CONTROL SYSTEM FOR DOUBLE-BURNER SINGLE-CAVITY OVEN

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5 Claims

ABSTRACT OF THE DISCLOSURE

The invention relates to the control of heating units found in ovens, and in particular to a single control system utilizing a single selector assembly for controlling multiple heat generating units in a single-cavity oven.

BACKGROUND OF THE INVENTION

Technological progress has affected almost every segment of our lives. The apparatus on which and in which our food is prepared is no exception. Thus, in the recent past, conventional cooking apparatus included essentially a single range, either gas-fired or electric, provided with a single or double oven, and a multiplicity of heat generating elements arranged on a flat surface for surface cookery. Indeed, this surface arrangement of heat generating units gave rise to the name “range.” Progress in this area has not involved major innovations in the basic heating units per se, but considerable innovation has occurred in the control mechanisms utilized to facilitate use of the basic heating units. One major innovation that has occurred in the design of cooking apparatus involves the separation of the conventional oven from the surface-cooking “range.” These units are modernly of the “built-in” type, with the cooking surface or “range” being built into a convenient counter and the oven being built into a convenient wall. Both of these units are arranged with respect to other appliances in the modern kitchen to facilitate the use and lighten the burden for the homemaker.

These innovations are due in part to the desire of architects to achieve an aesthetic effect in the kitchen which is in tune with the decorative scheme throughout the home. In this regard, oven units have been recessed in walls paneled with expensive hardwoods or covered with ceramic tile. Achievement of the aesthetic effect has required that control mechanisms for such oven units be unobtrusive yet readily available for manipulation by the homemaker. Additionally, at least where the oven is gas-fired, it is important the control mechanism incorporate built-in safety features with which the homemaker need not be concerned when she manipulates the control.

Accordingly, it is one of the important objects of the present invention to provide a control system for an oven utilizing multiple heat generating units as a main burner and a broiler burner of a control system for controlling all of the burners or heat generating units within the oven through manipulation of a single selector assembly.

In ovens that utilize gas to effect heating thereof, it is desirable that the volume of gas be regulated in accordance with a predetermined temperature setting. In addition, it is desirable that the main and broiler burners be ignited through use of an effective pilot. Pilots may be of two types, i.e., a “standing pilot” which is controlled by a separate valve and once ignited remains lighted, and a “pilot” which is electrically ignited each time it is desired to ignite the main or broiler burner. It used to be that standing pilots were continuously activated in that the source of gas for the pilot was not interrupted in the event the pilot was extinguished. Modernly, safety devices are incorporated in conjunction with the pilot which will effect automatic cut off of the main source of fuel in the event the pilot is extinguished. It is therefore another object of the invention to provide a control system utilizing a single assembly which when manipulated activates either an electric igniter which ignites the pilot, or which is effective to channel fuel from an appropriate source to whatever burner is selected for ignition by a “standing pilot.” This single manipulation of a single selector assembly is also effective to set or to actuate a plurality of switches effective to activate solenoid valves, monitor temperature and energize control circuits.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will become apparent from the following description and drawings. The invention is not limited to the showing made by said description and the drawings, and presents different forms of the invention may be adopted within the scope of the appended claims.

SUMMARY OF THE INVENTION

In terms of broad inclusion, the invention comprises a single cavity oven-type cooking unit, either detached from a range-type unit, or in conjunction therewith, and equipped with a main or “roasting” burner and an auxiliary or “broiling” burner. It is intended that the term “burner” will include a heat generating unit energized with electricity. In the gas-fired type of appliance, each burner is associated with a gas-fired pilot which is effective to ignite the gas discharged from the main or auxiliary burner when one of these is turned on. Associated with each of the pilots, is a pilot generator which comprises a thermocouple having a section exposed to the heat from the pilot and which generates an electric potential and current utilized to maintain in an open condition the main gas supply valve for the appliance. Also, within the oven cavity, is provided a heat sensing unit in association with an adjustable control circuit for controlling the ultimate temperature within the oven cavity. Interposed between each of the burners and the main gas supply valve is a single selector assembly including a knob adapted for manipulation by the homemaker in selecting one or the other of the main or auxiliary burners within the oven cavity. This single selector assembly is constructed so that the single manipulation to choose one or the other of the main or auxiliary burners will control all other functions that need be controlled in conjunction with the burner selected.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating the multiple selectively energizable heat generating units within an oven cavity in conjunction with the control mechanism for controlling such heat generating units.

FIG. 2 is a schematic illustration partly diagrammatic showing upper and lower burner assemblies in conjunction with a single control system arranged for manipulation by a single selector assembly. The controls are represented in the position they would assume when the upper burner is activated.

FIG. 3 is a schematic illustration in the nature of a cross-sectional view through the selector assembly indicating the interconnection of gas passages.

FIG. 4 is a view similar to FIG. 2 but showing the control system set for activation of the lower burner assembly.

FIG. 5 is a schematic view in the nature of a cross-sectional view through the selector assembly indicating the interconnection of gas passages when the selector
In terms of greater detail, and referring specifically to FIG. 1, the control system of the invention is embodied in an oven designated generally by the numeral 2, having a cavity 3 within which are positioned a first main or "roasting" burner 4, conveniently of the gas-fired type, and a second main or "broiler" burner 6, preferably of the same type. The multiple burner assembly is controlled from a single selector assembly 7 which is illustrated as a three-way valve in FIGS. 8 and 9. Assembly 7 is interposed between the burners and a normally closed safety valve 8. An appropriate conduit or first outlet 9 connects the selector assembly with the lower burner, while an appropriate conduit or second outlet 10 connects the upper burner with the selector assembly. The selector assembly is provided with a selector knob 13 or control means adapted for manipulation by the homemaker to select one or the other of the burners. The main gas supply valve is preferably of the magnetically controlled type, and is connected to a source of gas through a main inlet conduit 14.

In operation, starting from the "OFF" position illustrated in FIGS. 6 and 7, clockwise rotation of the shaft 36 by manipulation of the selector assembly knob 13 will effect activation of the lower burner 4, by bringing the main gas supply conduit into communication with the conduit 9 leading to the lower burner. This condition is represented schematically in FIG. 5. Such rotation of the shaft will also shift the movable blade of the single pole-double throw switch 33 from the position shown in FIG. 6 to the position illustrated in FIG. 4. In the embodiment illustrated in FIG. 9, where each of the burners 4 and 6 is associated with a pilot equipped with an electric ignition system, rotation of the shaft 36 by manipulation of the selector assembly control knob 13 will also effect closing of the ignition contact switch 37 so as to create an arc 38 as shown in close proximity to the pilot assembly 22, and thus ignite the gas escaping therefrom. In the embodiment illustrated in FIG. 2, the pilot utilizes a "standing pilot" the electric ignition system is of course omitted. This arrangement is illustrated in FIG. 8.

If it is now desired to switch from the main burner, as illustrated in FIG. 4, to the broiler burner as illustrated in FIG. 2, the selector assembly knob 13 is rotated counterclockwise so as to open a passage between the main gas supply line and the pilot 26, illustrated schematically in FIG. 3 by interconnection of the passages as shown, and of course connects the main supply line 14 with the conduit 12 to supply gas to the burner 6. Incidentally, the supply of gas is also connected to a re-ignition or auxiliary pilot 41 as shown best in FIG. 2.

Manipulation of the selector knob to select broiler burner 6 coincidently actuates the single pole-double throw switch 33 so as to complete the circuit through lead 32 between the pilot generator 30 and the controlled main valve 8. Thus, so long as the pilot generator is heated by the pilot, a solenoid winding 42 (FIGS. 8 and 9) is energized, the spring-biased armature 43 is held in its lower position as shown in these two figures, and the valve member 44 is retained separated from valve seat 45 of valve body 46 of the valve and the chamber within the electrically controlled valve assembly into the selector assembly 7 as shown. Where the
auxiliary or broiler burner is equipped with a pilot that requires ignition each time the burner is ignited, appropriate manipulation of the ignition contact switch 37 activates the ignition control system and strikes an arc as at 47 to ignite the gas permitted to escape from the pilot 26 by opening of valve 49. In this regard, and with special reference to FIG. 9, where the selector assembly and control system includes an electric ignition system, the selector assembly is provided with pilot valves 48 and 49, activated mechanically or electromagnetically through rotation of the shaft 36 by manipulation of the selector knob 13. In FIG. 9, pilot valve 49 is shown in its open position so as to permit the passage of gas from the main gas valve through conduit 27 to the pilot 26. It should be noted that the electric ignition contact switch 37 is preferably actuated against a spring pressure by rotation of shaft 36 so that the contacts return to an open position immediately upon release of the control knob 13. In this manner the ignition system to the associated pilot is inactivated as soon as the pilot has ignited.

If desired, means may be provided to electrically ignite the "standing pilots." Such ignition may be effected by counterclockwise rotation of the shaft 36 to a position indicated on the selector assembly as "pilot ignition," in which position the rotation of the shaft will effect closing of appropriate contacts to momentarily energize the appropriate ignition system circuit. Thereafter, the "standing pilot" remains lighted as previously discussed.

What is claimed is:

1. In fuel burning apparatus, the combination comprising: first and second main burners; first and second pilot burners adjacent to said first and second main burners, respectively; first and second outlets; a three-way valve having first and second inlet conduits for said first and second outlets, said first and second outlets being connected, respectively, from said first and second inlet conduits, said three-way valve having an inlet, said three-way valve having control means selectively operable to provide communication between said three-way valve inlet and of one said outlets at a time; a main inlet conduit; a normally closed safety valve connected between said main inlet and said three-way valve inlet; a solenoid winding; an armature adjacent said winding movable in response to energization of said winding to hold said safety valve open; first and second thermocouples adjacent said first and second pilot burners, respectively, positioned to be heated thereby; and a selector switch movable in response to movement of said control means for connecting first thermocouple in a manner to energize said winding when said control means is in a position providing communication between said three-way valve inlet and said first outlet, and for connecting said second thermocouple in a manner to energize said winding when said control means is in a position providing communication between said three-way valve inlet and said second outlet, said selector switch being adapted to disconnect each one of said thermocouples from said winding when the other one is connected thereto.

2. The invention as defined in claim 1, wherein said safety valve includes a spring to bias said armature to a valve closing position.

3. The invention as defined in claim 1, wherein at least one of said main burners includes a probe to detect the temperature therearound, and a normally closed control switch connected in series with said selector switch to open the circuit thereto when the temperature of said probe exceeds a predetermined magnitude.

4. The invention as defined in claim 3, wherein said control switch has a spring to bias it closed.

5. The invention as defined in claim 4, where said safety valve includes a spring to bias said armature to a valve closing position.

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