May 17, 1932. J. B. BURDETT 1,858,291

VALVE

Filed May 29, 1930

Fig. 1.

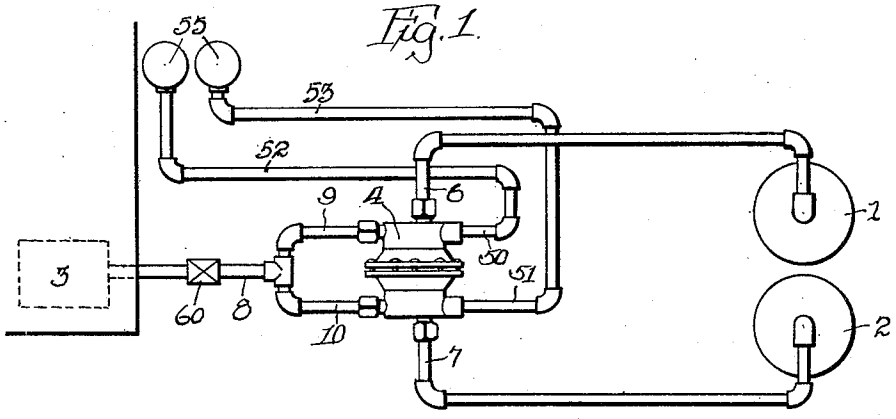
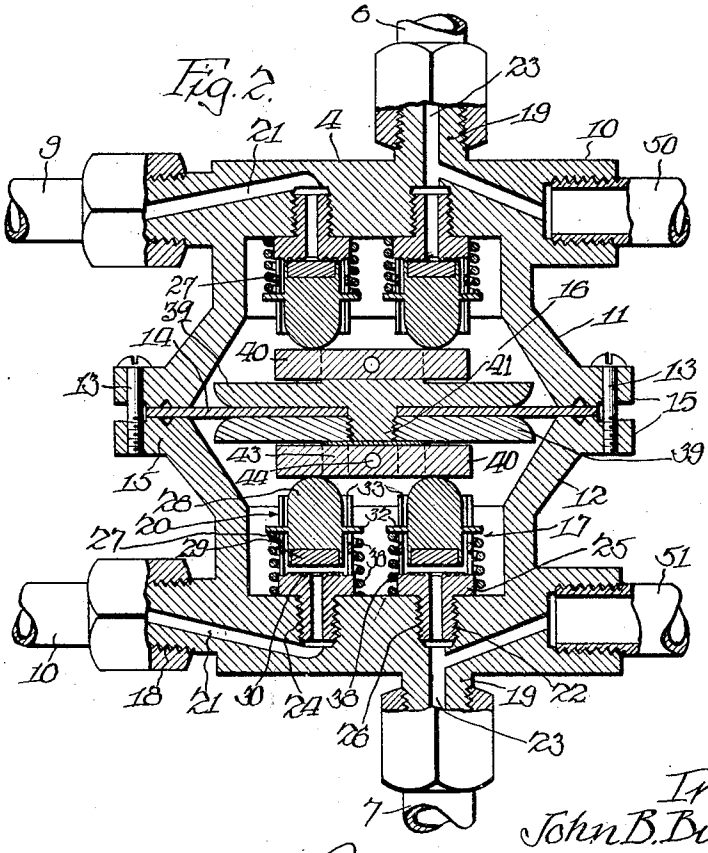


Fig. 2.



Inventor:
John B. Burdett:
By Jones, Addington, Ames & Seibold
Attys.

Patented May 17, 1932

1,858,291

UNITED STATES PATENT OFFICE

JOHN B. BURDETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO BURDETT MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

VALVE

Application filed May 29, 1930. Serial No. 456,874.

My invention relates to systems for feeding gas under pressure to a part to be supplied, and more particularly to a valve structure for use in such systems permitting the connection of any number of sources of supply so that the gas may be fed to said part first from one source and then from the other source, the valve acting as a cut-off for either source when the other source is connected and feeding gas to said part.

There are many systems in use today in which the gas used for heating and lighting purposes is furnished under high pressure in supply tanks or cylinders. Heretofore, as one of these tanks would exhaust, the system required shutting down until the empty tank could be removed and a filled tank substituted. If the user inadvertently failed to keep one or more filled tanks available, he would be inconvenienced to the extent of being without heat or light until a filled tank could be obtained. And should a filled tank be immediately available for connection to the system, the use of the system would be temporarily impaired until the substitution is made. These tanks are generally required to be placed at a distance from the house, or part to be supplied, and obviously during inclement weather and at night the work of making the substitution is most unpleasant.

An object of this invention is to provide a valve connection of relative simplicity and one that is durable and efficient, which allows connecting and which so operates automatically that as one tank empties another tank is connected, and the tank which empties is automatically cut off from communication with the burner. It will be apparent that the structure suggested is inexpensive and assures a constant supply of gas. The arrangement permits the substitution of a filled tank for the tank emptied during a time when another tank is discharging, and consequently no delay in the use of the system will be experienced.

Other objects and advantages of the present invention will be apparent from the detailed description when taken in connection with the accompanying drawings, which form a part thereof:

In the drawings, Figure 1 is a diagrammatic layout of a system employing a valve embodying the invention; and

Fig. 2 is an enlarged, detailed sectional view of the valve.

It will be understood, at the outset, that the valve mechanism disclosed by me may be used in various other systems than the one shown and described. However, I find that certain benefits and advantages are to be obtained by adopting this valve mechanism to such systems as are specifically mentioned, inasmuch as any number of sources of supply may be arranged to be automatically connected successively to the burner when the particular tank connected and discharging to the burner is exhausted.

In the drawings, there is diagrammatically illustrated in Figure 1 a system comprising any number of sources of supply, such as tanks 1 and 2, a part to be supplied or burner 3, and a valve mechanism 4 interposed in the connections between the sources of supply and the burner.

The arrangement shown preferably has a connection 6 leading from source 1 to valve mechanism 4, and a connection 7 leading from source 2 to valve mechanism 4. Burner 3 communicates with valve mechanism 4 by a common connection 8, which branches into two parts 9 and 10, these branch connections being in communication at all times with pipe 8.

Valve mechanism 4 is specifically shown in detail in Fig. 2. It comprises preferably a housing 10 of two parts 11 and 12, both being of the same construction and secured together by bolts or screws 13. A diaphragm 14 is clamped between the flanges 15 of said housing parts to divide housing 10 into two separated chambers 16 and 17. Inlet and outlet nipples 18 and 19 are provided on each of the housing parts, and, within each of these chambers 16 and 17, valve members 20 are provided for the inlet and outlet connections.

Inlet nipples 19 are each provided with a passage 23, which communicate with the chambers 16 and 17 by internally threaded enlarged openings 22. Likewise, outlet nipples 18 are provided with passages 21, which

communicate with the chambers 16 and 17 by enlarged internally threaded openings 24.

Internally threaded inlet openings 22 and outlet openings 24 of each chamber are each adapted to receive a valve seat member 25 having reduced threaded shanks 26 fitting into these openings 22 and 24. Seat member 25 forms, as a matter of fact, a part of each valve member 20.

These valve members 20 are substantially the same for the inlet and outlet connections of the chambers 16 and 17. They each comprise a valve guide 27 fitted upon seat members 25. These guides accommodate the movable valve bodies 28 having valve discs 29 provided therein, which valve discs are adapted to rest upon seats 30 of members 25. It will be noted that valve seat 30 preferably consists of a series of annular projections arranged to receive in fluid-tight relation the valve disc 29. Each valve body 28 is preferably provided with opposed fingers 32 for movement in vertical slots 33 in valve guides 27. A spring 38 is preferably furnished to normally keep the valves off their seat.

Diaphragm 14 may be furnished with suitable clamping plates 39 carrying opposed bearing plates 40, each bearing plate 40 functioning to hold the opposite valves seated.

One of the clamping plates 39 may have a threaded shank 41 passing through diaphragm 14. The other clamping plate 39 may have a threaded opening which fits onto threaded shank 41. These clamping plates 39 may then be furnished with projections 43, shown in dotted lines, to which bearing plates 40 are attached, say by pins 44.

It will be observed that the area of the valve discs 29 exposed to the pressure at the inlet connections is very much less than the area of the diaphragm 14 on opposite sides which is exposed to the pressure of the fluid in the chambers 16 and 17. Consequently, fluid under pressure entering one of these chambers with its inlet valve unseated will cause diaphragm 14 to move against the valve members 20 in the opposite chamber. The difference in effective pressure areas of these parts, subject to the pressure, will hold the diaphragm 14 against the opposite valve members, thereby closing off their inlet and outlet connections.

As illustrated in Fig. 2, the upper valve members are being held against their seats. The connections 6 and 9 are therefore cut off, and the gas from source 1 is not permitted to enter chamber 16. As thus shown, the source of supply or tank 2 is feeding gas through connection 7, inlet passage 23, into chamber 17, out of outlet passage 21, through connection 10, connection 8, and to the part to be supplied or burner 3.

Under certain conditions, tanks 1 and 2 when filled may contain the gas under a relatively high pressure range, say from between 90 and 100 pounds. The valve structure 4 shown is of a construction which permits the tank 2 to exhaust substantially all of its gas to the burner 3 before it will be cut off and tank 1 connected. A pressure reducing valve 60 may be conveniently furnished in line 8, if so desired.

For the convenience of the user, I provide connections 50 and 51 for the chambers 16 and 17, respectively, which connections are adapted to receive pipes 52 and 53, respectively. These pipes lead to a point in close proximity to burner 3, or to the building in which the burner 3 is disposed. At the end of pipes 52 and 53, pressure gauges 54 and 55 may be attached so that the user may at all times know the pressure of the gas in each of tanks 1 and 2. Assuming that tank 2 is completely exhausted of its gas under pressure, valve mechanism 4 automatically functions to close valve members 20 in chamber 17 so that the inlet and outlet connections 18 and 19, respectively, are closed. Closing of the valve members 20 in chamber 17 automatically opens valve members 20 of chamber 16, so that the gas under pressure in tank 1 is thereupon allowed to feed to the burner through this valve mechanism 4. Gauge members 55 will indicate to the occupant of the building that tank 2 has been exhausted in order that he may have ample time to replace it with a filled tank.

Without further elaboration, the foregoing will so fully explain the gist of my invention, that others may, by applying current knowledge, readily adopt the same for use under varying conditions of service, without eliminating certain features, which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. In a system of the class described, the combination of independent sources of fluid supply, a part to be supplied, mechanism including a chamber for each source, valve members in said chambers, a connection leading from each source to its corresponding chamber, a connection leading from each chamber to said part to be supplied, and a diaphragm separating said chambers and operating said valve members alternately to connect said sources to the part to be supplied, said valve members being held in actuated position by the pressure of the connected source and remaining actuated until said pressure is substantially exhausted.

2. In combination, independent sources of fluid supply, a part to be supplied, a valve having a chamber for each source, a connection leading from each source to its corresponding chamber, a connection leading from each chamber to said part to be supplied, a diaphragm separating said chambers, and

valve means associated with said diaphragm and actuated thereby to control the flow of fluid from said sources to said part to be supplied, said valve means being held in actuated position by the pressure of the connected source and remaining actuated until said pressure is substantially exhausted.

3. In combination, independent sources of fluid supply, a part to be supplied, a valve having a chamber for each source, a connection leading from each source to its corresponding chamber, a connection from said chambers to said part to be supplied, a diaphragm separating said chambers, and valve means in each chamber arranged to be actuated by said diaphragm for alternately connecting each source and its corresponding chamber to said part to be supplied, said valve means being held in actuated position by the pressure of the connected source and remaining actuated until said pressure is substantially exhausted.

4. In combination, independent sources of fluid supply, a part to be supplied, a valve having a chamber for each source, a connection leading from each source to its corresponding chamber, a connection from said chambers to said part to be supplied, and valve means associated with pressure actuated means disposed between said chambers for alternately connecting each source and its corresponding chamber to said part to be supplied, said valve means being held in actuated position by the pressure of the connected source and remaining actuated until said pressure is substantially exhausted.

5. In combination, independent sources of fluid supply, a part to be supplied, and valve means including connections between said sources of supply and said part to be supplied to feed the fluid to said part first from one source and then from the other source, said valve means comprising valve members and a diaphragm for actuating the valve members, said diaphragm being disposed between said valve members, said connections and valve members being arranged to cut off either source from the other source and said part when the other source is supplying fluid to said part, said valve members being held in actuated position by the pressure of the connected source and remaining actuated until said pressure is substantially exhausted.

6. In a valve of the type described, the combination of a housing, a diaphragm dividing said housing into separated chambers, an inlet and an outlet for each chamber, each inlet being adapted to receive fluid under pressure and discharge the fluid at the outlet of its chamber, and valve members for the inlets and the outlets, said diaphragm being arranged to close the inlet and the outlet of one chamber while the inlet and the outlet of the other chamber are open.

7. In a valve of the type described, the combination of a housing, a diaphragm dividing said housing into separated chambers, inlets and outlets for said chambers, said inlets being adapted to receive fluid under pressure and discharge the fluid at said outlets, and valve means arranged either to close or open the inlet and outlet of each chamber, said diaphragm being arranged to actuate said valve means to close the inlet and outlet of one of the chambers while fluid under pressure is flowing into the inlet and out of the outlet of the other chamber.

In witness whereof, I have hereunto subscribed my name.

JOHN B. BURDETT.