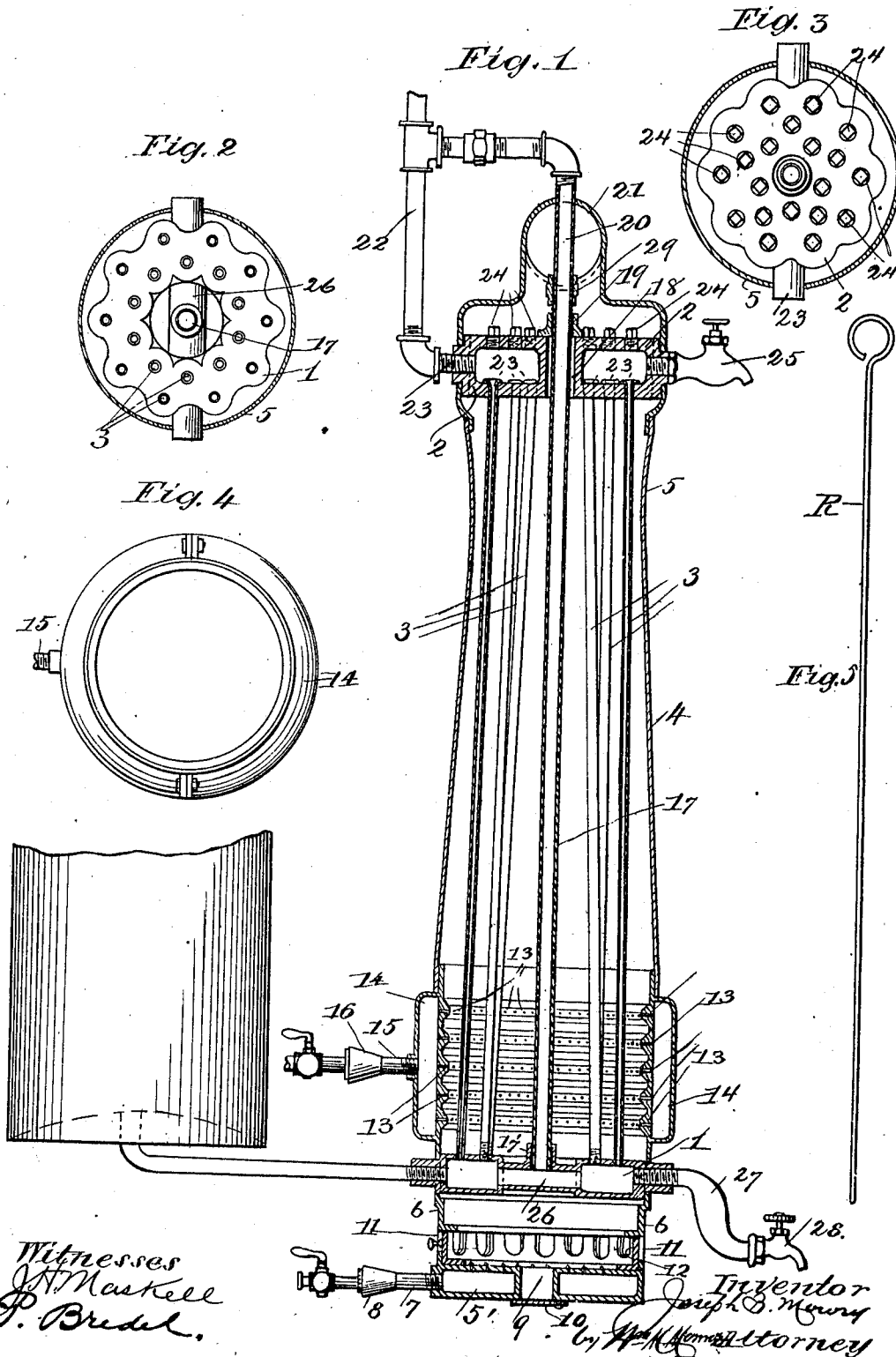


J. B. MOWRY.
 QUICK ACTING WATER HEATER.
 APPLICATION FILED MAY 18, 1910.

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Patented Apr. 11, 1911.



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UNITED STATES PATENT OFFICE.

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QUICK-ACTING WATER-HEATER.

989,025.

Specification of Letters Patent.

Patented Apr. 11, 1911.

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To all whom it may concern:

Be it known that I, JOSEPH B. MOWRY, a citizen of the United States, and resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Quick-Acting Water-Heaters, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide a quickly acting hot water heater capable of great efficiency in the mode of application of the fuel and which can be operated at a minimum amount of expense.

The invention comprises a vertical heating chamber inclosed by a cylindrical casing, and upper and lower receptacles for water, the lower one being the inlet or receiving chamber and the upper one a chamber into which the water is carried by a natural upward circulation, through connecting tubes from the lower chamber, and from whence it is carried through the circulation pipes and is returned preferably to a tank communicating with the lower chamber.

The invention also comprises means for applying the heat powerfully to the lower portion of the heater and to both the lower chamber and to the lower ends of the said connecting tubes, means for conserving the heat and for controlling the air admission to the interior of the heater to prevent cooling the same, and means for concentrating the rising products of combustion upon the upper chamber so as to obtain the maximum effect of the heat therein and to obtain a perfect combustion of the gases.

Further objects are to provide an increased heating surface and also a tubular inner bolt or water tube arranged to secure the chambers rigidly together and also to serve as a circulating means for the water.

Further objects are to augment the heating capacity by means of horizontal annularly arranged burners in the casing so disposed as to direct the flame radially upon the inner tubes in a direction converging toward the center of the heater.

Further objects are to converge the heated gases upon the upper chamber by means of a reduction in the diameter of the casing.

To accomplish these objects the invention consists in the combination and arrangement of the various parts and construction of de-

tails as hereinafter described, shown in the accompanying drawings, and specifically pointed out in the claims.

In the accompanying drawings Figure 1 60 is a vertical longitudinal central section of the heater, showing upper and lower water chambers and connecting tubes, and the lower and circumferential burners, and means for controlling the admission of air thereto and especially to the lower burner; Fig. 2 is a transverse section of the heater showing the lower chamber; Fig. 3 is a transverse section showing the upper chamber; Fig. 4 is a plan view of circumferential burner; Fig. 5 is a detail elevation of a rod which can be inserted in the tubes of the heater to clean them.

In these views 1 is the lower water chamber and 2 the upper water chamber. These chambers are connected by substantially vertical or slightly inclined tubes 3, 3. These tubes are preferably arranged in two circles in the lower chamber, and their upper ends are arranged in three circles in staggered rows, in the upper chamber, thus permitting them to be drawn a little nearer together at the top. 4 is the casing inclosing the tubes and preferably narrowed at 5 to concentrate the rising heat upon the upper chamber.

5' is a flat circular burner secured below the lower chamber, and separated and spaced therefrom by means of a circular wall 6.

7 is the inlet pipe for the fuel gas and it is provided with a mixer 8 for air which is made of any ordinary type. A central opening 9 is formed through the burner 5', controlled by the damper 10.

The wall 6 is provided with a series of openings 11, which are controlled by a damper of annular shape 12. Thus after lighting the gas from the burner the air entrance can be prevented except as it is drawn through the mixer 8. The effect of this air control is to force the air through the mixer and to produce a strong draft and cause the perfect combustion of the gas with a blue flame and the generation of an intense heat thereby. The dampers are left open while lighting this burner and closed to produce the draft described. To supply a still greater heat to the water as it rises in the tubes, circumferentially arranged burner orifices 13, 13, are formed in the inner wall of the annular burner 14, which forms a portion of the lower wall of the casing.

Five horizontal rows of orifices are shown

and a common gas inlet pipe 15 placed intermediate between the upper and lower ends of the burner chamber 14, and provided with the air mixer 16. This burner 14 is not extended vertically high in the casing since there is a certain limitation in the height to which the gas will rise in the burner without losing its efficiency for heating purposes, since the extreme draft produced by the rapid rise of the heated products of combustion from the lower burner orifices will carry along the gas escaping from the higher orifices in an incompletely consumed condition, and a great waste and reduction in efficiency will ensue. For this reason the circumferential burner is confined to the lower end of the heater, and the combustion is therefore perfect before arriving at the upper part of the heater and there will be no deposit to speak of of soot upon the chamber or tubes 3, 3.

The two chambers are rigidly spaced apart and secured together by means of the central tubular bolt 17, preferably screwed into a central boss 17' on the lower chamber and passing through a central opening 18 in the upper chamber, where it is secured by means of the nut 19 above the upper chamber. The central tubular bolt is secured to the tube 20 which passes upwardly through the hood 21, by means of which hood the products of combustion are carried to the chimney, and the tube 20 communicates with the circulating pipe 22. A coupling 29 connects the tubes 17 and 20. A lateral pipe 23 communicating with the interior of the upper chamber conveys the hot water therefrom to this circulating pipe 22.

The connecting tubes 3, 3, are preferably screwed into the upper wall of the lower chamber, and their upper ends pass through the lower wall of the upper chamber and are turned over at the edges at 23, 23, to secure them in place. Plugs 24, 24, in the upper wall of this chamber register with the tubes 3, 3, and when these plugs are removed a tool can readily be inserted to turn the edges of the tubes 3, 3.

An intense heat is generated in the heater and the water becomes almost instantly hot in the upper chamber. A faucet 25 in this chamber provides boiling water almost immediately upon lighting the burners, and closing the drafts. Means are provided for cleaning the lower chamber and comprise the transverse pipe 26, diametrically in line with the water inlet pipe and with a sediment catcher and faucet 27 and 28, so that all deposit can be quickly drawn away from the chamber. And by removing the sediment catcher a cleaning rod can be passed completely through the lower chamber and all deposit removed, and the chamber flushed out. By removing the plugs 24, 24, in the

upper chamber, a rod R equal in diameter to the internal diameter of the tubes 3, 3, can be forced through them to thoroughly cleanse them and thus keep the heating system in good working order, since a deposit coating the inner sides of the tubes will prevent the transmission of heat to the inclosed water to a large extent, while the perfect combustion obtained by the forced draft will maintain the exterior surfaces of the tubes substantially free from deposit. The annular circumferential gas burner 14 is preferably formed in two equal portions to one of which the inlet tube and mixer are attached.

I do not limit myself to the exact shape or construction of parts but modifications therein are protected by the scope of the claims.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. In a water heater, a lower annular water chamber, an upper water chamber, an inclosing casing, tubes connecting the said chambers, the lower chamber provided with threaded openings and the lower ends of the tubes screwed therein, and the upper chamber having openings in the lower wall through which said tubes are inserted, and having their upper edges turned over the inner edges of said openings, the said upper chamber having holes in its upper wall registering with said tubes and plugs in said openings, a hollow transverse bar for said lower chamber, a hollow bolt secured in said hollow bar in said lower chamber and passing through said upper chamber, a hood over said upper chamber, an inlet pipe for said lower chamber in line with said hollow bar, an outlet pipe for said upper chamber and a circulating pipe communicating with said outlet pipe and with said hollow bolt.

2. In a water heater, upper and lower water chambers, a casing therefor having a constricted upper end underneath said upper chamber, tubes connecting said chambers, a central tube serving as a bolt to secure said chambers together, an exterior casing connected with said chambers and spaced from said tubes, a burner underneath said lower chamber, means for excluding air therefrom, a gas inlet tube and mixer therefor, an annular horizontal burner in the lower end of said casing, forming a portion of the walls thereof, an inlet gas pipe, and mixer therefor, and a hood inclosing the upper end of said casing, the said lower chamber provided with an inlet pipe, and an opposite opening communicating therewith, and said upper chamber provided with an outlet opening and a circulating pipe communicating with said outlet opening, and with said central tube.

3. In a heater, upper and lower water
chambers, tubes connecting the same, the
lower chamber provided with an inlet pipe,
and the upper chamber with an outlet pipe,
5 a burner spaced from the lower chamber, a
gas inlet pipe and mixer therefor, an exterior
wall provided with openings separating
said burner from said lower chamber,
an annular damper for said openings, a casing
10 inclosing said chambers and tubes, a

hood therefor provided with an outlet opening and a horizontal annular burner in said casing above said lower chamber, and an inlet pipe and mixer therefor.

In testimony whereof, I hereunto set my hand this 28th day of April 1910.

JOSEPH B. MOWRY.

In the presence of—

WM. M. MONROE,

GEO. S. COLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
