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GAS VALVE

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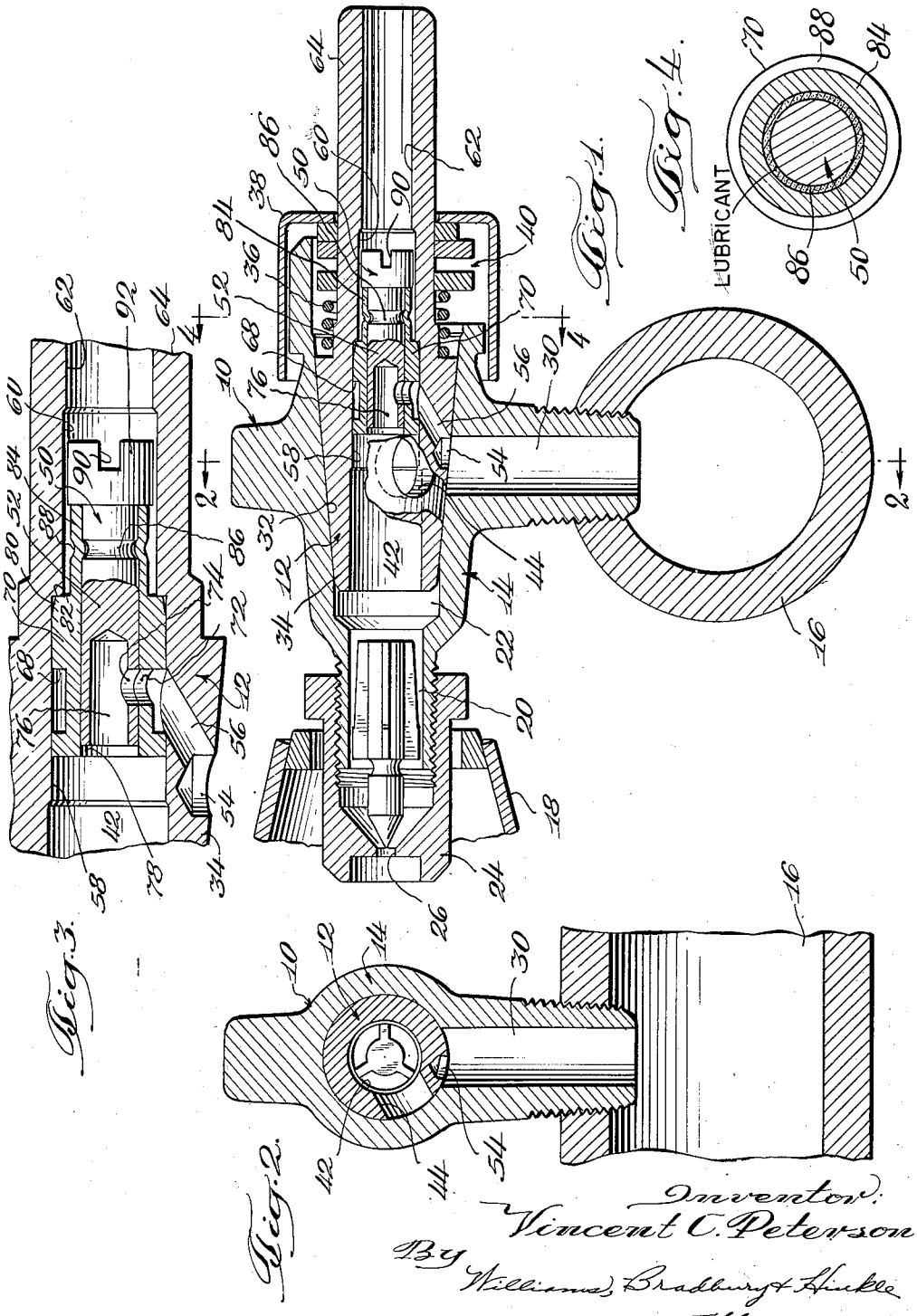


Fig. 1.

Fig. 4.

Fig. 3.

Fig. 2.

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GAS VALVE

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The present invention pertains to gas valves and particularly to gas valves of the type operable to different positions to supply different amounts of gas to gas burners and the like, and one type of which is commonly called a high-low valve.

The primary object of the present invention is to provide a gas valve having new and improved means accessible through the valve stem for adjusting the flow of gas in one, and preferably the low, position of the valve.

Another object of the present invention is to provide a new and improved non-leaking stem adjustment plural position valve which can be manufactured readily and economically on a mass production basis as a unit for insertion into a valve stem and having a highly effective, and easily made gas seal for preventing the leakage of gas through the stem.

A further object of the present invention is the provision of a new and improved gas valve of the character aforesaid wherein the stem adjustment means may be inserted into the stem in any angular position, whereby assembly of the valve is greatly facilitated.

Other objects and advantages of the present invention will become apparent from the ensuing description thereof, in the course of which reference is had to the accompanying drawings, in which

Fig. 1 is an axial cross-sectional view through a valve constructed in accordance with the present invention, the valve operating handle being omitted for the sake of simplicity;

Fig. 2 is a vertical transverse cross-sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary axial cross-sectional view similar to Fig. 1; and

Fig. 4 is a further enlarged transverse cross-sectional view taken along the line 4—4 of Fig. 1.

The present invention has been illustrated in conjunction with a plural position gas valve 10 of the type commonly called a high-low valve. The valve includes a rotatable tapered valve plug 12 movable from an off position, wherein no gas flows through the valve, to high and low positions wherein different quantities of gas flow to the burner. In the high position a larger quantity of gas flows to the burner and in the low position a smaller quantity of gas flows to the burner.

Gas valves are installed in different localities having different types of gas as well as supplies available only at different pressures. These differences do not materially affect the operation

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of the valve or of its associated burner when the valve is in its high position, but difficulties may be encountered when the valve is operated to its low position. This makes it desirable that some means be provided for adjusting the quantity of gas which flows through the valve to the burner in the low position. It is desirable that the adjustment means be simple, efficient, inexpensive, and readily accessible even after the valve has been assembled in the stove or the like with which it is intended to be used. Additionally, it is essential that there be no leakage of gas past the stem adjustment means and through the handle. All of these requirements are fulfilled by the low adjustment means of the present invention, which will now be described in detail.

The gas valve includes the previously mentioned rotatable plug 12 and a valve body 14 within which the plug is mounted in conventional manner. Gas is supplied to the valve from a suitable source of gas through a manifold 16 and regulated quantities of gas are supplied to a burner, not shown, which is connected to the valve through a mixing tube 18, which may be of conventional construction. The gas valve includes an outlet passageway 20 communicating with an outlet chamber 22 from which gas flows into the mixing tube through a hood 24 having an orifice 26. The hood is adjustable, in order that the effective area of the orifice may be varied, as is conventional in gas valves.

The gas valve includes an inlet passageway 30 providing communication from within the manifold 16 to a tapered bore or passageway 32 within which the tapered inner portion 34 of the valve plug is rotatably mounted. The valve plug is held in place by a spring 36 bearing against the portion 34 and an end cap 38 detachably secured to the valve body. A plural element position indicating and determining mechanism 40 is located between the spring and the cap. It forms no part of the present invention and may take various forms.

The valve plug includes an axial outlet passageway 42 communicating with the outlet chamber 22 and with a radial passageway 44 leading to the exterior of the plug so constructed and arranged that when the plug is turned into an angular position such that the passageways 30 and 44 are in alignment a "high" quantity of gas flows to the burner through the valve. The quantity of gas flowing to the valve through the passageway 44 may be regulated in a "turn-down range" by adjusting the angular position

of the plug thereby to control the effective size of the passageway 44.

In the low position of the valve a smaller and preadjusted quantity of gas is supplied to the burner through the low adjustment means constituting the primary feature of the present invention, and which is an improvement over the means disclosed and claimed in the copending application of Philip S. Harper, Serial No. 576,673, filed February 7, 1945, and assigned to the assignee of this application. This means includes an auxiliary valve indicated as a whole by reference character 50 and comprising an adjustable member 52 rotatable to regulate the effective area of a passageway interconnecting the inlet passageway 30 and the axial outlet passageway 42 in the low position of the valve. In this position gas flows from the inlet passageway 30 to the axial passageway 42 through the generally radial passageways 54 and 56 in the portion 34 of the valve plug to a reduced diameter axial bore 58 located intermediate the axial passageway 42 and a still further reduced opening 60. The opening 60 communicates with a still further reduced diameter passageway 62 extending through the valve stem 64 and through which access is had to the stem adjustment means (upon removal of the usual handle, which has not been shown) for adjusting the quantity of gas supplied to the burner in the "low" position of the valve.

From the passageway 58, or more particularly from an annular groove 68 in a sleeve or insert 70, fixedly secured in passageway 58 and forming part of the stem adjustment means, the gas flows through a pair of openings 72 and 74 into an axial passageway 76 communicating with the axial passageway 42 in the valve plug. The passageway 72 is in the insert 70 while the passageways 74 and 76 are radially and axially disposed in the rotatably adjustable valve member 52. The rotatable valve member 52 is mounted within an axial passageway 78 extending through the insert 70 and which passageway is machined to close tolerances to prevent the leakage of gas therebetween and the outside of the rotatable valve member.

The insert 70 is secured within the valve plug as by a press fit, the passageway 58 being reamed to a close dimensional tolerance better to receive the insert. The annular groove 68 is located intermediate the ends of a larger diameter portion of the insert 70 to provide adequate sealing surfaces preventing the gas from escaping along its exterior. The inner end of the large diameter portion is tapered as indicated by reference character 80 to facilitate insertion of the insert within the passageway 58. Assembly of the stem adjustment means is further facilitated by the fact that proper insertion is indicated and determined by the abutment of the large diameter end of insert 70 against the shoulder 82 located at the junction of passageways 58 and 60 in the valve stem.

In accordance with one of the primary features of the present invention, a readily made and efficient gas seal is provided to prevent the escape of gas through the valve stem. The arrangement of the present invention includes a thin-walled extension 84 of the insert, a portion of which is adapted to be deformed as by rolling, inwardly into an annular rounded groove 86 in the rotatable valve member 52 as indicated by reference character 88.

The valve member 50 is provided at its outer

end with a slot 90 in an enlarged head 92 for the reception of a screwdriver or the like whereby it may be turned for adjustment purposes. The enlarged head, it may be noted, facilitates assembly of the insert and valve because it positions the two parts relative to each other.

The adjustment of the quantity of gas flowing through the gas valve in the low position of the valve is effected by turning the valve member 52, thereby to regulate the effective size of an orifice formed by the positional relationship of the passageways 72 and 74 in the insert 70 and rotatable valve member 52 respectively. It might be mentioned that it is preferred that the seal be made before the ports 72 and 74 are drilled. If desired, some lubricant such as graphite grease may be interposed in the groove 86 to facilitate turning and to enhance the seal.

From the foregoing detailed description of the present invention, it may be noted that the stem adjustment means is of a character such that it may be made in large quantities by mass production methods and that it may be pre-assembled before insertion into the rotatable plug of a gas valve. Furthermore, the assembly relative to the gas valve is a simple operation and can be accomplished readily and quickly.

The gas seal provided by the annular groove 86 and rolled-in portion 88 of the insert is a very effective seal whereby the leakage of gas through the stem is substantially entirely eliminated. The construction, in effect, provides what may be termed a double seal.

While the present invention has been described in connection with the details of but a single embodiment thereof, it should be understood that such details are not intended to be limitative of the invention, except in so far as set forth in the accompanying claims.

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

1. An adjustable and preassembled valve unit for mounting in a passageway in a gas valve, including in combination, a tubular member having a radial opening therein and adapted to be secured in said gas valve, a valve member rotatably mounted in said tubular member and having structure cooperating with said opening for adjusting the gas flow therethrough, and means including an annular groove in one of said members, an annular portion in the other of said members fitting therein, and a sealing medium confined in said groove and filling the space between said members for providing a gas seal between the members.

2. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway therethrough and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member insertable into said axial passageway and including a first portion fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion having its outer surface spaced from said axial passageway, said first portion having a transverse passageway intermediate its ends and communicating with said transverse passageway in the plug, a valve member rotatably mounted within said tubular member including structure cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve

member, said valve member being short of one end of said tubular member and having its opposite end beyond the thin walled extension and terminating in an enlarged slotted portion accessible through said axial passageway to enable said valve member to be rotatably adjusted, and means including an annular external groove in said valve member and a portion of the thin wall of said extension depressed into said groove for securing said tubular and valve members in gas tight manner.

3. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway therethrough and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member mounted within said axial passageway and including a first portion fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion, said first portion having a transverse passageway intermediate its end and communicating with said transverse passageway in the plug, and a valve member rotatably mounted in said tubular member for access through said axial passageway and including structure cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve member and a portion of the thin wall of said extension depressed into said groove for preventing leakage of gas between said tubular and valve members.

4. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway therethrough and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member mounted within said axial passageway and including a first portion fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion, said first portion having a transverse passageway intermediate its ends and communicating with said transverse passageway in the plug, and a valve member rotatably mounted in said tubular member for access through said axial passageway, said valve member including an open ended axial passageway at one end and a transverse passageway cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve member beyond the end of the axial passageway and a portion of the thin wall of said extension depressed into said groove for preventing leakage of gas between said tubular and valve members.

5. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway therethrough and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member mounted within said axial passageway and including a first portion fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion, said first portion having an annular external passageway communicating with said transverse passageway in the plug and having a transverse passageway open to said annular passageway, and a valve member rotatably mounted in said tubular member for access through said axial passageway and including structure cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve member and a portion of the thin wall of said extension depressed into said groove for preventing leakage of gas between said tubular and valve members.

6. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway having large and small diameter portions and with an intermediate shoulder and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member mounted within said axial passageway and including a first and larger diameter portion fitting in the large diameter portion and abutting against said shoulder and fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion, said first portion having a transverse passageway intermediate its ends and communicating with said transverse passageway in the plug, and a valve member rotatably mounted in said tubular member for access through said axial passageway and including structure cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve member and a portion of the thin wall of said extension depressed into said groove for preventing leakage of gas between the tubular and valve members.

7. In a stem adjustment gas valve, the combination including, a rotatable valve plug having an axial passageway therethrough and a transverse passageway leading from said axial passageway to the exterior of the plug, a tubular member mounted within said axial passageway and including a first portion fixedly securing the member in said axial passageway in gas tight manner and a second portion comprising a tubular thin walled extension from said first portion, said first portion having a transverse passageway intermediate its ends and communicating with said transverse passageway in the plug, and a valve member rotatably mounted in said tubular member for access through said axial passageway and including structure cooperating with said transverse passageway in said tubular member for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve member, a portion of the thin wall of said extension depressed into said groove and sealing medium confined in said groove for preventing leakage of gas between said tubular and valve members.

8. An adjustable and preassembled valve unit for mounting in a passageway in a gas valve, including in combination, a tubular member dimensioned to fit into the passageway and including a tubular thick walled portion and a tubular thin walled extension, said member having a transverse passageway therethrough intermediate its ends, a valve member rotatably mounted within said tubular member including structure cooperating with said transverse passageway for adjusting the gas flow through the latter upon rotation of the valve member, and means including an annular external groove in said valve

member and an annular portion of the thin walled extension depressed into said groove for preventing leakage of gas between the tubular and valve members.

9. In a gas valve, the combination including, structure defining a first passageway and a second passageway transverse to and opening into the first, and an adjustable preassembled valve unit mounted within said first passageway, said valve unit including a tubular member having a radial gas passageway therethrough and mounted in said first passageway so as to provide communication between said radial gas passageway and said second passageway, a rotatable valve member mounted in said tubular member, said rotatable valve member having structure cooperating with said radial passageway to adjust the flow of gas therethrough, and means including an annular external groove on the valve member and a portion of the tubular member depressed into said groove for securing the tubular and valve members in relatively rotatable and gas tight relationship.

10. In a gas valve, the combination including, structure defining a first passageway and a second passageway transverse to and opening into the first, and an adjustable preassembled valve unit mounted within said first passageway, said valve unit including a tubular member having a thicker portion and a thin-walled extension and a radial gas passageway intermediate the ends of said thicker portion, said member being mounted by a press fit in said first passageway so as to provide communication between said radial gas passageway and said second passageway, a rotatable valve member mounted in said tubular member, said rotatable valve member having structure cooperating with said radial passageway to adjust the flow of gas therethrough, and means including an annular external groove on the valve member and an annular portion of the thin-walled extension fitting into said groove for securing the tubular and valve members in relatively rotatable and gas tight relationship.

11. In a gas valve, the combination including, structure defining a first passageway and a second passageway transverse to and opening into the first, and an adjustable preassembled valve unit mounted within said first passageway, said valve unit including a tubular member having a thicker portion and a thin-walled extension and a radial gas passageway intermediate the ends of said thicker portion, said member being

mounted by a press fit in said first passageway so as to provide communication between said radial gas passageway and said second passageway, a rotatable valve member mounted in said tubular member, said rotatable valve member having structure cooperating with said radial passageway to adjust the flow of gas therethrough, and means including an annular external groove on the valve member, an annular portion of the thin-walled extension fitting into said groove and a sealing medium confined in said groove between said extension and valve member for securing the tubular and valve members in relatively rotatable and gas tight relationship.

12. In a gas valve, the combination including, structure defining a first passageway and a second passageway transverse to and opening into the first, and an adjustable preassembled valve unit mounted within said first passageway, said valve unit including a tubular member having a radial gas passageway therethrough and mounted in said first passageway so as to provide communication between said radial gas passageway and said second passageway, a rotatable valve member mounted in said tubular member, said rotatable valve member having structure cooperating with said radial passageway to adjust the flow of gas therethrough, and means including an annular groove on one of said valve and tubular members and an annular portion in the other of said members fitting into said groove for securing the tubular and valve members in relatively rotatable and gas tight relationship.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
512,892	Munger	Jan. 16, 1894
671,678	Krebs	Apr. 9, 1901
755,299	Kent	Mar. 22, 1904
805,741	Lundy	Nov. 28, 1905
812,627	Wirth et al.	Feb. 13, 1906
1,261,469	Bache	Apr. 2, 1918
2,257,886	Mueller	Oct. 7, 1941

FOREIGN PATENTS

Number	Country	Date
81,665	Switzerland	July 1, 1919
332,997	France	of 1894