(No Model.)

I. M. SEAMANS.

AUTOMATIC GAS REGULATOR FOR WATER HEATING APPARATUS.

No. 422,841. Patented Mar. 4, 1890.

Fig. 1.

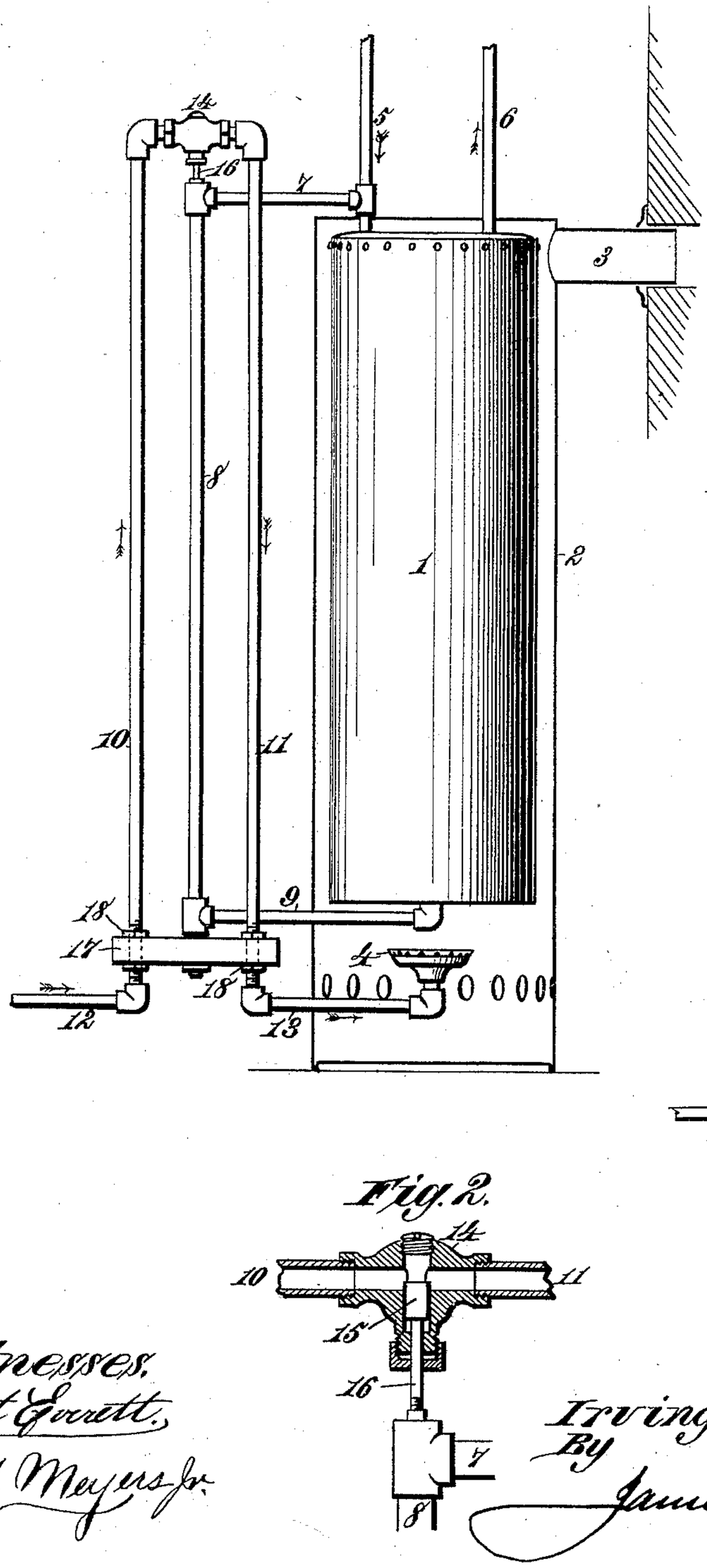

Fig. 3.

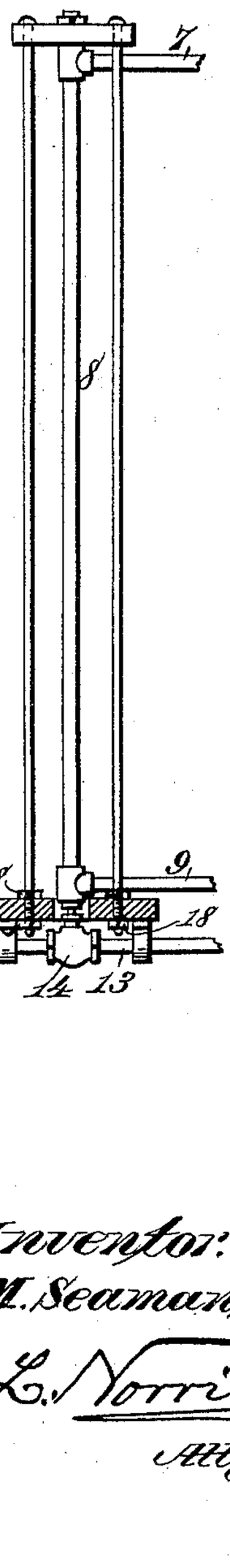

Fig. 2.

Witnesses.
Robt Everett.
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UNITED STATES PATENT OFFICE.

IRVING M. SEAMANS, OF BUFFALO, NEW YORK, ASSIGNOR TO THE BUFFALO DENTAL MANUFACTURING COMPANY, OF SAME PLACE.

AUTOMATIC GAS-REGULATOR FOR WATER-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 422,841, dated March 4, 1890.

Application filed October 3, 1889. Serial No. 325,918. (No model.)

To all whom it may concern:

Be it known that I, IRVING M. SEAMANS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Automatic Gas-Regulators for Water-Heating Apparatus, of which the following is a specification.

This invention relates to improvements in automatic gas-regulators for water-heating apparatus; and it consists in the construction and combination of devices hereinafter described and claimed.

In the annexed drawings, illustrating the invention, Figure 1 is a sectional elevation of a water-heating apparatus embodying my my improvements. Fig. 2 is an enlarged sectional detail of a portion of said apparatus. Fig. 3 illustrates a modification in the arrangement of the gas-supply pipe and regulating-valve.

Referring to the drawings, the numeral 1 designates a vertical boiler, such as is commonly used for domestic purposes. This boiler is surrounded at a little distance therefrom by a metal jacket 2, the upper portion of which communicates, by means of a pipe or tube 3, with a chimney or other exit for the products of combustion from a gas or vapor burner 4, that is located beneath the boiler. As shown, the gas-burner 4 is surrounded by the lower extended portion of the jacket 2; but this is not essential, and the jacket may be dispensed with, if desired.

The upper end of the boiler 1 is provided with a water-inlet pipe 5 and with a water-outlet pipe 6, as usual. Extended laterally from the water-inlet pipe 5 is a branch pipe or tube 7, which connects by means of a vertical expansion-tube 8 with a branch pipe or tube 9, connected with the lower end of the boiler.

Two gas or fuel supply pipes 10 and 11 are arranged on opposite sides of the expansion-tube 8, parallel therewith and extended slightly above and below the same. One of these pipes, as 10, connects by suitable pipes or tubing 12 with a gas-main or other source of supply, and the other gas-pipe, as 11, is connected by tubing 13 with the gas-burner 4, beneath the burner. The upper ends of the parallel gas-pipes 10 and 11 are connected above and on line with the expansion-tube 8 by a valve-casing 14, which incloses a valve 15, that is carried by a valve-stem 16, which is extended downward through the valve-casing and attached to the upper end of the vertical expansion-tube. The lower parts of the pipes or tubes 8, 10, and 11 are connected and braced by a cross-head 17, which serves as a fixed support for the expansion-tube. It will be seen that by means of the branch pipe or tubes 7 and 9 the expansion-tube 8 is so connected with the boiler that there will be a circulation through said expansion-tube from and to the boiler whenever the apparatus is in operation. As the water in the boiler becomes heated and circulates through the expansion-tube 8, the latter is caused to lengthen or expand, and thereby actuates the valve 15, partly closing the same, so as to diminish the flow of gas to the burner. When the water is drawn from the boiler, it becomes partly or wholly refilled with cold water, which also enters the expansion-tube 8, thereby cooling it and causing it to contract or shorten, and by the contraction of the expansion-tube the valve 15 is opened, so as to permit an increased supply of gas to pass to the burner and heat the contents of the boiler. It will thus be seen that the supply of gas passing to the burner is automatically regulated from time to time as required in such a manner as to maintain a constant supply of hot water without overheating the boiler.

While I have illustrated the arrangement of expansion-pipe 8, fuel-supply pipes 10 and 11, and valve 15 only in connection with a water-heating apparatus, it is obvious that it is applicable to any circulation system in which it is desirable to regulate the supply of heat according to variations in the temperature of the circulating fluid, whether a liquid, a vapor, or a gas, and I would therefore have it understood that I do not confine my invention to a water-heating apparatus, inasmuch as it can be used as well, for instance, in connection with hot-air or steam heating.

It is obvious that instead of conducting gas through the pipes 10 and 11 it can be carried directly to the burner through the

pipe 13, as shown in Fig. 3, the valve-casing 14 being then located between the pipes 12 and 13, and the pipes 10 and 11 being employed simply to afford a fixed support for the expansion-pipe 8 at its upper end, instead of supporting said pipe at its lower end, by means of a cross-head, as before described. For this purpose the supports 10 and 11 could be in the form of solid rods.

By means of nuts 18 on the pipes 10 and 11 the apparatus can be adjusted to suit different temperatures.

What I claim as my invention is—

1. In a regulator for a heating apparatus, the combination, with two parallel fuel-supply pipes connected at one end by a valve-casing having a valve therein, of an expansion-tube forming part of the heating and circulating system, and having one end connected with the said valve, substantially as described.

2. In a regulator for a heating apparatus, the combination, with the parallel fuel-supply pipes 10 and 11, connected at one end by a valve-casing 14, having a valve 15 therein, of the intermediate expansion-tube 8, forming part of the heating and circulating system, and having one end connected with said valve, substantially as described.

3. In a regulator for a heating apparatus, the combination, with a boiler and a gas-burner located beneath the same, of two vertical parallel gas-tubes connected at their upper ends by a valve-casing inclosing a valve, one of said pipes being connected with the gas-burner and the other with a source of supply, and an expansion-tube connected with both ends of the boiler and located between said gas-tubes, with its upper end in connection with said valve, substantially as described.

4. In a regulator for a heating apparatus, the combination, with the boiler 1, having inlet-pipe 5 and outlet-pipe 6 and the gas-burner 4, of the gas-tubes 10 and 11, connected at one end by a valve-casing 14, having a valve 15, and the expansion-tube 8, connected with said valve and with the opposite ends of the boiler, substantially as described.

5. In a regulator for a heating apparatus, the combination of the boiler 1, having an inlet-pipe 5 and outlet-pipe 6, the jacket 2, having an exit-tube 3, the gas-burner 4, the parallel gas-pipes 10 and 11, connected by a valve-casing 14, having a valve 15, the expansion-tube 8, connected with said valve, and the pipes 7 and 9, substantially as described.

6. The combination of a boiler, a burner for heating the boiler, a fluid-supply pipe to the burner, a valve which governs the flow of the fluid through the pipe to the burner, and an expansion-tube connected with the valve and having its upper and lower ends in communication, respectively, with the upper and lower ends of the boiler for a continuous circulation through the expansion-tube, substantially as described.

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

IRVING M. SEAMANS.

Witnesses:

GEORGE B. SNOW,

WILLIAM GRAM, Jr.