Oct. 14, 1958 C. C. LAMAR 2,855,953

GAS VALVES

Filed Dec. 21, 1953 2 Sheets-Sheet 1

Fig. 1.

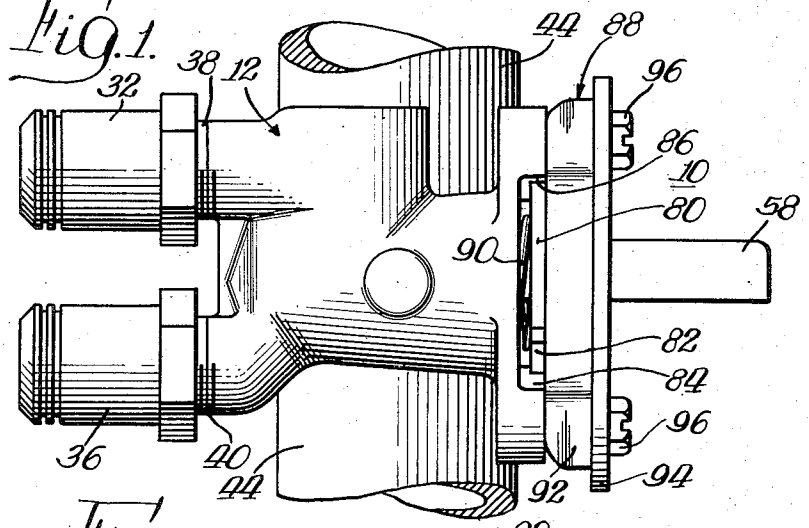



Fig. 2.

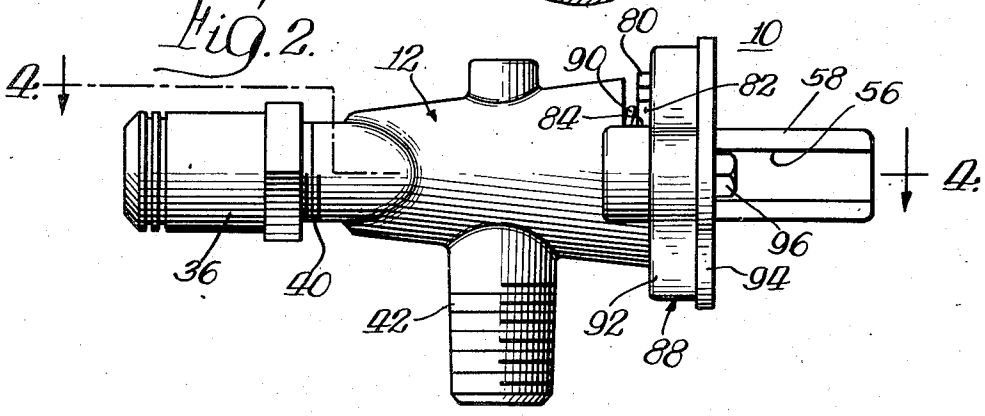
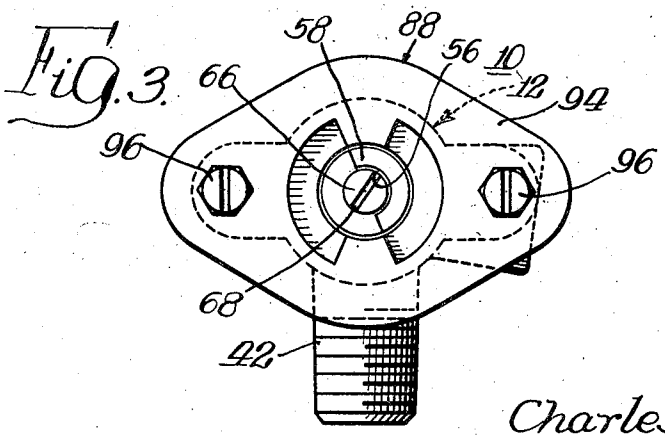



Fig. 3.

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GAS VALVES

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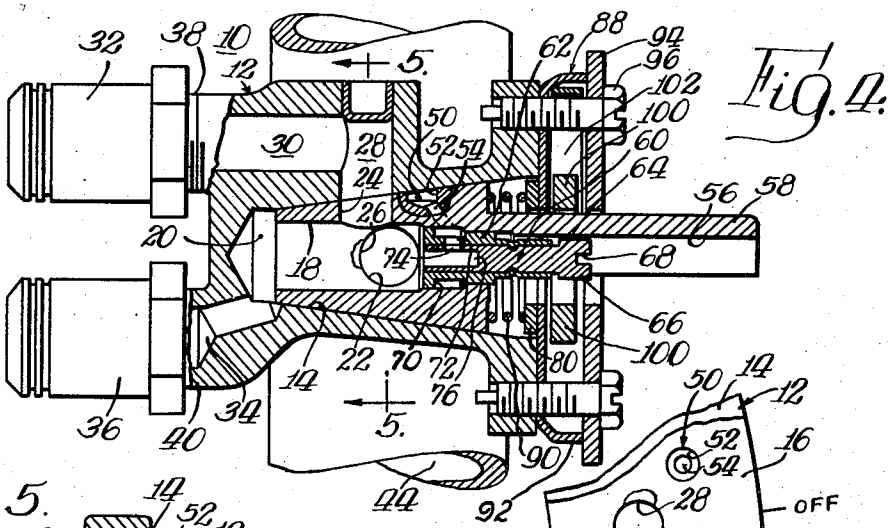



Fig. 4.

Fig. 5.

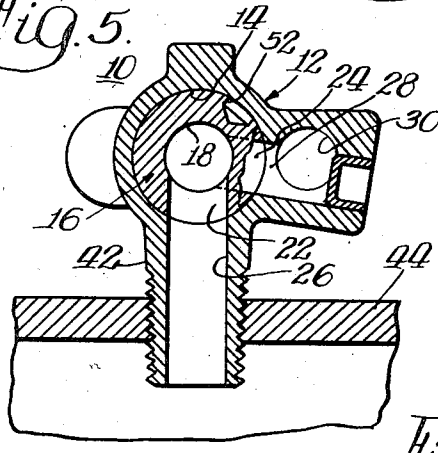



Fig. 7.

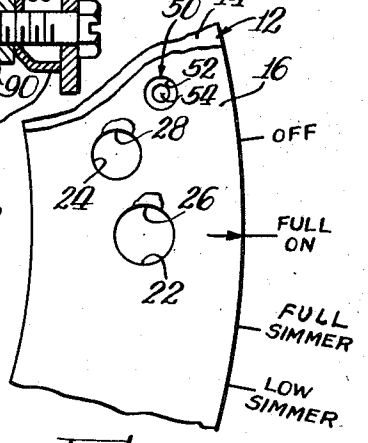



Fig. 6.

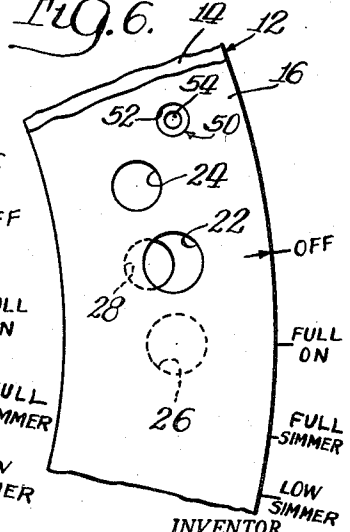



Fig. 9.

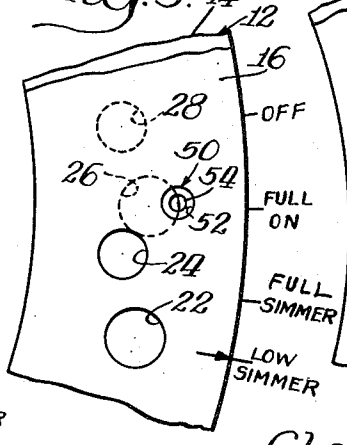
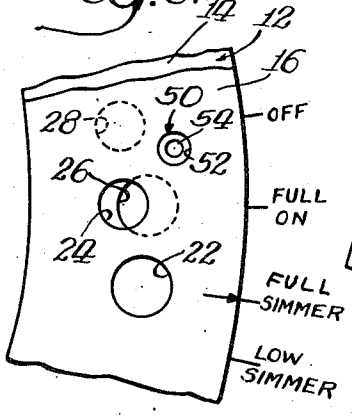



Fig. 8.

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United States Patent Office 2,855,953 Patented Oct. 14, 1958



2,855,953

# GAS VALVES

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Application December 21, 1953, Serial No. 399,400

1 Claim. (Cl. 137—599.2)

The present invention relates to gas valves and particularly to gas valves for use with gas burners having two burner sections. Burners of this character are commonly called double burners and the two burner sections are called the main and simmer burner sections. The primary object of the present invention is to provide a new and improved gas valve for a double burner, i. e., a new and improved double gas valve.

Another object of the present invention is to provide a new and improved double gas valve for providing a desired sequence of operations according to which a full supply of gas is supplied to both the main and simmer burner sections in a first operative position to which the valve is moved from its off position.

A further object of the present invention is the provision of a new and improved double gas valve providing a full supply of gas to both the main and simmer burner sections as the valve is turned in one direction to a first operative position from an off position, and providing, further, a full supply of gas to the simmer burner only upon continued movement in the same direction and providing, finally, a predetermined low supply of gas to the simmer burner only as the valve is moved in the same direction to a limit position.

Another object of the present invention is to provide a new and improved double gas valve having the sequence of operations set forth in the preceding paragraph and including a simplified system of gas flow and control passageways whereby the valve can be made to be small in size and manufactured simply and economically.

In brief, the valve of the present invention includes a valve body having a tapered plug receiving chamber and a tapered plug mounted within the chamber. The body includes an inlet passageway, an outlet passageway to the main burner opening to the plug receiving chamber at a point axially and angularly spaced from the inlet passageway and a simmer burner outlet passageway communicating with the end of the plug receiving chamber. The rotatable valve plug includes an axial passageway open to the plug receiving chamber and the simmer burner outlet passageway and a pair of transverse passageways extending from the axial passageway to the surface of the plug and a first of which is aligned with the inlet and the second of which is aligned with the main burner outlet passageway in the full on position of the valve to which the plug is operable from its off position. These first and second passageways in the plug are both axially spaced and angularly spaced from each other and the spacing is such that the passageway which is aligned with the main burner outlet passageway in the full on position, the second passageway, is in registry with the inlet passageway in a full simmer position, to which the plug is operable from its full on position. Accordingly, this passageway provides gas to the simmer burner in the full simmer position of the valve.

The main burner outlet passageway and the second passageway in the plug are of smaller diameter than the inlet passageway and the first passageway in the plug,



and the angular spacing between the inlet and outlet passageways is so small that, as the valve is turned from the full on toward full simmer position the second passageway in the plug comes into registry with the inlet passageway before the first one goes out of registry with the latter. As a result of the spacing, the valve plug and body can be made smaller and a so called carry over passageway generally used in valves of this character is eliminated. The valve plug is provided with a further passageway including, preferably, adjustable gas flow restricting means and which passageway is effectively angularly displaced from the other passageways so that in a still further position of the plug, to which the plug is operable from a full simmer position, the simmer burner only is supplied with a predetermined low but adjustable quantity of gas. The gas flow adjusting means is preferably of the stem adjustment type, i. e., the adjustment can be effected through a hollow valve stem. The passageway through which gas is supplied to the simmer burner only at a low but regulatable rate includes a portion extending to the outer surface of the valve plug and which is so located that it registers only with the inlet passageway in the valve body and not with the main burner outlet passageway.

Other objects and advantages of the present invention will become apparent from the ensuing description of a preferred embodiment of the gas valve, in the course of which reference is had to the accompanying drawings, in which:

Fig. 1 is an enlarged top plan view of a double gas valve constructed in accordance with the present invention, the valve operating handle being omitted and the valve being in its full on position;

Fig. 2 is a side elevational view of the valve shown in Fig. 1;

Fig. 3 is an end view of the valve, the view being from the outer or stem end;

Fig. 4 is a fragmentary cross sectional view taken along a horizontal plane passing through the axis of the valve plug and with the valve plug illustrated in its full on position;

Fig. 5 is a transverse cross sectional view taken approximately along the line 5—5 of Fig. 4; and

Figs. 6, 7, 8 and 9 are flat developments of the valve body and valve plug surfaces in various positions of the valve, these being the off, the full on, the full simmer and the low simmer positions (as indicated by the arrow in each figure) into which the valve plug is rotated in sequence as it is moved in one direction from the off position, which is at one limit of movement of the valve plug, to the low simmer position, which is at the other limit of movement of the valve plug.

Referring now first particularly to Figs. 1, 2, 3 and 5, the double gas valve of the present invention is indicated as a whole by reference character **10**. It comprises a valve body **12** having a plug receiving chamber with a conical inner surface **14** and within which is mounted a rotatable control member illustrated as the tapered or conical plug **16**.

The plug is provided with an axial passageway **18** (see Figs. 4 and 5) providing communication between the interior of the valve plug and the small diameter end **20** of the valve plug receiving chamber. The plug is provided also with a pair of axially and angularly spaced apart transverse, preferably radial, passageways **22** and **24**, the first of which **22** is aligned, in the full on position of the valve, with the inlet passageway **26** and the second of which, **24**, is aligned with the transversely extending portion **28** of a main burner outlet passageway in the valve body, the latter of which also includes an axially extending portion **30** having associated with it the usual ad-

justable hood **32** by means of which the main burner outlet orifice (not shown) may be adjusted.

The valve body includes also a simmer burner outlet passageway **34** leading from the small diameter closed end **20** of the plug chamber through an adjustable hood **36** to the simmer burner. The outlet passageways **30** and **34** are formed respectively in externally threaded bosses **38** and **40** on which the hoods are rotatably mounted.

The inlet passageway **26** is formed in a downwardly extending externally threaded boss **42** by means of which the valve is detachably mounted upon the usual gas supply manifold **44**.

In accordance with the present invention, the valve is so constructed and arranged that the first operative position from the off is the full on position. This has the advantage that it provides first a full flow of gas for rapid heating from which the valve can be turned back toward the off position for frying or from which it can be turned in the first direction to provide the full simmer and low simmer burning conditions. This arrangement also enables the ignition apparatus to be arranged to light the main burner from which the simmer can be lit. This is favorable under certain conditions.

As heretofore indicated, the full on position to which the valve plug is first turned is illustrated in Figs. 4 and 5. The valve is turned to this position by movement in a clockwise direction, as about 86°, from the off position. From the full on position the valve plug is movable to a full simmer position, as about 164° from the off position, in which the passageway **24** is in registry with the inlet passageway **26**. Upon further movement of the valve plug in the same (clockwise) direction, as to about 218° from off, a low simmer passageway system, indicated as a whole by reference character **50**, connects the inlet **26** to the simmer burner outlet passageway **34**.

The low simmer passageway **50** may be seen, particularly from Fig. 4, to include a first and counterbored portion **52** at the outer surface of the valve plug which is so located axially of the plug that it registers with the inlet passageway only. It is connected by a smaller diameter inclined passageway **54** to a multi-diameter axial passageway **56** extending through the valve stem to the axial passageway **18** in the plug. Within this passageway **56** there is located an adjustable valve indicated as a whole by reference character **60** and by means of which the amount of gas flowing in the low simmer position can be regulated. This valve includes an outer fixed element **62** which is mounted as by a press fit in the passageway **56** and an inner axially extending rotatable element **64** having an enlarged outer end **66** provided with a screwdriver slot **68** whereby it can readily be rotated through the passageway **56** when the valve operating handle not shown is taken off the outer end of the valve stem **58**. The fixed element **62** is provided with an external annular passageway or groove **70** which communicates with the passageway **54** in the valve plug. The fixed element is also provided with a radial opening **72** and the rotatable element **64** with a similar opening **74**, communicating with the axial passageway **76** open at one end to axial passageway **18** in the valve plug, so that upon rotation of the element **64** the openings can be brought more or less into full registry, thereby to regulate the amount of gas flowing in the low simmer position of the valve. Further details of construction of the stem adjustment valve **60** may be obtained from the Peterson Patent No. 2,590,569.

The valve **10** may be provided with suitable position determining and indicating means. For example, the limit positions may be determined by a washer **80** constrained for movement with the valve stem and including a radial projection **82** engageable with the stops **84** and **86** (see Fig. 1) which stops determine the off and low simmer positions, respectively. The position indicating mechanism includes also structure mounted within a housing indicated generally by the reference character **88**



against which the disk **80** is biased by a spring **90** encircling a portion of the valve stem and which spring also holds the valve plug seated in the plug chamber. The housing **88** comprises a cuplike rear portion **92**, the outer end of which is closed by a plate **94**. The two parts are held in assembled relation relative to each other and to the valve body by the securing screws **96** passing therethrough into suitable threaded openings in the valve body. Within the housing is a detent disk **100** having associated therewith a disk engaging spring **102**. The disk and spring are so constructed and arranged that various operative positions of the valve are readily indicated to the operator of the valve. For further description of the position indicating and determining mechanism reference may be had to the co-pending application of Philip S. Harper, Serial No. 554,484, filed November 2, 1955, and which is a continuation of application Serial No. 162,446, filed May 17, 1950, now abandoned.

From the foregoing detailed description, it is apparent that the valve of the present invention can be constructed simply and economically in as much as relatively few passageways are required in the valve body and plug to give the desired operating conditions, as well as sequence of operation. As indicated heretofore, the passageways **22** and **26** and the passageways **24** and **28** are aligned in the full on position, to which the plug is moved in a clockwise direction as viewed from the stem end. At this time, as shown in Figs. 4 and 7, particularly, it will be seen that full quantities of gas as determined by adjustment of the hoods **32** and **36** will be supplied to the main and simmer burners, respectively. From the full on position to which the valve is generally first turned in order to provide adequate ignition, the valve plug may be turned in either direction. If turned toward the off direction, the supply of gas to the two burners is gradually decreased. When the valve plug is turned from the full on toward the off position, the passageway **22** in the valve plug begins to register with the main outlet passageway **28** while it is still in registry with the inlet passageway. However, upon further movement of the valve plug toward its off position, the supply of gas to both burners is gradually decreased at the inlet, thereby providing a gradual as well as even turn down of the gas to both burner sections.

In going from the off toward the full on position passageways **22** and **24** gradually come into full registry with passageways **26** and **28**, thereby to supply increasing quantities of gas to both the main and simmer burner outlet passageways. It should be noted that passageways **22** and **26** are somewhat larger than pasageways **24** and **28** (.204 inch as compared with .193 inch) and that the angular and axial spacing between the two sets of passageways is so small that passageway **22** provides communication between the inlet passageway **26** and main outlet passageway **28** in a position intermediate the off and full on positions, the passageway **22** bridging passageways **26** and **28** before passageway **24** moves out of registry with passageway **28**.

In going from the full on position toward the full simmer position (i. e. from Fig. 7 toward Fig. 8), it should be noted that the arrangement of the passageways is such that gas is supplied continuously to the simmer outlet passageway first through passageways **22** and **18** and then through passageways **24** and **18** so that a full supply of gas is supplied to the simmer burner. At the same time, the flow of gas to the main burner is gradually decreased and finally cut off by passageways **24** and **28** going out of registry.

The arrangement of passageways according to which passageway **24** begins to register with inlet passageway **26** before passageway **22** goes out of registry with it is thus such as to eliminate a so-called "carryover" passageway required in other valves of this character to supply gas to the simmer burner in a carryover range between the full on and full simmer positions. The arrangement

also enables the valve to be made smaller, that illustrated being of a size comparable to single valves in so far as the plug is concerned. The use of a small plug enables the body to be made smaller, as well.

Continued movement of the valve plug in the same direction moves it to the low simmer position indicated in Fig. 9. It will be noted from a comparison of Figs. 8 and 9 that as the valve plug is moved from the full simmer to the low simmer position the passageway **24** moves out of registry with the inlet passageway **26** while the low simmer passageway system **50** moves into registry with the inlet passageway **26** until, finally, in the low simmer position, only the passageway **50** is in registry with the inlet. As a result, a predetermined low quantity of gas is supplied to the simmer burner only.

While the present invention has been described in connection with a valve in which the plug is moved in a clockwise direction from the off at one limit to the low simmer at the opposite limit, it should be understood that the valve could just as well be constructed for movement in the opposite direction. It should be understood further that while the present invention has been described in connection with the particular details of one embodiment thereof, these details are not intended to be limitative of the invention except as set forth in the accompanying claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

A double gas valve for double gas burners of the type comprising main and simmer burner sections, including in combination, a valve body including an axially extending tapered plug receiving chamber and a tapered valve plug rotatably mounted in said chamber, said valve body including a gas inlet passageway opening into said plug receiving chamber intermediate the ends of the plug, said valve body having a main burner outlet passageway opening into said chamber at a point angularly spaced from the inlet passageway and also spaced a short distance axially from the inlet passageway toward the smaller end of the plug receiving chamber, said valve body having also a simmer burner outlet passageway communicating with the end of the plug receiving chamber, said valve plug including an axial passageway continuously open to the end of the plug receiving chamber and thus to the simmer burner outlet passageway, a pair of passageways leading from the exterior of the plug surface to said axial passageway and a first of which is aligned with the inlet passageway and the second of which is aligned with the main burner outlet passageway in a first and full on position of the valve plug, the first of said pair of passageways also being of a size to bridge across said inlet and main burner outlet passageways, said valve plug having another passageway leading from its exterior to the axial passageway and including flow restricting means for supplying a low quantity of gas to said axial passageway, said other passageway having an opening on the plug surface which is spaced axially nearer the larger end of the plug than the center of the first of said pair of passageways and also angularly spaced from the others and so located as to register only with the inlet passageway in the body, and the angular and axial spacings of said various passageways being such that the valve plug is effective in an off position to close the inlet passageway while the first of said pair of passageways is in registry with the main burner outlet passageway and is operable from said off position in one direction, first, through a turndown range in which the first of said pair of passageways bridges the inlet and main burner outlet passageways to a full on position in which gas is supplied to both the main and simmer burner outlet passageways from said inlet passageway through the first of said pair of passageways in the plug registering with the inlet passageway, the axial passageway in the plug open to the simmer burner outlet passageway and the second of said pair of passageways in the plug registering with the main burner outlet passageway, second, to a full simmer position in which said main burner outlet is closed and gas is supplied at a full rate to the simmer burner outlet passageway only from the inlet through the second of said pair of passageways registering with the inlet passageway and said axial passageway, and, third, a low simmer position in which the main burner outlet passageway is closed and said other passageway registers with the inlet passageway to supply the simmer burner outlet passageway only with a low quantity of gas through said axial passageway.

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