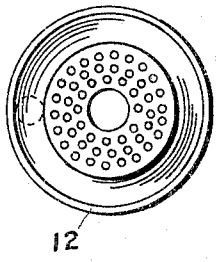
No. 788,890. PATENTED MAY 2, 1905.

P. A. DEASY.

WATER HEATING APPARATUS.

APPLICATION FILED APR. 4, 1904.

FIG. 4



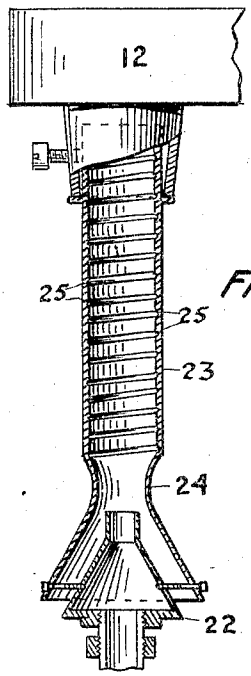


FIG 5

FIG. 1

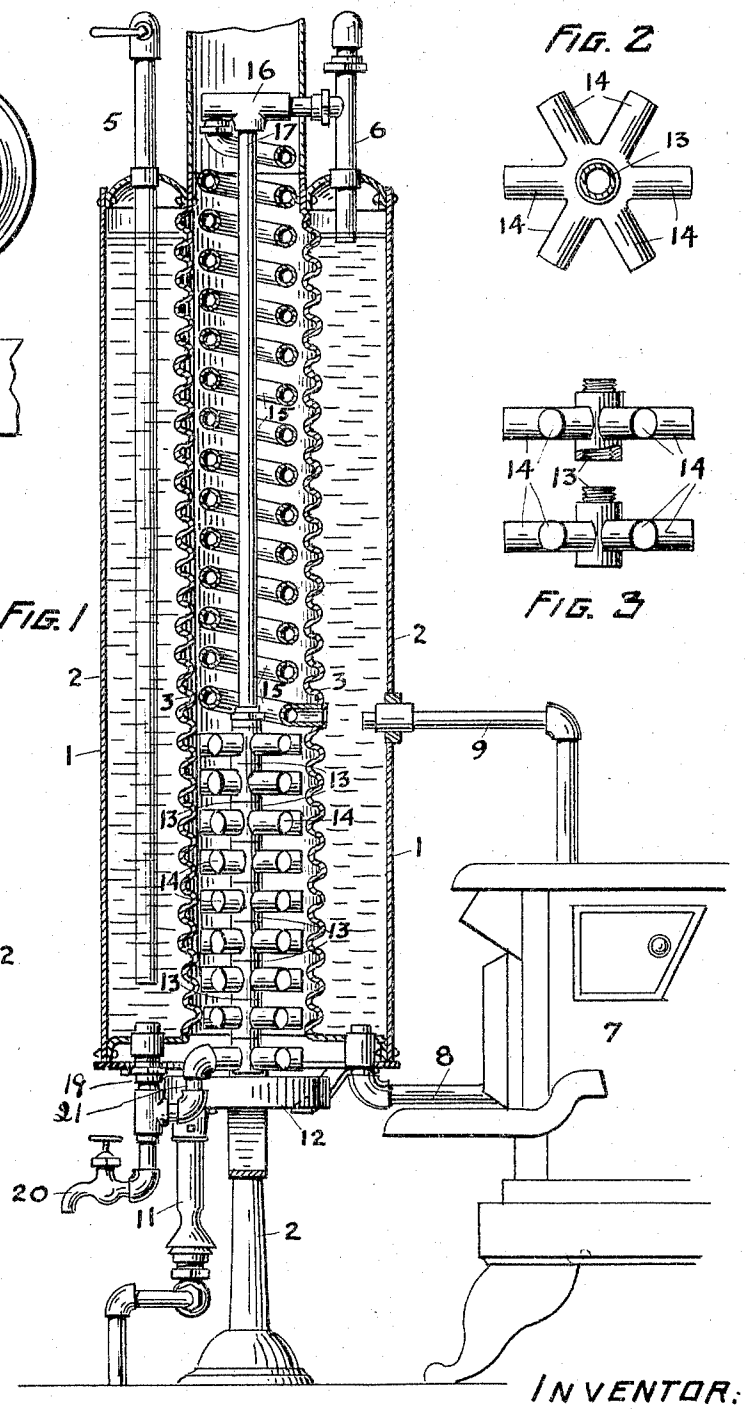


FIG. 2

FIG. 3

WITNESSES:

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UNITED STATES PATENT OFFICE.

PETER A. DEASY, OF OAKLAND, CALIFORNIA, ASSIGNOR TO THE DEASY WATER HEATER COMPANY, OF OAKLAND, CALIFORNIA.

WATER-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 788,890, dated May 2, 1905.

Application filed April 4, 1904. Serial No. 201,601.

To all whom it may concern:

Be it known that I, PETER A. DEASY, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Water-Heating Apparatus, of which the following is a specification.

My invention relates to improvements in water-heating apparatus, the object of the invention being to provide an improved apparatus of this character which can be substituted for the ordinary kitchen-boiler and in which the water can be heated either by means of the water-back in the kitchen-range or by means of a separate gas-heater, as may be desired. In devising water-heaters of this character the object is to provide a construction by which a sufficient volume or proportion of the whole quantity of water in the boiler shall be brought as quickly as possible to a sufficiently high temperature for ordinary domestic purposes. With certain constructions of such water-heaters a small quantity of water may be quickly brought almost to boiling-point by using a sufficiently large amount of gas or other heating medium; but this is undesirable. It is preferable that a much larger quantity of water should be brought in a very short time to a temperature much less than that of boiling, but sufficient for ordinary domestic purposes. It is the object of my invention to accomplish this result. This I effect by providing a rapid circulation of a comparatively large quantity of water. By this means the greater part of the water in the boiler is brought to a high temperature very quickly. Again, it has been found that when a gas-heater is used to heat water in a kitchen-boiler there is considerable condensation of moisture upon the surface of the boiler, so much, in fact, that the moisture collects, runs down, and drops on the floor. This condensation is of course that of the water which is part of the product of combustion of the gas.

A further object of my invention is to provide a construction of kitchen-boiler which will prevent this dropping of moisture so condensed, and an incidental advantage of this construction is that a greater heating-surface is provided for the boiler.

A further object of my invention is to provide an improved gas-heater for use in connection with such a boiler.

My invention therefore resides in the novel construction, combination, and arrangement of parts for the above ends hereinafter fully specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of the apparatus, the boiler being shown in vertical section. Fig. 2 is a broken plan view of one of the short tubes. Fig. 3 is a broken side view of two of the short tubes disconnected. Fig. 4 is a plan view of the burner. Fig. 5 is a vertical section of the burner-tube.

Referring to the drawings, 1 represents a kitchen-boiler supported upon a stand 2. This boiler is in form that of a double cylinder, so that it has a central vertical flue, the water being contained between the outer cylindrical wall 2 and the inner wall 3. The inner wall 3 has a vertical series of separate or independent circular horizontal corrugations 4. The advantage of this construction is twofold: First, any moisture which is deposited by condensation upon said inner wall does not run so freely down the wall, its progress being checked by the corrugations. It is therefore subjected to greater heat and is consequently evaporated before it can drop onto the floor. Secondly, said inner wall is of greater area, and thus provides a greater extent of heating-surface for the boiler.

5 represents the cold-water-supply pipe leading into the boiler and opening near the bottom thereof, and 6 represents the hot-water pipe leading from the top of the boiler.

7 represents a cook stove or range having the usual water-back, (not shown,) with the lower pipe 8 leading from the bottom of the boiler to said water-back and the upper pipe 9 leading from the top of the water-back to a higher point in the boiler.

11 represents a gas-heater having a burner 12, the products of combustion from which

ascend through the flue formed within the inner wall 3 of the annular boiler. In the lower portion of said flue are provided a series of short tubes 13, screwed into one another in a vertical series, each tube having short radiating arms 14. This series of short tubes, forming a water-conduit with an expanded area, extends to a point somewhat below the middle of the boiler and about opposite to the entrance of the uplift-pipe 9 from the water-back. Exactly opposite to said entrance is connected with the boiler, through the inner wall 3, the lower end of a coil of pipe 15, which extends to the top of the boiler and is connected above said top with a T-piece 16, the central member of which is connected with a vertical pipe 17, connected at the bottom with the uppermost of the short tubes 13. The opposite end of the T-piece is connected with the hot-water pipe 6, leading from the boiler.

A short pipe 19 leads from the bottom of the boiler and is provided with a faucet 20 for drawing off and is connected to the lowest of the short tubes 13 by a branch connection 21.

By means of this construction there are provided two distinct systems of circulation of the boiler—one up through the short tubes 13 and the central pipe 17, then down the interior of the boiler and through the short pipe 19 and branch connection 21 to the bottom of the series of tubes 13, and the other up through the coil 15, across the T-piece 16, and down the interior of the boiler to the lowest point of the coil 15. By reason of this construction the water in the boiler is maintained at a substantially uniform temperature, which increases rapidly to the temperature desired. Instead of obtaining a small quantity of water at or near the boiling-point there is obtained in the same time a much larger quantity of water at a temperature lower than that of boiling-point, but sufficient for domestic purposes. By actual test, comparing the present construction with one in which there is a continuous single conduit through the flue, I have found that with a single circulation, using twenty-three and nine-tenths feet of gas, water was heated uniformly to a temperature of 205° in thirty-five minutes, but with the double circulation, using the same quantity of gas, the water was heated uniformly to a temperature of 183° in nineteen minutes. This latter temperature is quite sufficient for ordinary domestic purposes and is obtained in a much quicker time with the same quantity of gas than can a uniform high temperature be obtained under the other system.

The gas for the gas-burner passes through a tapering nozzle 22, which is inserted in the lower tapering end of a tube 23 in front of a contracted throat 24, the space between the nozzle and the lower end of the tube being an air-space for drawing in the air to mix with the gas. The inner surface of the air-tube is formed with a spiral rib 25, as shown. I have found that this construction of contracted throat and spiral rib prevents the flames igniting back along the tube.

I claim—

1. In an apparatus of the character described, the combination of a boiler having a central flue therethrough, a burner discharging into said flue, a water-conduit having an expanded area in the lower portion of the flue and connected at its lower end with the bottom of the boiler, a straight pipe leading from the upper portion of said conduit and connected with the top of the boiler, and a second independent conduit in said flue above said first conduit having an expanded area exposed to the action of the heat of the flue connected at its lower end with a lower portion of the boiler and at its upper end with the upper portion of the boiler, substantially as described.

2. In an apparatus of the character described, the combination of a boiler having a central flue therethrough, a burner discharging the products of combustion into said flue, a water-conduit in the lower portion of the flue, a second independent water-conduit in the upper portion of the flue, and connections from each conduit from the upper portions thereof to the upper portion of the boiler and from the lower portions thereof to lower portions of the boiler, substantially as described.

3. In an apparatus of the character described, the combination of a boiler having a central flue, a burner discharging the products of combustion into said flue, a water-conduit having radiating arms in the lower portion of the flue to form an expanded water area exposed to the action of the heat, and a pipe leading from said conduit to the top of the boiler, a second conduit comprising a coil of pipe surrounding said first pipe, and connections from said conduits from the tops thereof to an upper portion of the boiler and from the bottoms thereof to bottom portions, substantially as described.

4. In an apparatus of the character described, the combination of a boiler having a central flue, a burner discharging the products of combustion into said flue, a conduit comprising a series of radiating arms in the lower portion of the flue, and a pipe leading upward therefrom to the top of the boiler, and a second conduit consisting of a coil of pipe around the first pipe and leading to the top of the boiler, the lower end of the first conduit being connected with the bottom of the boiler, and the lower end of the coil with the boiler at a point opposite to said end, substantially as described.

5. In an apparatus of the character described, the combination of a boiler having a central flue, a burner discharging the products of combustion into said flue, a conduit

comprising a series of radiating arms in the lower portion of the flue, and a pipe leading upward therefrom to the top of the boiler, a second conduit consisting of a coil of pipe around the first pipe and leading to the top of the boiler, the lower end of the first conduit being connected with the bottom of the boiler, and the lower end of the coil with the boiler at a point opposite to said end, a stove or range having a water-back, and pipes leading thereto from the bottom of the boiler and from the point opposite to the bottom of the coil, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER A. DEASY.

Witnesses:
FRANCIS M. WRIGHT,
BESSIE GORFINKEL.