

Oct. 3, 1967

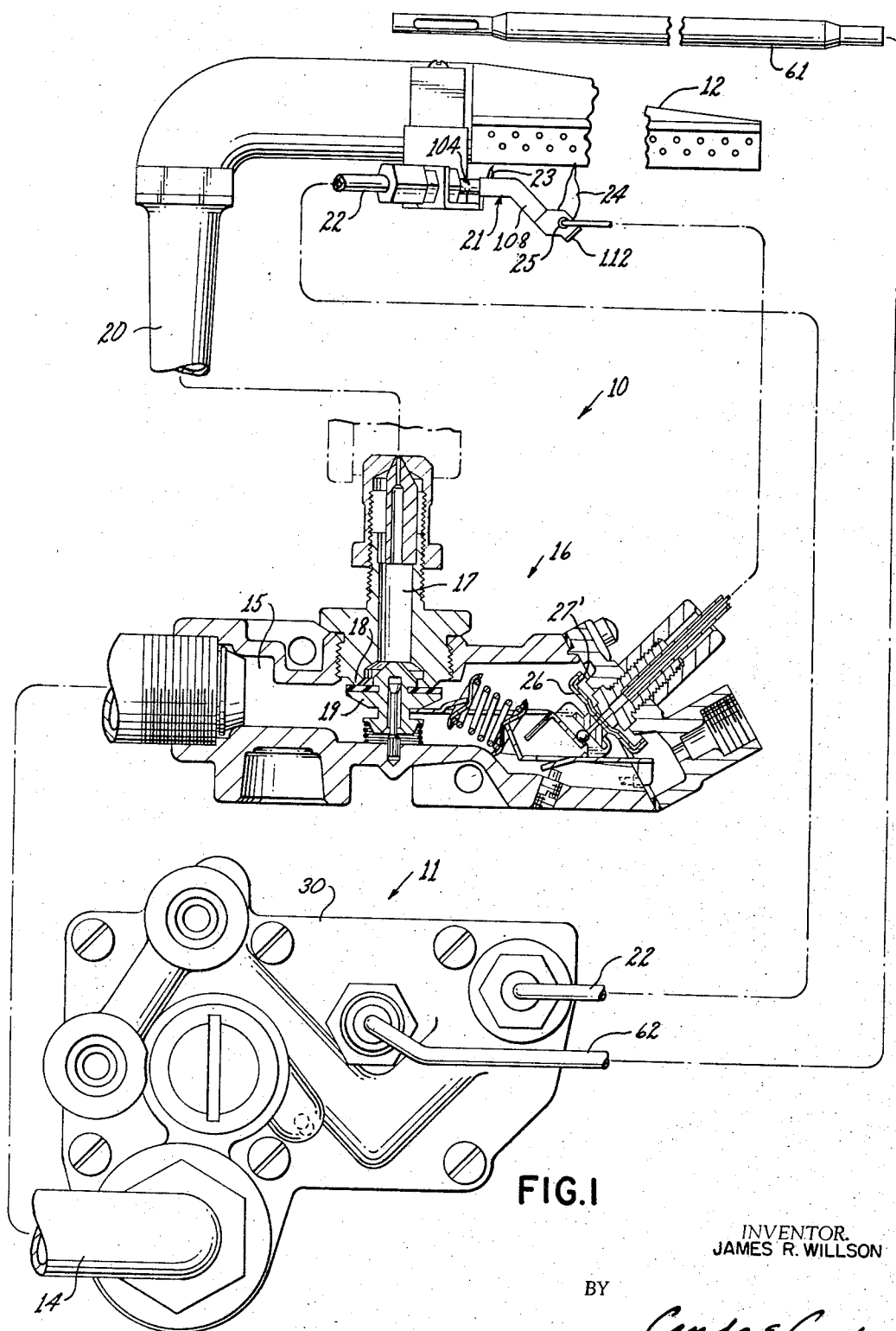
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3,344,989

CONTROL DEVICE AND PARTS THEREFOR OR THE LIKE

Filed Dec. 2, 1964

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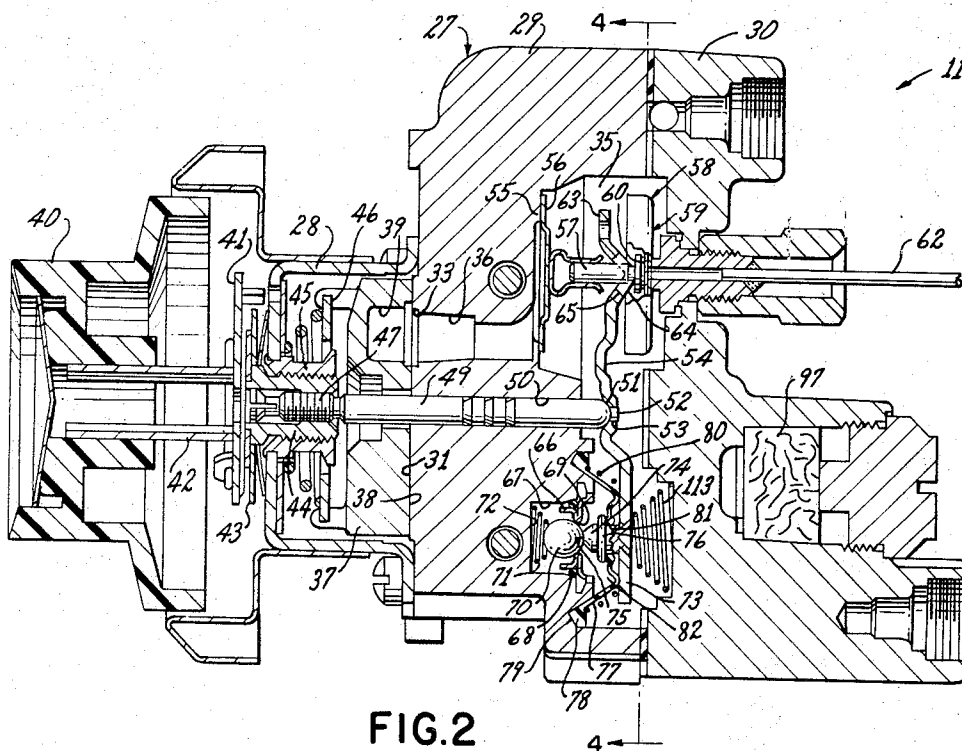


FIG. 2

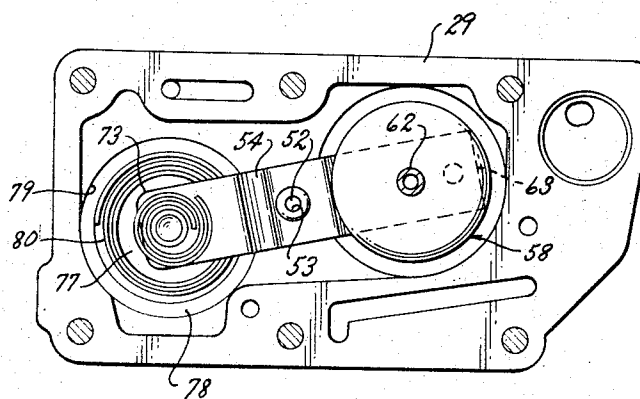


FIG. 4

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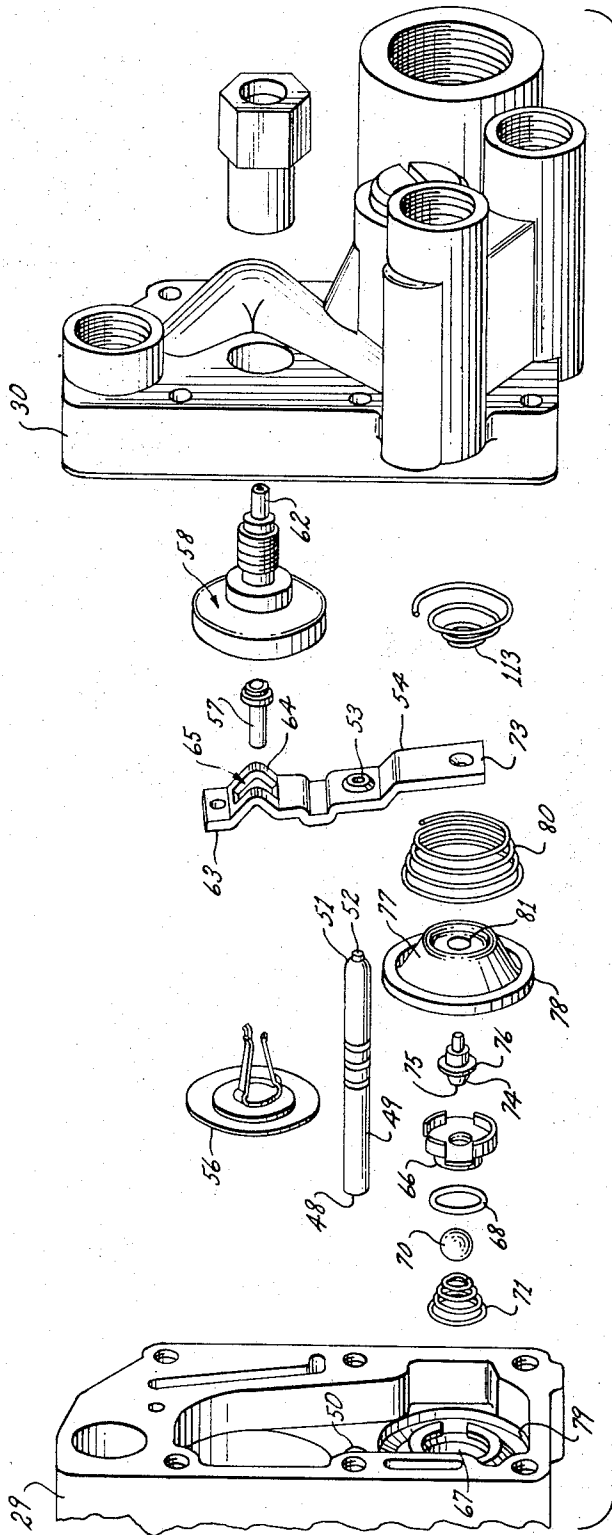


FIG. 3

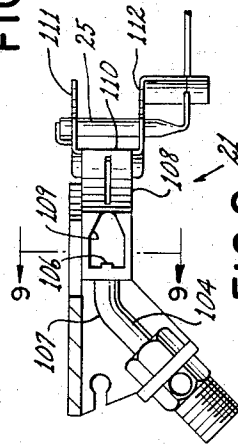


FIG. 8

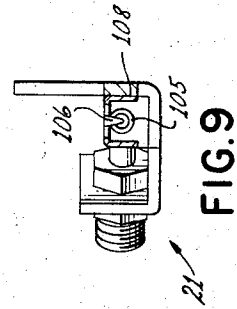


FIG. 9

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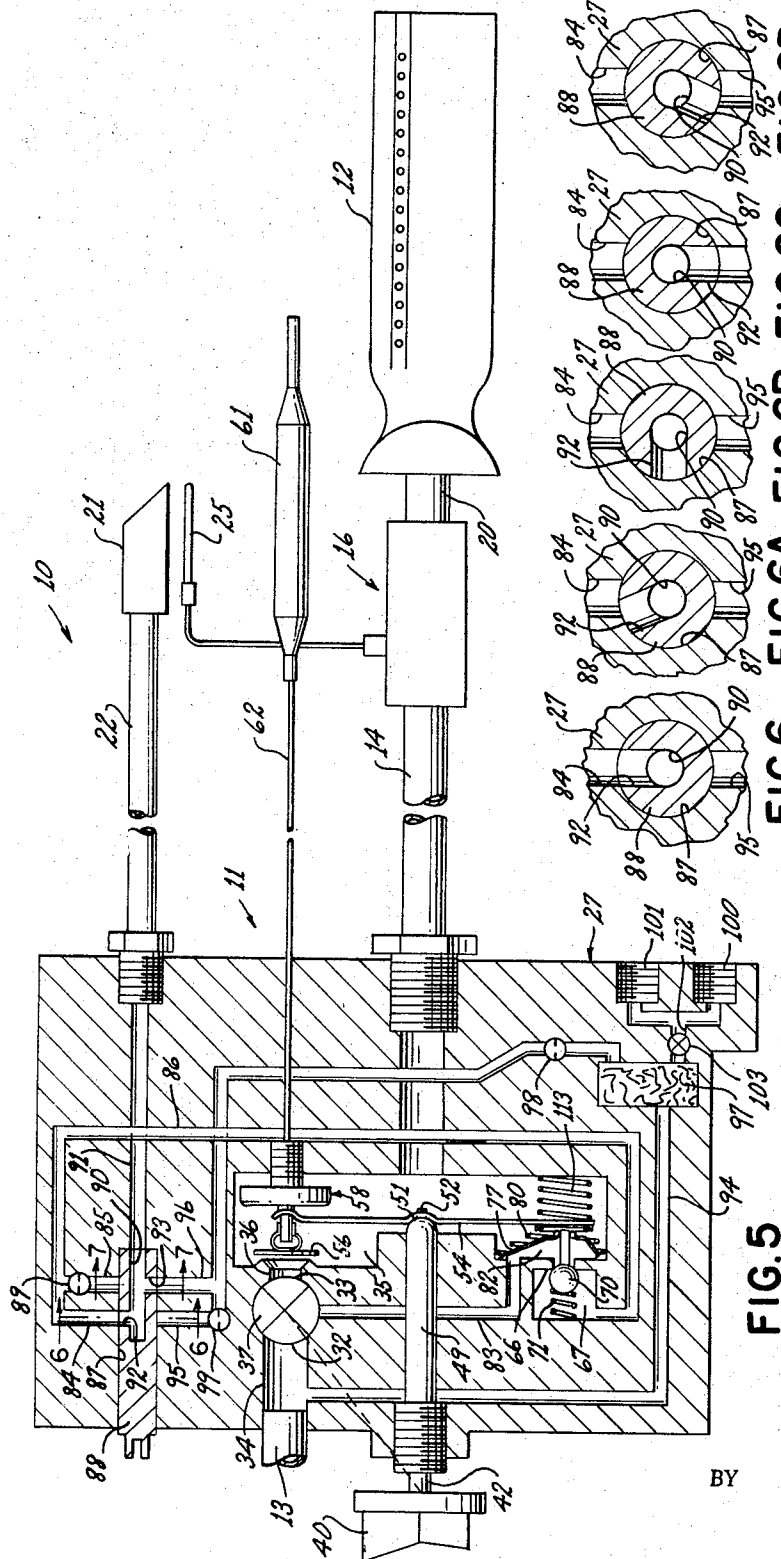


FIG. 5

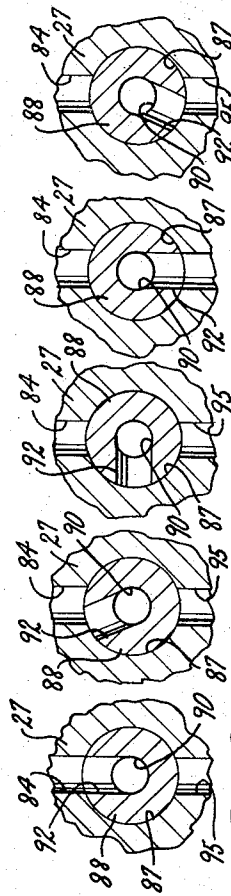
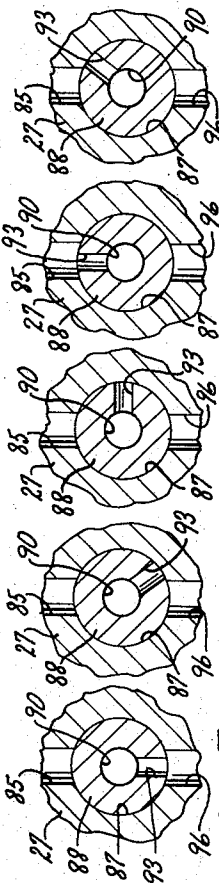


FIG. 6A FIG. 6B FIG. 6C FIG. 6D



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CONTROL DEVICE AND PARTS THEREFOR OR THE LIKE

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This invention relates to an improved control device for fuel burning apparatus and the like as well as to improved parts for such a control device or the like.

In particular, this invention provides a control device wherein fuel to a main burner means is cycled on and off in relation to fuel being supplied to a pilot burner means disposed adjacent the main burner means, the pilot burner means having the flame thereof controlled by the temperature effect produced by the main burner means.

Further, this invention provides such a control device wherein the parts thereof are relatively simple to manufacture and assemble together to provide an economical control device to produce the above function.

In addition, this invention provides such a control device wherein the controller pilot burner means can have a standby flame thereof adjusted for natural gas and can have the heater flame thereof adjusted for LP (liquefied petroleum) gas in a manner hereinafter described.

Accordingly, it is an object of this invention to provide an improved control device having one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide improved parts for such a control device or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a schematic view illustrating the improved control system of this invention.

FIGURE 2 is an enlarged, cross-sectional view of the control device illustrated in FIGURE 1.

FIGURE 3 is an exploded perspective view of certain parts of the control device illustrated in FIGURE 2.

FIGURE 4 is a cross-sectional view taken on line 4—4 of FIGURE 2.

FIGURE 5 is a schematic view illustrating the control system illustrated in FIGURE 1 in schematic form.

FIGURE 6 is an enlarged, fragmentary, cross-sectional view taken on line 6—6 of FIGURE 5.

FIGURES 6A—6D are, respectively, views similar to FIGURE 6 and illustrate the pilot adjusting key in different positions thereof.

FIGURE 7 is an enlarged, fragmentary, cross-sectional view taken on line 7—7 of FIGURE 5.

FIGURES 7A—7D are, respectively, views similar to FIGURE 7 and illustrate the pilot adjusting key in different operating positions thereof.

FIGURE 8 is a top view of the controller pilot illustrated in FIGURE 1.

FIGURE 9 is a cross-sectional view taken on line 9—9 of FIGURE 8.

While the various features of this invention are hereinafter described and illustrated as being particularly adapted to provide control means for a cooking oven of a cooking apparatus or the like, it is to be understood that

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the various features of this invention can be utilized singly or in any combination thereof to provide control devices for other structures as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURES 1 and 5, the improved control system of this invention is generally indicated by the reference numeral 10 and comprises a control device 11 for controlling the temperature effect of an oven (not shown) by means of a main burner means 12 disposed in the oven in any suitable manner.

Fuel is adapted to flow from a supply conduit 13, FIGURE 5, through the control device 11 and out through an outlet conduit 14 thereof to an inlet chamber 15 of an automatic safety valve means 16, the inlet chamber 15 of the valve means 16 being separated from an outlet chamber 17 thereof by a valve seat 18 opened and closed by a valve member 19.

The outlet chamber 17 of the safety valve 16 is interconnected to the main burner means 12 by a conduit means 20.

Fuel is also adapted to flow from the source 13 through the control device 11 in a manner hereinafter described to be interconnected to a controller pilot burner means 21 by means of a conduit 22, the pilot burner means 21 adapted to always have a small flame 23 except when an increased flow of fuel through the conduit means 22 takes place in a manner hereinafter described to provide a large flame 24 to ignite fuel subsequently issuing from the main burner means 12 in the manner hereinafter described.

When the large flame 24 appears at the controller pilot burner means 21, the same is adapted to heat a temperature sensing bulb 25 which controls movement of a movable wall 26 of a temperature responsive device 27' so that when the temperature sensing bulb 25 senses the large flame 24, the movable wall 26 of the temperature responsive device 27' will operate suitable levers in the safety valve 16 to snap the valve member 19 to its open position so that fuel can issue to the main burner means 12 and be ignited by the flame 24. However, when the large flame 24 ceases to exist at the controller pilot burner means 21 and only the small flame 23 is issuing therefrom, the condition responsive means 27' moves the movable wall 26 in such a manner that the lever means interconnecting the movable wall 26 with the valve member 19 snaps the valve member 19 to its closed position whereby fuel cannot issue from the main burner means 12 until the temperature sensing bulb 25 again senses a large flame 24 at the controller pilot burner means 21.

The control device 11 of this invention is so constructed and arranged that the same is adapted to sense the temperature effect produced by the burner means 12 so that for any selected temperature position of the control device 11, the control device 11 will maintain the oven at that selected temperature by cycling on and off the burner means 12 by means of controlling the pilot burner means 21 in a manner hereinafter described.

As illustrated in FIGURES 2 and 5, the control device 11 includes a housing means 27 formed of three parts 28, 29 and 30 suitably interconnected together in the manner illustrated in FIGURE 2. The housing part 29 has a flat surface 31 interrupted by a pair of adjacent ports 32 and 33 with the port 32 being interconnected to the fuel mani-

fold 13 by a passage means 34 and the port 33 being interconnected to a chamber 35 by a passage means 36 formed in the housing part 29.

A rotatably mounted valve member 37 has a flat surface 38 thereof disposed in sealing and sliding contact with the surface 31 of the housing part 29, the valve member 37 having a recess 39 formed in the side 38 thereof to interconnect together the ports 32 and 33 when the valve member 37 is moved to a particular rotational position thereof by a control knob 40.

The control knob 40 is interconnected to a plate-like member 41 by a C-shaped shaft 42, the plate-like member 41 being secured to a plate-like member 43 affixed to a hollow tubular member 44 threadedly received in a threaded bore of a hollow tubular member 45 fixed to the housing part 28. A drive member 46 is operatively interconnected to the valve member 37 and is operatively interconnected to the drive plate 41 when the control knob 40 is first moved from its off position toward an on position thereof whereby rotational movement of the control knob 40 also rotates the valve member 37 to fully interconnect the ports 32 and 33. However, the drive plate 41 is disengaged from the drive member 46 after the ports 32 and 33 have been fully interconnected by the valve member 37 whereby the control knob 40 can be rotated in a higher temperature direction to select the desired temperature for the oven or the like. When the control knob 40 is rotated in the opposite direction back to its off position, the drive plate 41 is again interconnected to the drive member 46 to rotate the valve 37 back to its off position whereby the ports 32 and 33 are not interconnected together.

The hollow tubular member 44 carries an adjusting screw 47 which abuts against an end 48 of a fulcrum pin 49 disposed for axial movement in a bore 50 in the housing part 29, the pin 49 having a rounded end 51 provided with a reduced cylindrical portion 52 received in an aperture 53 of a lever 54 disposed in the outlet chamber 35 for a purpose hereinafter described.

The passage 36 is separated from the chamber 35 by a valve seat 55 adapted to be opened and closed by a valve member 56 carried on an extension 57 of a temperature responsive device 58. The temperature responsive device 58 has a wall 59 fixed to the housing part 30 and a movable wall 60 carrying the extension 57 for moving the valve member 56 toward and away from the valve seat 55 in relation to the temperature sensed by a temperature sensing bulb 61 disposed in the oven and interconnected to the interior of the temperature responsive device 58 by a conduit means 62.

As illustrated in FIGURES 2 and 3, the lever 54 has the end 63 thereof provided with an angled portion 64 having a slot 65 passing therethrough and receiving the extension 57 whereby the portion 64 can bear against the movable wall 60 of the temperature responsive device 58 for a purpose hereinafter described.

A valve seat member 66 is disposed in a bore 67 formed in the housing part 29 and sealed therein by an O ring 68, the valve seat member 66 defining an opening 69 therethrough. A ball valve 70 is urged to close the valve seat opening 69 by a compression spring 71 disposed between the ball valve 70 and a wall 72 of the housing part 29 in the manner illustrated in FIGURE 2.

The end 73 of the lever 54 has a projection 74 affixed thereto in any suitable manner, the projection 74 having an end 75 adapted to engage the ball valve 70 and having an annular outwardly directed shoulder 76.

A flexible diaphragm 77 is provided and has an outer periphery 78 disposed in a recess 79 of the housing part 29 and held in sealing relationship therewith by a compression spring 80 disposed between the diaphragm 77 and the end 73 of the lever 54.

The central portion of the flexible diaphragm 77 has an opening 81 passing therethrough and through which the projection 74 is snap fitted so that the flexible dia-

phragm 77 cooperates with the housing part 29 to define an inlet chamber 82 on one side of the valve seat member 66.

As illustrated in FIGURE 5, the inlet chamber 82 is interconnected to the manifold 13 by a passageway 83 opened and closed by the valve member 37. Thus, when the valve member 37 is disposed in its closed position, no fuel can issue from the manifold 13 to the passage 36 or 83. However, when the main valve 37 is moved to an on position thereof, the same interconnects the fuel manifold 13 to both the passageway 36 and the passageway 83 for a purpose hereinafter described.

The outlet chamber 67 on the downstream side of the valve seat 66 is interconnected to a pair of branch passageways 84 and 85 by a passageway 86 formed in the housing means 27 in the manner illustrated in FIGURE 5, the branch passageways 84 and 85 respectively leading to a bore 87 formed in the housing means 27 and receiving a pilot adjusting key or member 88 accessible from the exterior of the device 11. The branch passageway 85 has an orifice means 89 disposed therein for controlling low pressure gas in a manner hereinafter described.

The adjusting key 88 has an axial bore 90 formed therein and being disposed in communication with a passageway 91 formed in the housing means 27 and leading to the conduit 22 in the manner illustrated in FIGURE 5. The adjusting key 88 has a pair of transverse bores 92 and 93 formed therein in opposite directions and interconnecting the exterior of the key 88 with the internal bore 90 therein, the transverse bores 92 and 93 being alignable with the branch passageways 84 and 85 in a manner hereinafter described.

Another passageway 94 is formed in the housing means 27 and leads from the fuel supply passageway 34 at a point upstream from the valve means 37 to a pair of branch passageways 95 and 96 respectively alignable with the transverse bores 92 and 93 of the adjusting key 88 for a purpose hereinafter described. The passageway 94 passes through a suitable fuel filtering chamber 97 and has a natural gas orifice 98 disposed therein, the branch passageway 95 having a LP (liquefied petroleum) gas orifice 99 provided therein.

If desired, the fuel filtering chamber 97 can be interconnected to a pair of outlet ports 100 and 101 formed in the housing means 27 by a passage means 102 whereby the outlet ports 100 and 101 can be interconnected to the pilot burners for the top burners of the cooking apparatus or the like utilizing the control device 11, the passageway 102 having a flow adjusting key 103 disposed therein.

The controller pilot burner 21 as illustrated in FIGURES 1, 8 and 9 includes a bent conduit 104 having an outlet end 105 partially obstructed by a tang 106 whereby the elbow 107 in the conduit 104 and the tang 106 provide a turbulence of the fuel flowing out of the conduit end 105 to thoroughly mix the gas and air for proper ignition thereof. A flame shield 108 is provided and has an opening 109 through which the small flame 23 can burn. However, the flame shield 108 extends in alignment with the outlet end 105 to direct an increased flow of fuel out of the outlet end 105 downwardly to the free end 110 of the flame shield 108 so that the large flame 24 will be at the free end 110 of the flame shield 108 when an increased flow of fuel is provided through the conduit 104 in a manner hereinafter described.

The temperature sensing bulb 25 is carried by a pair of ears 111 and 112 of the flame shield 108 and is disposed transversely to the flow of fuel beyond the end 110 of the flame shield 108 so that the temperature sensing bulb 25 can sense when the large flame 24 is burning at the controller burner means 21 for the purpose previously described.

The operation of the controller system 10 of this invention will now be described.

When the control system 10 has natural gas being supplied in the manifold 13, it can be seen that even though the valve means 37 is disposed in its off position fuel is adapted to flow through the passage means 94 to the branch passage means 96 and out through the transverse bore 93 of the adjusting screw 88 to the controller pilot 21 when the adjusting key 88 is disposed in the position illustrated in FIGURES 5, 6 and 7.

This flow of fuel through the orifice 98 in the above manner permits the pilot burner means 21 to have the small flame 23 continuously burning once the same is ignited because regardless of the further action of the control device 11, the small flow of fuel to the controller pilot 11 remaining constant.

However, since the sources of natural gas vary in different regions of the country and the like, the adjusting key 88 can be rotated in the proper direction between the positions illustrated in FIGURES 6, 7 and FIGURES 6A, 7A to vary the interconnection between the transverse bore 93 of the adjusting key 88 and the branch passageway 96 to regulate the standby flame 23 of the controller pilot 21 so that the same will not inadvertently control the temperature sensing bulb 25.

When the adjusting key 88 is disposed in the position illustrated in FIGURES 6B and 7B, it can be seen that the branch passage 96 is prevented from being in communication with the controller pilot 21 so that no fuel can issue therefrom until the adjusting key 88 is disposed in one of its operating positions.

With the adjusting key 88 disposed in one of its positions between FIGURES 6, 7 and FIGURES 6A, 7A, it can be seen that the standby flame 23 at the control pilot 21 will remain constant.

The operator then turns the control knob 40 from its off position toward a desired temperature setting thereof, the initial rotation of the control knob 40 rotating the valve member 37 to interconnect the passage 34 with the passages 36 and 83 for a purpose hereinafter described.

As the control knob 40 is being rotated to its selected on position, the tubular member 44 is rotated therewith and, through its threaded relation with the threaded member 45, moves to the left in FIGURE 2 to permit the fulcrum pin 49 to move to the left therewith as a compression spring 113 is disposed between the end 73 of the lever 54 and the housing part 30 in the manner illustrated in FIGURE 2 whereby the fulcrum pin 49 will be disposed in a particular axial position thereof when the control knob 40 is set at its selected temperature setting.

At this time, since the temperature sensing bulb 61 is sensing a temperature below the selected temperature, the movable wall 60 thereof is disposed in such a position that the valve member 56 is disposed in an open position and the lever 54 is pivoted in such a manner by the compression spring 113 that the same opens the ball valve 70 so that fuel can flow from the passageway 83 to the passageway 86 leading to the branch passageway 84. Since the adjusting key 88 is disposed somewhere at or between the positions illustrated in FIGURES 6 and 6A, it can be seen that the increased flow of fuel through the passageway 86 will now enter the transverse bore 92 of the adjusting key 88 and be added to the flow of fuel through the transverse bore 93 whereby the increased flow of fuel to the controller pilot burner 21 will cause the large flame 24 to exist as long as the ball valve 70 is disposed in an open position thereof.

Since a large flame 24 now exists at the controller pilot 21, the temperature sensing bulb 25 senses the presence of the flame 24 and snaps open the valve member 19 of the safety valve 16 whereby fuel can flow through the opened valve member 56 and the open valve member 19 to the main burner means 12 to be ignited by the large flame 24 at the controller pilot 21.

The main burner means 12 continues to have fuel directed thereto in the above manner until the temperature sensing bulb 61 senses that the temperature of the oven is at or above the temperature selected by the control knob 40 whereby the movable wall 60 of the condition responsive means 58 has moved to the left in FIGURE 2 such a distance that the ball valve 70 is moved to its closed position and terminates the supply of fuel to the passageway 86 so that the large flame 24 ceases to exist at the controller pilot 21 and only the small flame 23 is provided in the above manner. When the large flame 24 ceases to exist at the controller pilot 21, the condition responsive means 27' snaps closed the valve member 19 of the safety valve 16 to terminate the supply of fuel to the main burner means 12.

Thus, should the temperature of the oven again fall below the selected temperature, the movable wall 60 of the condition responsive means 58 has moved to the right in FIGURE 2 such a distance that the ball valve 70 is again opened so that a large flame 24 can exist at the controller pilot 21 to open the valve member 19 of the safety valve 16 and permit fuel to issue from the main burner means 12.

Thus, it can be seen that the main burner means 12 will be cycled between its on and off positions by means of the controller pilot burner 21 to maintain the temperature of the oven at the selected temperature.

However, if for some reason the control device 11 is malfunctioning so that the ball valve 70 will not close when the temperature responsive device 58 senses a temperature above the selected temperature and the temperature of the oven should exceed a safe limit for the oven, the movable wall 60 of the condition responsive means 58 will move to the left in FIGURE 2 such a distance that the valve member 56 will be disposed against the valve seat 55 to prevent the flow of fuel to the main burner means 12 if such a runaway condition should ever exist.

When the control knob 40 is disposed in its "broil" position, the fulcrum pin 49 is axially moved to the left to such a distance that the lever 54 will not permit the valve member 70 to be closed until the condition responsive means 58 senses a temperature of approximately 650° F. in the oven. However, before the condition responsive means 58 will move the valve member 70 to the closed position during the broiling operation, the movable wall 60 of the condition responsive means 58 is moved to the left such a distance that the valve member 56 tends to throttle down the flow of fuel through the valve seat 55 so that the temperature of the oven in its broil position will never tend to exceed approximately 625° F. whereby a continuous flame broiling is provided in the oven by the control device 11 of this invention.

However, should a runaway condition exist, the valve member 56 will seat against the valve seat 55 to terminate the flow of fuel to main burner means 12 in the manner previously described.

When it is desired to turn off the control device 11, the control knob 40 is rotated toward its off position whereby when the control knob 40 approaches its off position, the valve member 37 is rotated to its off position to terminate the flow of fuel to the passage means 83 and 36. However, the small flame 23 continues to burn at the controller pilot 21 as the passage 94 is not closed.

As the control knob 40 is being rotated to its off position, the same causes the tubular member 44 to further thread into the tubular member 45 to axially move the fulcrum pin 49 to the right in FIGURE 2 to such a distance so that regardless of the temperature being sensed by the temperature sensing bulb 61, the lever 54 will be disposed in a position where the ball valve 70 will be disposed against the valve seat 66.

Therefore, it can be seen that the control system 10 of this invention includes many novel features wherein

the control device 11 can be rapidly and substantially automatically assembled together to provide the novel arrangement previously described.

When it is desired to utilize the control device 11 with LP gas, the adjusting key 88 is rotated to the position illustrated in FIGURES 6C and 7C whereby the transverse bore 92 of the adjusting key 88 is in communication with the passageway 95 and the transverse bore 93 of the adjusting key 88 is disposed in communication with the passageway 85.

In this position of the adjusting key 88, it can be seen that the source 13 of LP gas is directed by the passageway 98 through the orifice 99 to the transverse bore 92 of the adjusting key 88 to flow out the controller pilot 21 to produce the small flame 23. When the ball valve 70 is subsequently opened to provide the large flame 24 at the controller pilot 21 in the manner previously described, it can be seen that the flow of fuel from the passageway 83 through the opened valve seat 66 is directed by the passage 86 through the LP gas orifice 89 into the passageway 85 leading to the transverse bore 93 of the adjusting key 88 whereby an increased flow of fuel will be directed to the controller pilot 21 to produce the large flame 24.

Should it be desired to adjust the large flame 24 of the controller pilot 21 when the LP gas is being utilized, the adjusting key 88 can be adjusted between the positions illustrated in FIGURES 7C and 7D to vary the amount of fuel being supplied through the passageway 85 to the transverse bore 93 of the adjusting key 88 to control the size of the large flame 24.

Thus, it can be seen that the adjusting key 88 is adapted to adjust the small or standby flame 23 of the controller pilot 21 when natural gas is being utilized and is also adapted to adjust the large flame or heater flame 24 at the controller pilot 21 when LP gas is being utilized.

For example, a tremendous variation in natural gas pressures makes it necessary to be able to adjust the standby pilot flame 21 to be able to avoid runaway to broil in high pressure areas and still not over compromise low pressure performance at the fixed setting. Thus, the adjustment of the key 88 for the natural gas source merely adjusts the standby flame 21 and not the heater flame 24.

Conversely, LP gas sources do not have the big variation in pressures, so it becomes important to be able to adjust the heater flame 24 for trailer requirements and the like, the adjustment of the heater flame 24 for LP gas taking place without adjustment of the standby flame 21 for LP gas.

Therefore, it can be seen that not only does this invention provide an improved control device and system, but also this invention provides improved parts for such a control device or system.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. In a control system having a main burner means, said system having a pilot burner means and a source of fuel, said system having control means for connecting and disconnecting said source of fuel to and from said main burner means, first passage means for interconnecting said source of fuel to said pilot burner means to produce a small standby flame at said pilot burner means, second passage means for additionally interconnecting said source of fuel to said pilot burner means to produce a large heater flame at said pilot burner means, and a single adjusting means in said passage means for adjusting the flow rate therethrough to selectively control the size of said standby flame and the size of said heater flame, said control means disconnecting said source of fuel from said

main burner means only when a standby flame is burning at said pilot burner means and interconnecting said source of fuel to said main burner means when a heater flame is burning at said pilot burner means.

2. In a control system as set forth in claim 1, a valve means for controlling the interconnection of said source of fuel to said adjusting means through said second passage means.

3. In a control system having a main burner means, said system having a pilot burner means and a source of fuel, said system having control means for connecting and disconnecting said source of fuel to and from said main burner means, first passage means for interconnecting said source of fuel to said pilot burner means to produce a small standby flame at said pilot burner means, second passage means for additionally interconnecting said source of fuel to said pilot burner means to produce a large heater flame at said pilot burner means, and a single adjusting key in said passage means for adjusting the flow rate therethrough to selectively control the size of said standby flame and the size of said heater flame, said control means disconnecting said source of fuel from said main burner means when only a standby flame is burning at said pilot burner means and interconnecting said source of fuel to said main burner means when a heater flame is burning at said pilot burner means.

4. In a control system as set forth in claim 3, a valve means for controlling the interconnection of said source of fuel to said adjusting key means through said second passage means.

5. In a control system having a main burner means, said system having a pilot burner means and a source of fuel, said system having control means for connecting and disconnecting said source of fuel to and from said main burner means, a housing means having a bore rotatably receiving a hollow adjusting key having the interior thereof interconnected to the exterior thereof by two transverse bores, said housing means having means interconnecting said interior of said key with said pilot burner means, said housing means having first passage means for interconnecting said source of fuel to either one of said bores to produce a small standby flame at said pilot burner means, said housing having second passage means for additionally interconnecting said source of fuel to either one of said bores to produce a large heater flame at said pilot burner means, said adjusting key being adapted to selectively control the size of said standby flame and the size of said heater flame, said control means disconnecting said source of fuel from said main burner means when only a standby flame is burning at said pilot burner means and interconnecting said source of fuel to said main burner means when a heater flame is burning at said pilot burner means.

6. In a control system as set forth in claim 5, a thermostatically operated valve means carried by said housing means and disposed in said second passage means between said source of fuel and said adjusting key.

7. In a control system having a main burner means, said system having a pilot burner means and a source of fuel, said system having control means for connecting and disconnecting said source of fuel to and from said main burner means, a housing means having a bore rotatably receiving a hollow adjusting key having the interior thereof interconnected to the exterior thereof by two transverse bores, said housing means having means interconnecting said interior of said key with said pilot burner means, said housing means having first passage means for interconnecting said source of fuel to said bore of said housing means, said first passage means having a pair of ends each being selectively alignable with said bores of said key to produce a small standby flame at said pilot burner means, said housing means having second passage means for additionally interconnecting said source of fuel to said bore of said housing means, said second passage means having a pair of ends each being selectively align-

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able with said bores of said key to produce a large heater flame at said pilot burner means, said adjusting key being adapted to selectively control the size of said standby flame and the size of said heater flame, said control means disconnecting said source of fuel from said main burner means when only a standby flame is burning at said pilot burner means and interconnecting said source of fuel to said main burner means when a heater flame is burning at said pilot burner means. 5

8. In a control system as set forth in claim 7, a natural gas orifice means disposed in said second passage means between said source of fuel and said ends thereof. 10

9. In a control system as set forth in claim 7, an LP gas orifice means disposed in one of said ends of said first passage means.

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10. In a control system as set forth in claim 7, an LP gas orifice means disposed in one of said ends of said second passage means.

References Cited

UNITED STATES PATENTS

928,898	7/1909	Boyse	67—16
1,921,778	8/1933	Roberts	158—115
2,582,582	1/1952	Bottom	158—118
2,664,153	12/1953	Swenson	158—115 X
3,159,202	12/1964	Weber	158—115

EDWARD J. MICHAEL, *Primary Examiner.*