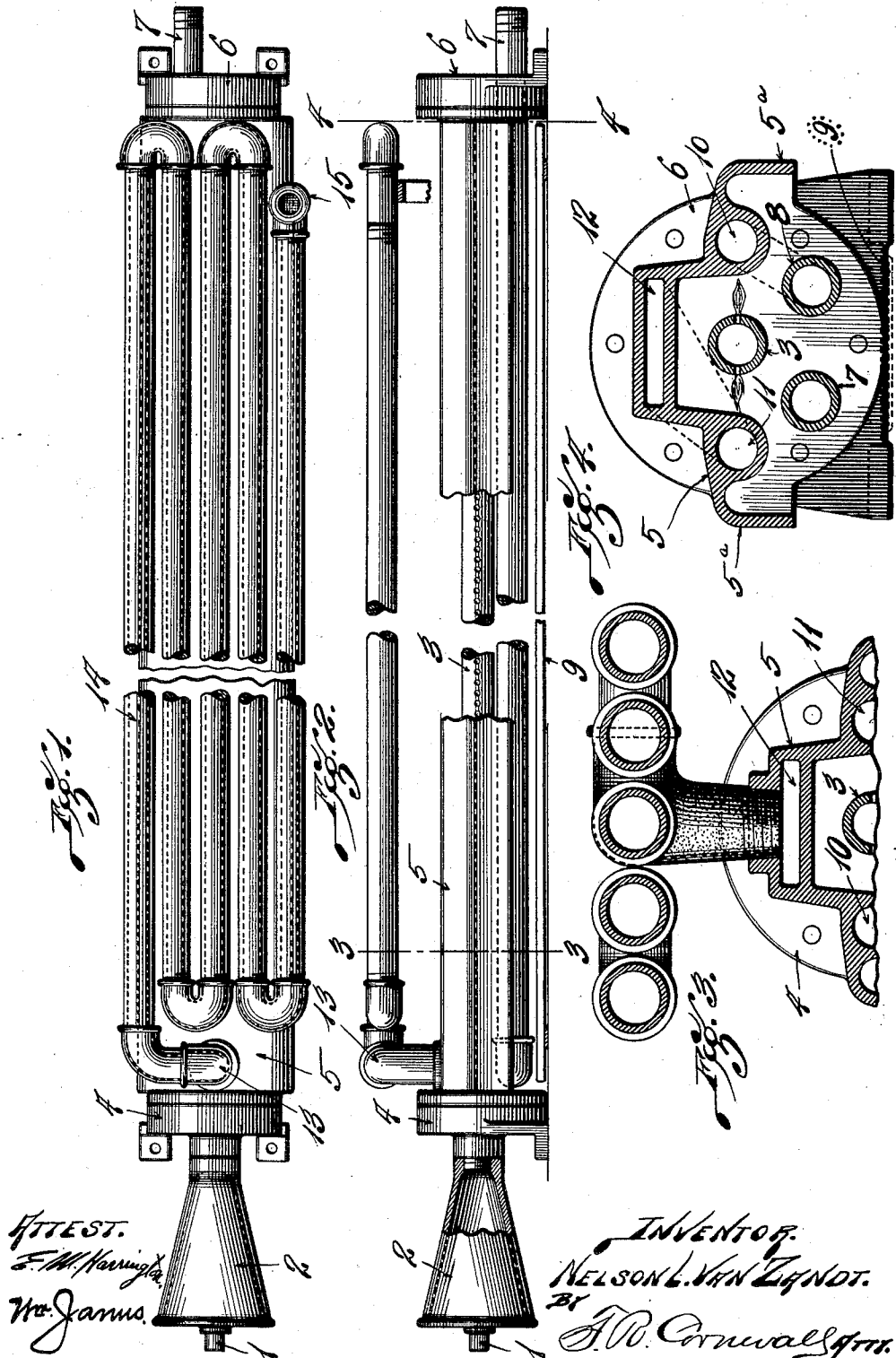


N. L. VAN ZANDT.
WATER HEATER.

APPLICATION FILED MAY 3, 1911.

1,038,802.

Patented Sept. 17, 1912.



UNITED STATES PATENT OFFICE.

NELSON L. VAN ZANDT, OF ST. LOUIS, MISSOURI.

WATER-HEATER.

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Specification of Letters Patent.

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Application filed May 3, 1911. Serial No. 624,871.

To all whom it may concern:

Be it known that I, NELSON L. VAN ZANDT, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Water-Heaters, of which the following is 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, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved water heater; Fig. 2 is a side elevational view partly in section; Fig. 3 is a sectional view on line 3—3 of Fig. 2, and Fig. 4 is a sectional view on line 4—4 of Fig. 2.

This invention relates to a new and useful improvement in water heaters, the object being to construct a device of the character described which will be simple, cheap and efficient, and economical in the use of fuel.

One of the features of my present invention is the heating of water in horizontally disposed pipes grouped around a heat generating medium, preferably a gas burner, the water entering the apparatus and passing through the lowermost pipes whereby the heat is applied to the upper surfaces of said pipes, after which the heated water rises and flows through pipes in a higher horizontal plane. The jets of flame from the burner pipe, which is centrally located, are emitted in opposite directions against the water pipes which are at the extremities of an imperforate hood whereby certain of the products of combustion are trapped and consumed, the heated gases passing under said pipes and between them and the lowermost pipes.

The lowermost inlet pipes are cold, and in the operation of the apparatus will condense moisture on their surfaces, which moisture is caught by a pan located under said pipes where it is evaporated and the gases resulting from such evaporation, including the hydrogen gas, is utilized in the combustion of the fuel and makes an extremely hot flame. After passing from the intermediate pipes, the heated water flows through a flattened opening in the hood, whence it passes into a circulating coil arranged above the hood and then out into the system.

In the drawings, 1 indicates a pipe lead-

ing from some suitable source of gas supply which ejects gas under pressure into the funnel-shaped mixing tube 2, where the air is drawn in and mixed with the gas and forced into a burner pipe 3. This burner pipe extends through the front header and is perforated on each side, as shown, whereby the air and gas are forced outwardly and burned in small jets of flame along the entire length of pipe 3. 4 is the front header which is made of a suitable casting provided with channels in its inner face, which channels are closed by the flange of a casting 5, said casting having a corresponding flange at its rear end to close the ports or channels in the casting 6 forming the rear header. The water to be heated enters through a pipe 7 which passes through the rear header and passes under and parallel to the casting 5, being spaced some distance therefrom so as to provide an exhaust opening for the flames, said pipe being connected at its forward end to the return bend whereby the water is brought back through a pipe 8 parallel to the pipe 7, likewise spaced from the hood casting 5. Both of these pipes 7 and 8 are located in a horizontal plane below the burner and immediately above a trough-shaped pan 9 which latter catches the water of condensation dripping from the pipes 7 and 8 and exposes it to evaporation by the heat from the burner. From the pipe 8 the water passes into a port or passage in the rear header and thence into a duct 10 arranged in one leg of the hood casting 5. The water in pipe 10 passes upwardly to the front header when it is led across by a channel therein into a passage 11 provided in the opposite leg of the hood casting 5. A suitable port in the rear header connects the passage 11 with the flattened opening 12 arranged in the top of the hood casting, whence the water passes upwardly to connecting elbows 13 whence the water travels in pipes 14 constituting a coil and being substantially co-extensive in length with the hood casting 5, the water eventually passing out through the elbow 15 into a pipe connected with the hot water system.

In practice, it is intended to use ordinary illuminating gas as a heating medium, and as many heating devices of the character illustrated in the drawings may be employed as desired to supply hot water to the system, they being arranged in battery form. The apparatus may be inclosed in a suitable non-

heat-conducting housing or casing, not shown, and as it occupies but a small space, can conveniently be arranged along the wall of a building or close under the joists in the cellar of a building. The pressure from the gas supply pipe is sufficient to thoroughly mix the air and gas so that the heating pipe is supplied with fuel throughout its length.

In operation, cold water enters through pipe 7 and is returned through pipe 8. Moisture from the surrounding air has a tendency to condense on these pipes, and I utilize this water of condensation by catching it in a drip pan or trough 9; or, if desired, I can supply the trough 9 with water from some external source of supply. The flame from the centrally located burner is directed outwardly against the walls of the passages 11 and 12, and tends to decompose in free carbon rising in the hood. The flames will tend to draw the carbon down, and intercepting its path of travel, will consume or decompose it and utilize its value as a heating medium. The flames will roll under the edges of the hood, and due to the presence of moisture in the pan 9, which moisture is evaporated by the radiated heat, the gases resulting from such evaporation will help support the combustion of the fuel. So far as I am aware, I am the first to utilize horizontally arranged pipes grouped around a centrally located burner over which extends a hood for confining the products of combustion. In practice, the apparatus is intended to be about 5 feet in length, and there is therefore about 50 feet of heating surface for the water. Of course, if the hot water rises in the system and loses its heat by radiation, or is drawn off, as the case may be, cold water may be supplied to the apparatus either from the system or from a supply pipe depending upon the manner of using the apparatus.

I prefer, in making the hood casting 5, to provide overhanging extensions on each side thereof as indicated at 5^a, Fig. 4, so as to form a trap for heated gases beyond the passages 10 and 11. These overhanging extensions also tend to force the flames downwardly around the pipes 7 and 8.

What I claim is:

1. In a water heater the combination of a horizontally disposed burner, a hood casting arranged thereabove and provided with water passages, and headers at each end of said casting and ported to connect said passages.

2. In a water heater the combination of a horizontally disposed burner, a hood casting arranged over said burner and provided with water passages, the passage at the top of the burner being flattened, and water pipes extending parallel to and spaced from the legs of said hood.

3. In a water heater the combination of a horizontally disposed burner, water pipes grouped therearound, and a drip pan under the lowermost pipes for retaining the water of condensation to permit its being evaporated in the heater.

4. In a water heater the combination of a horizontally disposed burner, horizontally disposed pipes grouped therearound, an imperforate hood over said burner and a drip pan under the lowermost pipes for holding water to permit its being evaporated.

5. In a water heater the combination of a horizontally disposed burner, a hood extending over said burner and provided with water passages, pipes arranged under and parallel to said hood, said pipes being below the burner, and a coil of pipes located above said hood.

6. In a water heater the combination of headers, an imperforate hood casting extending from header to header and provided with water passages, pipes arranged under the legs of said hood and spaced apart therefrom, a horizontally disposed burner centrally located with respect to said pipes and hood, a pan under said last mentioned pipes for catching the water of condensation, and a coil of pipes arranged above the hood, substantially as described.

7. In a water heater the combination of headers, a hood casting extending from header to header and provided with water passages, said hood casting having laterally extending imperforate overhanging extensions at each side thereof.

8. In a water heater, a hood casting provided with longitudinal passages therethrough spaced apart from each other and provided with a flattened longitudinal passage therethrough spaced above the first mentioned passage.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 1st day of May, 1911.

NELSON L. VAN ZANDT.

Witnesses:

M. P. SMITH,
B. L. CROWLEY.