F. W. OBENHAUS.

VALVE.

APPLICATION FILED MAR. 7, 1918.

1,288,968. Patented Dec. 24, 1918.

Fig. 1.

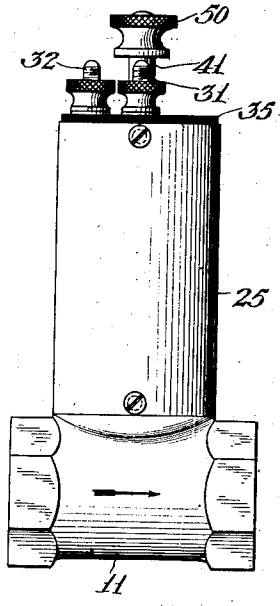


Fig. 2.

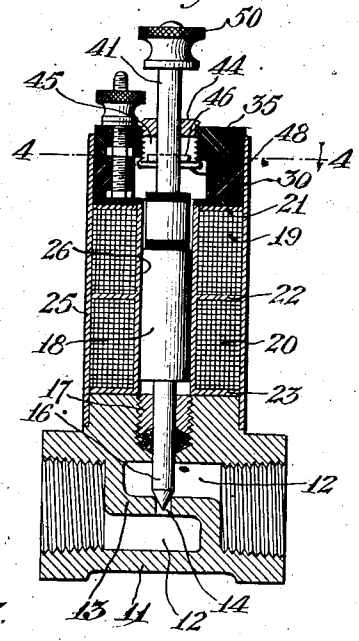


Fig. 5.

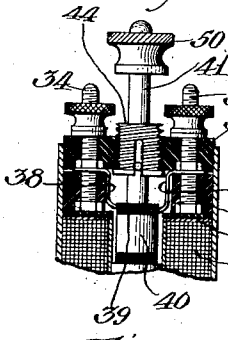


Fig. 3.

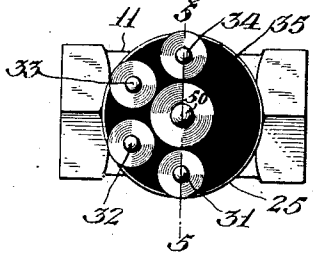


Fig. 4.

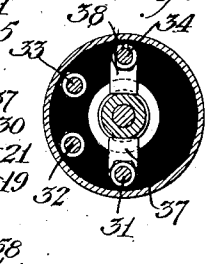
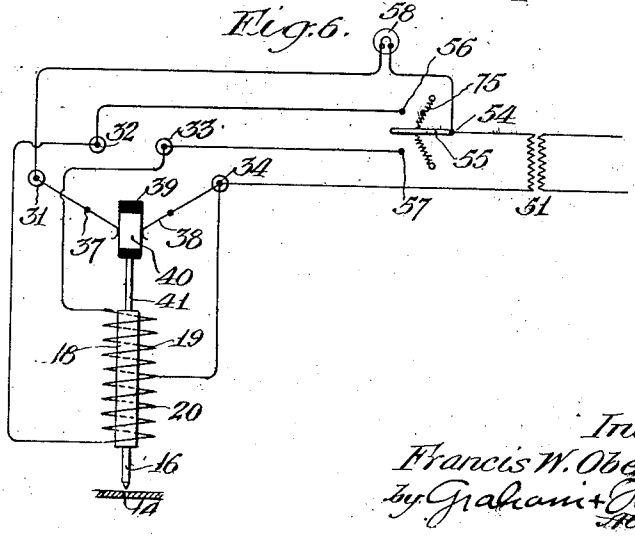


Fig. 6.



Inventor
Francis W. Obenhaus
by Graham & Harris
Attorneys

UNITED STATES PATENT OFFICE.

FRANCIS W. OBENHAUS, OF PASADENA, CALIFORNIA, ASSIGNOR TO UNIT SYSTEM OF HEATING & MANUFACTURING COMPANY, A CORPORATION OF CALIFORNIA.

VALVE.

1,288,968. Specification of Letters Patent. Patented Dec. 24, 1918.

Application filed March 7, 1918. Serial No. 220,968.

To all whom it may concern:

Be it known that I, FRANCIS W. OBENHAUS, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Valve, of which the following is a specification.

My invention relates to valves and particularly to electrically operated valves.

The principal object of my invention is to provide an electrically operated valve which is adapted to control the flow of gas to gas heated appliances.

A further object of the invention is to provide a valve in which is incorporated a signal switch of novel design.

Further objects will be made evident hereinafter.

Referring to the drawings which are for illustrative purposes only,

Figure 1 is a side elevation of a valve embodying my invention.

Fig. 2 is a vertical central cross section through said valve.

Fig. 3 is a top view of the same.

Fig. 4 is a section on a plane represented by the line 4—4 of Fig. 2.

Fig. 5 is a partial section on a plane represented by the line 5—5 of Fig. 3.

Fig. 6 is a diagram of connections.

The form of my invention shown in these drawings consists of a valve body 11 having a central cavity 12 therein, this cavity having a central diaphragm 13 with a small opening 14 therein. Each end of the cavity 12 is threaded to receive a gas pipe, not shown. One of these gas pipes goes to the source of supply and the other to the appliance. Resting on a valve seat, formed at the upper end of the opening 14, is the conical end of a valve stem 16 which passes through a stuffing box 17 and has rigidly connected thereto a core 18 of magnetic material such as Swedish iron. Surrounding the core 18 are a pair of coils, one of which, 19, may be called the opening coil, and the other of which, 20, may be called the closing coil. Iron washers 21, 22, 23 are provided at the top and bottom of the coils 19 and 20 and therebetween, as shown. Outside the coils and secured to the body 11 is an iron shell 25, and inside the coils and around the core 18 is a thin brass tube 26 in which the core 18 slides.

Resting on the top of the washer 21 is an insulating washer 30 in which four studs 31, 32, 33 and 34 are secured. The studs pass through a second insulating washer 35. The washer 30 has a cylindrical central hole of considerably greater size than the core 18, and secured under the studs 31 and 34 are a pair of copper brushes 37 and 38. These brushes project downwardly as shown in Fig. 5 and contact with an insulating ring 39 or with a conducting ring 40. The insulating ring is carried on an adjusting stem 41 secured in the top of the core 18, and the conducting ring 40 is carried on the ring 39 and insulated thereby from the stem 41.

Threaded in the washer 35 is a locking nut 44, this nut being drilled to fit loosely around the stem 41 and having a slot 45 in which a pin 46 carried in the stem 41 is secured. A head 48 is formed on the bottom of the nut 44 so that when the nut 44 is threaded into place from the under side of the washer 30 it cannot be removed by screwing it upwardly in that washer. Formed on the extreme upper end of the stem 41 is a knurled adjusting nut 50.

The coils 19 and 20 have a common terminal which is connected to the stud 34. The other end of the coil 19 is connected to the stud 33 and the other end of the coil 20 is connected to the stud 32 as shown in Fig. 6. I provide a transformer 51 and connect one terminal of the low tension winding thereof with the stud 34. The other terminal of the low tension winding I connect to the center post 54 of a switch having a swinging arm 55. This swinging arm is so designed that it can make contact with either of two posts 56 and 57 which are connected to the studs 32 and 33 respectively, standing normally, however, in the neutral position as shown in Fig. 6 due to two springs 75, and automatically returning to that position unless manually held in contact with the posts 56 and 57. A lamp 58 is also connected between the post 54 and the stud 31. The lamp 58 is located in such a position that it is visible to a person manipulating the switch arm 55. A battery may be substituted for the transformer 51 if de-

sired and any convenient form of switch may be used, that shown being merely diagrammatic.

The method of operation of my invention is as follows:

With the parts in the position shown in Fig. 2 the valve is closed and all flow of gas through the opening 14 is interrupted due to the conical bottom of the valve stem 16 closing the top of that opening. If now the switch arm 55 be thrown over in such a manner as to make contact with the post 57, current will flow from the transformer 51 to the post 54, through the arm 55, to the post 57, and to the stud 33. From the stud 33 it will flow through the coil 19 to the stud 34 and thence to the other side of the transformer, thus completing the circuit.

The energizing of the coil 19 will lift the core 18, the magnetic circuit being through the upper washer 21, the iron shell 25, the center washer 22, the core 18 and through an air gap between the upper end of the core 18 and the washer 21, at which point there will be a magnetic attraction tending to lift the core 18. As the core 18 is lifted it will lift the valve stem 16 thus opening the hole 14. It will also lift the stem 41, lifting the insulating ring 39 with its conducting ring 40.

With the valve closed, or with the parts in the position shown in Fig. 2, the brushes 37 and 38 rest on the insulating ring 39 and there is no circuit therebetween. When the stem 41 is lifted the conducting ring 40 is lifted so that it contacts with both of the brushes 37 and 38, thus connecting them electrically. When this occurs current flows from the transformer 51 through the lamp 58 through the stud 34, the brush 38, the ring 40, the brush 37, the stud 31, the lamp 58, the post 54, and back to the transformer. The lamp therefore is energized and visible whenever the valve is open and the lamp and switch may be placed at any convenient point so that the valve may be conveniently and intelligently operated, the operator knowing, for example, from the fact that the lamp is burning that the valve is open.

Whenever it is desired to close the valve the switch arm 55 is thrown over to contact with the post 56 and current flows from the transformer 51, to the post 54, through the arm 55, to the post 56, to the stud 32, through the closing coil 20, to the stud 34 and back to the transformer 51. The energizing of the coil 20 causes a magnetic flux to flow through the washer 23, the shell 25, the center washer 22, the core 18 and through an air gap between the washer 23 and the lower end of the core 18, causing a downward pull on the core 18 which is sufficient to seat the conical end of the valve stem 16 in the hole 14.

The stuffing box 17 serves to prevent gas from escaping from the cavity 12 and also serves as a friction means tending to hold the stem 16 in any position into which it may be forced by the action of the coils 19 and 20. Although I have used the terms up and down and equivalent expressions, it should be understood that they refer only to the position of the parts as shown on the drawing. In practice the valve can be operated in any position, gravity not being depended upon in any way in its operation.

I prefer to use for the switch a switch having an arm 55 which normally sets between the posts 56 and 57 and which returns to this position whenever it is released, due to the centering action of two springs 75, thus preventing the coils 19 and 20 from being energized except at such times as an operator actually has his hand on the arm 55.

By turning the stem 41 by means of the knurled adjusting nut 50 the locking nut 44 is turned in the head 35 and raised and lowered in that head. The slot 45 is of such a length and the pin 46 is so placed that when the nut is turned to its extreme bottom position the pin 46 is resting in the extreme upper end of the slot 45. In this position the stem 41 is forced to its extreme bottom position and the stem 16 is forced down so that its conical end tightly closes the hole 14.

The purpose of this arrangement is twofold. In the first place, it is possible by adjusting the position of the nut 44 to limit the amount of opening of the valve so that the amount of gas passed can be regulated. Second, it is possible to force the stem 16 down and close the hole 14 entirely when it is desired to put the valve out of commission for a period. This occurs for example in domestic installations where the valve is used in connection with heating devices which are shut down entirely during the summer months. In such a case the householder in the spring will screw down the valve solidly so that it tightly shuts off the gas and is locked in this position regardless of any manipulation of the switch. The stem 41 also provides a ready means of manually working the valve for testing or repair purposes.

What I claim is:—

1. A system of remote control for the gas supply of heating appliances comprising an electrically operated valve; an operating switch located at a point remote from said valve; an indicator so located as to be visible to a person operating said operating switch; means by which said operating switch can actuate said valve to open or close same; and means operated by said valve for actuating said indicator.

2. An electrically operated valve comprising a valve body having an opening therein

through which the fluid to be controlled passes; valve means for closing said opening to prevent gas from passing therethrough; electrically operated mechanism for actuating said means; contacts for connection to a signal circuit; and means actuated in synchronism with said valve means for causing said contacts to open and close said signal circuit.

3. In an electrically operated valve a valve locking means comprising a core; an adjusting stem secured to said core; a projection on said stem; a stationary member rigidly secured to the valve body; and a nut threaded in said stationary member, said adjusting stem passing through said nut, and said nut being so placed that it can be turned in said stationary member in such a manner as to strike against said projection and force said valve stem to close said opening.

4. A valve as in claim 3 in which the projection on said adjusting stem is in the form of a pin and in which the adjusting nut is provided with an axial slot in which said pin slides in such a manner that said nut can be turned by turning said adjusting stem.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 28th day of February, 1918.

FRANCIS W. OBENHAUS.