May 27, 1941. F. H. RUTHERFORD 2,243,128

VALVE STRUCTURE

Filed Jan. 18, 1939

Fig. 1.

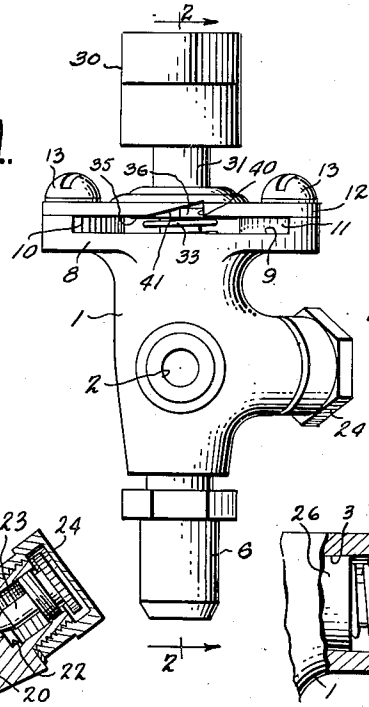


Fig. 4.

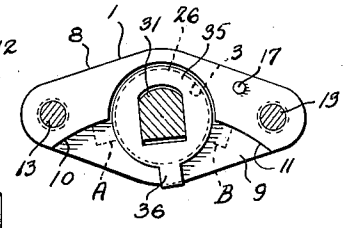


Fig. 3.

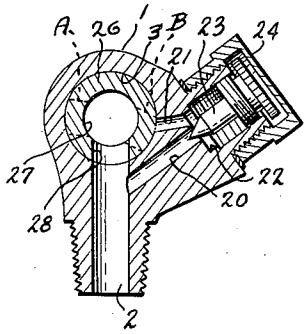
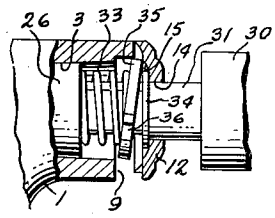


Fig. 6.



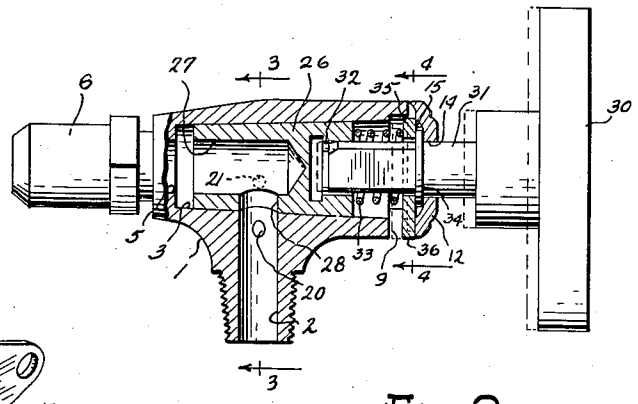


Fig. 2.

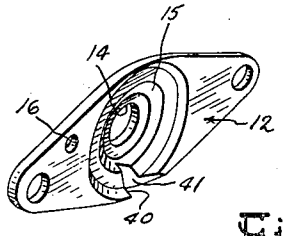


Fig. 5.

INVENTOR.
Francis H. Rutherford

BY
Barnes, Kisselle, Laughlin & Raisch
ATTORNEYS

Patented May 27, 1941

2,243,128

UNITED STATES PATENT OFFICE

2,243,128

VALVE STRUCTURE

Francis H. Rutherford, Detroit, Mich., assignor to Detroit Brass & Malleable Works, Detroit, Mich., a corporation of Michigan

Application January 18, 1939, Serial No. 251,459

2 Claims. (Cl. 251—165)

This invention relates to a valve structure especially useful as a gas cock.

Among the objects of the invention is the provision of a simple, fool-proof valve for controlling the flow of gas to the gas burner of a range so that relatively large and relatively small volumes of gas may be supplied to the burner for high and low flames respectively. To this end the valve is arranged so that it may be operated from "off" position to full "on" position in quite a conventional manner, with the valve being turned through about 90°. When the valve is thus operated it is positively stopped in both "off" and "on" positions. In this case the "on" position is an intermediate position, the valve being capable of further rotation in the "on" direction, but to do this the valve stem must be shifted to render the stop in full "on" position ineffective. Then the valve may be rotated further in the "on" direction to adjust the valve for a low flame or simmer flame and there is a definite stop in this position. The valve may be turned off from this simmer position without interference of any intermediate stop, and accordingly, it may be rotated until the rotation is prevented by the stop in "off" position.

A structure for carrying out the invention is shown in the accompanying drawing.

Fig. 1 is a bottom plan view of a valve constructed in accordance with the invention.

Fig. 2 is a sectional view taken substantially on line 2—2 of Fig. 1 with the valve, however, shown in a normally correct position.

Fig. 3 is a sectional view taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a view taken substantially on section line 4—4 of Fig. 2 with parts shown in elevation.

Fig. 5 is a perspective view of the under side of the cap.

Fig. 6 is a view in section showing one position of a stop member on the stem.

The valve has a body 1 with a threaded extension providing an inlet passageway 2, which extension is designed to be screwthreaded into a gas supply pipe or the like. The valve body has a tapered bore 3 into which the inlet passageway 2 extends and an outlet passageway 5, the outlet being completed by the usual jet 6. The body also has an enlargement at the end opposite the outlet for the reception of a cap, this enlargement being illustrated at 8, and this enlargement is milled away or slotted to provided a clearance or slot 9 defined by shoulders 10 and 11. A cap which may be of pressed metal, and illustrated at 12, is designed to be secured to the enlargement by screws 13. The cap has an aperture 14 for the passage of a valve stem, and the passage may be surrounded by a depression 15. The cap and body may have respectively an aperture 16 and a stud 17 for locating purposes so that the cap can be secured to the valve body only in correct position.

The valve body also has other gas passageways, the same being illustrated at 20 and 21, both communicating into a chamber 22, in which a controlling needle valve 23 is positioned for axial adjustment on screwthreads. The chamber is located in an enlargement on the valve body and the needle valve may be closed by a sealing cap 24.

Located within the chamber 3 is a rotary valve plug 26 tapered to fit against the seat and having an axial bore 27 and a port 28. A handle for controlling the rotary valve member is illustrated at 30 and it is secured to a stem 31 which is slidably and non-rotatably fitted into a recess 32 in the valve plug. A coil spring 33 acts upon the plug and reacts against the cap indirectly through a collar 34 fixed on the stem and a washer 35 which is slidably and non-rotatably secured to the stem and which has a locking finger or projection 36.

The projection 36 operates in the slot 9 and the slot is closed on one side by the cap. The cap is provided with a notch of such a shape as to provide an abrupt shoulder 40 and an inclined plane or cam surface 41.

As the valve is rotated by the handle the projection 36 moves in the slot 9. When the projection is against the shoulder 10, as indicated by position A of Fig. 4, the valve is "off." In this position the port 28 is in corresponding position A shown in Fig. 3. In this position the projection 36 is urged against the cap, but the washer 35 is slightly cocked as shown in Fig. 6 because the projection prevents the washer from seating squarely against the collar 34. When the valve is turned substantially through 90° the projection rides along and follows the incline 41 and abuts against the shoulder 40. In this position, as shown in the full lines in Figs. 3 and 4, the port 28 is in alignment with the inlet 2. Therefore, a full supply of gas may pass through the passageway 2, bore 27, outlet 5 and jet 6.

The valve may be operated to and from the "off" and "on" positions with the rotation positively limited by the shoulders 10 and 40. When it is desired to have a lower or simmer flame the valve handle is pushed inwardly, as indicated by the dotted lines of Fig. 2, and the collar 34 shifts

the washer 35 inwardly, and the projection 36 is moved off the shoulder 40 and into the slot 9, whereupon the valve may be turned further in a counter-clockwise direction until the projection 36 strikes the shoulder 11. The position of the projection at this time is indicated by the dotted line position B shown in Fig. 4 and the port 26 is in the corresponding dotted position B shown in Fig. 3. Accordingly, inlet passageway 2 is closed from the bore 27 but gas may flow through the passageway 20 and 21 through port 28 and into the bore 27. The volume of gas or rate of flow may be controlled by the adjustment of the needle valve 23. This is a simmering position.

When the valve is turned "off" by a clockwise movement, the projection 36 snaps passed the shoulder 40 and rides along the incline 41 with practically no perceptible variation in the torque required to turn the valve. Thus, regardless of the position of the valve in either full "on" position or simmer "on" position, it can be turned "off" by a rotary movement which may be continued until the projection is stopped by the shoulder 10. This is a safety feature in that no extra movements are required to turn the valve "off," other than a rotary motion.

Thus a simple valve structure is provided wherein a definite operation is provided between full "on" and "off" positions and wherein the valve may be turned "off" from any position merely by rotary movement. The preferred arrangement is that the valve moves from "off" position to full "on" position, with the result that a full flow of gas is supplied to the burner in the first instance. In this way the ignition of the burner is assured. This is an operation in contradistinction to an arrangement where the valve moves from "off" position to a simmer position, supplying a small flow of gas to a burner, in which event the ignition is not positive.

I claim:

1. A gas cock comprising a valve body and a rotatable valve member which have passageways which are out of registry in one extreme position of the valve member, some of which are in registry in another extreme position of the valve member and some of which are in registry in an intermediate position, a valve stem slidably and non-rotatably connected to the valve member, a cap secured to the valve body through which the stem extends, a collar on the stem inside the cap, a washer member non-rotatably and slidably mounted on the stem and positioned adjacent the collar, a spring between the valve member and the washer member, the body and cap being arranged to form a slot with a stop at each end, said washer member having a projection movable in the slot, the stops and projection determining the extreme rotary positions of the valve member, and a notch in the cap opening into the slot in said intermediate position, and defined by an abrupt shoulder and an inclined plane whereby the said valve stem may be rotated in one direction between stops without axial movement, said abrupt shoulder facing the stop at the end of the slot which determines that position of the valve member when the passageways are out of registry whereby the valve may be freely turned between positions determined by the abrupt shoulder and one of the stops.

2. A gas cock comprising a valve body and a rotatable valve member which have passageways which are out of registry in one extreme position of the valve member, some of which are in registry in another extreme position of the valve member and some of which are in registry in an intermediate position, a valve stem slidably and non-rotatably connected to the valve member, a cap secured to the valve body through which the stem extends, a collar on the stem inside the cap, a washer member non-rotatably and slidably mounted on the stem and positioned adjacent the collar, a spring between the valve member and the washer member, a projection on the washer, the body and cap forming a way with a stop at each end in which the projection moves, the spring holding the projection against one wall of the way and the stops determining the extreme rotary positions of the valve member, and a notch in said one wall defined by a shoulder positioned substantially at an abrupt angle to said one wall and by an inclined plane, said spring causing the projection to ride on the inclined plane and abut the shoulder whereby the notch stops the valve member in the intermediate position as it is rotated in one direction only, and the stem being axially shiftable to shift the washer to move the said projection out of the notch so that the same may be turned past the notch.

FRANCIS H. RUTHERFORD.