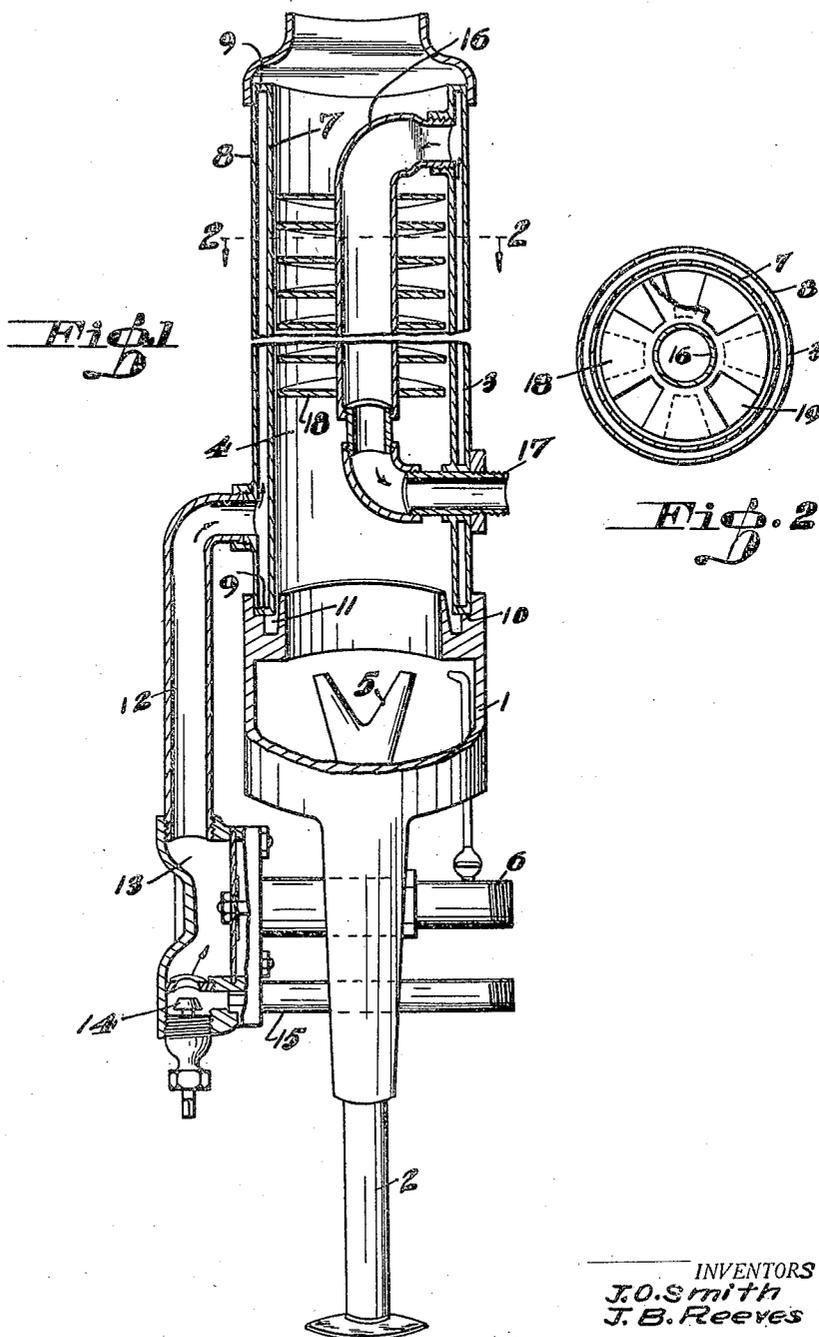


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J. O. SMITH ET AL.
WATER HEATER,
FILED APR. 29, 1920.



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UNITED STATES PATENT OFFICE.

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WATER HEATER.

Application filed April 29, 1920. Serial No. 377,706.

To all whom it may concern:

Be it known that we, JOSEPH OSCAR SMITH and JOHN B. REEVES, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Water Heaters, of which the following is a specification.

This invention is a water heater and has for its object the provision of a heater comprising a relatively long narrow flue forming the heating chamber and having a water jacket surrounding the same. This flue may extend the entire height of a room and form the exhaust flue for the heater without necessitating the use of extra pipe sections. The flue forming the heating chamber being relatively narrow the greatest efficiency of the heat units passing therethrough will be expended upon the relatively thin film of water in the narrow water jacket surrounding the heating chamber, thereby causing the water to quickly heat; and the desired capacity of the heater may be obtained by providing a relatively long flue and water jacket.

It is a further object of the invention to provide a heater which will be of comparatively few parts and which may be quickly assembled, thereby preventing the liability of the heater becoming inoperative and also forming an extremely cheap construction.

Further objects of the invention will be readily understood from the following description of the accompanying drawings, in which—

Figure 1 is a perspective view of a water heater construction in accordance with the invention, partly broken away.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

The improved water heater comprises a burner chamber 1 mounted upon a supporting standard 2 and a relatively long narrow annular water jacket 3 supported upon the burner chamber and forming a combined flue and heating chamber 4 within the water jacket. Burners 5 are provided in the burner chamber having their nozzles arranged as a Y and extending upwardly and outwardly so as to direct the flames from the burners upwardly through the heat chamber 4 adjacent the inner surface of water jacket 3 so as to form a draft opening at the axis of the heat chamber. The burners are supplied with fuel from a pipe 6.

Means are provided for automatically controlling the admission of fuel to the burners, this controlling means forming the subject matter of our co-pending application Serial No. 377,705, filed April 12, 1920.

The water jacket 3 is formed of concentric inner and outer spaced shells 7 and 8 connected at their ends by cross walls 9 to provide a closed cylindrical jacket of relatively thin width, so that a comparatively thin film of water will pass through the water jacket thereby increasing the rapidity with which the water will be heated by the heat from the burners passing through the heat chamber 4 inside of the shells forming the water jacket.

The water jacket is supported at its lower end upon the burner chamber 1, preferably, in an annular groove 10 provided in the upper edge of said chamber. A second groove 11 is, preferably, formed in the upper edge of the burner chamber inside of the inner shell 7 of the water jacket, this groove being arranged to receive any moisture which may be condensed within the heat chamber 4 when the burner is first started. The moisture which may be condensed within the heat chamber will drip from the wall of shell 7 into the groove 11 and will be subsequently vaporized and pass out of the burner, thereby avoiding the dripping of water into the burner chamber.

Water is, preferably, supplied to the water jacket 3 through a pipe 12 communicating with the water jacket adjacent its lower end and extending downwardly outside of the burner chamber to a valve chamber 13. A valve 14 controls the inlet of the water from a water pipe 15 into the valve chamber and thence into the water jacket.

The discharge from the water jacket, preferably, comprises a pipe 16 communicating with the upper end of the water jacket and extending inwardly from the inner shell 7 and thence downwardly through the heat chamber 4. The lower end of pipe 16 is coupled to a pipe 17 extending outwardly through the shells of the water jacket. This pipe may be connected to any suitable conduit for the hot water. All of the connections, as thus described, are preferably threaded connections so that the parts may be quickly assembled and taken apart. The pipe 16 extending downwardly through the heat chamber is, preferably, arranged concentric to the shells of the water

jacket, so that all of the water passing downwardly through the pipe may be acted upon by the heat within the heat chamber to increase the heat of the water.

5 A series of plates 18, preferably, surround the pipe 16 and extend radially therefrom to a point spaced slightly from the inner shell of the water jacket. These plates are provided with openings 19 to permit the pas-
10 sage of the burning gases through the heat chamber to the upper open end thereof, the openings in one plate being staggered with relation to the openings in adjacent plates, thereby forming tortuous passages for the
15 hot gases through the heat chamber. The plates 18 besides thus forming baffles for the products of combustion also form heating fins for the pipe 16. By means of these fins the heat of the products of combustion pass-
20 ing through the heating chamber is conducted by contact with said fins directly to the pipe 16 for heating the water therein.

It will be observed that the water heater constructed in accordance with this inven-
25 tion provides a relatively thin water jacket surrounding a combined flue and heating chamber of relatively small diameter, so that a quantity of water in the jacket may be quickly heated, the temperature of this
30 water being further raised during its passage through the pipe 16 which is completely surrounded by the heating medium passing through the chamber 4. By making the water jacket and heating flue relatively
35 long a relatively large amount of hot water may be obtained, and the heating chamber also forming the flue of the burner dispenses with the necessity of employing pipe sections to form a flue.

40 It will also be observed that the baffles 18

are so arranged as to prevent the products of combustion passing too rapidly through the heating chamber, whereby the greatest efficiency is obtained from the heat units of the heating medium, and it will be further
45 noted that the baffles 18 form efficient heat conductors to the walls of the pipe 16.

Various changes may be made without departing from the spirit of the invention as
50 claimed.

What is claimed is:

1. A water heater comprising a burner chamber, the top of said chamber having an annular groove, an annular recess formed on the upper portion of the outer wall of said
55 groove, said recess forming an annular shoulder adapted to support a water jacket formed between concentric shells and forming a heating flue within the inner shell, and the inner shell of the jacket project-
60 ing inwardly beyond the outer wall of said groove and terminating intermediate the outer and inner walls of said groove.

2. A water heater comprising a burner chamber, the top of said chamber having an
65 annular groove and there being an annular recess formed on the upper portion of the outer wall of said groove and forming an annular shoulder, and a water heating jacket resting upon the shoulder so as to
70 leave a space in said groove below the water heating jacket and inside of the lower end of the water heating jacket, the inner wall of said groove extending above the lower
75 end of the jacket.

In testimony whereof we have signed our names to this specification.

JOSEPH OSCAR SMITH.
JOHN B. REEVES.