No. 659,248. Patented Oct. 9, 1900.

W. G. MILLER.

AUTOMATIC GAS CONTROLLER.

(Application filed Nov. 20, 1899.)

(No Model.)

Fig. 1.

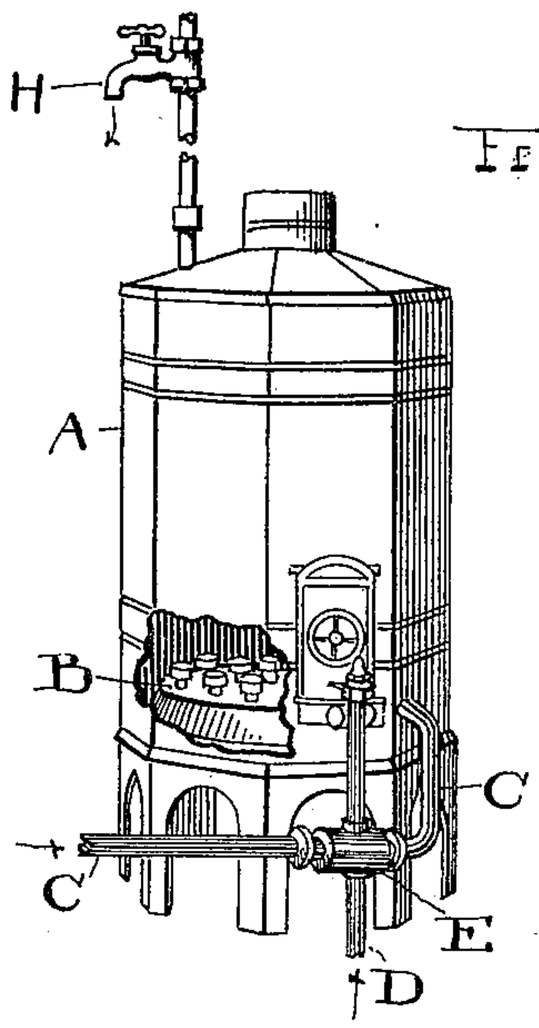


Fig. 3.

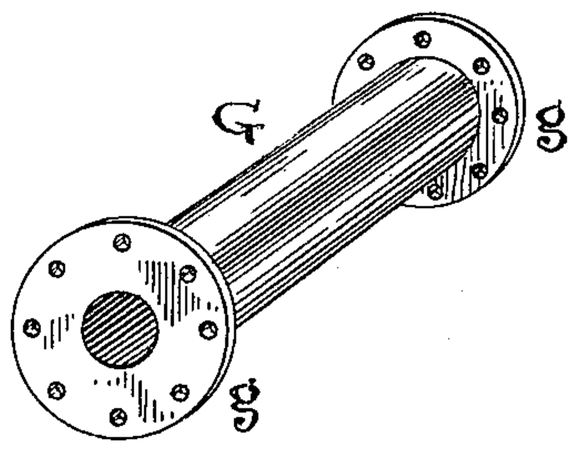
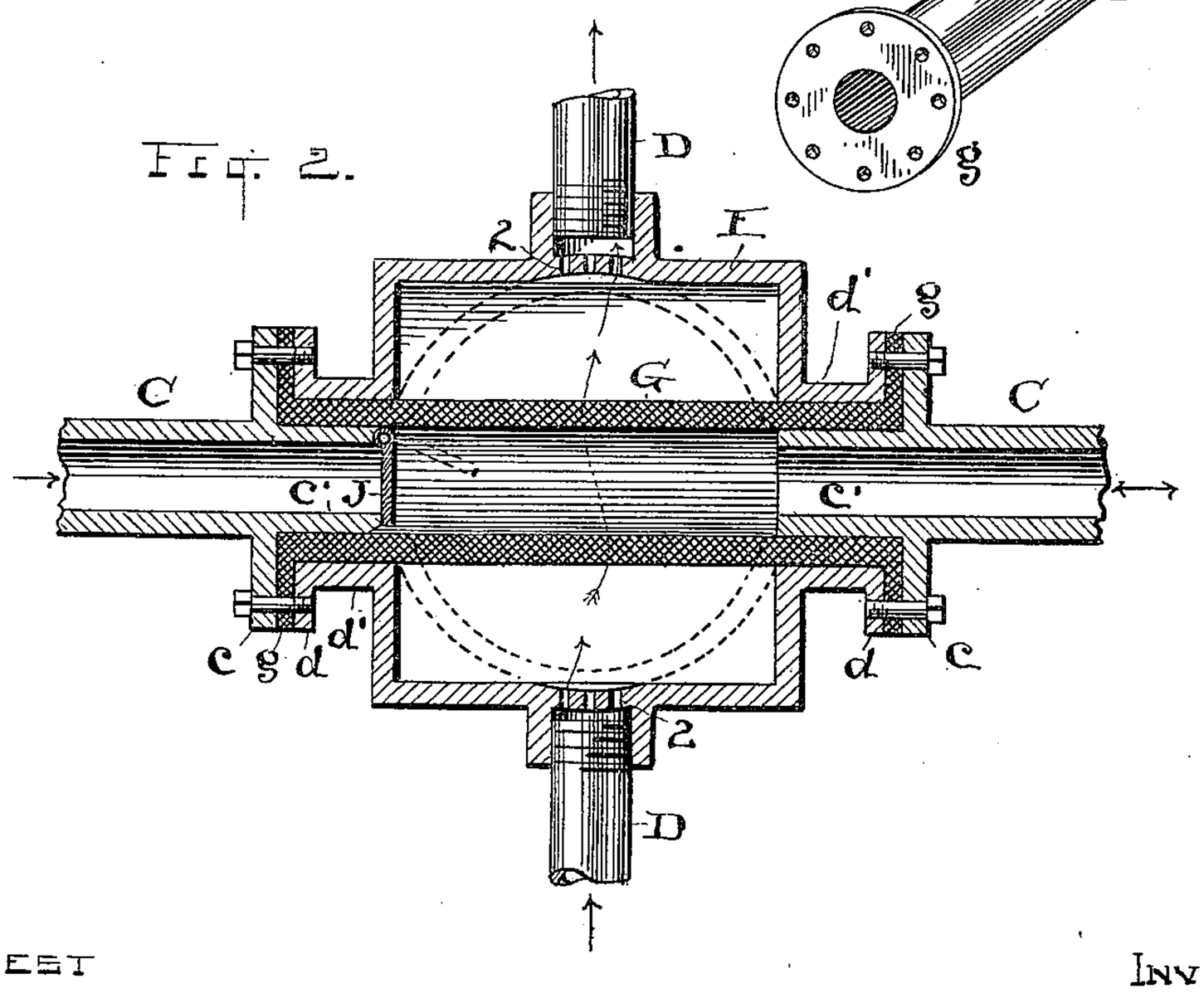


Fig. 2.



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WILLIAM GORDON MILLER, OF PITTSBURG, PENNSYLVANIA.

AUTOMATIC GAS-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 659,248, dated October 9, 1900.

Application filed November 20, 1899. Serial No. 737,708. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GORDON MILLER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Gas-Controllers; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to automatic gas-controllers for instantaneous water-heaters.

The invention consists in an expansible or elastic controller and its combinations, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective elevation of a fixture or heater embodying my invention with a portion of the shell sectioned away to disclose the burner in part. Fig. 2 is a sectional elevation of the controller-chamber understood to be present in Fig. 1, but considerably enlarged, and showing also portions of the water and the gas connections, respectively, and a longitudinal section of the controller itself coupled up for use. Fig. 3 is a perspective elevation of the controller alone.

A represents the casing of the fixture or heater, and B the gas-burner therein.

C represents the water pipe or pipes, and D the gas pipe or pipes, and E is the gas-controlling chamber, with which the several pipes C and D, respectively, are connected at right angles to each other, as here shown. The chamber E is preferably cylindrical in cross-section. Any good mechanical way may be adopted to connect these pipes with the chamber E; but in this instance the gas-pipes D are threaded into bosses on opposite sides of said chamber, while the pipes C have flanges *c*, through which they are bolted to flanges *d* on the chamber.

G is the gas or fluid controller, consisting of an elastic expansible or distensible tube of a good quality of india-rubber and of a length to reach through chamber E from side to side and continue the water-channel between the pipes C. At its extremities the said tube has flanges *g*, adapted to come between the flanges *c* and *d*, respectively, and to form gaskets which make a thoroughly-tight joint, and as a further feature of construction the opposite pipes C have each an extension *c'* inside its flange *c*, which presses the tube G against the neck *d'* to extend outward from the wall of the chamber, and besides serving to pack the tube affords a firm bearing therefor on both sides flush up with the inner wall of the chamber. A direct and unobstructed through-passage is thus afforded for the water, and at right angles to this is the passage for the gas, with its inlet and its outlet to and from chamber E, centrally opposite each other in this instance and preferably; but they may be anywhere in the wall of the chamber opposite the middle of the controller and might both be on the same side. This brings said openings in any event in position to be covered and hermetically closed by the controller when under the influence of the expanding fluid within, and the controller is distended or inflated from the plain tubular shape seen in full lines to the substantially globular or spherical shape seen in dotted lines, Fig. 2. Of course with a good quality of rubber this expansive action can be obtained with considerably-less pressure than is ordinarily present in a service-pipe, and, in fact, it has been found that such expansion can be obtained to the complete cutting off of the gas-flow by only the several pounds of back pressure in the service-pipe when the cock has been closed; but it is desirable, also, that the controller should be responsive in the opposite direction, so as to promptly open the gas passages or ducts for starting the heater when the water-cock H is opened. To this end the controller is made fairly heavy or thick in cross-section—say relatively of about the weight here shown—so that it will contract at least sufficiently to open the gas-passage, if it does not go back fully to its normal size, when the internal pressure is relieved by opening said cock. Each gas-opening is preferably fashioned with a diaphragm 2, integral or separate, concave on its inner side particularly to conform to the circumference of the controller when distended, as shown in dotted lines, Fig. 2, and these diaphragms are provided with holes to afford ample room for the flow of gas.

J represents a valve in the water-service pipe or passage adapted to close under back pressure and confine the water within under sufficient pressure to keep the gas-passages closed in case it should occur that unusual draft were made on the water without said valve.

While I have herein shown and described the controller and its box or chamber in connection with a water-heater, it is evident from their construction and operation that their use is not necessarily thus limited and that they may be employed to control the flow of a liquid as well as a gas or vapor, and that the distending or motor element instead of being water under pressure might be some other liquid, air, gas, or vapor under pressure. The use of the term "fluid," therefore, is to be understood herein as covering water, air, gas, or any other like element which can be confined under pressure and used for motive purposes within the controller or to be controlled thereby.

The materiality and advantage of the foregoing construction will now be apparent, especially as compared with piston-valves, which are now common in this art. In the use of a piston-valve the main pressure is always on the under side of the valve, while the water in the pipes beyond or above the piston is on the opposite side. Therefore whatever water is above the piston becomes a back weight or pressure on the piston, and in low main pressures this back pressure may practically counterbalance the main pressure, and thus defeat the entire operation; but in the case of my present invention the weight of the column of water in coil and pipe operates, in conjunction with the main or working pressure, to distend the controller, and, in fact, the column or back pressure alone is found in many instances to be sufficient to operate the device, and this, too, in cases where the device would be entirely useless for the time if it were not responsive to pressure of this kind.

What I claim is—

1. A fluid-controlling device comprising a suitable chamber having gas inlet and outlet passages, a fluid-conduit through said chamber comprising an expansible tube, said tube adapted to open and close the gas-outlet passage, substantially as described.

2. A chamber with inlets and outlets for water and gas, respectively, and a tubular controller for the gas-outlet in open relation at its ends with the water inlets and outlets and adapted to expand to close the gas-outlet, substantially as described.

3. The chamber having inlet and outlet openings for gas, and a fluid-conduit through said chamber having an expansible tube extending across the chamber in such relations to the gas-outlet opening as to close the same when expanded, substantially as described.

4. In fluid-controlling devices, a chamber having inlet and outlet passages midway between its ends and a distensible member arranged at right angles to said passages and its ends coupled up for the passage of a pressure fluid, substantially as described.

5. The chamber having two sets of fluid inlets and outlets, and an elastic member having its ends coupled up with one each of said inlets and outlets and constructed to expand and close the other inlet and outlet under internal pressure, and service-pipes united with all said inlets and outlets, substantially as described.

6. A chamber having gas inlets and outlets and water inlets and outlets at right angles to each other, and pipes connected therewith, and a distensible member coupled up to complete the water connection through said chamber and adapted when expanded to close the gas-outlet, substantially as described.

7. In an instantaneous heater, a water-service pipe and an expansible tube set into said pipe, a wall inclosing said tube and normally separate therefrom and an inlet and an outlet for gas in said wall, the outlet being at right angles to the axis of the expansible tube, substantially as described.

8. The chamber having gas inlet and outlet openings and perforated diaphragms over said openings, and an expansible tubular member forming a fluid-conduit through said chamber and adapted to bear against said outlet when expanded, substantially as described.

9. The chamber having a water and a gas inlet and a water and a gas outlet, the water service-pipes connected with the water inlet and outlet and the elastic tube coupled up with said pipes and arranged to close the gas-outlet when expanded, and a back-pressure valve in the water service-passage through said pipes and tube, substantially as described.

10. In a fluid-controlling device, an elastic and expansible tube having flanges at its ends, in combination with a cylindrical chamber having ends with necks in which said tube is supported and having a gas-inlet and a gas-outlet midway between its ends adapted to be closed by said tube when expanded, substantially as described.

Witness my hand to the foregoing specification this 9th day of November, 1899.

WILLIAM GORDON MILLER.

Witnesses:
H. T. FISHER,
R. B. MOSER.