

Oct. 9, 1956

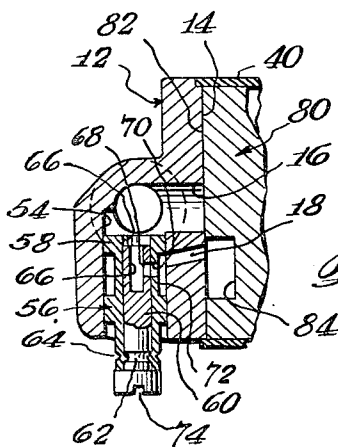
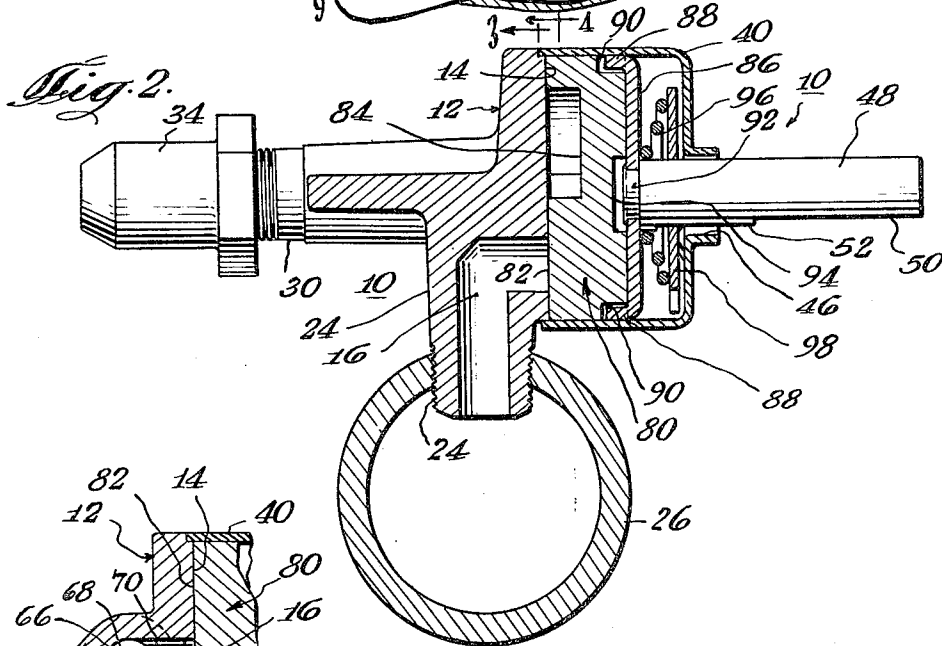
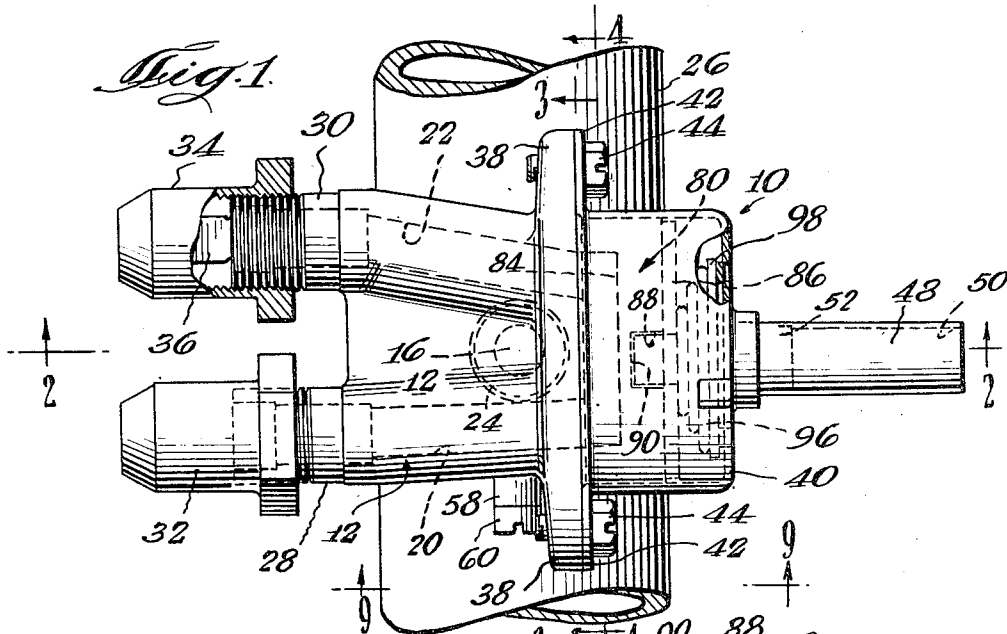
F. H. BERGQUIST

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GAS VALVES

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2 Sheets-Sheet 1



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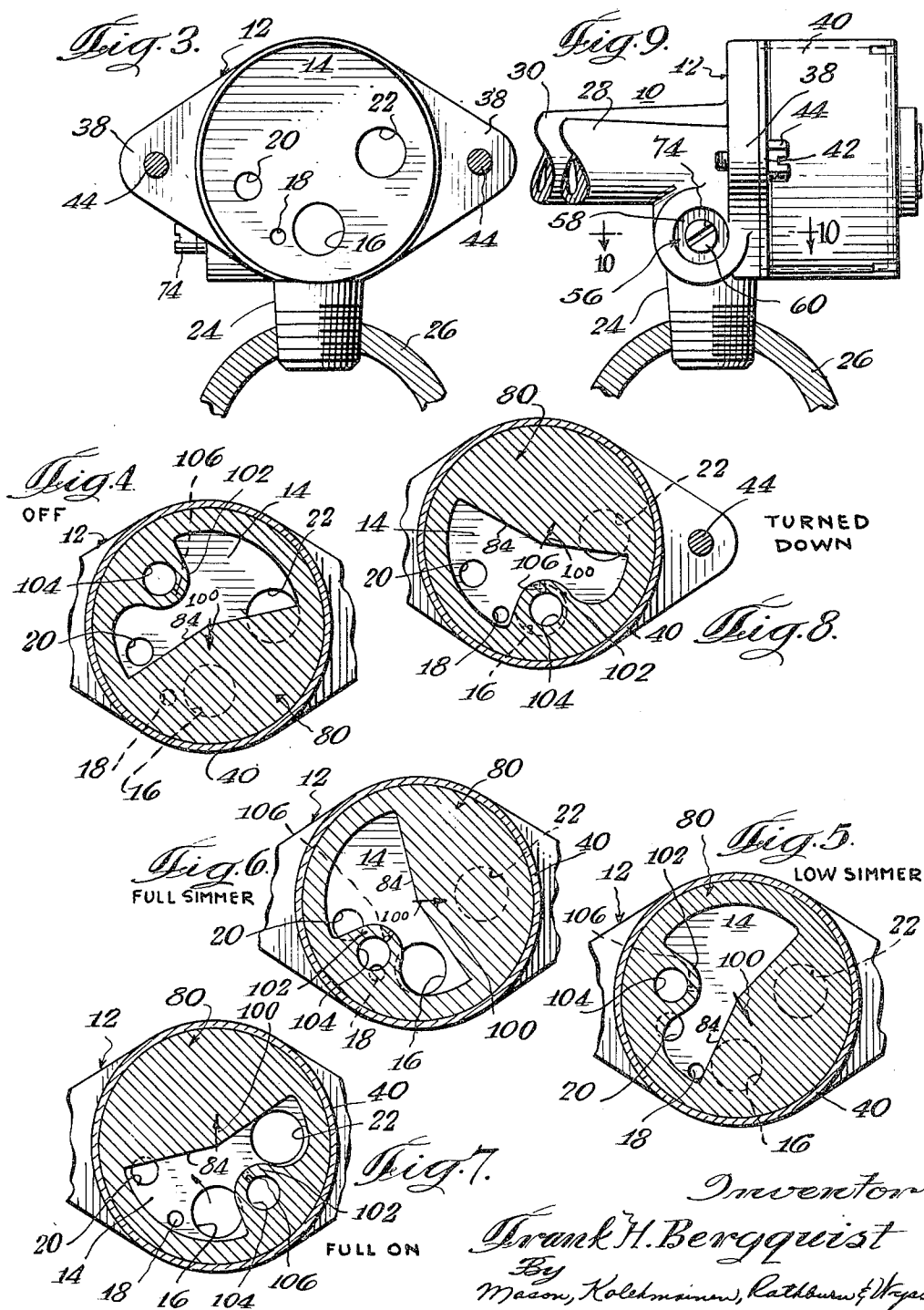
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GAS VALVES

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2 Sheets-Sheet 2



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2,765,810

GAS VALVES

Frank H. Bergquist, Chicago, Ill., assignor of one-fourth to Philip S. Harper, one-fourth to Carolyn L. Harper, and one-fourth to Harris Trust and Savings Bank, Chicago, Ill. (an Illinois banking corporation), as trustee of The Philip S. Harper Trust, and one-fourth to said Harris Trust and Savings Bank as trustee of The Carolyn L. Harper Trust

Application September 1, 1951, Serial No. 244,796

3 Claims. (Cl. 137—625.12)

The present invention relates to gas valves and especially to so called double gas valves, i. e., valves used with gas burners having two burner sections and wherein a single valve unit controls both burner sections. Burners of this type are called double burners and one of the burner sections is called the main burner and the other is called the simmer burner.

It is an object of the present invention therefore, to provide a new and improved valve for a double gas burner which is simple and compact, inexpensive to manufacture, and which provides desired operating conditions including a regulatable supply of gas to both burners and, preferably, to the simmer burner only, and full and predetermined low quantities of gas to the simmer burner only.

It is another object of the present invention to provide a new and improved double gas valve of the disk type including means for supplying a regulatable quantity of gas to the simmer burner only, a predetermined low quantity of gas to the simmer burner only, and simultaneously regulatable quantities to both the main and simmer burners.

Another object of the present invention is the provision of a new and improved rotating disc type valve for double gas burners which is capable of providing uniform turn down of the simmer and main burners including means for gradually closing, in a turn down range, the gas inlet passageway before the passageways to the main and simmer burners are closed, means including a carry-over passageway to supply a minimum quantity of gas to both burners at the end of the turn down range, means for supplying a high, as well as regulatable quantity to the simmer burner only, and means for supplying a fixed low quantity of gas to the simmer burner only.

Further objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of the present invention, reference may be had to the accompanying drawings in which:

Fig. 1 is a top view partially in section of a double gas valve embodying the present invention, the valve being in its off position;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken in part along line 3—3 and in part along the valve seat 14 as shown in Fig. 1;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2 illustrating the valve in its off position;

Fig. 5 is a view similar to Fig. 4 with the valve in its low simmer position;

Fig. 6 is a view similar to Fig. 4 with the valve in its full simmer position;

Fig. 7 is a view similar to Fig. 4 with the valve in its full on position;

Fig. 8 is a view similar to Fig. 4 with the valve in a posi-

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tion approximately at the end of the turn down range in which a limited quantity of gas is supplied to both burners;

Fig. 9 is a fragmentary side elevational view of the valve, the view being along the line 9—9 of Fig. 1; and

Fig. 10 is a cross-sectional view along the line 10—10 of Fig. 9.

In brief, the double gas valve of the present invention includes a valve body having main and branch gas inlet passageways and a pair of gas outlet passageways, of which the latter lead to the main and simmer burners of the gas range with which the present invention may be employed. The valve further includes a rotatable valve element, such as a disk, having a recess defined therein for interconnecting the inlet and outlet passageways in a predetermined manner. This recess is so shaped and positioned relative to the disk as to provide uniform turn down of both the simmer and main burners, an off position, a full on position, in which the recess registers with the main inlet passageway and the two outlet passageways, a full simmer position in which the recess registers with the inlet passageway and the simmer burner outlet passageway, and a low simmer position in which the recess registers with the simmer outlet and branch inlet passageways. This recess is furthermore so defined that, for the uniform turn down of both the main and simmer burners, the recess is moved out of registry with this inlet passageway while registry with the outlet passageways is maintained. In order to supply gas to at least the simmer burner at the end of the uniform turn down range and before the simmer only position is reached the disk valve member is provided with an additional recess and a carry-over port affording a passageway for a limited supply of gas from the inlet passageway to the main recess. The valve of the present invention is an improvement over the one disclosed and claimed in the copending application of Charles C. Lamar Serial No. 244,813 filed contemporaneously herewith.

Referring now to the drawings and more particularly to Figs. 1 and 2 thereof, there is illustrated a double gas valve constructed in accordance with the present invention and indicated as a whole by the reference numeral 10. It comprises a valve body 12 having a flat ground valve seating surface or seat portion 14, best shown in Figs. 2 and 3 of the drawings, which surface is the terminus for main and branch gas inlet passageways 16 and 18, respectively, a simmer burner outlet passageway 20, and a main burner outlet passageway 22. The inlet passageways are located between the outlet passageways and to one side of a line passing through the centers of the latter.

The main inlet passageway 16 may be at least partially located in an externally threaded boss 24 indicated as being disposed in a vertical direction and adapted for attachment to the usual gas supply main as shown at 26 in Figs. 1, 2, 3 and 9 of the drawings. The outlet passageways and specifically the simmer burner passageway 20 and the main burner passageway 22 are located within longitudinally extending spaced apart externally threaded bosses 28 and 30, respectively. The passageways 20 and 22 are indicated as disposed in a generally horizontal position and their outer ends may be cooperatively associated with adjustably mounted hoods 32 and 34 provided with orifices and cooperating with fixed needle valves (of which but one, 36, is shown) secured to the valve body to provide nozzles through which gas is selectively supplied to both burners. For the purpose of supporting additional means for defining an enclosing chamber for the valve disk 80, the valve body 12 is provided with integrally formed laterally projecting ears 38.

The valve disk enclosing chamber includes a cup-shaped housing 40 comprising a pair of cooperating laterally projecting ears 42 whereby suitable fastening means such as

screws 44 may fasten the housing to the valve body. The housing has at its bottom a central aperture 46 for accommodating a conventional horizontally disposed valve operating stem 48. The valve stem 48 may have two flat surface portions 50 and 52, respectively, for accommodating the handle (not shown) and position indicating mechanism, respectively.

The branch inlet passageway 18 provided in accordance with the present invention is utilized in supplying a predetermined low quantity of gas in the low simmer position of the valve. In order to adjust or predetermine this low quantity there is placed in the passageway, or in an enlargement thereof 54, communicating with the main inlet passageway 16, a preassembled and adjustable valve 56. The valve comprises relatively rotatable parts 58 and 60. The part 58 is tubular, fixedly secured as by press fit in passageway 54 and rotatably receives part 60. The part 60 is rotatably secured in gas tight manner in part 58 by an annular groove 62 in the former and a portion 64 extending therein. To provide a passage for gas through the valve, the rotatable part is provided with a counter bore 66 and a radial passageway 68 movable relative to a similar passageway 70 to provide a variable size orifice whereby the quantity of gas flowing in the low simmer position may be predetermined. Also, in order to facilitate assembly of the valve 56 relative to passageway 18, the tubular part 58 is provided with an annular groove 72 communicating with the passageway. The rotatable valve part 60 is provided at its end with a screw driver slot 74 so that its position can readily be adjusted. Further details of the valve 56 may be ascertained from the copending application of Vincent C. Peterson, Serial No. 600,795 filed June 21, 1945 (Patent No. 2,590,569, issued March 25, 1952).

The valve of the present invention includes a rotatable valve member 80 in the form of a disk provided with an accurately ground surface 82 in frictional engagement with the valve seat 14 on the valve body. Moreover, this valve member is provided with a recess 84 of a particular configuration best shown in Figs. 4 to 8 of the drawings. This configuration might be termed a sort of kidney shaped configuration which is such as to close the inlet passageway 16 in the closed position of the valve shown in Figs. 2 and 4 of the drawings. The particular relationship of the recess 84 relative to the passageways 16, 18, 20 and 22 will be described in greater detail hereinafter in connection with other views of the drawings.

For the purpose of interconnecting the valve disk and valve stem, there is provided a valve operator 86 in the form of a disk having a pair of laterally projecting fingers 88. These laterally projecting fingers are adapted to be disposed in a pair of cooperating recesses 90 in the valve disk 80 on the side opposite the recess 84. The valve operator is fixedly connected to the valve stem as by the valve stem end portion 92 of somewhat rectangular cross section fitting into and secured as by peening or staking to a similarly shaped opening in the valve operator (see Fig. 2). To accommodate the end 92 of the valve stem, the valve element 80 is preferably provided on its adjacent surface with a cooperating recess 94.

In order to maintain the valve disk 80 in gas tight engagement with the seat 14 and the valve operator operatively connected to the disk, there is provided a suitable compression spring 96 disposed within the housing 40. One end of the spring engages the operator 86 to push it toward the disk and thus the disk toward the seat. The other end of the spring 96 engages a position indicating washer 98 mounted loosely but nonrotatably on the valve stem and which abuts against the inside of the bottom of the cup-shaped housing 40. The washer and cooperating mechanism have not been illustrated but they may be of conventional construction and adapted to indicate the various positions of the valve, i. e., the off, low simmer, simmer only and full on.

Reference will now be had to Figs. 4, 5, 6 and 7 of the drawings which illustrate the valve in its off, low simmer, simmer and full on positions, respectively. The arrows 100 show the angular position of the disk, the arrow indicating the position of the flat 50, which faces down in the off position. In the off position of the valve, the recess 84 is out of registry with the inlet passageway 16. In the full on position, where the valve disk is displaced substantially 180° from the off position, the recess 84 is in registry with the main inlet passageway 16 and the outlet passageways 20 and 22, thereby providing the full on position with gas being supplied at the maximum rate determined by the outlet orifices to both the simmer and main burners. In the simmer position, recess 84 is in registry with the main inlet and simmer outlet passageways, while the main burner outlet passageway 20 is closed. In the low simmer position the branch inlet passageway 18 and the simmer outlet passageways are in registry. The recess 84 is also so configured as to provide a uniform turndown of gas supplied to both the main and simmer burners as the valve is moved from the full on position toward the simmer position. This is readily accomplished by gradually closing the inlet passageway 16 and this is done by an inwardly extending portion 102 of the disk, which gives the recess an irregular shape and which moves over the inlet passageway as the disk is turned clockwise, as viewed in Figs. 7 and 6, from the Fig. 7 to the Fig. 6 position.

A minimum supply of gas is provided, at least to the simmer outlet passageway, at the end of the turn down range (see Fig. 8), so as to prevent extinguishment of the flame at the simmer burner. This is done by a carryover passageway comprising a recess 104 in the portion 102 of the disk and the small passageway 106 interconnecting the two recesses 84 and 104. The small passageway 106 is located away from the flat engaging surfaces of the valve disk and seat so that it will not become clogged for example, with lubricating grease, in use. It is of a size to supply a greater quantity of gas than supplied through the valve 56.

A regulatable or uniform turn down supply of gas is also supplied to the simmer burner only when the valve is turned toward the low simmer position from the simmer position, i. e., when the valve disk is turned from the Fig. 6 position to its Fig. 5 position, in a clockwise direction, as viewed in these figures. This results from the gradual closure of the simmer outlet passageway by portion 102 of the disk.

In view of the detailed description included above and particularly in view of the five operating positions shown by Figs. 4, 5, 6, 7, and 8 of the drawings, the operation of the double gas valve 10 of the present invention will be readily understood by those skilled in the art. As noted heretofore Fig. 4 represents the off position of the valve, Fig. 5 represents the low simmer position in which gas is supplied in a low predetermined rate to the simmer burner only, Fig. 6 represents the simmer position in which gas is supplied to the simmer burner only at a high rate, Fig. 7 represents the full on position in which both the main burner and simmer burner are full on, and Fig. 8 represents approximately the end of the turn down range in which both burners are fed at a reduced rate determined by the carryover passageway 106. It will be apparent that a slight additional clockwise rotation of the valve disk 80 as viewed in Fig. 8 of the drawings will cause the supply of gas to the main burner to be completely cut off and will cause the simmer burner to be fed at a low rate through the carryover passageway 106.

From the above description it will, moreover, be apparent that there has been provided a double burner gas valve which is of very simple construction and which can be assembled in a simple manner. While there has been illustrated and described a particular embodiment of the present invention, it will be understood that various

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changes and modifications will readily suggest themselves to those skilled in the art, and it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. A double gas valve for simmer and main burners, and operable from an off position to a low simmer position wherein gas is supplied to the simmer burner only at a predetermined low rate, to a simmer position wherein gas is supplied to the simmer burner only at a full simmer rate and to a full on position wherein gas is supplied to both the simmer and main burners, including in combination, a valve body having a plane surface defining a valve seat, said valve body having main and branch inlet passageways and simmer and main burner outlet passageways terminating at said surface, said inlet passageways being located between said outlet passageways and to one side of a line passing through the centers of the outlet passageways and said branch inlet passageway being located between the main inlet passageway and the simmer outlet passageway, a disk type rotatable valve member having a plane surface engaging said valve seat, a first recess in said rotatable valve member and opening on the surface of said member connecting said inlet passageway with both the simmer and main burner outlet passageways in the full on position, said rotatable valve member having a portion extending into said recess gradually closing said inlet passageway before the recess moves out of registry with said outlet passageways to provide uniform turn down of the gas as said valve member is moved from the full on position toward the simmer position, a second recess in said portion of the valve member, and a small carryover passageway interconnecting said first and second recesses, for supplying a predetermined minimum quantity of gas to both outlet passageways, said second recess being positioned to register with said inlet passageway when said valve member is between the simmer and full on positions and at the end of the uniform turn down range, said second recess also being out of registry with said simmer outlet passageway in the low simmer position, and said first recess also connecting said simmer outlet passageway to said main and branch inlet passageways in the simmer and low simmer positions, respectively, and the valve member including structure closing the main burner outlet passageway in said two last mentioned positions.

2. A double gas valve for simmer and main burners, and operable from an off position to a low simmer and simmer positions wherein gas is supplied to the simmer

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burner only at predetermined low and full rates, respectively, and to a full on position wherein gas is supplied to both the simmer and main burners, including in combination, a valve body having a plane surface defining a valve seat, said valve body having main and branch inlet passageways and simmer and main burner outlet passageways all terminating at said surface and said branch inlet passageway terminating at a point between the inlet passageway and the simmer outlet passageway, a disk type rotatable valve member having a plane surface engaging said first surface and movable from the off position a first angular distance to the low simmer position, a second and greater angular distance to the simmer position, and a third and still greater angular distance to the full on position, and a recess in said rotatable valve member and opening on the surface of said member connecting said branch inlet passageway only with said simmer outlet passageway in the low simmer position, and connecting said main inlet passageway only with said simmer outlet passageway in the simmer position and with both the simmer and main burner outlet passageways in the full on position.

3. A double gas valve for simmer and main burners and operable from an off position to a plurality of other positions including a low simmer position wherein gas is supplied to the simmer burner only at a low and predetermined rate, a full simmer position wherein gas is supplied to the simmer burner only at a high rate and a full on position wherein gas is supplied to both burners at a high rate, including in combination, a valve body having a plane surface defining a valve seat and including gas inlet passageway means and main and simmer burner outlet passageways communicating with said surface, and a disc type rotatable valve member having a plane surface seating against said valve seat and movable from said off position to said other positions, and means including a recess in said rotatable valve member controlling the communication between said gas inlet passageway means and main and simmer burner outlet passageways for connecting said inlet passageway means to both outlet passageways in the full on position and to said simmer burner outlet passageway only in the full simmer and the low simmer positions, and flow restricting means in the valve body included in the connection between said gas inlet passageway means and simmer burner outlet passageway in said low simmer position.

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