamental portion **10***a* which is uppermost when the switch is in the "Off" position; the ring **10** may be formed of die cast zinc with a chrome plate finish.

The dial **11** is generally convex and is made of some light-transmitting material such as a melamine resin. In its inner face the dial **11** has inscribed eight numerals, from "0" to "7," arranged in a circle around the axis of rotation of the knob **9** and shaft **2**, the numeral "0" corresponding to the "Off" position of the switch and the remaining numerals corresponding to the seven "On" positions. Also in its inner face the dial **11** has a

recessed portion **11***a*. Apart from the numerals "0" to "7" and the recessed portion **11***a* the inner surface of the dial is unpolished, as indicated by stippling in the drawings, and is therefore translucent. The periphery of the dial **11** adjacent the numeral "0" is flattened as at **11***b* to receive the portion **10***a* of the manipulating ring.

The ring **10** has a lug **10***b* extending inwardly from adjacent the portion **10***a*, and to the lug is secured, by means of a stud **12**, a spider member **13**. From its hub the spider member has a rearwardly extending sleeve **13***a* which is frictionally slidable axially on the shaft **2** and connects the knob **9** to the shaft. The shaft **2** has a flattened portion **2***a* and the sleeve is complementarily formed internally so that the shaft must turn with the knob. The spider **13** also has a peripheral rim **13***b* which fits snugly within the ring **10**, and the rim **13***b* and sleeve **13***a* are connected by a plurality of arms **13***c* forming thin vanes in planes radial to the axis of rotation. The rear edges of the vanes **13***c* are perpendicular to the axis of rotation of the shaft **2**, whereas the front edges slope rearwardly between the rim **13***b* and the hub.

The ring **10** has a rearwardly extending rim **10***c* which surrounds the flange **4***a* and which forms with the rim **13***b* a recess into which the flange **4***a* extends, forming the aforementioned light trap. The ring **10** and rim **13***b* may hereinafter be referred to as the annular portion of the knob **9** and the arms **13***c* as the spider portion, the spaces between the arms forming a light-transmitting interior of the knob surrounded by the opaque annular portion.

Supported on the front of the spider **13** are seven differently coloured light filters **14** made of a light transmitting substance such as a melamine resin. Each filter is shaped substantially like a sector of a circle, and the filters are arranged side by side in circular order on the spider, as best seen in Fig. 3, a filter being located directly behind each of the numerals "1" to "7" on the dial **11**. Each filter increases in thickness from its outer edge **14***a* to its inner edge **14***b* so that as shown in Fig. 5 the front faces of the filters lie substantially in a plane perpendicular to the axis of rotation of the shaft **2** and knob **9**. The outer edge **14***a* of each filter is held between the dial **11** and the rim **13***b* of the spider to hold the filter in position on the spider. Each filter also has on its rear face a substantially triangular protruding portion **14***c* which extends between adjacent vanes **13***c* of the spider; the apex of the protruding portion is cut off and recessed as at **14***d* to engage a flange **13***d* on the hub of the spider. The whole of the material of each filter may be coloured in a distinctive colour, or alternatively a coloured wafer may be adhesively secured to the plane surface **14***e* of the portion **14***c*. As best seen in Fig. 2, the side **14***f* of the filters are bevelled and unpolished.

When the portion **10***a* of the knob **9** and the numeral "0" of the dial **11** are uppermost, as shown in Fig. 3, the switch is in the "Off" position, the lamp **6** is not energized, and the lug **10***b* of the knob is interposed between the lamp and the dial. When the knob **9** is turned so that one of the numerals "1" to "7" on the dial is in the uppermost position the switch is in an "On" position and the lamp **6** is energized; the "On" position shown in Fig. 5 is typical, the numeral "4" on the dial being uppermost. In any "On" position one of the filters **14** is uppermost and is located directly between the lamp **6** and the dial **11**. The lamp being suspended above the shaft **2**, most of its light passes through the said uppermost filter, and the vanes **13***c* which extend rearwardly from the sides of the filter assist in directing most of the light to the uppermost filter, particularly since the rear edges of the vanes are in a plane

close to the lamp and pass close to the lamp as the knob is rotated. Because of its varying thickness each filter acts as a lens, and when the filter is in the uppermost position it focuses the light from the lamp onto a substantially V-shaped area which includes the numeral immediately in front of it on the dial **11**. The provision of the bevelled, translucent sides **14***f* is found to assist in producing a V-shaped area having sharp edges. As the knob **9** is rotated the numerals on the dial move sequentially through the V-shaped area and each numeral is in turn illuminated in the colour of the filter **14** behind it. The numerals "1" to "7" on the dial may correspond to increasing amounts of power supplied by the switch to a heating element, and the colours of the filters corresponding to these numerals may brighten to a glowing red indicating increasing temperature.

In addition to the predominant illumination of the uppermost portion of the dial opposite the lamp **6**, the remainder of the dial has a more dim, general illumination in any of the "On" positions. This is due to the fact that the filters **14** other than the uppermost one receive some illumination from the lamp **6** and transmit light to other areas of the dial. Since the dial at such other areas receives unfocussed illumination from several differently coloured filters spaced rearwardly from the dial, the net result is a general dim illumination of the dial, the colour of which may be different in different areas, and a predominant illumination of the colour of the uppermost filter at the area of the dial opposite the uppermost filter. As differently coloured filters come opposite the lamp the colourations of the dim illumination and of the predominant illuminations vary. Thus a pleasing and useful illumination of the dial of the control knob is achieved.

It is to be understood that the form of the invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of the parts may be resorted to, without departing from the scope of the claims.

What I claim as my invention is:

1. Switch positioning means comprising a rotatable shaft, a hollow knob having a peripheral wall by which the knob may be grasped manually and having a translucent dial at its outer end, a spider within the knob rearward of the dial and connecting the peripheral wall with the shaft whereby the shaft may be rotated by the knob to a plurality of positions, the knob being coaxial with the shaft, the dial bearing switch position indicia located round the axis of rotation of the knob and shaft, and means for illuminating the dial with predominant illumination at a primary area located radially from said axis and through which the indicia are movable sequentially as the knob is rotated and with more dim illumination at adjacent areas, the colour of the predominant illumination being variable by rotating the knob and the more dim illumination being differently coloured than the predominant illumination; said means comprising a stationary light source behind the spider and located radially from the shaft opposite said primary area, a plurality of differently coloured light filters arranged in circular order on the spider and movable with the knob to pass sequentially in front of the light source to transmit light from the light source to said primary area, adjacent filters transmitting light from the light source to said adjacent areas.

2. Switch positioning means as claimed in claim 1, in which the filters are mounted on the front of the spider and the arms of the spider extend rearwardly therefrom to direct light primarily to the filter in front of the light source.

3. Switch positioning means as claimed in claim 1, in which the filters are lenses held by and between the front of the spider and the dial.

4. Switch positioning means comprising a movable switch position control having a position indicator, and means for illuminating a portion of the position indicator with predominant illumination the colour of which is variable by moving the switch position control and for illuminating adjacent portions of the position indicator with more dim illumination differently coloured than the predominant illumination; said means comprising a stationary light source spaced rearwardly from the position indicator opposite the first-mentioned portion of the position indicator, a plurality of differently coloured light filters arranged side by side behind the position indicator and movable with the position control to pass sequentially in front of the light source to transmit light from the light source to the first-mentioned portion of the position indicator, adjacent filters transmitting light from the light source to said adjacent portions of the position indicator, and a plurality of vanes fixed relative to the filters and extending rearwardly from the sides of the filters to direct light primarily to the filter in front of the light source.

5. Switch positioning means comprising a rotatable switch position control knob having a translucent dial rotatable with the knob and bearing switch position indicia located round the axis of rotation of the dial, and means for illuminating the dial with predominant illumination at a primary area through which the indicia are movable sequentially as the dial is rotated and with more dim illumination at adjacent areas, the colour of the predominant illumination being variable by rotating the knob and the more dim illumination being differently coloured than the predominant illumination; said means comprising a plurality of differently coloured light filters arranged in circular order side by side behind the dial and rotatable coaxially therewith, and a stationary light source behind the filters, the filters being so located relative to the dial that at successive switch positions successive ones of the filters transmit light from the light source to said primary area and adjacent filters transmit light from the light source to said adjacent areas, the light source and filters being so arranged that the filter transmitting light to said primary area is predominantly illuminated and the adjacent filters are more dimly illuminated, there being a plurality of vanes fixed relative to the filters and extending rearwardly from the sides of the filters to direct light primarily to the filter transmitting light to said primary area.

6. Switch positioning means as claimed in claim 5, in which the filters are portions of a rotatable member spaced rearwardly from the dial.

7. Switch positioning means as claimed in claim 5, in which the filters are shaped like sectors of a circle.

8. Switch positioning means for use with a stationary light source, comprising a switch position control adapted to move in front of the light source when positioning the switch; the control having a switch position indicator, and means for illuminating a portion of the position indicator with predominant illumination the colour of which is variable by moving the switch position control and for illuminating adjacent portions of the position indicator with more dim illumination differently coloured than the predominant illumination; said means comprising a plurality of differently coloured light filters at the rear of the position indicator and movable with said control to pass sequentially in front of the light source, the filter in front of the light source transmitting light from the light source to the first-mentioned portion of the position indicator, adjacent filters transmitting light from the light source to said adjacent portions of the position indicator, and a plurality of vanes fixed relative to the filters and extending rearwardly between the filters to direct light primarily to the filter in front of the light source.

9. Switch positioning means as claimed in claim 8, in which the filters are lenses spaced rearwardly from the position indicator, the spacing being such that each lens

when transmitting light to said first-mentioned portion focuses the light on said portion.

10. A rotatable switch positioning control knob, comprising an annular portion, a plurality of arms extending inwardly from and fixed relatively to the annular portion, the arms comprising thin vanes in planes radial to the annular portion, and the vanes having spaces between them, and a light-transmitting switch position indicator located within the annular portion in front of the plurality of vanes for receiving light passing through the several spaces between the vanes.

11. A control knob as claimed in claim 10, in which the position indicator has switch position indicia in front of the spaces between the vanes.

12. A control knob as clamed in claim 11, in which the indicia are provided on the surface of the position indicator adjacent the vanes, said surface being translucent.

13. A control knob as claimed in claim 10, in which a plurality of differently coloured light filters are located between said spaces and said position indicator for filtering the light passing to the position indicator.

14. In combination, a wall having a circular opening and a forwardly directed annular flange surrounding the opening, a switch position control rotatable about an axis through the centre of the opening, the control having a spider portion with arms extending away from the axis and with spaces between the arms and an annular portion carried by the arms of the spider portion in front of the flange, the annular portion having an inner rearwardly extending rim of smaller diameter than the flange and an outer rearwardly extending rim of larger diameter than the inner rim, the rims defining a recess between them into which the flange extends, and a light source rearward of the spider portion for illuminating the spaces between the arms of the spider portion, the flange and rims substantially preventing escape of light around the outer rim.

15. In combination, a wall having a circular opening and a forwardly directed annular flange surrounding the opening, a rotary switch at the rear of the wall, a rotatable switch position control knob at the front of the wall, a shaft through the opening connecting the switch and the control knob, the control knob having a light-transmitting interior and an opaque portion having an annular recess into which the flange extends, and a light source rearward of the light-transmitting interior for illuminating it, the flange in the recess substantially preventing escape of light around the flange.

16. In combination, a rotary switch, a rotatable position control for the switch comprising a spider portion having a hub engageable with the switch for rotation thereof, the spider portion having arms radiating from the hub and having spaces, between them, the control having an annular portion carried by the arms of the spider portion and a light-transmitting position indicator in front of the spider portion and surrounded by the annular portion, the position indicator having a plurality of switch position indicia in front of the spaces between the arms of the spider portion, and a stationary light source behind the spider portion and at one side of the axis of rotation for illuminating the indicia through said spaces.

17. The combination claimed in claim 16, in which the arms of the spider member consist of thin vanes in planes radial to the axis of the hub and having rear edges which pass close to the light source as the control is rotated whereby the space closest to the light source receives most of the illumination.

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