March 21, 1933. E. E. MEUSY 1,901,979

GAS COCK

Filed Aug. 5, 1932

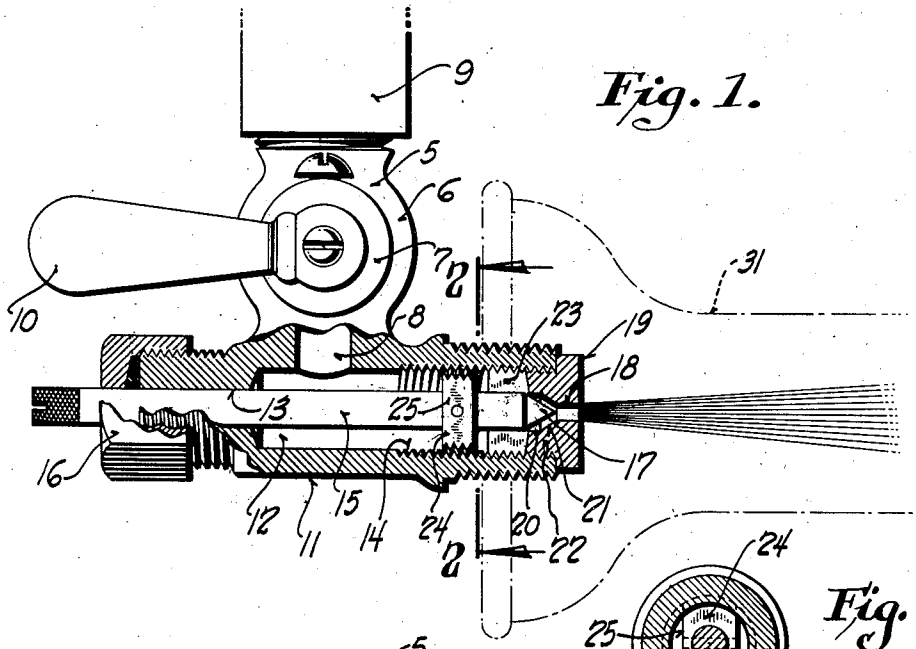


Fig. 1.

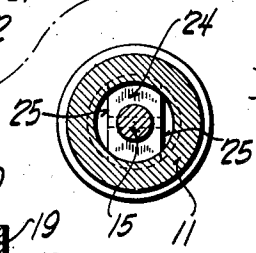


Fig. 2.

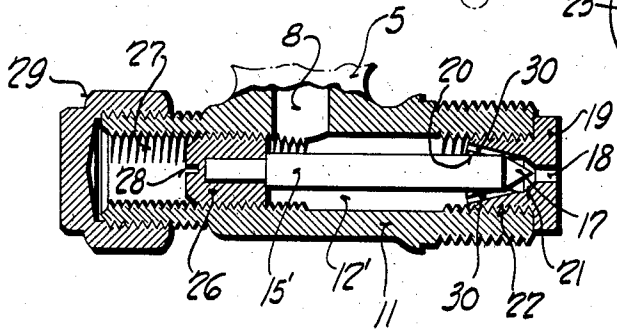


Fig. 3.

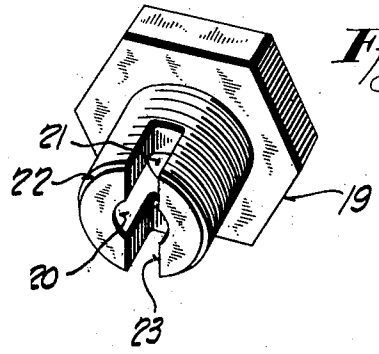


Fig. 4.

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UNITED STATES PATENT OFFICE

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GAS COCK

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This invention relates to certain new and useful improvements in gas cocks, and has as a general object to provide improved means for metering the volume of gas discharged from the cock into the burner.

As is well known, gas cocks are provided with an adjustable discharge orifice usually embodying some form of needle valve. The needle valve structures heretofore employed for this purpose have entailed difficult and expensive manufacturing method for the reason that they required co-axiality between a threaded portion of the valve body and the orifice or valve seat with which the needle point of the valve cooperated.

It is therefore, a more specific object of this invention to provide a novel needle valve metering unit for gas cocks and similar valves which is entirely self-centering and obviates the necessity for co-axiality between a threaded portion and the orifice of the valve.

It is also an object of this invention to provide a needle valve for metering the flow of fluid from the gas cock or similar valve structure which is readily adjustable while the device with which the valve is used is functioning.

Another object of this invention resides in the provision of a valve of the character described having a removable tip formed in one piece and in which the discharge orifice, the valve seat and a guide for the needle valve stem are formed in a single operation, so as to insure absolute co-axiality between the stem and the valve seat.

And a further object of this invention is to provide a gas cock of the character described which may be accurately manufactured at a comparatively low cost.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of our invention constructed according to the best mode we have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view partly in longitudinal section and partly in elevation of a gas cock embodying this invention;

Figure 2 is a cross sectional view through Fig. 1 on the plane of the line 2—2;

Figure 3 is a view similar to Fig. 1 illustrating a slightly modified form of this invention; and

Figure 4 is a perspective view of the end plug in which the needle valve orifice and guideway are formed.

Referring to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 5 designates generally the body of a gas cock having a barrel 6 in which a plug 7 is rotatably mounted. The barrel 6, as is customary, has a transverse fuel passage 8, one end of which communicates with a supply pipe 9.

The rotatable plug 7 is adapted to be actuated by a handle 10 and has a transverse passageway, not shown, to be aligned with the passage 8 so that the plug 7 controls the passageway.

At one side of the barrel 6 the valve body has a transverse portion 11 provided with a bore 12 which communicates with the passage 8. One end of the bore 12 communicates with a bore 13 of smaller diameter, and the other end of the bore 12 is internally threaded as at 14.

Freely rotatably mounted in the bore 13 and extending throughout the length of the bore 12 is a needle valve stem 15. One end of this stem projects outwardly through the bore 13 and is knurled and slotted to afford means for turning the same. A packing nut 16 threaded on the adjacent end of the transverse part 11 provides a fluid-tight joint about the projecting end of the stem.

The opposite end of the needle valve stem is pointed as at 17 to provide the needle valve per se, and this pointed end 17 cooperates with the discharge orifice 18 to meter the volume of fuel permitted to issue from the valve.

The discharge orifice 18 is formed in an integral one-piece end plug 19 removably secured in the open threaded end of the bore 12. The discharge orifice 18 communicates with the outer end of the plug and is part of a two-diameter aperture formed axially through the plug.

The inner end of this aperture consists of a bore 20 of a diameter to snugly receive the adjacent pointed end of the needle valve stem, and the shoulder between the bore 20 and the orifice 18 is tapered to provide a valve seat 21. Inasmuch as the entire axial aperture comprising the inner bore 20, the valve seat 21 and the orifice 18, is formed in a single operation, absolute co-axiality is assured between the bore 20 and the valve seat.

An external thread is cut on the inner end portion 22 of the plug at the same time the axial aperture is formed, so that the threads on the inner end portion 22 are also co-axial to the aperture through the plug, to insure the plug being centered with respect to the bore 12.

The valve stem 15, being snugly received in the bore 20, is thus firmly held in absolute axial alignment with the valve seat and the discharge orifice, and to preclude binding, the bore 13 in which the opposite end of the stem is received, is sufficiently large to permit the stem to move freely into the bore 20.

Provision is made for the passage of fluid from the bore 12 past the end portion of the valve stem received in the bore 20. For this purpose, the inner end 22 of the plug has a transverse milled slot 23 with the bottom thereof terminating adjacent the valve seat.

Axial adjustment of the valve stem is effected upon rotatation of the stem by means of a threaded connection between the stem and the threads 14 in the discharge end of the bore 12. This threaded connection may be formed in any desired manner and in the present instance consists of a transverse member 24 pinned to the stem and having its opposite ends concentric about the axis of the stem and externally threaded for engagement with the threads 14. The flat sides 25 of the member 24 are spaced sufficiently from the inner wall of the bore to provide the necessary fluid passage past the threaded connection.

The exact detail of the end plug construction and the threaded connection between the stem and bore is susceptible to modification and in Fig. 3 another construction is illustrated.

In this embodiment of the invention, the valve stem 15′ does not project exteriorly of the valve body, but has an externally threaded head 26 fixed to its end. This head 26 has a threaded connection with an internal thread 27 formed in the adjacent end of the bore 12′ which continues for the entire length of the transverse portion 11.

A screw slot 28 formed in the head 26 affords means for imparting rotation thereto, to effect axial adjustment of the valve stem, and the open end of the threaded bore is closed by a removable cap 29. Obviously, it is necessary to remove the cap 29 to effect adjustment of the valve stem, whereas, in the embodiment shown in Fig. 1, this adjustment may be effected without requiring the removal of any such cap.

The end plug illustrated in Fig. 3 differs from that shown in Fig. 1 only in the specific formation of the fluid passage past the end of the stem received in the bore 20. In place of the milled slot 23, drilled passages 30 are provided which extend from the inner end of the plug to a point adjacent the valve seat.

In both embodiments of the invention the discharge end of the transverse part 11 is preferably externally threaded to facilitate attachment of the valve to a burner head 31 indicated in dotted lines in Fig. 1 or to any other type of burner.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to one skilled in the art to which an invention of this character appertains that this invention affords a novel needle valve construction which by reason of its low cost of manufacture is particularly well adapted for use with gas cocks or the like; and it is also apparent that the construction of the needle valve embodied in this invention insures positive alignment between the needle point and the valve seat without necessitating difficult alignment between a drilled valve seat and a threaded portion; and further that the construction of this needle valve structure enables adjustment of the discharge volume while the device with which the valve is employed is functioning.

What I claim as my invention is:

1. A needle valve structure comprising, a body having a bore and an inlet leading thereto, a needle valve movable axially in said bore and pointed at one end, a plug closing one end of the bore and having a multiple diameter bore forming a guide way, a valve seat and a discharge orifice, the pointed end of the needle valve being snugly received in the guide way to be held thereby in proper co-axial alignment with the valve seat, said plug having means affording a fluid passage communicating the bore in the body with the multiple diameter bore in the end plug at a point adjacent the valve seat, and a threaded connection between the needle valve and the bore in the valve body to afford means for imparting axial movement to the needle valve.

2. In a valve, a body member having a bore, a needle valve movable axially in said bore, and an end plug closing the bore and having a longitudinal bore and a discharge orifice, a valve seat between the bore and the discharge orifice, said needle valve being snugly re-

ceived in the longitudinal bore to be held thereby in proper axial alignment with the valve seat, and said plug having means to provide a fluid passage from the bore of the body member to the bore in the plug adjacent the valve seat.

3. In a valve, a valve body, a needle valve movable axially in said valve body, an integral one-piece plug having a bore to snugly receive and firmly hold the needle valve for movement along a fixed axis, said plug also having a discharge orifice outwardly of the bore receiving the needle valve, a valve seat between the orifice and said bore with which the needle valve point cooperates, and means to conduct fluid from the interior of the valve body substantially past the bore receiving the needle valve.

4. In a valve, a valve body, a plug removably secured to the valve body and having a different diameter, co-axial communicating bores with the shoulder between two adjacent bores forming a valve seat, a needle valve within the valve body and having a pointed end snugly received in one bore of the plug and firmly held thereby in co-axiality with the valve seat, said plug having a fluid passage to one side of the bore in which the needle valve is received but terminating inwardly of the valve seat, and means for adjusting the needle valve axially with respect to the valve seat.

5. In a valve, a valve body, a needle valve movable axially within the valve body, an integral one-piece end plug carried by the valve body, said end plug having a two diameter bore axially therethrough with the shoulder between the bores affording a valve seat, the pointed end of the needle valve being snugly received in the larger of the two bores to be firmly held thereby and guided for movement in exact co-axiality with the valve seat, the inner portion of the plug in which said bore of larger diameter is formed having a transverse slot extending to a point adjacent the valve seat to afford a fluid passage from the interior of the valve body substantially past the pointed end of the needle valve received in said bore of larger diameter.

6. In a valve, a valve body having a bore threaded at one end, an end plug removably threaded in said bore to close one end thereof, said end plug having an axial passage therethrough comprising an inner bore and an outer bore of smaller diameter than said inner bore with the shoulder between the bores providing a valve seat, a needle valve within the bore of the valve body and having a pointed end snugly received in the bore of largest diameter in the end plug to be guided thereby into proper engagement with the valve seat, said plug having a fluid passage from its inner end portion to a point adjacent the valve seat, an externally threaded member carried by the needle valve and engaged with the internal threads of the bore whereby rotation of said needle valve imparts axial movement thereto to adjust its pointed end with respect to the valve seat, and said externally threaded member being formed so as to afford a fluid passage from the interior of the valve body past said externally threaded member.

7. In a valve, a valve body having a bore threaded at one end, an end plug removably threaded in said bore to close one end thereof, said end plug having an axial passage therethrough comprising an inner bore and an outer bore of smaller diameter than said inner bore with the shoulder between the bores providing a valve seat, a needle valve within the bore of the valve body and having a pointed end snugly received in the bore of largest diameter in the end plug to be guided thereby into proper engagement with the valve seat, said plug having a fluid passage from its inner end portion to a point adjacent the valve seat, an externally threaded member carried by the needle valve and engaged with the internal threads of the bore whereby rotation of said needle valve imparts axial movement thereto to adjust its pointed end with respect to the valve seat, said externally threaded member being formed so as to afford a fluid passage from the interior of the valve body past said externally threaded member, the end of the needle valve opposite its point extending out beyond the opposite end of the bore and exteriorally of the valve body to enable the needle valve to be turned from without the valve body, and means to provide a fluid-tight joint at the point of egress of the needle valve from the valve body.

8. In a valve, a valve body having a bore threaded at one end portion, an end plug removably threaded in said bore to close one end thereof, said end plug having an axial passage therethrough comprising an inner bore and an outer bore of smaller diameter than said inner bore with the shoulder between the bores providing a valve seat, a needle valve within the bore of the valve body and having a pointed end snugly received in the bore of largest diameter in the end plug to be guided thereby into proper engagement with the valve seat, said plug having a fluid passage from its inner end portion to a point adjacent the valve seat, the end of the bore opposite the plug also being internally threaded, a threaded head on the valve stem engaging said internal threads of the bore so that rotation of said needle valve imparts axial movement thereto to adjust its pointed end with respect to the valve seat, and a cap to close said last named end of the bore.

In testimony whereof I have hereunto affixed my signature.

EUGENE E. MEUSY.