

(No Model.)

2 Sheets—Sheet 1.

H. F. GABEL.
WATER HEATER VALVE.

No. 606,132.

Patented June 21, 1898.

Fig. 1.

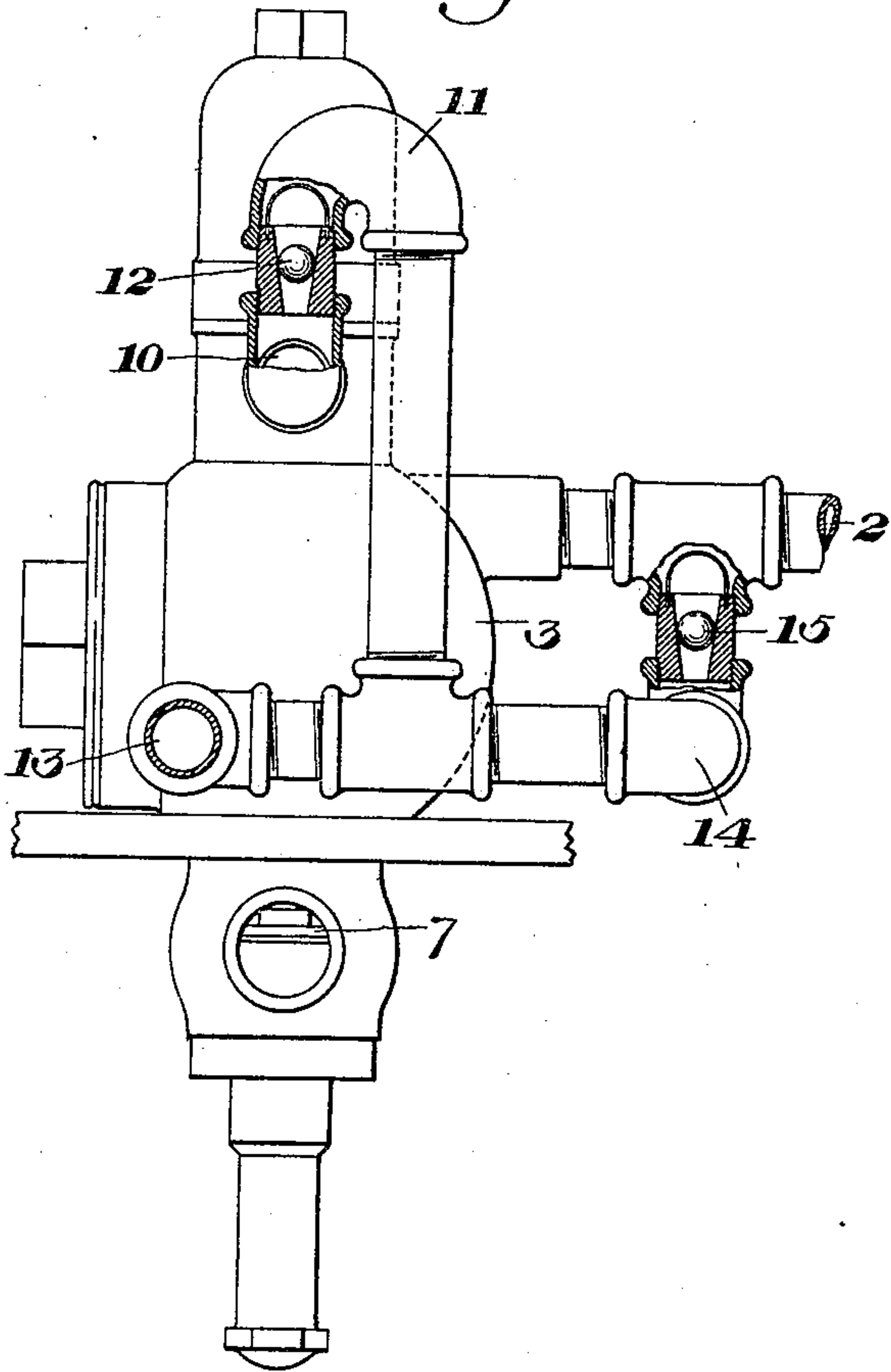


Fig. 2.

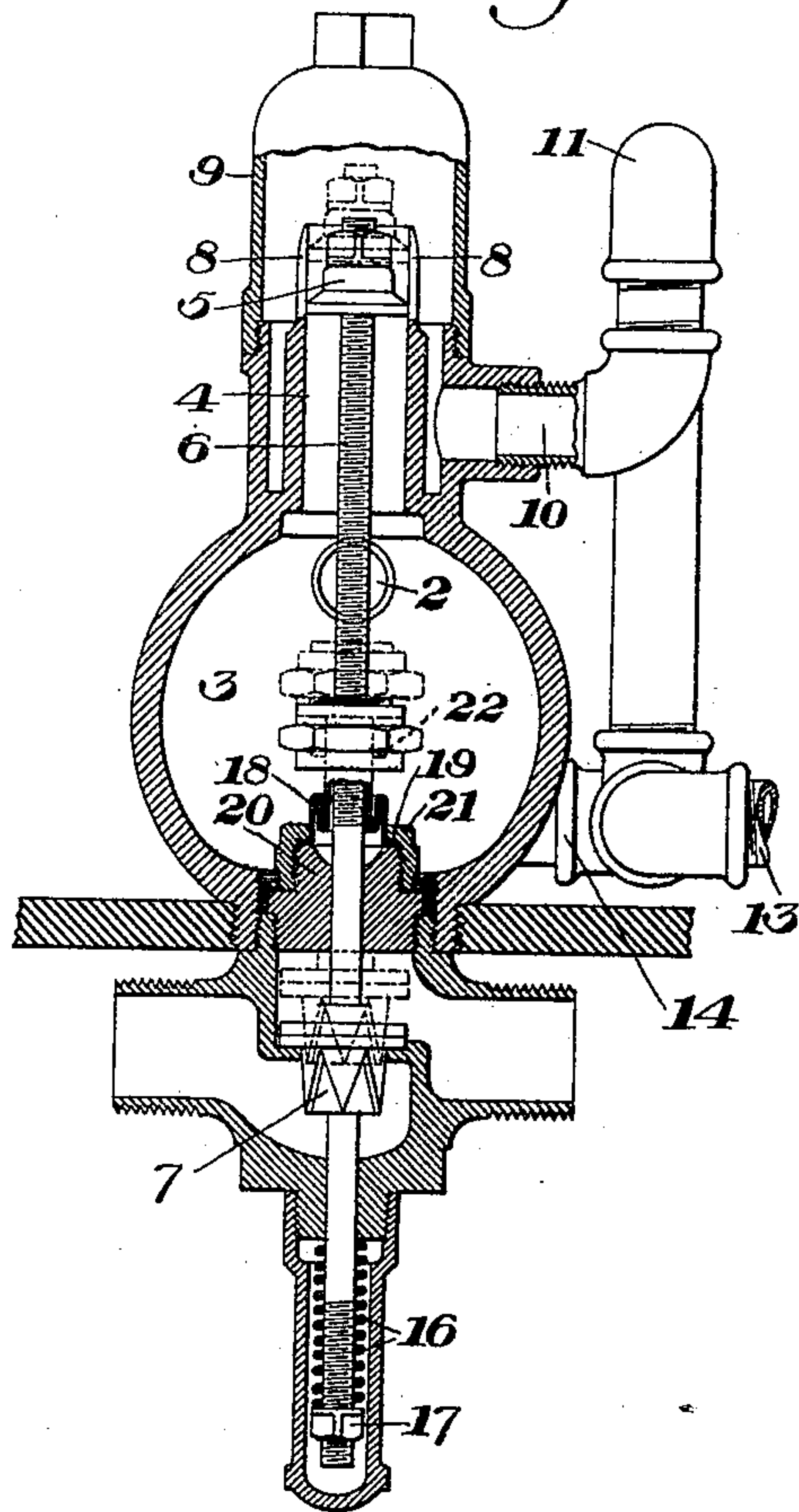


Fig. 3.

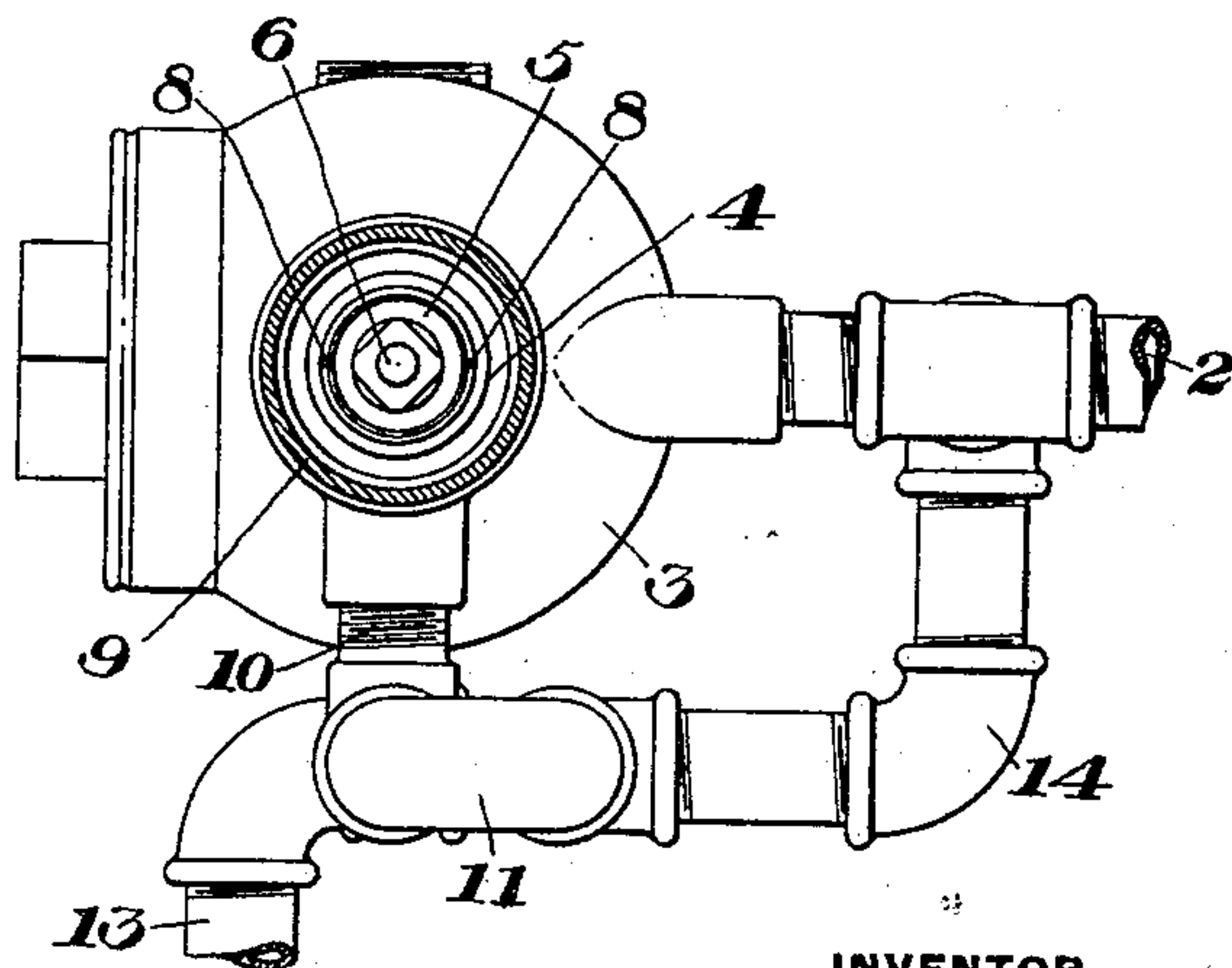
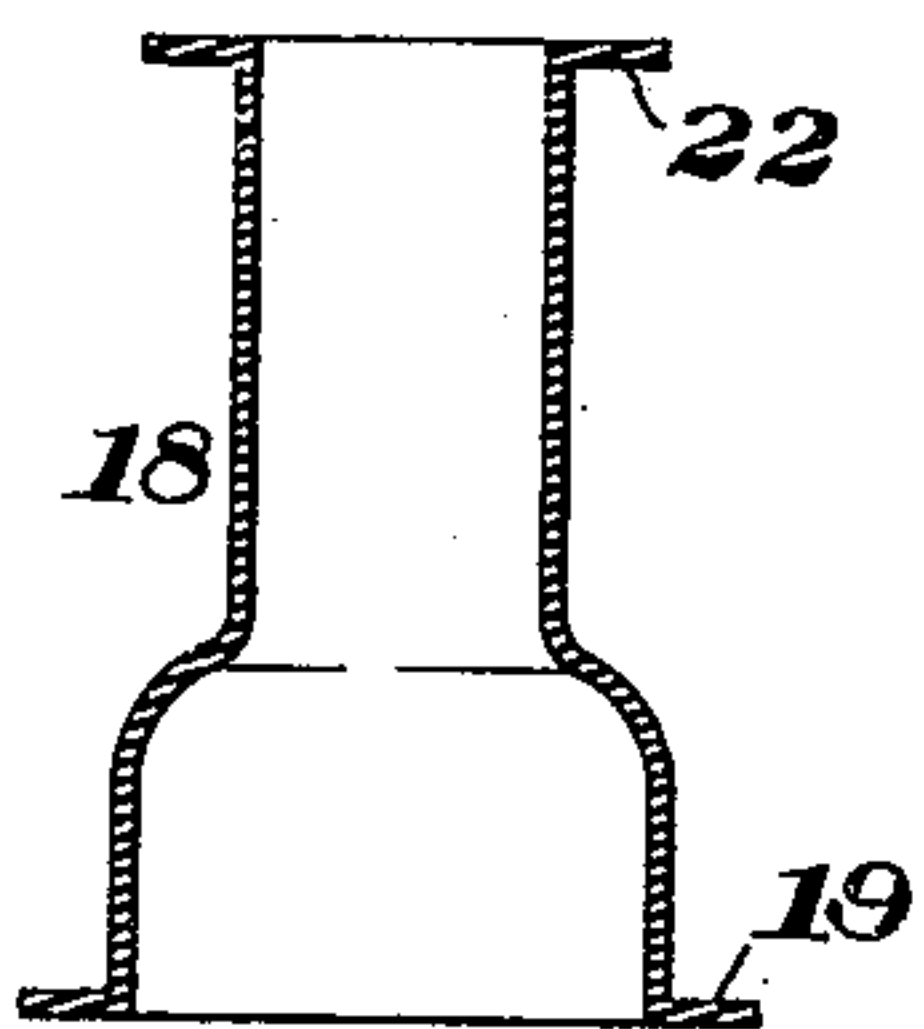


Fig. 4.



WITNESSES

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S. S. Mordis

INVENTOR

Henry F. Gabel
by Richard A. Russell
his attys.

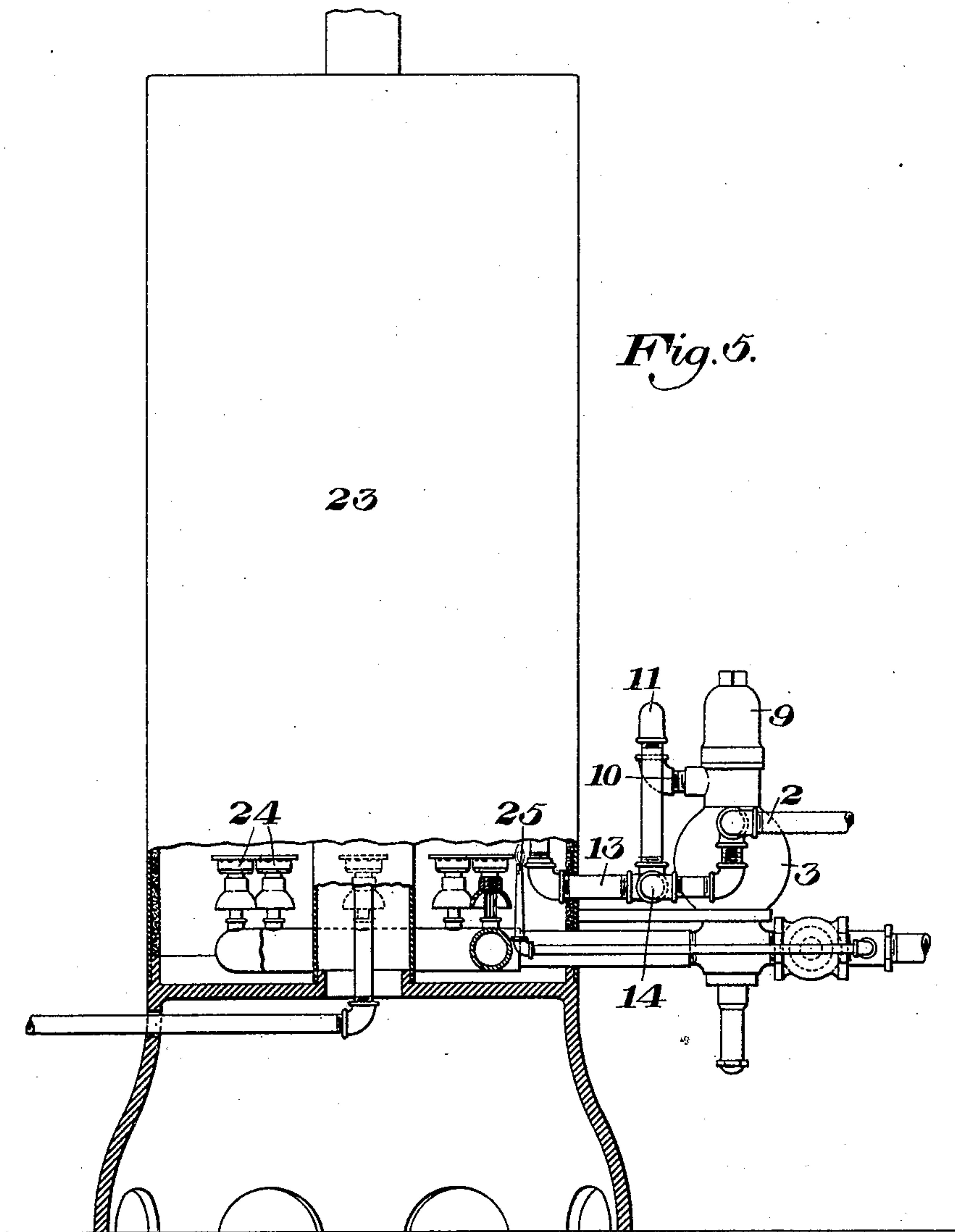
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2 Sheets—Sheet 2.

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WATER HEATER VALVE.

No. 606,132.

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WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

HENRY F. GABEL, OF PITTSBURG, PENNSYLVANIA.

WATER-HEATER VALVE.

SPECIFICATION forming part of Letters Patent No. 606,132, dated June 21, 1898.

Application filed November 3, 1897. Serial No. 657,258. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. GABEL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Water-Heater Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved valve system, partly broken away to show the ball-valves. Fig. 2 is a sectional elevation of the same. Fig. 3 is a top plan view. Fig. 4 is a detail sectional view of the flexible diaphragm I employ upon the valve-rod; and Fig. 5 is a side elevation, partly in section, of a water-heater provided with my improved valve-piston.

My invention relates to water-heaters which are provided with automatic valves arranged to cut off the flow through the heater when the spigots are closed in the house-pipes and is designed to do away with the liability to dangerous pressure being generated in the heater and house-pipes, such as occurs when the water-heater valves are placed in the pipe leading from the water-main to the heater. With these valves as heretofore arranged when the spigots were closed in the house-service pipes the pressure was cut off from the main and existed in the heater and the house-pipes. Hence if the valve does not work properly for any reason, such as by becoming clogged with dirt or impurities, a dangerous pressure may occur in the heater and the house-pipes. My invention overcomes this difficulty; and it consists in an automatic valve or regulator placed between the water-main and the heater and arranged in such a way that pressure generated in the heater will pass back directly into the water-main and not be prevented from so doing by the regulating-valve.

It also consists in the construction and arrangement of the parts, as hereinafter set forth in the claims.

In the drawings, 2 represents a supply-pipe leading from the water-main into a spherical-shaped chamber 3. From the upper end of this chamber extends a cylinder 4, containing the vertically-moving piston-valve 5, which fits neatly therein and is secured to the valve-

rod 6, which leads downwardly through the chamber 3, and carries at its lower end the gas-regulating valve 7. The upper end of the cylinder 4 is preferably beveled, as shown, and is provided with vertical slots 8 8, through which, when the piston-valve is forced above their lower ends, the water flows into an annular chamber between the cylinder and an outer casing 9. From the lower end of this casing 9 leads the pipe 10, which is reflexed or provided with a return-bend at 11, a downwardly-seating ball-valve 12 being placed in the upwardly-extending portion of the pipe, as shown in Fig. 1. The downwardly-extending portion of this pipe leads to a T connection, from one arm of which leads the pipe 13 to the heater, while the other arm is connected by a branch pipe 14 with the supply-pipe 2. The branch pipe 14 is provided with a vertically-extending portion, in which is provided the ball-valve 15; which allows a back-flow from the heater directly into the pipe 2 without passing through the regulating-valve. Around the lower end of the valve-stem 6 I provide the spiral spring 16, which bears upon an adjustable nut 17 and thus tends to close the valve. To avoid the use of a stuffing-box at the point where the valve-rod passes through the lower end of the chamber 3, I provide the flexible diaphragm 18, which is clearly shown in Fig. 4. The lower flange 19 of this diaphragm is clamped between the nut 20 and the screw-cap 21, and the upper flange 22 is clamped around the valve-rod, as shown in Fig. 2.

The valve 5 is adjustable upon its rod, and the upper part of the gas-valve 7 forms a stop, which will prevent the rod moving upwardly beyond a determined point. Hence by adjusting the valve 5 I can set the device so that no more water can pass through the heater than can be heated by it.

When the valve-rod reciprocates, the annular curved portion 22 of this diaphragm will move up and down and contact with itself only, thus avoiding any sticking of the diaphragm, which would occur if it came in contact with the moving metal parts. I intend to cover this particular form of diaphragm whether used in the particular valve shown and described or in other valves.

Fig. 5 shows the general position of my im-

proved valve, 23 representing the heater, having the usual heater-burners 24 and the pilot-light 25.

The operation of my device is as follows:

5 When a spigot in the house-service pipe is opened, the pressure of the water from the main entering the chamber 3 will force the piston-valve 5 upwardly, and the water will flow out through the slots 8 and through pipe
10 10 and pipe 13 into the heater. At the same time the gas-valve being lifted will allow gas to flow to the burner, where it will be ignited by the pilot-light and heat the water passing through the heater. When the spigot is closed,
15 the piston 5 will be moved downwardly below the slots and shut off the flow. If when the valve 5 is closed any excessive pressure is generated in the coil or from any cause there is any pressure in the house system or heater
20 greater than that in the main, this back pressure will close the valve 12 and raise the ball-valve 15, thus allowing the water to flow back directly into the supply-pipe 2 without passing through the regulating-valve.

25 The advantages of my invention will be apparent to those skilled in the art, since the heater and house system are not cut off from the main when the regulating water-valve is closed, thus preventing the accumulation of
30 a dangerous pressure and automatically relieving the heater. The piston-valve construction is of advantage, as clogging of the valve is prevented by the water overflowing through the side slots into the annular space
35 surrounding the valve-chamber. The valve 5, being adjustable in connection with the stop on the rod, allows the setting of the device so easily accessible that the supply of
40 water can be limited to any desired amount, according to the capacity of the heater. The diaphragm is also of advantage, as stuffing-boxes are avoided and the injury of the diaphragm consequent upon its sticking to moving metal parts is avoided.

45 Many variations in the arrangement of the regulating-valve so as to allow the back pressure to flow into the water-main, as well as in the construction and arrangement of the other parts, may be made without departing
50 from my invention, since

I claim—

1. The combination with a water-heater having a supply-pipe leading thereto, of a
55 heater, a valved supply-pipe leading thereto, a water-regulating valve in the supply-pipe leading to the heater, said valve being connected to and arranged to actuate the gas-valve, and a valved by-pass leading from between the regulating-valve and the heater to
60 the water-supply pipe and arranged to allow liquid under pressure to flow back from the heater into the supply-pipe.

2. A regulator for water-heaters arranged to be placed in the water-supply pipe to the
65 heater, said regulator containing a regulating-valve, and having a valved by-pass arranged to connect the pipe leading to the regulator with that leading from the regulator to the heater, so as to give a direct connection between the heater and the supply-
70 pipe, in combination with a gas-valve connected to the regulating-valve and arranged to be placed in the gas-supply leading to the burner.

3. The combination with a water-heater having a heating-burner, of a water-supply pipe leading to the heater, a water-regulator in said supply-pipe, a gas-supply pipe leading to the burner, a valve in said gas-supply
75 connected to and actuated by the water-regulator, a valved by-pass connecting the water-supply pipe to the regulator with the feed-pipe leading from the regulator to the heater, and a valved pipe leading from the by-pass to
80 the regulator.

4. An automatic regulator for water-heaters comprising a cylinder having slots in its upper end portion, a piston movable therein, a supply-pipe leading into the cylinder below
90 the piston, an outer casing surrounding the cylinder, and an outlet-pipe leading from this casing below the level of the slots in combination with a gas-regulating valve connected to and operated by the piston.

5. An automatic regulator for water-heaters comprising a cylinder having an opening in its upper end, a piston movable therein, a supply-pipe leading into the cylinder below
100 the piston, means for adjusting the piston longitudinally upon its rod, said rod having a stop arranged to limit its movement, an outer casing surrounding the cylinder, and an outlet-pipe leading from this casing at a
105 point below the level of the upper opening in the cylinder in combination with a gas-valve connected to and operated by the piston.

6. The combination with a fixed element forming the wall of a chamber and having a hole, of a rod movable through the hole, and
110 a flexible diaphragm arranged to pack the rod or stem, said diaphragm surrounding the rod and having at one end a flange clamped to the fixed element and at the other a flange clamped to the rod, said diaphragm having
115 an inwardly-curved annular portion arranged to double upon itself during movement of the rod, thereby preventing contact of the curved portion with the rod.

In testimony whereof I have hereunto set
120 my hand.

HENRY F. GABEL.

Witnesses:

H. M. CORWIN,
C. BYRNES.