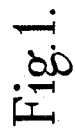
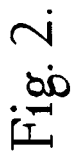


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F. J. KINDL

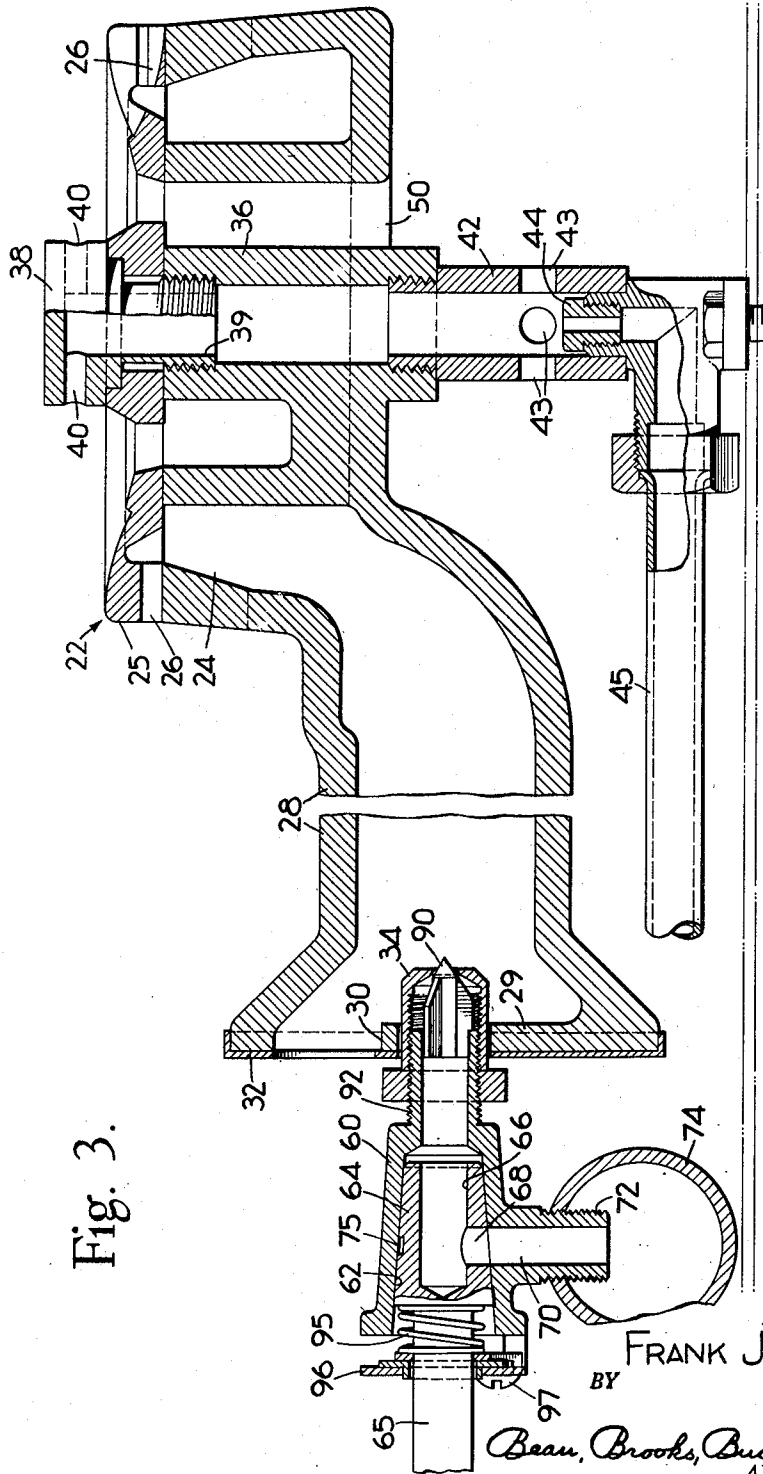
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Fig. 3.



INVENTOR.

FRANK J. KINDL

BY

Bean, Brooks, Buckley & Bean
ATTORNEYS

Feb. 19, 1957

F. J. KINDL

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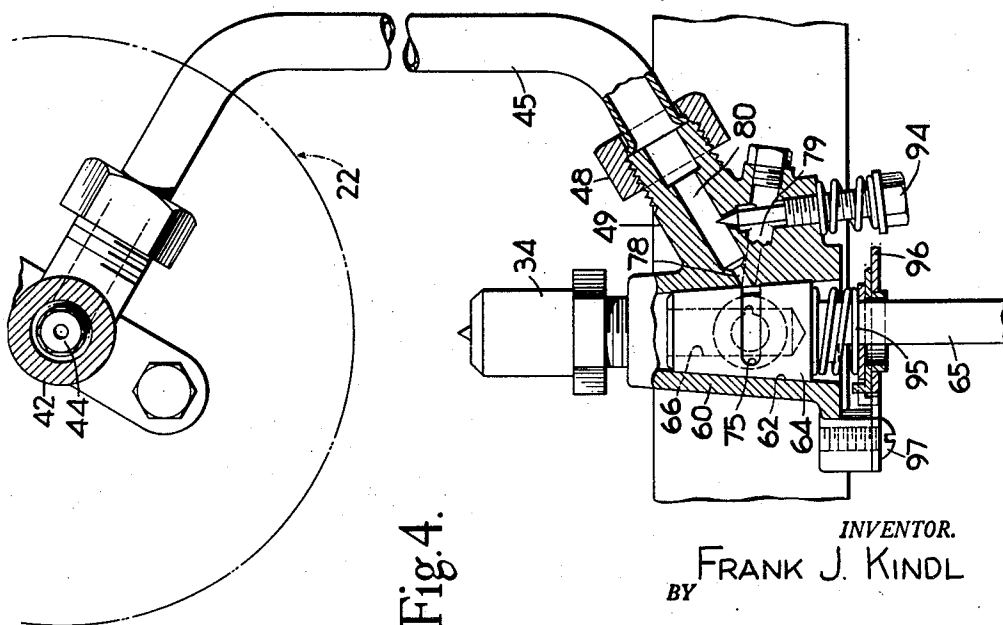


Fig. 4.

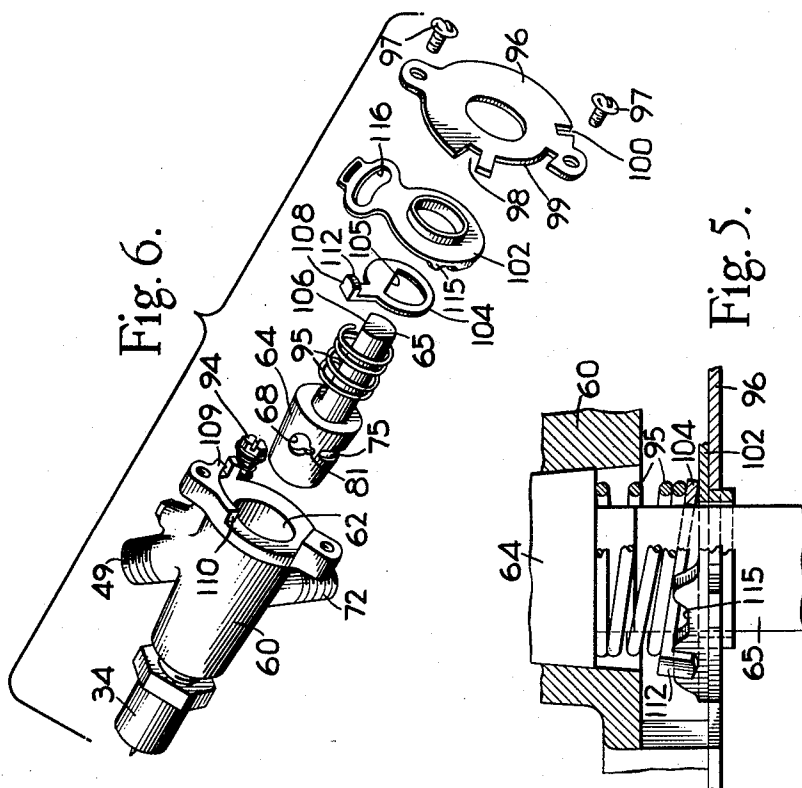


Fig. 6.

Fig. 5.

INVENTOR.
BY FRANK J. KINDL

Bean, Brooks, Buckley & Bean.
ATTORNEYS

Feb. 19, 1957

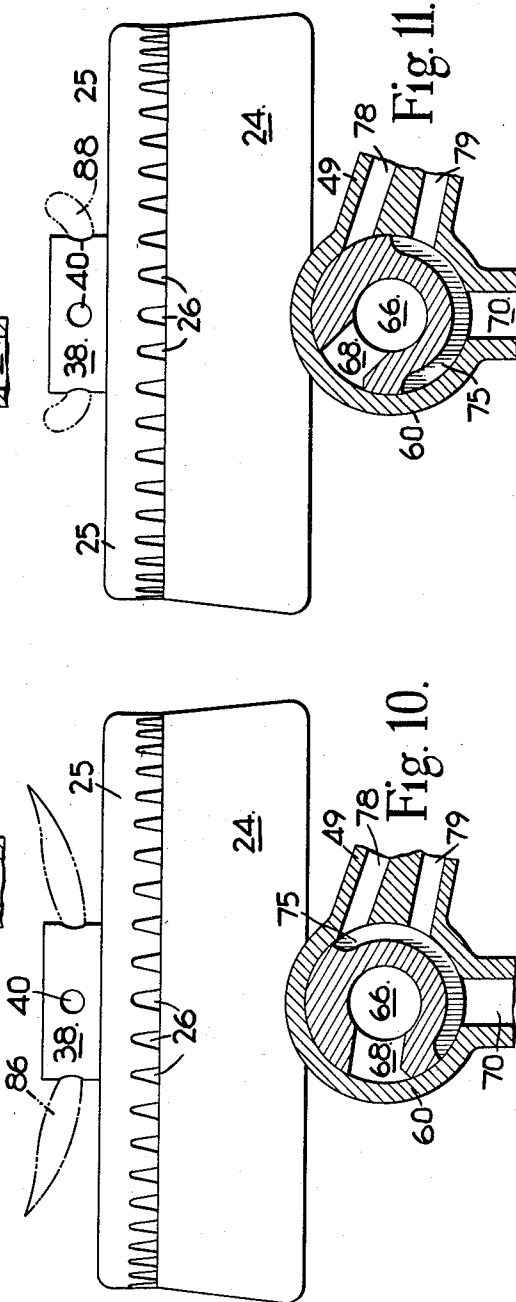
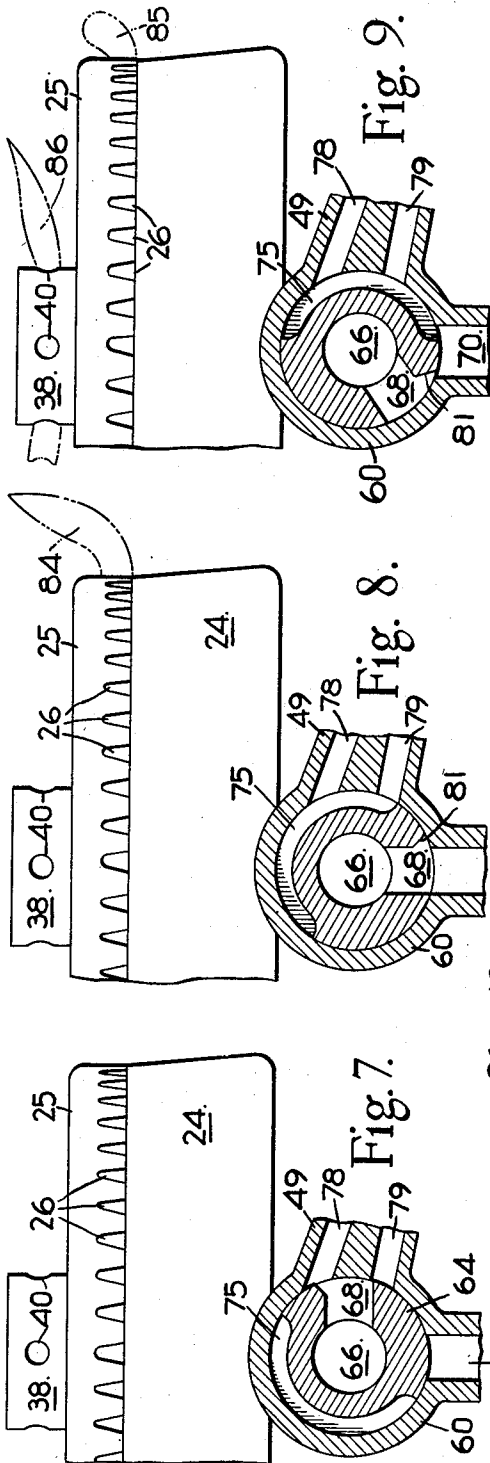
F. J. KINDL

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INVENTOR.
FRANK J. KINDL
BY
Bean, Brooks, Buckley & Bean.
ATTORNEYS

Feb. 19, 1957

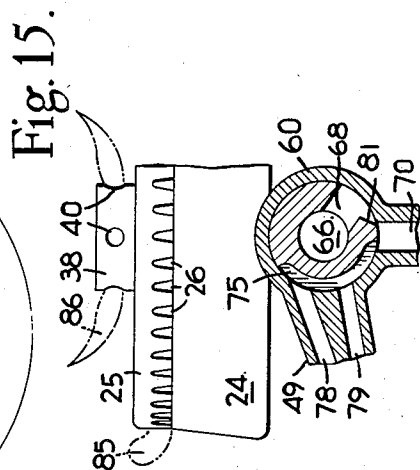
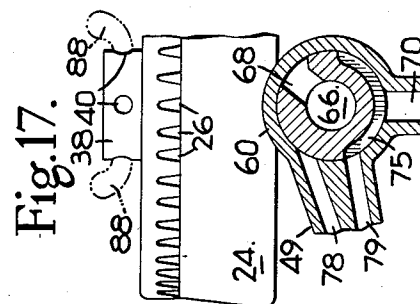
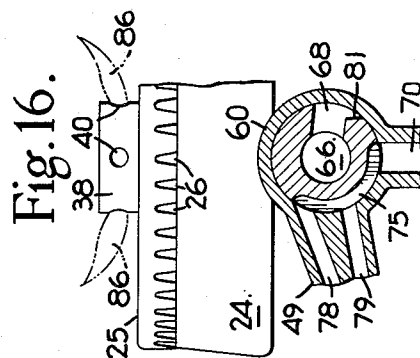
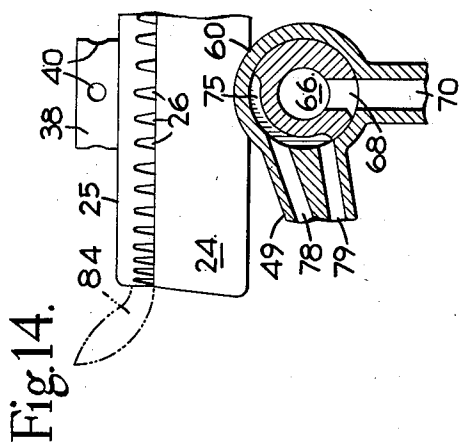
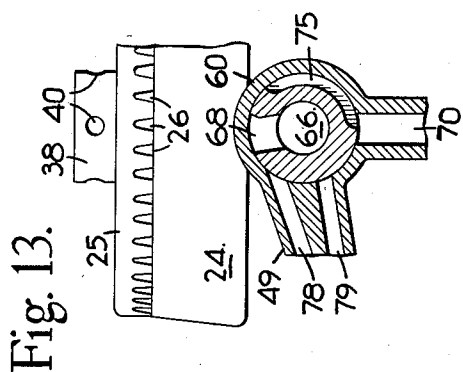
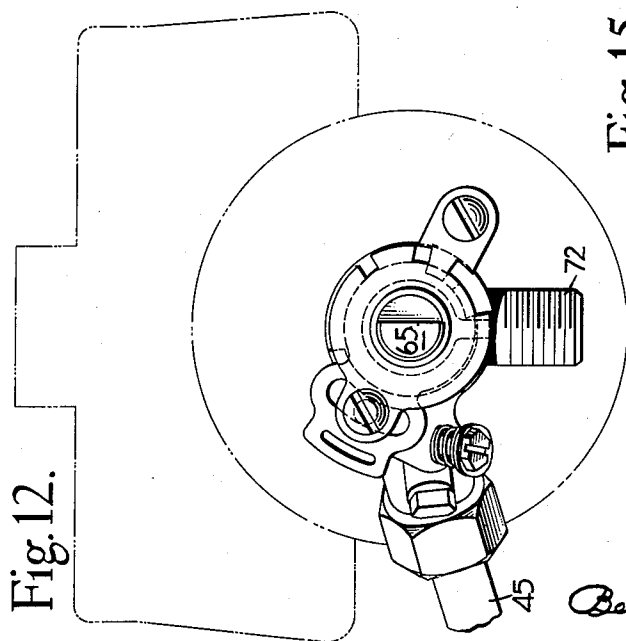
F. J. KINDL

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Filed Jan. 26, 1952

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INVENTOR.
FRANK J. KINDL
BY

Bean, Brooks, Buckley & Bean
ATTORNEYS

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GAS RANGE BURNER CONTROL

Frank J. Kindl, Cleveland, Ohio, assignor to The W. J. Schoenberger Co., Cleveland, Ohio

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2 Claims. (Cl. 137—599)

This invention relates generally to gas flame control, and more particularly to improvements in gas cooking range burners and control valves therefor.

One of the objects of the present invention for example is to provide an improved dual outlet gas range top burner and control valve therefor; the control valve being manually adjustable from "off" position through a sequence of variable heat output positions consonant with cooking heat change progressions such as are preferable in typical cooking procedures.

It is another object of the invention to provide an improved multiple outlet gas burner and control valve arrangement providing an improved variable flame distribution pattern sequence responsive to straight-line adjustment of the valve control means.

Another object of the invention is to provide an improved gas burner control valve mechanism as aforesaid, embodying suggestive "snap" positioning means for the control device at various typical control stations thereof without interference with full range fine adjustments therebetween.

Another object of the invention is to provide in a gas burner arrangement as aforesaid, an improved valve device which is relatively simple in construction and readily interchangeable with other type valves in present use.

Another object of the invention is to provide in a gas burner arrangement as aforesaid an improved valve device providing a plurality of suggested operating positions which are relatively disposed so as to coincide with cooking heat change sequences such as are usually preferred in cooking operations; the valve action being "snap" controlled so that the user need not search for each next desired changed valve position.

The invention contemplates provision of a novel gas control valve and a concentric dual ring type burner arrangement which may be so designed in one form that when the valve is turned away from "off" position it arrives first at a maximum heat position whereby full gas supply is delivered in horizontal radial directions through the larger outside burner ring, such as is desirable for heavy duty cooking. Then, upon further rotation of the control valve a second control position is reached whereby a reduced supply of gas issues from the outer ring burner while a full supply of gas is permitted to issue from the inner ring burner portion of the unit. This provides a relatively evenly distributed flame effect over the entire burner unit area which is desirable for reduced temperature cooking and/or frying for example. Then upon further rotation of the valve device the supply of gas to the outer burner is entirely cut off, while a full supply of gas is still delivered to the central burner to provide a localized concentrated heating effect over a smaller cooking area. Finally, upon still further rotation of the valve member in the same direction the gas supply to the central burner is sharply reduced while the outer burner remains idle for "simer" or "keep warm" operation. Preferably, snap means are provided to operate automatically to guide the user by "signal clicks" to

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the various typical control positions above described; and the various valve mechanisms of the device are adjustable so as to provide for fine regulations of the valve action without need of special tools or a special skill on the part of the user.

In the accompanying drawing:

Fig. 1 is a fragmentary top perspective view of a gas range, with portions broken away to show installation of a burner-valve unit of the invention therein;

Fig. 2 is a fragmentary front end elevation, on a larger scale, of the control valve and burner unit of Fig. 1;

Fig. 3 is a fragmentary section, taken along lines III—III of Fig. 2;

Fig. 4 is a fragmentary section, taken along lines IV—IV of Fig. 2;

Fig. 5 is a fragmentary sectional view of the valve stem snap action control mechanism thereof;

Fig. 6 is an "exploded" view of elements of the valve structure per se;

Fig. 7 is a fragmentary sectional view of the valve and elevation of the burner of Figs. 1–6, with the valve shown in "off" position;

Fig. 8 is a view corresponding to Fig. 7 but showing the valve in the first "on" or "high heat" position, with the corresponding burner flame illustrated thereon;

Fig. 9 is a view corresponding to Figs. 7–8, but showing the unit in "second" or evenly distributed heating position;

Fig. 10 is a view corresponding to Figs. 7–9 showing the unit in "third" or further reduced "spot heating" position;

Fig. 11 is a view corresponding to Figs. 7–10, but showing the unit in "keep warm" position;

Fig. 12 is a view corresponding to Fig. 2, but of a modified form of valve of the invention; and

Figs. 13–17 inclusive, correspond respectively to Figs. 7–11, and show the unit of Fig. 12 under various conditions of valve adjustment.

The invention is illustrated in Figs. 1–6 as being embodied in a gas range burner unit such as might be mounted within a gas range cabinet as indicated generally at 20 (Fig. 1). The burner unit is indicated generally at 22, and is illustrated to comprise a standard concentric two ring type burner consisting of an annular chamber portion 24 topped by an annular cover plate 25 formed with radially directed ports 26 for delivery of gas-air mixtures in radially horizontal directions under the cooking vessel. The chamber 24 is in communication with a mixing tube 28 leading forwardly toward the valve device of the invention and terminating in a funneled front end portion having a front wall 29 apertured as indicated at 30 and covered by a rotatable shutter plate 32. The end wall portion 29 is centrally apertured to receive in slip-fitted relation therethrough the adjustable hood 34 of the main gas delivery nipple portion of the valve device of the invention, as will be explained more fully hereinafter. Thus, it will be understood that gas delivered through the hood 34 into the interior of the mixing tube 28 will then flow through the annular chamber portion 24 of the burner to find exit through the ports 26, while primary air for combustion of the gas will be drawn through the opening in the shutter 32 and into the conduit 28 to be therein mingled with the gas prior to discharge thereof through the ports 26.

The burner device 22 is also formed centrally thereof with an upstanding cylindrical sleeve portion 36 (Fig. 3) into the top end of which is screwthreaded a cap screw 38; the cap screw 38 being axially bored as indicated at 39 and radially drilled as indicated at 40 to provide multiple radial ports therearound in open communication with the interior of the sleeve portion 36. A second sleeve 42 is screwthreaded into the lower end of the sleeve 36 and

is apertured as indicated at 43 to permit ingress of air from externally thereof. A gas inlet jet device 44 is fitted into the lower end of the sleeve 42 for delivery thereinto of gas from a conduit 45 leading to a connection as indicated at 48 with the secondary gas outlet nipple portion 49 of the valve of the invention, as will be explained more fully hereinafter. Thus, it will be appreciated that upon delivery of gas through the tube 45, it will flow upwardly and out through the ports 40, carrying with it some primary air infedding through the ports 43, to provide a centrally disposed "spot" flame area inside the ring of flame provided by the outer ring burner comprising the ports 26. An annular opening 50 up through the burner unit around the sleeve 36 permits flow of air upwardly through the burner unit to provide supplementary secondary air for the gas flames.

As shown in Figs. 1-6, the valve of the invention comprises a generally cylindrical body 60 having a tapered axial bore 62 in which is placed a tapered plug 64 carrying integrally therewith a stub shaft or control stem portion 65. The plug 64 is axially bored as indicated at 66 from the inner end thereof, and also is formed with a lateral branch bore 68. The gas inlet portion of the valve casing is formed with an inlet port 70 which is arranged in registry with the path of rotation of the port 68 in the valve plug, and one of the side walls of the branch bore is cut away as indicated at 81 in Fig. 9 for partial registration with said inlet port. The inlet port portion 72 is embodied in a threaded nipple as indicated at 72 (Figs. 3 and 6) for threaded connection into the gas supply manifold pipe 74 of the gas range. Thus, it will be appreciated that upon rotation of the valve plug 64 to such position as to intercommunicate the port 68 thereof with the gas inlet port 70, gas will be let through the plug and through the hood 34 into the main burner mixing tube 28 as explained hereinabove.

The valve plug 64 is also peripherally grooved as indicated at 75 in line with the secondary gas port portion 49 of the valve body, when the plug 64 is rotated therein. As shown in Figs. 4, 7-11, the port portion 49 of the valve body is formed with peripherally spaced gas ports 78-79 leading from the tapered bore 62 of the body to a common port 80 which is in turn in communication with the conduit 45 leading to the central burner ports 40. Thus, it will be appreciated that whenever the valve plug 64 is turned to the position within the valve casing 60 as indicated in Fig. 7, the gas inlet port 70 is closed so that no gas may enter the valve device, and thus Fig. 7 illustrates the valve device in its "off" position. However, as indicated by Fig. 8, upon rotation of the valve plug 64 in clockwise direction through approximately 90°, the port 68 of the valve plug is thereby brought into registry with the inlet port 70 so that gas enters the inner bore of the plug and then passes through the hood 34 into the conduit 28 leading to the outer burner ports 26. Under this condition the ports 26 are furnished full gas supply whereby the flames at the ports 26 will be of maximum size as indicated at 84 (Fig. 8).

Then, upon further rotation of the valve plug in clockwise direction as to the position thereof shown in Fig. 9, the port 68, by virtue of the cut-away portion 81 thereof as well as the groove 75, will be in flow communication with inlet port 70 so that fuel will flow not only to the outlet ports 78 and 79 but also to the port 68. Thus, under this condition of adjustment of the valve plug the main burner ports 26 are substantially throttled so that the flames issuing therefrom will be of greatly reduced size such as indicated at 85, while the inner burner ports 40 are given full supply of gas so that flames issuing therefrom are full size such as indicated at 86 (Fig. 9). This provides a substantially uniform and wide spread flame pattern for moderated heating such as is particularly suited for frying purposes or the like. Then, upon still further rotation of the valve plug in clockwise direction as to the position thereof shown in Fig. 10, the port 68

of the valve plug will be entirely excommunicated from the inlet port 70 so that the main burner ports 26 are entirely "off" while the groove 75 still intercommunicates the inlet port 70 and the outlet ports 78-79 so that the central burner ports 40 are supplied with full gas supply. Hence, under this condition of valve adjustment the burner supplies a centrally concentrated "spot" type heating pattern such as is particularly useful in other types of cooking.

Finally, still further rotation of the valve plug in clockwise direction as to the position thereof indicated in Fig. 11 will cause the main supply port 68 of the plug to remain out of communication with the gas supply while the groove portion 75 of the plug now interconnects the gas supply port 70 with only the secondary gas outlet port 79. Thus, under this condition of the valve adjustment it will be appreciated that the central burner ports 40 will be supplied only with a much reduced gas supply, whereby flames of reduced size such as are indicated at 88 will issue therefrom. This setting of the valve device will provide a burner operation particularly suited to "simmer" or "keep warm" type operation.

As illustrated in Figs. 1, 3, 4, 6, the gas discharge hood portion 34 of the valve member is conveniently provided with a needle valve device as indicated at 90 disposed to extend through the discharge orifice of the hood, whereby screwthreaded adjustment of the hood upon the threaded nipple portion 92 of the valve casing will provide fine adjustments of the gas pressure and volume flow into the main burner whenever the valve plug bore 66 is brought into communication with the valve inlet port 70. Also, as indicated at 94, a needle valve device may be conveniently screwthreaded into the valve body so as to control flow of gas from the gasway 79 into the common gasway 80, thereby providing for fine adjustments of the gas pressure and volume flow into the burner ports 40 under "simmer" conditions. Thus, it will be appreciated that simple screwthreaded adjustments of the hood 34 and of the needle valve 94 may be made without special skill or tools for the purpose of adjusting the burner devices to provide desired heating effects under different gas pressure and gas quality conditions.

To maintain the valve plug 64 in firmly seated position in the tapered body bore, a compression spring 95 is fitted over the valve stem 65 to bear at one end against the plug body 64. A face plate 96 is screwed to the valve body as indicated at 97, and is formed with peripheral notches 98, 99, 100, respectively (Fig. 6). An adjusting washer 102 is mounted inside of the face plate 96 and in front of a click washer 104 which is formed with a D-shaped opening as indicated at 105 (Fig. 6) to cooperate with a flatted portion 106 of the valve stem 65, so that the click washer 104 will rotate with the valve stem. Thus, the spring 95 performs a double function in that it maintains a predetermined pressure on the plug for proper seating thereof in the valve body, while at the same time it enables the click washer to tilt relative to the fixed cover plate 96 as the valve device is rotated from one operative position to another. The click washer 104 is provided with a radially extending arm 108 for cooperation with the notches 98, 99, 100 and opposed abutment portions 109-110 (Fig. 6) formed on the valve body, whereby rotation of the click washer is limited to a range of positions between the abutments 109-110; the parts being so dimensioned and arranged that when the washer arm 108 is against one of the abutments the valve is in "off" position. Then when the valve stem is moved through the successive operative positions described hereinabove to the final "keep heat" position the washer arm 108 is thereupon disposed against the opposite abutment portion of the valve casing. As shown at 112, the turned end portion of the click washer arm is rounded so that it may ride up out of the notches formed in the face plate 96 and risers 115 are provided on the inside face of the washer 102 to assist this action of the click

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washer. Thus, upon rotation of the valve stem the operator is given an automatic "feel" signal as to the proper position for the valve stem whenever it is desired to set the valve at one or another of the various operative positions referred to hereinabove. The washer 102 is adjustably mounted, by means of an arcuately slotted portion 116 thereof through which one of the mounting screws 97 extends, as shown in Fig. 2. Thus, fine adjustments of the valve "click" mechanism may be provided, as may be required upon installation of the device.

It will of course be appreciated that the valve device of the present invention may incorporate, if desired, various other useful features. For example, the valve control stem and plug unit may be of the two piece type having a spring device therebetween and detent lock means whereby whenever the valve stem is turned to any predetermined position, such as to the position thereof shown in Fig. 8, the stem will automatically lock in that position until such time as the operator may manually depress the control handle inwardly of the stem to disengage the locking mechanism preliminary to further turning of the valve. Such an arrangement might be useful for example in order to hold the valve device in the position of Fig. 8 for a sufficient length of time to insure lighting of the gas issuing from the jets 26, as from a pilot light device stationed nearby. Thus, the possibility that the valve might be quickly turned through the position of Fig. 8 and to the position of Fig. 10 without lighting of the issuing gas, would be precluded.

Figs. 12-17 illustrate another form of the valve device of the invention. In this case, the valve plug and valve casing parts are so dimensioned and relatively arranged so that beginning from the "off" position as illustrated in Fig. 13, the valve stem may first be turned in clockwise direction through approximately 190° to the position of Fig. 14 in order to furnish full gas supply to the main outer burner ports 26 while the inner burner element is "off." Then, the valve stem may be turned in counterclockwise direction through approximately 50° so as to bring the main outer burner to "low" operation while the center burner is in "full" operation as shown in Fig. 15. Then, further counterclockwise turning of the valve stem through another 30° or so will bring the valve device to a position as shown in Fig. 16 at which time the main burner will be in its "off" position while the central burner will be on full. Then, further counter-clockwise rotation of the valve member as to the position shown in Fig. 17 will reduce the operation of the center burner to "low" while the main burner remains "off." Then, still further counter-clockwise rotation of the valve device will return it to the position shown in Fig. 13, whereby the entire burner unit is "off."

I claim:

1. In a fluid control valve of the type described, a body having a tapered axial bore therein and provided at one end with a discharge outlet for connection to a main burner, a tapered plug rotatably received within said bore and having an axial recess therein opening at one end in communication with said discharge outlet, said plug having a radial inlet passage communicating with said recess and being provided with an elongate groove in its outer

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surface starting in a predetermined circumferentially spaced relation from said radial inlet passage and extending away therefrom through a predetermined circumferential extent of said plug so that one end of said groove is disposed closer to said radial inlet passageway than is the opposite end of said groove, said body having an inlet passageway, a first discharge passageway and a second discharge passageway, all opening upon the surface thereof defining said tapered bore and in circumferentially spaced relation to each other, said radial inlet passageway and elongate groove in the plug and said inlet passageway, first and second discharge passageways in the body all being disposed substantially within the same plane, said body having a second discharge outlet with which said first and second discharge passageways communicate for connection to a secondary burner, the spacing between said first and second discharge outlets and said inlet passageway in the body being so related to the length of said groove that said groove simultaneously places the first and second discharge passageways in flow communication with said inlet passageway in one position of said plug, the spacing between said one end of the groove from said radial inlet passageway being less than either the width of said inlet passageway in said body or the spacing between such inlet passageway and said first discharge passageway next adjacent thereto so that in another position of said plug, said inlet passageway in the body will be in communication with said first and second discharge passageways and said radial inlet passageway in the plug, and the spacing between said opposite end of the groove and said radial inlet passageway being greater than the width of said inlet passageway in the body so that in a further position of said plug, the valve will be closed.

2. In a fluid control valve as defined in and by claim 1 wherein said first discharge passageway is provided with a regulating valve for selectively controlling the fuel flowing therethrough.

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