United States Patent

Grayson

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[54] RANGE CONTROL SYSTEM

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[73] Assignee: **International Telephone and Telegraph Corporation**, New York, N.Y.

[22] Filed: **Dec. 23, 1970**

[21] Appl. No.: **101,064**

Related U.S. Application Data

[62] Division of Ser. No. 738,460, June 20, 1968.

[52] **U.S. Cl.** **116/133**, 116/124, 219/487

[51] **Int. Cl.** **G09f 9/00**

[58] **Field of Search** 116/124, 133; 219/487, 398, 219/453, 506; 338/122

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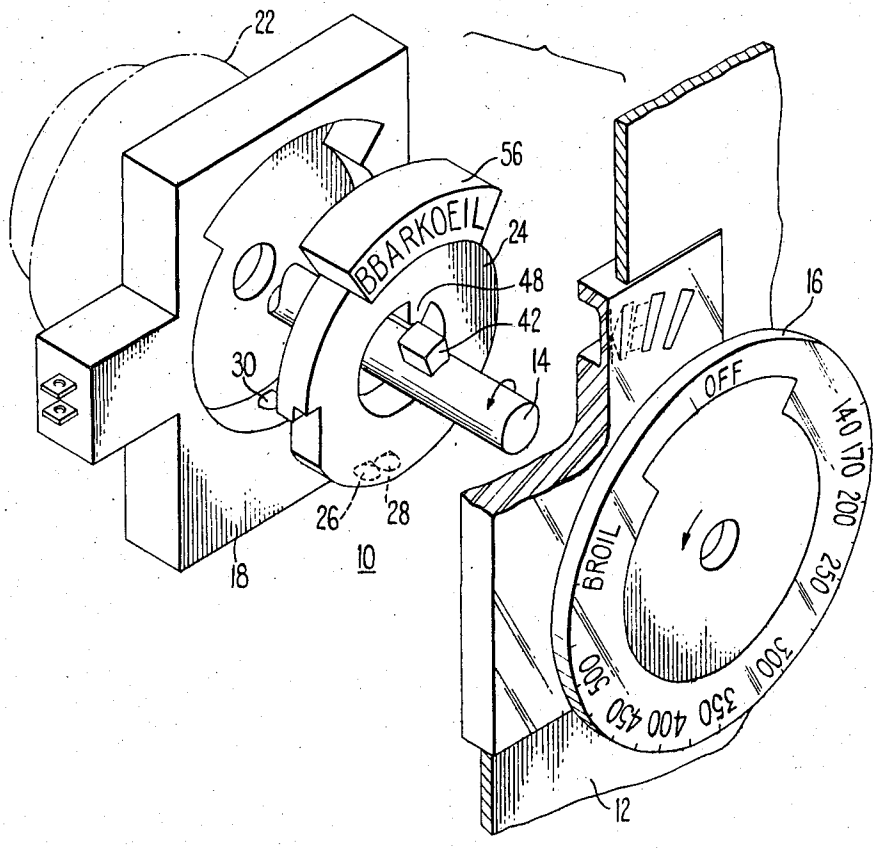
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[57] **ABSTRACT**

The invention comprises a single control knob for controlling both the bake burner and the broil burner of a range. When the bake burner is operational, a display is provided to so indicate. When the control knob is turned to its maximum operating condition, the bake burner is disconnected and the broil burner then becomes operational; and simultaneously, a display indication is provided to that effect. Should the operator desire to operate the broil burner at a reduced temperature, the control may then be turned to the reduced operating temperature. Should it once again be necessary of operate the bake burner, the control knob is turned to the "off" position, whereupon, the knob may then be returned to a temperature whereby the bake burner will be operational.

6 Claims, 10 Drawing Figures

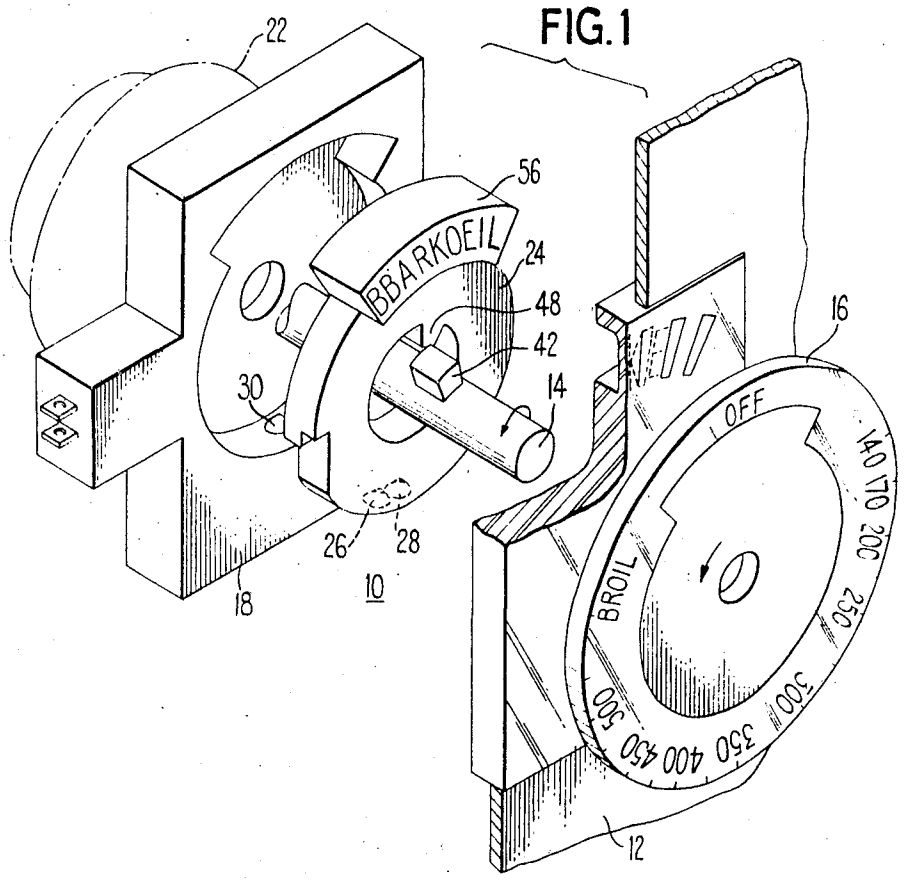


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SHEET 1 OF 2

FIG.1



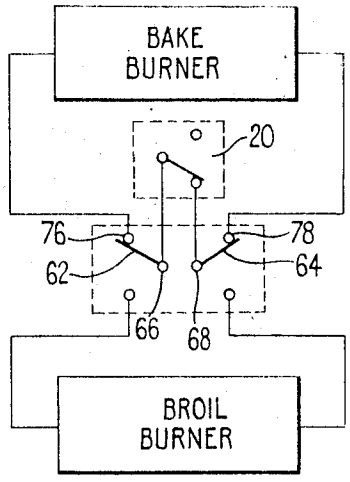


FIG.6

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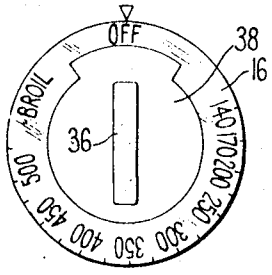


FIG.2A

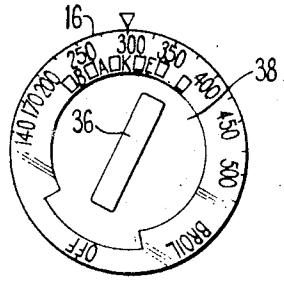


FIG.3A

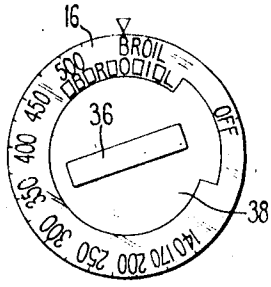


FIG.4A

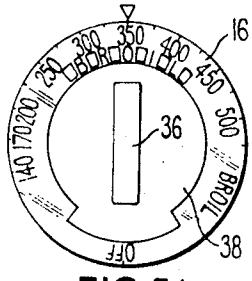


FIG.5A

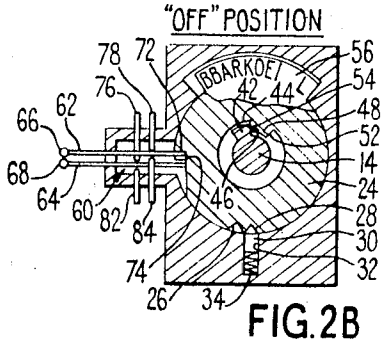


FIG.2B

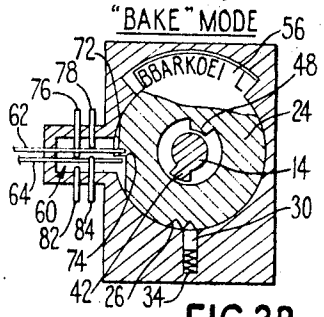


FIG.3B

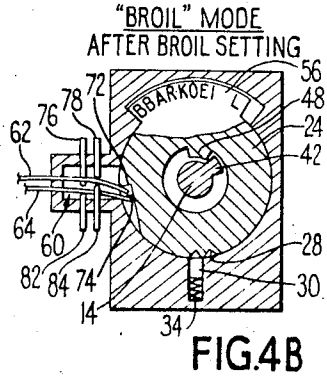


FIG.4B

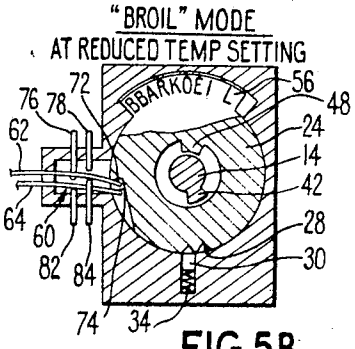


FIG.5B

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RANGE CONTROL SYSTEM

This is a division of copending application Ser. No. 738,460, filed June 20, 1968. The benefit of the filing date of said copending application is, therefore, hereby claimed for this application.

The present invention relates, in general, to a range control system and, more particularly, to a system where a pair of burner elements in the oven compartment are selectively controlled by a single control knob.

BACKGROUND OF THE INVENTION

In certain types of ranges, especially those of residential use, it is desirable to include a pair of burner elements in the oven compartment which are operated on a mutually exclusive basis. The conventional oven arrangement contains a bake burner and a broil burner which are located in different places in the oven. When the one burner is operational, the other burner is off. Heretofore, this kind of system required a first control knob for controlling whether the bake burner or the broil burner was in operation and a second control knob for controlling the temperature setting thereof. This duplication is, of course, costly from both a material and labor standpoint as well as making extra demands on the mounting space on the range. Moreover, the operator must view both control knobs to determine which element is one and at what temperature the element is operating.

In order to overcome the attendant disadvantages of prior art range control systems, the present invention provides a single control knob for controlling both the selection of the burner element and the temperature thereof. Further means are provided on said single control knob to adequately display which element is operational and the temperature setting of the operating burner.

SUMMARY OF THE INVENTION

More particularly, the invention comprises a single control knob which when actuated, allows the bake burner to operate and simultaneously display an indication that the bake burner is operational. When the control is turned to its maximum operating position, the bake burner is disconnected and the broiler burner then becomes operational with an accompanying display indication of its operation. Should the operator desire to operate the broiler burner at a reduced temperature other than maximum, the control knob may then be turned to the reduced operating temperature. Should it once again be necessary to operate the bake burner, the control knob is turned to the "off" position whereupon the knob may be then returned to a temperature whereby the bake burner will be operational.

The advantages of this invention, both as its construction and mode of operation, will be readily appreciated as the same and becomes better understood by references to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures and wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of the range control system of a preferred embodiment of the invention, partly in section;

FIGS. 2A and 2B depict the relative positions of the dial and switch members, respectively, of the system in FIG. 1 when the system is in the "off" position;

FIGS. 3A and 3B, 4A and 4B, and 5A and 5B depict the relative positions of the dial and switch members, respectively, of the system in FIG. 1 when the system is in different operational modes; and

FIG. 6 is a schematic diagram of the system in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, a range control system **10** is shown mounted on a range panel **12**. The range control system comprises a thermostat shaft **14** which has a temperature indicating dial **16** mounted thereon which is visible from the front of the system **10**. The shaft **14** extends through a hollow housing member **18** and is directly connected to a conventional oven thermostat switch **20** mounted in a housing **22**. The hollow portion of the member **18** contains a switch actuator element **24** having a pair of grooves **26** and **28** for mating with a detent means **30** mounted in a hollow, cylindrical slot **32** in the member **18**. A spring **34** biases the detent means **30** into contact with one of the grooves **26** or **28**.

Referring now to FIG. 2A, the temperature indicating dial comprises a transparent plastic member having the various operational temperatures of the burners from "off" to a maximum position of "broil" indicated along the periphery thereof. Mounted on the thermostat shaft **14** in the center of the dial is a control knob **36**. The indicating dial further comprises a first circular opaque region **38** whose purpose is merely asthetic and a semicircular opaque region **40** whose function will be explained hereinafter.

Referring now to FIG. 2B, the interrelationship between the position of the shaft **14** and the switch actuator element **24** is depicted. Extending outwardly from the shaft is a trapezoidal-shaped member **42** having a first side edge **44** and a second side edge **46**. The switch actuator element has a hollow center with a trapezoidal-shaped member **48** extending into the hollow center and having a first side edge **52** and a second side edge **54**. Rotation of the shaft **14** will cause edge **46** to abut edge **52** at one end of the rotation cycle and the edge **44** to abut edge **54** at the other end of the rotation cycle.

The outer surface of the element **24** generally is circular with a semicircular ridge **56** extending from the top section thereof, upon which are written the letters B-B-A-R-K-O-E-I-L which are used to denote the operational mode of the oven as will be explained hereinafter.

A mode selector switch **60** is mounted within a U-shaped portion of the housing member **18** and comprises a pair of flexible switch actuator elements **62** and **64**. At one end of the elements **62** and **64**, there are terminals **66** and **68**, respectively, for connection to the thermostat switch. Lips **72** and **74** on the outer edge of the switch element **24** abut the other end of the elements **62** and **64**, respectively. A pair of bake terminals **76** and **78** and a pair of broil terminals **82** and **84** are connected to their respective elements through the thermostat switch **20**. Either pair of terminals **76** and **78** or **82** and **84** may contact one of the contact elements **62** and **64**, respectively.

The housing member portion directly adjacent to the ridge **56** is transparent with six opaque-coated members **88** which are shown more clearly in FIGS. 3A, 4A and 5A. Each of the members **88** are a width slightly greater than the letters on the ridge **56**.

With the foregoing in mind, operation of the range control system is as follows:

Prior to use of the range, the dial **16** and shaft **14** are in the position shown in FIGS. 2A and 2B, respectively, with elements **62** and **64** connected to terminals **76** and **78**, respectively, and region **40** covering the lettering on ridge **56** and members **88**. Should the operator wish to use the oven in the bake mode, shaft **14** is rotated in a counterclockwise direction until the desired temperature indication on dial **16** is opposite an indicator arrow **90** mounted on the range panel **12** as shown in FIG. 3A.

In this position, the dial **16** has been rotated sufficiently so that member **40** no longer covers the members **88** or the lettering on ridge **56**. However, the alternate-spaced members **88** cover the letters B-R-O-I-L on ridge **56**, exposing the letters B-A-K-E, thus indicating to the operator that the oven is in the bake mode of operation.

Should the operator desire to use the oven in the broil mode, the shaft and knob are rotated until edge **44** abuts edge **54**. Further counterclockwise rotation of the shaft **14** causes element **24** to rotate slightly counterclockwise until detent means **30** is secured in groove **26**, as shown in FIGS. 3A and 3B. Further, lips **72** and **74** bend elements **62** and **64**, respectively, so that elements **62** and **64** are now in contact with ele-

ments 82 and 84, respectively, thus, deactivating the bake burner and activating the broil burner. As can be seen from FIGS. 3A and 3B, rotation of the shaft 14 and dial 16 to the "-broil" position and the attendant movement of the element 24 causes ridge 56 to move a distance equal to one of the letters thereon, and the letters B-R-O-I-L now are displayed between the members 88.

It should be understood that when the broil mode is actuated, the resultant heat is the maximum possible. However, should it be desired to operate the broil mode at a reduced temperature, the shaft 14 is rotated in a clockwise direction until the desired temperature is reached, as shown in FIGS. 5A and 5B. Should it be desired to operate the temperature once again in the bake mode, it is necessary to turn the shaft 14 clockwise until the indicator is at the "off" position, whereupon detent means 30 is returned to groove 28 and the elements 62 and 64 are once again in contact with terminals 76 and 78. Rotation of the shaft 14 in a counterclockwise direction will once again operate the bake burner.

FIG. 6 depicts a simplified schematic of the operation of the oven. With the oven in the bake mode, elements 62 and 64 connect the bake burner, through the terminals 76 and 78, to the thermostat switch 20. As is conventional, in order to maintain the oven at the desired temperature, thermostat switch 20 periodically is opened and closed. Further, when the broil burner is operational, elements 62 and 64 contact the broiler burner through the thermostat switch.

The term "interlock" and the phrase "stable state" are hereby defined as relating at least to apparatus which has only a plurality of states of conduction such as a flip-flop, as opposed to some other physical or mechanical state or mechanical position state.

The term "interlock" and the phrase "stable state" are also hereby defined as relating to systems of the type disclosed herein, to any electromechanical or other system, or to any purely mechanical or purely electrical system or otherwise.

The term "interlock" and the phrase "stable state" are also hereby defined to relate to a mechanical structure having two stable positions.

The term "switch" is hereby defined to include, but not be limited to, a pair of relay contacts or a switch having one or more contacts or no contacts such as an electronic switch.

The phrase "device actuable to provide heat" is hereby defined to include, but not be limited to, an electric heating element or both a gas burner and a valve, or otherwise.

The phrase "coupling means" is hereby defined to include, but not to be limited to, solely electrical coupling means, solely mechanical coupling means, electromechanical coupling means, and one or more valves or valves in combination with any of the said electrical, mechanical or electromechanical coupling means.

The phrase "connection means" is hereby defined to include, but not to be limited to, switches, other conductive apparatus, semiconductors, gates or otherwise.

In FIG. 1, note will be taken that the order of letters are in the following sequence: BBARKOEIL, there being no substantial space between any two adjacent letters except the letters I and L, one blank letter space being provided between the letters I and L. This first set of letters is provided on ridge 56.

Although one set of letters are shown in the ridge 56, a second set in FIG. 1, alternative thereto, which will work is BBRAOKIEL. In this case, there is no substantial space between any two adjacent letters. However, there is a blank letter space after the letter L.

The second set of letters just given is required whenever a reversal is desired or necessary. For example, thermostat shaft 14 may have a left-hand screw thread to cause the thermostat temperature setting to increase. If the screw thread of shaft 14 is made a right-hand screw thread, and everything else is the same, the thermostat temperature setting may be increased by rotating shaft 14 to the right. Dial 16 then must be changed so that the off position is the same, but the new right-hand half is the mirror image of the old left-hand half. Similarly, the new left-hand half must thus be the mirror image of the old right-hand half.

As can readily be seen, the system may be designed to operation of either a gas or electric range where two burners are not operated simultaneously. Further, the system allows either burner to be operated through a continuous range of temperatures with the burner mode displayed. Moreover, a single control knob is utilized on the range panel which minimizes the number of controls.

It should be further understood that the foregoing disclosure relates only to preferred embodiments of the invention, and that it is intended to cover all changes and modifications of the examples of the invention herein chosen for the purpose of the disclosure which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. An indicator comprising: a base; a first member having first and second sets of letters thereon, said first set including the letters B, R, O, I and L, said second set including the letters B, A, K and E, said letters B, A, K and E being positioned on said first member contiguous to the said letters B, R, O and I, respectively; a second member having a construction to mask all of the letters in both of said sets, but not all at one time, said second member having a construction so as to mask all of the letters of said first set without masking any of the letters of said second set and vice versa, said second member being opaque except for certain aperture means therethrough, said aperture means always masking at least five alternate ones of the letter spaces; mechanical means to move one of said members back and forth between two positions relative to said base and in directions along a line, all of said letters being aligned in succession along said line; and means to mount said one of said members movably relative to said base, the other of said members being fixed relative to said base, said aperture means including five spaced apertures located on approximately the same said line, each aperture having a width equal to the width one letter space and being at least as large as one letter in height, each said aperture being spaced from each aperture adjacent thereto a distance approximately equal to one letter space width, said two positions being spaced apart one letter space, said letters being arranged in a series in the order B, B, A, R, K, O, E, I and L, no substantial space being provided between the letters except the letters I and L, one blank letter space being provided between the letters I and L.

2. The invention as defined in claim 1, including means to stop said mechanical means at each of said two positions, said mechanical means including a manually operable and rotatable control knob, said series of letters being located on an approximately horizontal arc of a circle concentric with the rotational axis of said knob, and means to mount said knob rotatably relative to said base, said line being said arc.

3. The invention as defined in claim 1, including opaque means to mask all five of said apertures simultaneously, said opaque means being mounted on said base in a position to move to a position which does not obstruct the view of any of said letters which lie in registration with said apertures.

4. An indicator comprising: a base; a first member having first and second sets of letters thereon, said first set including the letters B, R, O, I and L, said second set including the letters B, A, K and E, said letters B, A, K and E being positioned on said first member contiguous to the said letters B, R, O and I, respectively; a second member having a construction to mask all of the letters in both of said sets, but not all at one time, said second member having a construction so as to mask all of the letters of said first set without masking any of the letters of said second set and vice versa, said second member being opaque except for certain aperture means therethrough, said aperture means always masking at least five alternate ones of the letter spaces, mechanical means to move one of said members back and forth between two positions relative to said base and in directions along a line, all of said letters being aligned in succession along said line; and means to mount said one of said members movably relative to said base, the other

of said members being fixed relative to said base, said aperture means including five spaced apertures located on approximately the same said line; each aperture having a width equal to the width one letter space and being at least as large as one letter in height, each said apertures being spaced from each aperture adjacent thereto a distance approximately equal to one letter space width, said two positions being spaced apart one letter space, said letters being arranged in a series in the order B, B, R, A, O, K, I, E and L, no substantial space being provided between any of the letters, one blank letter space being provided after the letter L.

5. The invention as defined in claim 4, including means to stop said mechanical means at each of said two positions, said mechanical means including a manually operable and rotatable control knob, said series of letters being located on an approximately horizontal arc of a circle concentric with the rotational axis of said knob, and means to mount said knob rotatably relative to said base, said line being said arc.

6. The invention as defined in claim 4, including opaque means to mask all five of said apertures simultaneously, said opaque means being mounted on said base in a position to move to a position which does not obstruct the view of any of said letters which lie in registration with said apertures.

* * * * *