

(No Model.)

2 Sheets—Sheet 1.

H. F. GABEL.
WATER HEATER.

No. 600,123.

Patented Mar. 1, 1898.

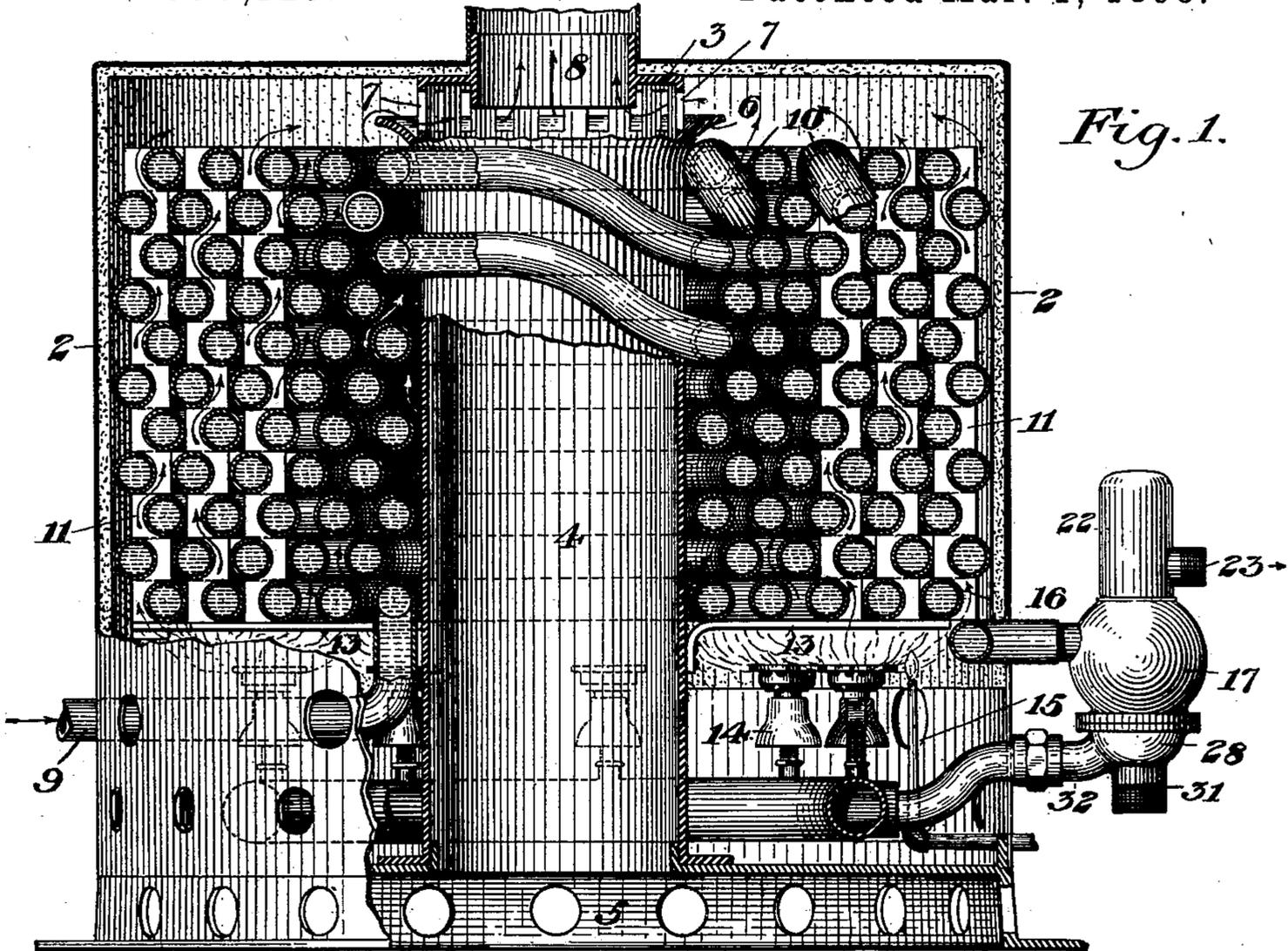
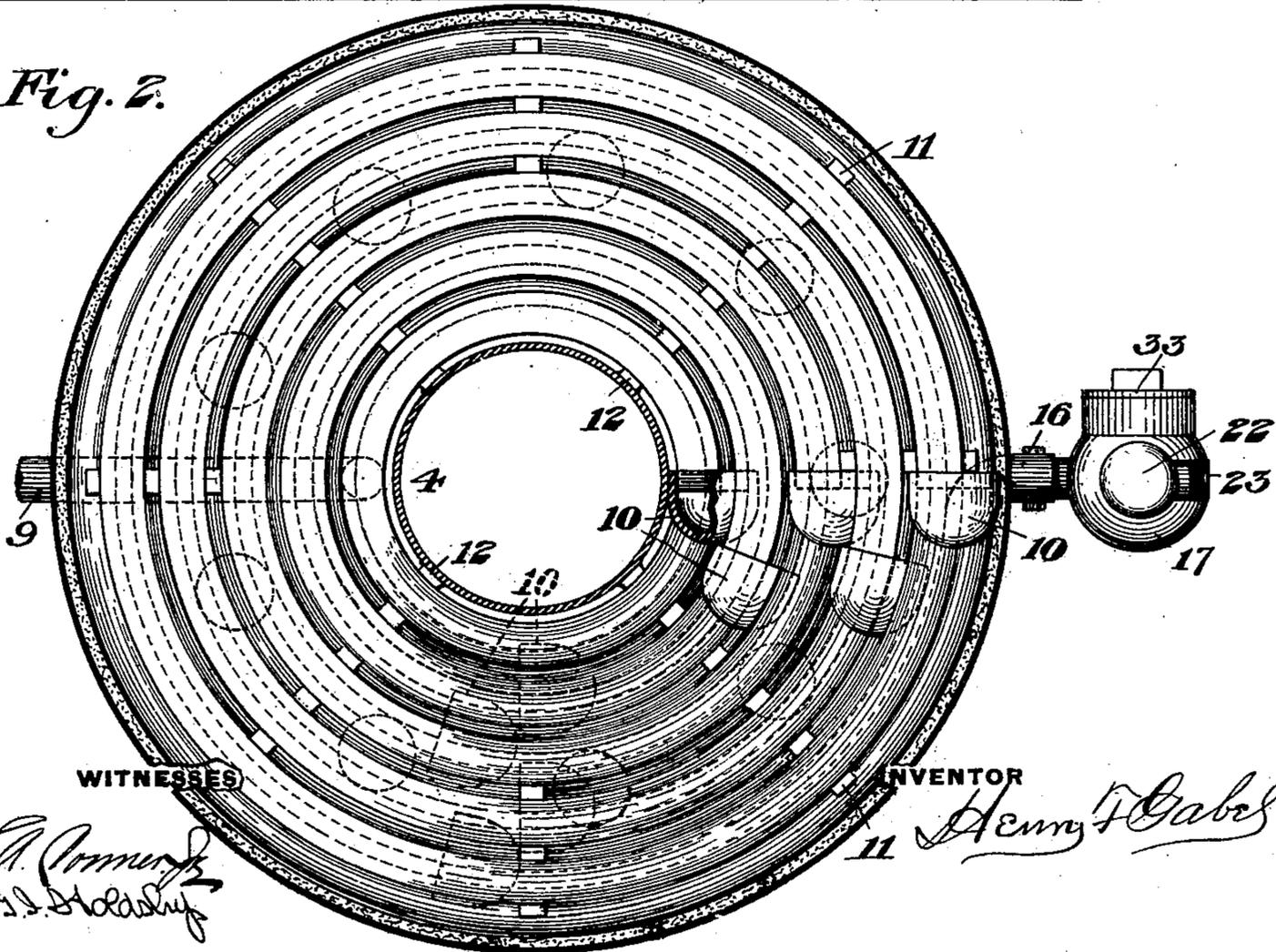


Fig. 1.

Fig. 2.



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Fig. 3.

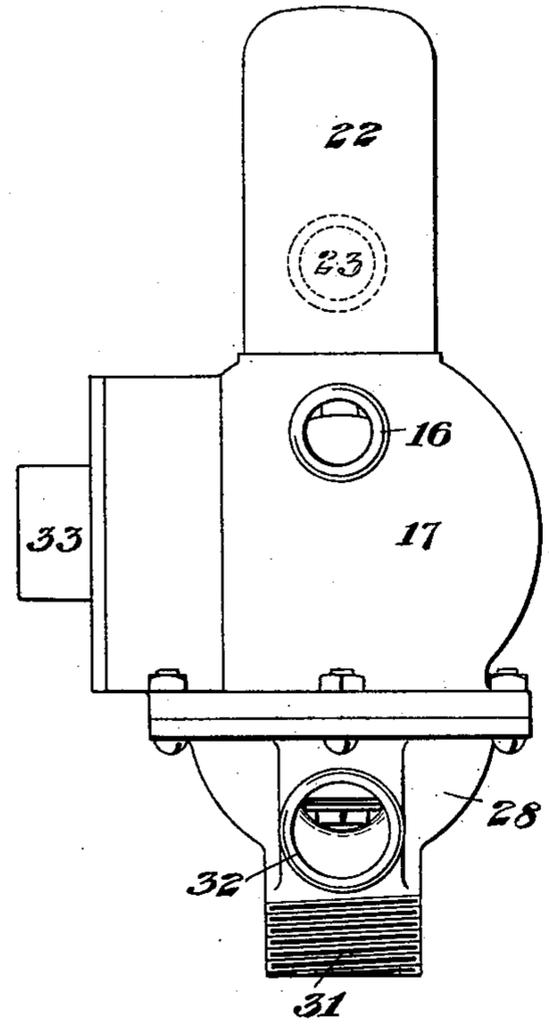


Fig. 4.

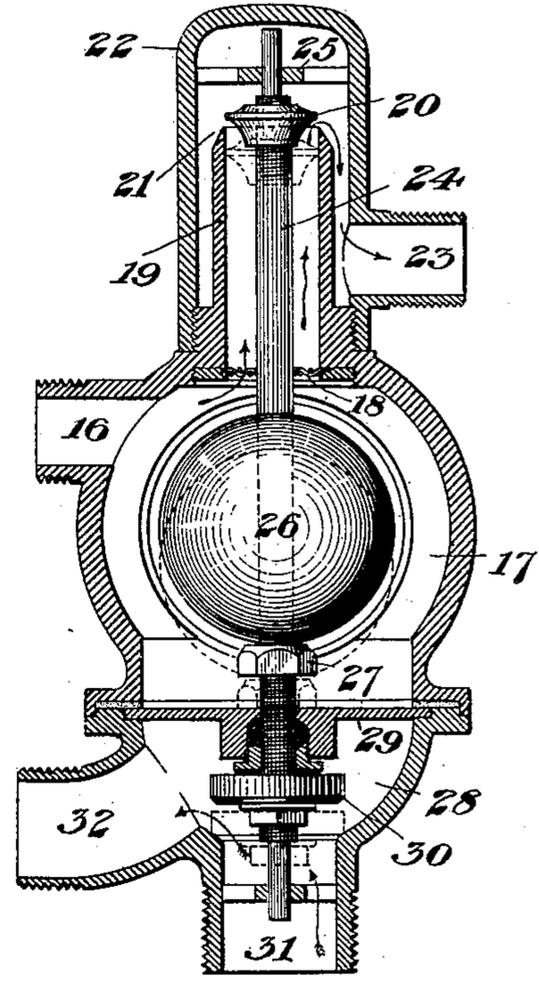
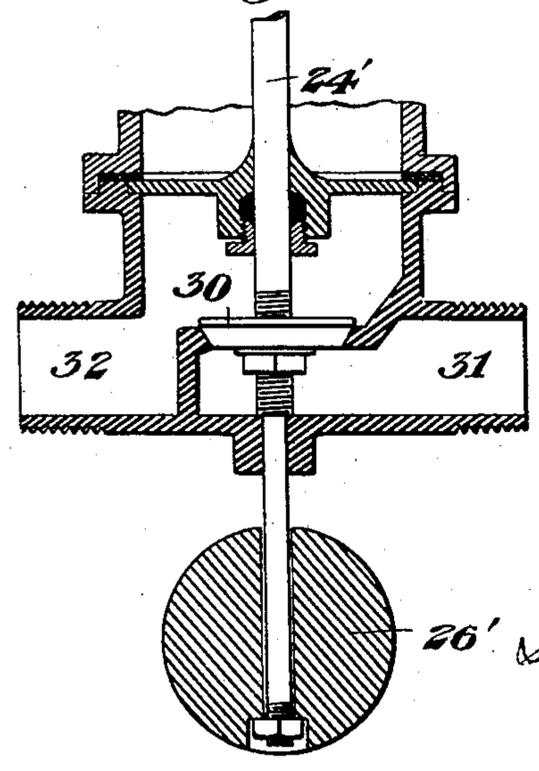


Fig. 5.



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UNITED STATES PATENT OFFICE

HENRY F. GABEL, OF PITTSBURG, PENNSYLVANIA.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 600,123, dated March 1, 1898.

Application filed July 30, 1897. Serial No. 646,489. (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-Heaters, 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 sectional side elevation of my improved heater. Fig. 2 is a horizontal section of the same. Figs. 3 and 4 are respectively an elevation and section of the improved valve I employ. Fig. 5 is a sectional view showing a modified form of this valve.

My invention relates to that class of water-heaters wherein the supply of gas or fuel is regulated by the flow of water through the heater, this flow being caused by opening one or more spigots in the house service-pipes leading from the heater.

Heretofore in this class of devices valves have been employed in the pipe leading from the water-main to the heater, these valves being arranged to regulate the supply of gas to the burner; but such valves are troublesome and uncertain by reason of their becoming clogged by dirt or impurities in the water, and, moreover, when in such location the pressure when the spigots are closed is within the heater and the house-pipes, which are then cut off from the main. Hence if the valve does not work properly and the supply of gas or other fuel is not cut off dangerous pressure is liable to be generated in the heater and the house-pipes. My invention overcomes these difficulties and increases the efficiency of the heater; and it consists, first, in placing an automatic regulator for the fuel-supply between the heater and its connection to the house-pipe, so that the heater is open to the water-main, and any abnormal pressure generated therein may pass back into the main; second, in an improved form of valve constituting such regulator, and, third, in an improved construction of heating-coils, as hereinafter more fully described, and set forth in the claims.

In the drawings, 2 represents the casing of my improved heater, this casing preferably being of cylindrical shape and lined with a non-conductor, as shown. This casing rests

upon an annular shoulder 3, formed at the upper end of a vertical cylinder 4, supported upon a suitable base 5. The outer edge of the casing also rests upon the outer portion of this base and may be easily lifted therefrom. Near the upper end of the cylinder 4 is provided an outwardly-curved flange 6, above which the cylinder is provided with an annular series of holes 7, through which the products of combustion pass to the offtake 8. Between the cylinder 4 and the casing is provided a heating-coil, which is built up as follows: The branch pipe 9 from the water-main leads in through a slot in the casing to the cylinder 4, where it is bent upwardly and thence horizontally around a portion of the cylinder, whence it extends upwardly at an incline to a higher level and thence horizontally about the pipe, continuing in this same manner until it reaches a point immediately beneath the flange 6, where a return-bend 10 is attached, as shown in Figs. 1 and 2, and the pipe then extends horizontally around the cylinder and partly beneath the first coils and between them, continuing downwardly in the same way as the first coil and concentric therewith until the bottom coil is reached, when another return-bend is attached and the pipe coiled upwardly the same as in the first coils. This manner of coiling is continued until the casing is substantially filled, and as each upward or downward coil is started spacing-plates 11 are inserted between several coils, these plates extending vertically at any desired distances apart and having alternate semicircular recesses to receive and hold the coils in position. For holding the first coil I preferably cast these spacers in the form of lugs 12 upon the exterior of the cylinder 4, as shown in Fig. 2.

13 are horizontally-extending supports for the pipes and spacing-plates, these supports being riveted to the central cylinder 4.

14 represents an annular burner suitably located beneath the coils, and 15 the ordinary pilot-light employed in devices of this character.

16 is the water-pipe leading from the heater, this pipe leading into a spherical-shaped sediment-chamber 17, the water thence passing upwardly through a sieve 18 into a piston-cylinder 19, containing piston 20. In the side of the

chamber 17 I provide a cleaning-opening closed by a screw-plug 33. The upper end of the cylinder or casing 19 is beveled sharply, as shown, so as to prevent the lodging of sediment thereon, and when the water flows from the heater upon the opening of a spigot the regulating-piston is forced upwardly to a point above the cylinder and clear thereof, the water thence falling back into an annular chamber 21, between the casing 19 and an outer casing 22, from which it flows to the house-pipes through pipe 23. The stem or rod 24 is guided at its upper end in a suitable support 25 and is screw-threaded for the attachment of the piston, which may be adjusted longitudinally thereon. Within the chamber 17 this stem is provided with a weight 26, which is held in place by a nut 27, and below this chamber the stem extends into a gas-valve chamber 28. The partition 29 between the chambers 17 and 28 is provided with a suitable packing-gland for the stem, and the portion of the stem within the chamber 28 is provided with a gas-valve 30, which seats in an opening in the lower end of the chamber, to which leads a gas-supply pipe 31. From the side of the chamber 28 leads the gas-supply pipe 32 to the burner.

The action of the valves will be apparent, since when a spigot is opened and the water flows from the heater through the chamber 17 it will lift the regulating-piston 20 above its casing and flow out through the pipe 23, which is below the level of the top of the casing, thus preventing the lodgment of sediment on the piston or cylinder. The lifting of the piston 20 at the same time raises the gas-valve 30 and allows the gas to flow to the burner, where it will be ignited by the pilot-light and heat the water flowing through the heater. When the spigot is shut, the weight 26 will close the gas and water valves.

In Fig. 5 I show a modification of the valve apparatus, wherein the weight 26' is placed at the lower end of the stem 24' and below the gas-valves instead of in the sediment-chamber.

The advantages of my invention are many. The alternate staggered arrangement of the coils is important, as it compels the rising gases of combustion to come in contact with all parts of the coil, thus giving a high efficiency. The peculiar method of coiling is necessary in order that the diameters of the coils may overlap each other in a vertical direction. The peculiar arrangement of the central cylinder prevents the blowing out of flames from the back draft and gives a better heating to the upper coils. The placing of the gas-valve regulator between the heater and the house-pipes gives a free communication between the water-main and the heater-pipe, so that any abnormal pressure consequent upon accidental heating of the water when the flow is shut off will pass back into the water-main to prevent injuries to the heater. The peculiar construction of the

water-regulating piston whereby it is lifted entirely above its casing prevents accidental sticking of this piston by the collection of dirt or impurities between it and its seat.

Many changes may be made in the form and arrangement of the valves and the other parts of the apparatus without departing from my invention, since

What I claim is—

1. The combination with a water-heater, of a pipe arranged to lead from the water-supply therinto, a pipe leading from the heater, and a regulator in the latter pipe and arranged to cut off the pressure from the house-pipe and control the fuel-supply to the heater.

2. The combination with a water-heater having a supply-pipe arranged to be connected to a water-supply, of a burner for the heater, the pipe arranged to lead the heated water from the heater, and a regulating-piston in said latter pipe connected to and arranged to cut off the pressure from the house-pipe and regulate the fuel-supply to the burner.

3. An automatic regulator for water-heaters comprising a cylinder having an open upper end, a piston movable therein, a supply-pipe leading into the cylinder below the piston, an outer casing surrounding the cylinder and an outlet-pipe leading from this casing at a point below the level of the top of the cylinder.

4. A regulator for water-heaters comprising a vertical open-topped casing, a piston movable therein and arranged to lift above the top of the casing to allow the flow of water, a gas-valve connected with the stem of the piston and a weight arranged to draw the piston downwardly into its cylinder when the flow of water ceases.

5. A water-heater regulator comprising a vertical open-topped cylinder, its upper edge being beveled, a piston movable therein and arranged to lift above the top of the cylinder, a gas-valve connected to the piston-stem, and a weight arranged to draw the piston downwardly into its cylinder when the flow of water stops.

6. In a water-heater, an annular coil, a burner below the same, a perforated central offtake, and a flange below the perforations, said flange preventing a back draft from passing through the coils to the burner.

7. The combination with a vertical cylinder having an upper outlet-opening, and a water-supply pipe leading to its lower end, of the casing surrounding the cylinder and having an outlet-pipe below the level of the opening in the cylinder, and a piston movable within the cylinder and arranged to be lifted above the opening to allow the water to flow therethrough.

In testimony whereof I have hereunto set my hand.

HENRY F. GABEL.

Witnesses:

L. A. CONNER, Jr.,
G. I. HOLDSHIP.