Sept. 30, 1952 W. R. CRAWFORD 2,612,133

RANGE CLUSTER SWITCH

Filed April 25, 1950 2 SHEETS--SHEET 1

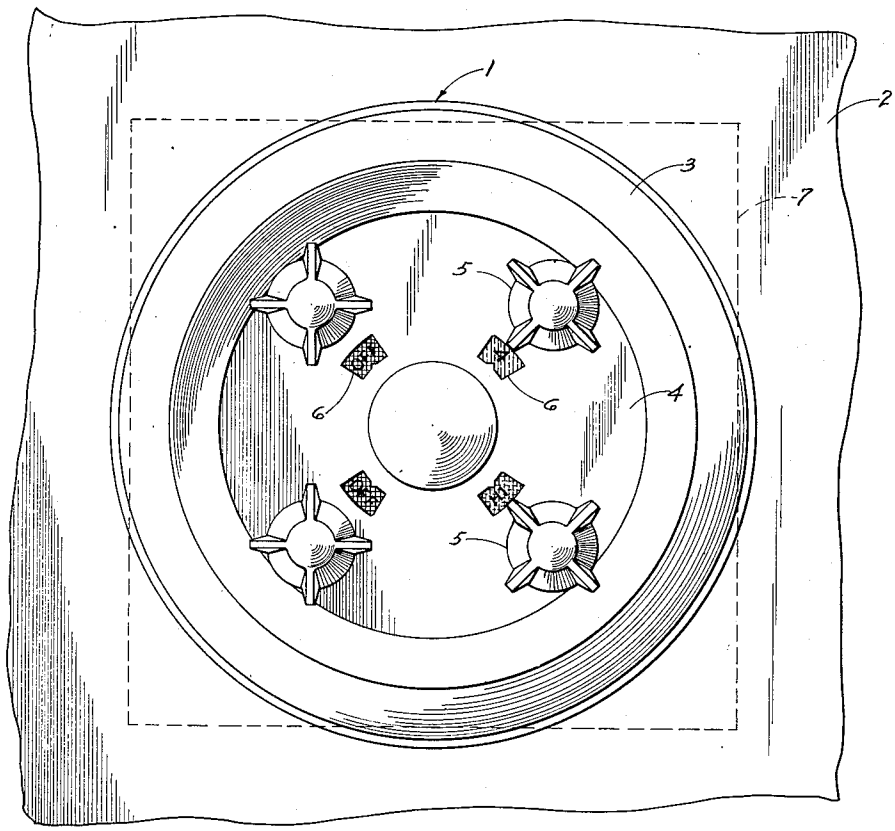


Fig. 1

INVENTOR.
WILLIAM R. CRAWFORD
BY
Alden D. Redfield
ATTORNEY.

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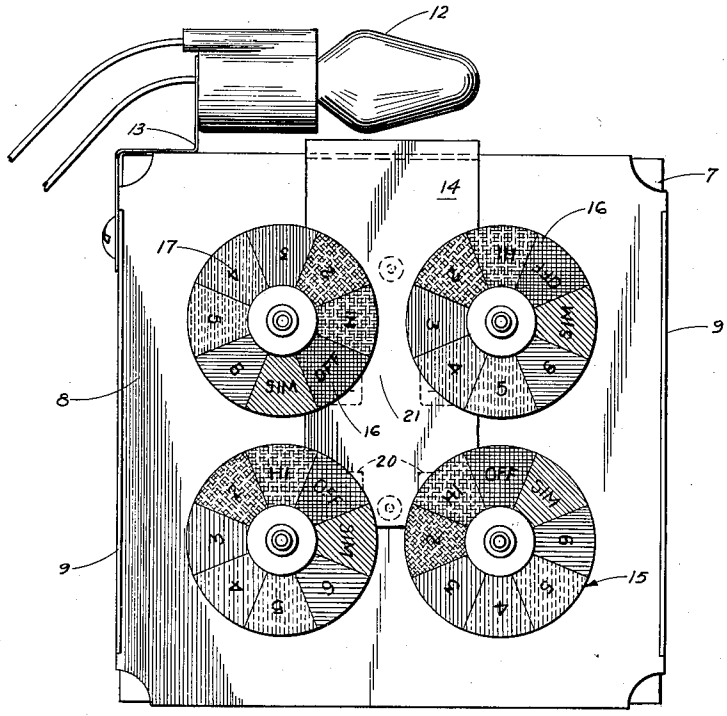


Fig. 2

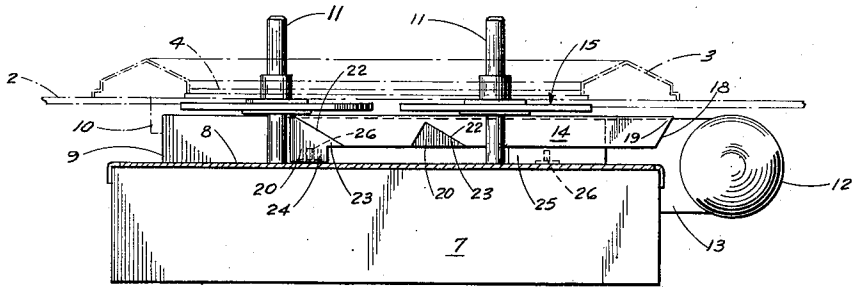


Fig. 3

INVENTOR.
WILLIAM R. CRAWFORD
BY
Alden D. Redfield
ATTORNEY.

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RANGE CLUSTER SWITCH

William Richard Crawford, Covington, Ky., assignor to Avco Manufacturing Corporation, Cincinnati, Ohio, a corporation of Delaware

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2 Claims. (Cl. 116—124)

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The present invention relates to a control switch for use in conjunction with electric ranges and has particular reference to a plurality of electrical control switches which are grouped in a cluster and secured to the backsplash of a range for the control of the surface burners.

In the highly competitive range manufacturing industry, it is common practice to vary the appearance of the ranges frequently so as to offer the public new and eye-appealing merchandise. Toward this end, the surface burner control knobs are often rearranged and relocated on the backsplash or along the top margin of the front wall of the range. For this reason, an important object of the present invention is to provide a novel and highly decorative range control which incorporates a plurality of grouped or clustered control knobs symmetrically spaced within a confined circular area.

It is also an object of the present invention to provide a range control switch construction having colored illuminated indicating means to signify to the user of the range what surface units are in use and, furthermore, what intensity of heat the burners are producing. An advantage of the present structural arrangement is that a single light source may be used to illuminate all of the colored indicating means for the associated switch units. Such indicating means may consist of a transparent window behind which a multi-colored translucent disc is rotated by operation of an associated switch.

A particular advantage of the present invention is that is facilitates the housing of a plurality of control switches in a very confined region. This has particular merit when the range operating controls are to be mounted in the backsplash or backguard of the range which often houses numerous other control and indicating devices. Another object of the present invention is that it provides a cluster switch construction which may be easily and rigidly mounted on any retaining wall, such as the front wall of the backsplash. Use of the present invention also simplifies the fabrication of this wall since a single mounting hole may be used to mount a plurality of switches instead of the usual arrangement in which a separate mounting hole is necessary for each individual switch.

A further object of the invention is the provision of a switch which is economical to manufacture, easily assembled and wired and rugged in construction. Cluster switches made according to the teachings of the present invention are also very attractive and have distinct sales appeal.

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The novel features that are considered characteristic of the invention are set forth in the appended claims; the invention itself, however, both as to its organization and method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in conjunction with the accompanying drawings in which:

Fig. 1 is a front elevational view showing a cluster switch assembly, having four control switches, secured to the backsplash of a range;

Fig. 2 is a front elevational view of the cluster switch having certain of its parts removed to show its construction with greater clarity; and

Fig. 3 is a side view of the cluster switch assembly, certain parts being shown in section and phantom lines to illustrate the assembly of the switch.

General description

As shown particularly well in Fig. 1 a cluster switch assembly, generally designated 1, may be secured to the front wall 2 of the backsplash of a range or like device requiring control by electric switches. A bezel 3, which may be chrome plated or otherwise treated with a decorative finish, is secured intimately to the face of the backsplash and retains within its inner periphery a decorative face 4 in front of which a plurality of control knobs 5 are disposed in operative relationship to the rest of the switch assembly. Face 4 is formed to define a plurality of transparent windows 6, each of which is disposed radially inwardly of an associated control knob. For a purpose to be explained more fully hereinafter, face 4 is entirely opaque with the exception of the windows.

A switch block 7 is secured to the rear face of the backsplash by means of a switch mounting plate 8 having perpendicular mounting flanges 9 which are removably secured, as by bolts, to tabs 10 formed integrally with the backsplash (see Fig. 3).

The switch block has a plurality of parallel outstanding control shafts 11, which for purposes of illustration are shown to be four in number, arranged symmetrically relative to imaginary horizontal and vertical reference planes intersecting in space at the center of the cluster switch assembly. Each shaft 11 operates an associated control switch provided within the switch block 7. The switch block and its internal construction constitute no part of the present invention and for this reason will not be described. Each control shaft may be turned in

either a clockwise or counterclockwise direction to regulate the intensity of heat produced by an associated electric heating unit, such as a top surface burner of an electric range, and in one position opens its associated control switch, thereby de-energizing the heating element being controlled.

A light bulb 12, which is energized by the closing of any one of the four control switches, is supported by a bracket 13 behind the backsplash and above the rear of the cluster switch assembly. Light from bulb 12 is distributed to the region behind each of the windows 6 by a light distributing block 14, the details of which will be described more fully hereinafter, the light rays passing through translucent multi-colored indicating dials, generally designated 15, before emerging from the windows. One dial is force fitted on each control shaft 11 for conjoint rotation and has a sufficient radial extent to completely cover the area of its associated window. As described later, each dial may be provided with a plurality of colored sectors each of which imparts a characteristic color to its window as the related shaft is rotated, signifying not only that the heating unit associated with the switch is on but also the intensity of the heat being produced.

Operation

Each indicating dial is provided with an opaque sector 16 which is positioned behind its associated window when the related switch is in its off or de-energized position. Thus, when all four of the control switches are in their off positions, bulb 12 is de-energized and all four of the windows 6 are dark. When any one of the switches is turned on by rotation of its knob 5, bulb 12 is energized and its light rays are distributed to each of the indicating dials; however, light can only pass through that window which is uncovered by the rotation of the indicating dial associated with the switch that has been turned on. Since face 4 is opaque, the illuminated window stands out brilliantly against the dark background.

If other switches are turned on subsequently, the associated indicating dials are rotated and the opaque sectors thereof are swung away from the related windows, thus permitting the emergence of characteristically colored light rays indicating the heat of the surface burner being controlled.

As each of the switches is opened and its corresponding heating unit de-energized, the opaque sector of its related indicating dial is swung in front of its window, thus darkening the window and indicating to the user that the heating unit has been turned off. Light bulb 12 remains energized until the last of the four switches is turned to the "off" position.

Since the electric circuit associated with bulb 12 constitutes no part of the present invention, it will not be illustrated or described herein. It is sufficient to understand that the bulb is energized whenever any of the four switches is turned on and that it will remain so energized until all of the switches are turned off.

As illustrated in Fig. 2, the preferred embodiment of the present invention incorporates a switch block having control switches with eight control positions, namely, an "off" position, "simmer," "high" and five intermediate heating positions between high and simmer. A corresponding number of sectors are provided on each indicating dial; each sector may be given a characteristic color which will eventually become associated in the mind of the user with the related operating condition of the heating unit. For instance, as shown, the "off" position is opaque, the "simmer" sector is colored green, the "high" sector is yellow and the sectors indicating intermediate heats have other colors as desired.

To aid those who may be color blind and to designate further to others the heat of the associated units, indicia 17 may be provided on each of the sectors in position to appear centralized in window 6 at each operating position.

Switch blocks, having eight position control switches, of the type hereinbefore described are commercially available and may be purchased from Tuttle and Kift, Inc., Chicago, Illinois (catalog No. C–152TG1) or from the Ark-les Switch Corporation, Watertown, Massachusetts (switch type 5050).

Cluster switches of the present type may also incorporate infinitely variable control switches having motor driven proportional cam operation. This type of switch block may also be obtained from Tuttle and Kift, Inc. and is designated by their catalog No. 45.

When infinitely variable switches are used, indicating dials 15 may be modified to the extent of eliminating the distinct boundaries between the colored sectors. Instead, the colors of the dial gradually blend one into another in a manner similar to the distribution of colors in a spectrum. Since such a switch does not have distinct operating positions but has an infinite range of adjustment, the user is aware of the heat of the associated unit by reason of the color in window 6 which color gradually changes from, for example, yellow to red as the intensity of the heat gradually increases. No other modifications are necessary to adapt the present invention for use with infinitely variable switch blocks.

Details of light distributor block

Any material characterized by a high degree of internal reflection and light transmissibility may be used to fabricate the distributor block. The block incorporated in the preferred embodiment is made of methyl methacrylate commonly known as "Lucite," although other materials, having comparable characteristics, may be used.

The distributor block may be constructed in numerous ways. The block incorporated in the preferred embodiment of the invention consists of a flat parallelepiped having a sloping top face 18 adjacent bulb 12 which defines an angle 19 of 61.5 degrees. This peculiar angle, for the proportions of the switch illustrated, facilitates ready penetration of the light rays passing perpendicularly from bulb 12 to the sloping face of the distributor block.

The distributor block is formed to define four notches 20 each of which is positioned directly behind an indicating dial and in alignment with a window 6. As indicated in Fig. 2, each notch extends transversely for about one-third of the full width of the distributor block, leaving a center portion 21 of full thickness free to transmit light to the lower end of the distributing block. Each notch 20 has a reflecting face 22 which defines an angle 23 with the rear face of the distributor block. Angle 23 for the proportions of the switch illustrated may fall within the range of 16 to 44° but preferably is 33°, since it has been found that this angle readily assists the distributor block. These rays pass through the

associated indicating dials when the switch is turned on and emerge from the windows 6.

To facilitate the mounting of block 14, a pair of mounting projections 24 and 25 are formed integrally adjacent the rear face and define apertures for engagement with a pair of pins 26 which are formed integrally with switch mounting plate 8.

General assembly

The cluster switch is assembled as follows: Switch mounting plate 8 is rigidly secured to switch block 7. Thereafter, distributor block 14 is engaged with pins 26 and indicating dials 15 are force fitted on shafts 11 in the proper angular position so that opaque areas 16 will cover the windows of the face when assembled. Bulb 12 and its bracket 13 are secured to one flange 9 of the switch mounting plate and the sub-assembly is then secured to tabs 10 of the backsplash.

Face 4 is secured to bezel 3 by means of stamped tabs or other conventional fasteners (not shown). The bezel is then passed over the projecting ends of shafts 11 and secured to the front face of the backguard by conventional fasteners (not shown). The assembly is completed by the force fitting of knobs 5 on to shafts 11.

Having described a preferred embodiment of my invention, I claim:

1. In combination in a cluster switch for installation in a range backguard formed to define an opening to accommodate the cluster switch, a switch mounting plate for attachment to the backguard, a switch block secured to said mounting plate, said switch block comprising a plurality of electrical switches having parallel projecting control shafts extending through the opening formed in the backguard, an opaque face obstructing the opening and surrounding the projecting control shafts, said opaque face being formed to define a transparent window adjacent each control shaft, an indicating dial secured for conjoint rotation to each of the control shafts in position to be observed through the window associated with the shaft, a light transmitting block secured to said switch mounting plate behind said indicating dials, said light transmitting block being formed to define a light receiving sloping face, a light source adjacent the sloping face, said block being formed to define a plurality of light reflecting faces behind said indicating dials in alignment with the windows of said opaque face, said reflecting surfaces transmitting light from said light source perpendicularly through said indicating dials, each of said dials defining variously colored light-transmitting sectors, one sector of each dial being opaque, whereby the light transmitted from the reflecting surfaces through the dials and windows indicates the position of said switches associated with said dials, the opaque sector of each dial obstructing the associated window when the associated switch is in its open position.

2. An electric range cluster switch comprising a switch block provided with a plurality of individual control shafts associated with the switches of said switch block, said shafts projecting outwardly from one face of said switch block, said control shafts being mutually parallel and symmetrically located relative to the center of said switch block, an indicating dial secured to each of said shafts, said indicating dials lying within a common plane, a substantially flat opaque face parallel to the plane of said dials, the outstanding ends of said shafts projecting through said opaque face, said face being formed to define transparent windows each disposed inwardly of an associated control shaft and in front of its related indicating dial, each indicating dial defining a plurality of variously colored sectors, one of the sectors being opaque, a light source, a light distributing means comprising a rectangular block of material of high internal reflection extending from said light source between said control shafts and positioned behind said indicating dials, said light distributing means having a plurality of angularly positioned light reflecting surfaces, each surface being disposed in alignment with a correspondingly positioned window provided in said opaque face, the reflecting surfaces directing light from said light source through said indicating dials and related windows, the opaque sector obstructing the associated window when the associated switch is in its open position, and a knob secured to each control shaft.

WILLIAM RICHARD CRAWFORD.

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