No. 896,237. PATENTED AUG. 18, 1908.

R. N. OAKMAN.

DISTANCE LIGHTING GAS BURNER VALVE.

APPLICATION FILED SEPT. 4, 1907.

Fig. 10.

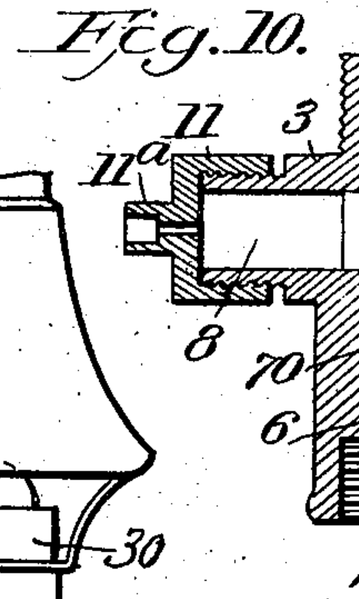


Fig. 11.

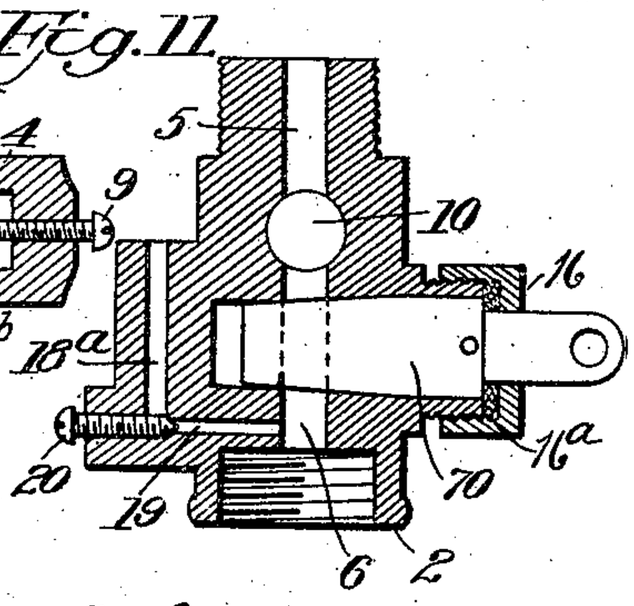


Fig. 1.

Fig. 2.

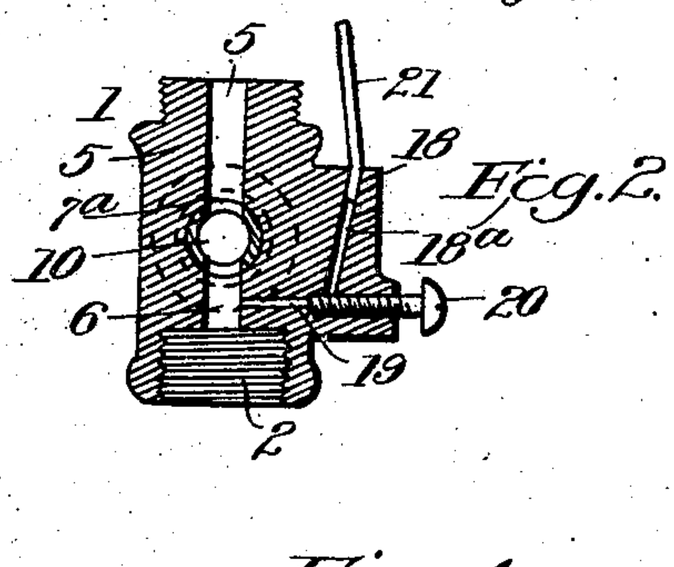


Fig. 3.

Fig. 4.

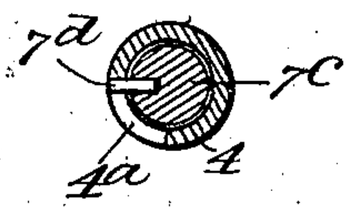


Fig. 5.

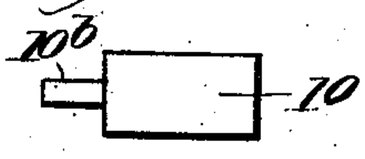


Fig. 6.

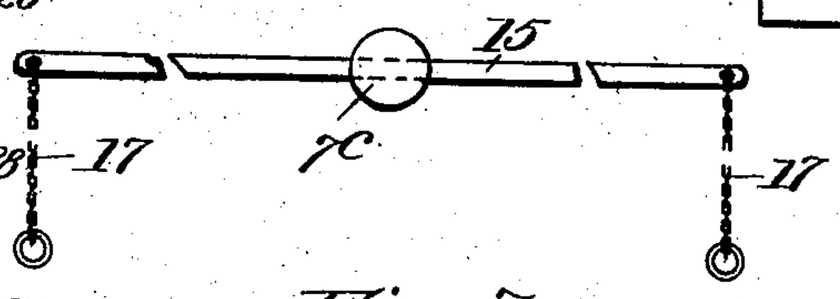


Fig. 7.

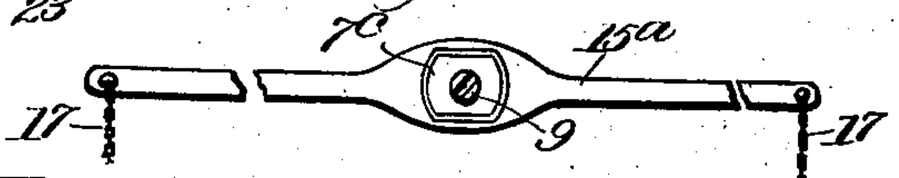


Fig. 8.

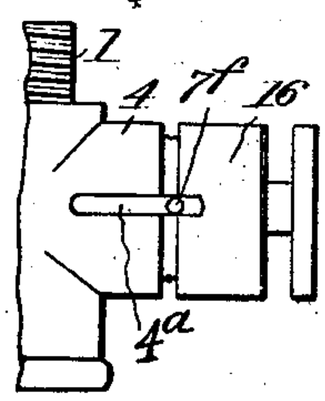
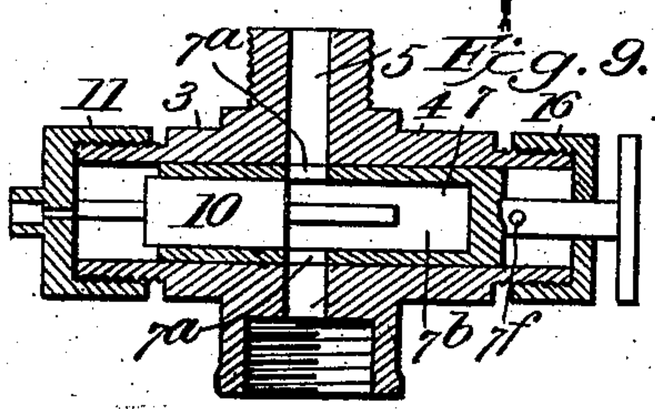


Fig. 9.



Witnesses

C. M. Walker.

J. T. Walker.

Inventor

R. N. Oakman

By E. B. Clark

Attorney

UNITED STATES PATENT OFFICE.

RICHARD N. OAKMAN, OF BROOKLYN, NEW YORK.

DISTANCE-LIGHTING GAS-BURNER VALVE.

No. 896,237. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed September 4, 1907. Serial No. 391,400.

To all whom it may concern:

Be it known that I, RICHARD N. OAKMAN, a citizen of the United States, residing at Brooklyn, State of New York, have invented certain new and useful Improvements in Distance-Lighting Gas-Burner Valves, of which the following is a specification.

This invention relates to valves for controlling gas conduits, particularly in distance lighting apparatus.

In distance lighting burners and connecting devices, in which a reciprocating piston valve is pneumatically operated, it sometimes happens that the piston valve will stick, due to impure gas, or condensation of oily or tarry matter on the valve or its casing, and it becomes necessary to mechanically push the piston, or open and clean the parts. This cannot be done, with the apparatus as now organized, without permitting leakage of gas, or cutting off the flow of gas at the meter, both of which are objectionable. If gas is cut off at the meter, other lights on the circuit will be cut out when it is only desired to clean one burner, or the piston valve of one burner. Even if an extra gas cock is connected in the pipe line between the meter and the distance lighting valve, the closing of such cock would cut off the flow of gas through the by-pass at the burner and extinguish the pilot light which would also be objectionable, besides involving extra expense for the cock and fitting. By my invention these defects and difficulties are overcome and I provide, in a single casing, a combination valve, having means for positively cutting off the flow of gas to the main burner, while permitting a continued flow to the pilot burner, and at the same time permitting the piston valve to be removed and cleaned without leakage of gas. This is quite advantageous in practice and permits the cleaning operation to be quickly performed.

The combination valve is neat, compact and effective, and can be conveniently manipulated.

The matter constituting my invention will be defined in the claims.

My invention is illustrated in the accompanying drawings, in which:—Figure 1 represents a sectional elevation of a gas burner, casing, valve and a switch pump, showing my improvements. Fig. 2 represents a transverse section of the casing, valve and by pass. Fig. 3 represents a longitudinal section of the valve plug of modified construction. Fig. 4 represents a transverse section on the line 4—4, Fig. 1, of the plug at end of casing. Fig. 5 represents a modified construction of piston valve. Fig. 6 represents an end view of the valve plug and cross-bar. Fig. 7 represents a modification of the same. Fig. 8 represents an elevation of part of the valve casing. Fig. 9 represents a longitudinal vertical section of the casing showing a modified construction of valve-plug. Figs. 10 and 11 represent vertical sections, one being at right angles to the other, of a modified construction and arrangement of valve casing and valves.

The burner pillar 1 is made with the usual screw-threaded socket 2 at the base and with an upward extension for attaching a gas and air mixing chamber 1^a of an incandescent burner. The pillar or valve casing is preferably cast with the opposite bosses or extensions 3 and 4 for containing a transverse valve and plug chamber 8 and is provided with the usual longitudinal gas passage leading to the mixing chamber. A valve chamber 8 is bored in the pillar or casing and its bosses or extensions 3 and 4 and is provided centrally with the gas ports 5 and 6 opening into the passageway to the burner. The rear end of chamber 8 is open for insertion of the hollow cut-off plug-valve 7, and it is tapered to correspond with the tapered plug-valve, as shown in Figs. 1 and 3. The chamber 8, however, may be made straight and of uniform diameter if the plug-valve 7 is to be moved longitudinally for opening and closing the ports 5 and 6 as shown in Fig. 9. The plug-valve is made with a straight, uniform, cylindrical bore from the front to the rear solid projecting end 7^c, to form a chamber for the valve 10 which is in the form of a piston, and the rear end of the chamber is, preferably, closed to form a closed space or chamber 7^b when the piston has closed the gas ports, the walls of the chamber being formed by the end of the piston, the opposing closed end of the chamber, and the inner periphery of the hollow plug-valve. The plug-valve is provided about centrally with ports 7^a, adapted to register with the gas ports 5 and 6. The rear end 4, Fig. 4, of the casing is cut away at 4^a, a quarter, or other arc, to form stops and to receive a projecting pin 7^d in the head 7^c of

the plug-valve. The head of the plug-valve may have a transverse opening to receive a bar 15, as shown in Figs. 1 and 6, or may be flattened on opposite sides to receive a bar 15[a], Fig. 7, having an opening adapted thereto. Pendent chains or cords 17 are attached to the ends of the bar 15 for oscillating or rotating the plug.

A suitable stop device is provided, either in the plug valve, or on the piston valve, at one or both ends thereof, for arresting the movement of the piston valve in the desired position in the chamber, and particularly in such position, after it has closed the gas-ports 5, 6 and 7[a], as to form a closed space or chamber 7[b] between the end of the piston and rear end of the chamber, as shown in Figs. 1, 9 and 10, the rear space 7[b] being of sufficient depth to prevent undue compression of air or gas therein, and consequent rebounding of the piston 10 when it is forced rearward to close gas-ports. I have found by practical tests, with this construction and arrangement of parts that, the piston 10 may be readily forced by pneumatic pressure rearward to close ports 5 and 6, and may be as readily retracted or drawn to the front of the chamber by exhaust, to open said ports, the movement of the piston, under the action of the exhaust, being aided by the presence of the slightly compressed air or gas on the rear side of the piston, it being readily understood that when the pressure on the opposite end of the piston is reduced, to an extent where it becomes less than the pressure within the space 7[b], as when the exhausting takes place, the air or gas contained in said space will tend to resume its normal condition, thereby acting to move the piston in the direction it must travel under the action of the exhaust. In actual practice I have found that by this construction and arrangement of the piston relative to the chamber within which it operates, the movement of the piston in the direction to open the gas ports of the plug valve, is exceedingly rapid, and that liability of the piston to stick is greatly lessened. This operation is not only facilitated by the presence of the slight compression on the rear side, which compression continues as long as the pressure on the opposite end of the piston is maintained, but its presence requires the use of an exhaust-producing structure of less power than where the space at the rear end of the piston is open to the atmosphere (the operation of the piston in such case being similar to that of a dash-pot), since the movement of the piston under the exhaust must be such as to draw into the space which is being vacated by the piston a corresponding quantity of air; and as the relative areas of the piston and air inlet are of considerable difference, the power required to provide this movement of the piston must be sufficient to overcome this difference; in other words, the piston is not free to move under the action of the exhaust. An important advantage of this construction is that leakage of gas from the valve-chamber is entirely prevented, thereby overcoming a serious objection to distance lighting devices.

The piston valve 10 is made cylindrical and is provided centrally at one end with a stop pin 10[a] which may be made integral with the body, or may be inserted therein by means of a screw-threaded connection, or in other desired manner. It is also provided with a stop-pin 10[b]. The stop-pin 10[a] will stop the piston after it has closed the gas ports, so as to form a closed air space 7[b], as heretofore explained. The stop pin 10[b] serves for application of pliers for withdrawing the piston when the cap 11 has been removed from the valve chamber.

The piston 10, Fig. 5, may be made without a stop-pin, 10[a], but with only a stop-pin 10[b], and used with the modified form of valve plug, shown in Fig. 3. In this construction, the valve plug 7 is provided with a screw-threaded opening in its head 7[c], in which is inserted an adjustable pin or screw 9 for arresting the piston in the proper position after it has closed the gas-ports.

The presence of the stop pin in the path of movement of the piston in a direction toward the rear end of the space 7[b], limits the movement of the piston in that direction and consequently controls the amount of compression placed on the air or gas contained in said space. If such stop pin be omitted, the movement of the piston in that direction would be controlled by the amount of pressure exerted by the pressure-applying mechanism operating on the opposite end of the piston, it being understood that when the pressures on the opposite ends of the piston become equal the piston will remain stationary. As such latter compression might prove greater than required, the presence of the stop pin will limit the amount of compression, thereby leaving an excess of pressure on the opposite end of the piston. And where the stop pin is adjustable such compression may be varied to suit the conditions present in the installment of the apparatus.

The front end of chamber 8 is closed by a screw-cap 11, having a hollow screw-threaded nipple 11[a]. The end of an air pipe 13 is flanged and inserted in the nipple and held in place by a hollow nut 12, which is screwed into the nipple against a packing around the pipe. Pipe 13 is extended and connected by a similar coupling to that above described, with a switch pump 14, located at any desired distant point, for conveniently operating the piston valve by pneumatic pressure and exhaust. The rear end of chamber 8 is closed by a screw-threaded cap

16 which serves to set up the plug 7 to its tapered seat in chamber 8.

The casing, at one side, is provided with a boss 18, in which are drilled by-pass passages 18[a] and 19, as shown in Fig. 2, the passage 19 being provided with a controlling valve 20. It is to be noted that the by-pass 19 connects with the gas supply in the pillar or casing below the cut-off valve 7 and piston valve 10, so that when valve 7 is turned or otherwise moved to close the gas ports 5 and 6, there will still be a flow of gas through the by-pass and pilot tube 21 to the point of ignition of an incandescent gas burner, or other form of burner. The pilot tube 21 will, in practice, extend up through the mixing chamber 1[a] and thence to the upper mixing chamber of an incandescent burner. The Bunsen burner is of a well known construction, having a needle-valve and an adjustable cap 30, for controlling the flow of gas into the mixing chamber 1[a].

The switch pump 14 is composed of a casing 22, having a cover plate 23, provided with openings, for the projections or push buttons of the plunger; and the casing is provided with a cylinder 24 containing a piston 25. The casing is also provided with an opening 29, in which is fitted a plunger having a push projection 27. The piston has a push projection 26. Both plungers, having the push projections 26 and 27, are engaged by a pivoted, vibrating lever 28. This is only one form of switch pump which may be used for pneumatically operating the piston valve at a distance from the burner.

It is important to provide a cut-off valve, as plug 7, and an adjacent piston valve, and they are preferably constructed and arranged as above described, but my invention is not limited to the particular arrangement shown, so long as a by-pass is provided, leading from the main supply of gas around the cut-off valve and the piston valve to a pilot tube and burner. For instance, a cut-off valve-plug 70, Figs. 10 and 11, having a port or passage for gas, may be arranged in a casing, and in the same casing, slightly above the plug valve, may be placed a valve chamber 8 and reciprocating piston valve 10, having connections and means for pneumatically operating the same. The valve casing in this instance would be provided with by-pass passages 18[a] and 19 connecting with the main gas passage below the cut-off valve, Fig. 11, and extending around both valves to a pilot tube connection. An annular washer 16[a] is placed between the shoulder of the plug 70 and the head of cap 16 so that the revolution of the plug shall not unscrew or loosen the cap. This construction is within the scope and spirit of my invention, and would provide for positively cutting off the main supply of gas to the main burner, while permitting a flow to the pilot burner, and at the same time, permitting the piston valve-chamber to be opened, the piston removed and cleaned, and the chamber cleaned, and the piston again returned to its place, leaving the gas-ports open. The piston valve-chamber would then be closed by its cap 11, and the cut-off plug-valve 70 could be opened, or turned for causing its passageway to register with the gas-ports 5 and 6 in the casing. Other details of construction may be modified without departing from the spirit of my invention.

Referring to Figs. 8 and 9:—the valve plug 7 may be made externally of uniform diameter, or cylindrical, so as to close the ports 5 and 6 by a longitudinal movement, or regulate the flow of gas by causing the ports 7[a] to register, more or less, with the ports 5 and 6. A radial pin 7[f] is secured in the head of plug 7 or its stem, and projects through a longitudinal slot 4[a] in the wall of the casing as shown in Fig. 8. This pin prevents revolution of the plug and serves as a handle for moving the plug longitudinally to control the gas ports.

In the use of distance lighting burners, the pilot burner is kept lighted, the flow of gas thereto being controlled by valve 20. In Fig. 1 the piston valve 10 is shown in the rearward position so that its body covers the gas ports 5, 6 and 7[a], and therefore shuts off the flow of gas to the main burner. When it is desired to ignite gas at the main burner, the pressure and exhaust device or switch pump 14 will be operated to exhaust air or other fluid from the front end of chamber 8 and thereby cause the piston to slide into the front end and open the gas ports. While the piston is in this position, the gas ports may be closed and opened by rotating the cut-off plug-valve in the usual manner. The flow of gas may be regulated by adjusting the plug-valve so as to open, more or less, the ports 5 and 6. In using the reciprocating piston-valve for distance lighting, the port 7[a] must register more or less with the ports 5 and 6.

If it is desired to remove the piston for cleaning, or any other reason, the gas may be cut off by the plug-valve without affecting the flow of gas through the by-pass to the pilot burner. If there are a number of lights on the circuit, this cutting out can be done without affecting the other lights. The gas can be turned on or off at the lamp or burner by means of the plug-valve, or from a distance by means of the air switch pump, operating to move the piston-valve back and forth.

Having described my invention, what I claim and desire to secure by Letters Patent, is:—

1. The combination with a casing having a gas conduit, of a transverse plug-valve having a longitudinal cylindrical chamber and

transverse ports, a piston and means for moving the same back and forth in said chamber, to open and close the conduit while the plug-valve is in the open position.

2. The combination with a casing having a gas conduit, of a plug-valve crossing the conduit and having a longitudinal cylindrical chamber provided with a closed head, a piston and means for moving the same back and forth within said chamber, to open and close the conduit, said piston and the opposing closed head forming a closed fluid space.

3. The combination with a casing, having ports, of a hollow plug valve having ports, a reciprocating piston in the plug and means for arresting its movements, after it has closed the ports, the end of the piston and the walls of the valve forming a closed fluid space at the rear of the piston, substantially as described.

4. The combination with a casing having a gas conduit, of a plug-valve crossing the conduit and movable to control the passage of gas therethrough, said valve being normally in open position, and a reciprocating valve movable across said conduit, the movements of the valves being independent of each other, the reciprocating valve controlling the passage of gas through the conduit while the plug-valve is in its open position.

5. The combination with a casing having a gas conduit, of a plug-valve crossing the conduit and movable to control the passage of gas therethrough, said valve being normally in open position, and a reciprocating piston carried by the plug-valve and movable independent thereof, said piston controlling the passage of the gas while the plug-valve is open.

6. The combination with a casing having a gas conduit; of a hollow plug valve crossing said conduit, and an independently-operated piston mounted to reciprocate within said plug valve, said piston opening and closing the passage of gas through the conduit while the plug-valve is in an open position.

7. The combination with a casing having a gas conduit, of a hollow plug-valve crossing said conduit, said valve having a closed end and a piston mounted to reciprocate within said valve, said piston and the opposing closed end forming a closed fluid space.

8. The combination with a casing having ports, of a hollow plug-valve having ports adapted to register with the casing ports, one end of said plug being closed to form a solid head, a reciprocating piston in the plug valve, said piston and the solid head forming the end walls of a chamber, and an adjusting pin or screw projecting through the solid head of the plug into said chamber.

9. A casing having a gas conduit and also having a piston chamber formed with a closed head, said chamber crossing the gas conduit, a piston mounted to reciprocate within said chamber, the piston and the closed end of the chamber forming a closed fluid space, means being provided for limiting the movement of the piston toward said closed end, whereby the compressing action of the piston may be controlled.

10. The combination with a casing having ports, of a hollow plug-valve having ports adapted to register with the casing ports, one end of said valve being closed to form a solid head, a reciprocating piston in said valve, said piston and the solid head forming the end walls of a chamber, an adjusting pin or screw projecting through the solid head of the valve into said chamber, means for moving the valve to adjust the ports, and independent means for reciprocating the piston.

11. The combination with a casing having ports, of a hollow plug-valve having ports adapted to register with the casing ports, one end of said valve being closed to form a solid head, a reciprocating piston in said valve, said piston and the solid head forming the end walls of a chamber, an adjusting pin or screw projecting through the solid head of the valve into said chamber, means for moving the valve to adjust the ports, means for limiting the movement of the valve, and independent means for pneumatically reciprocating the piston.

12. The combination with a casing, having ports, of a hollow plug, closed at one end and having ports, and means for turning and stopping it, a reciprocating piston in the plug and means for pneumatically reciprocating it, substantially as described.

13. The combination with a casing, having ports, of a hollow cut-off plug valve, having ports, and means for turning and stopping it, a reciprocating piston in the plug and means for pneumatically reciprocating it, and a by-pass communicating with the main gas supply below the cut-off plug valve and passing around the same to a pilot burner, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD N. OAKMAN.

Witnesses:

M. TURNER,

FRANK HAYWARD.