(No Model.)

J. H. PHILLIPS.

WATER HEATER.

No. 559,040. Patented Apr. 28, 1896.

Fig. 1.

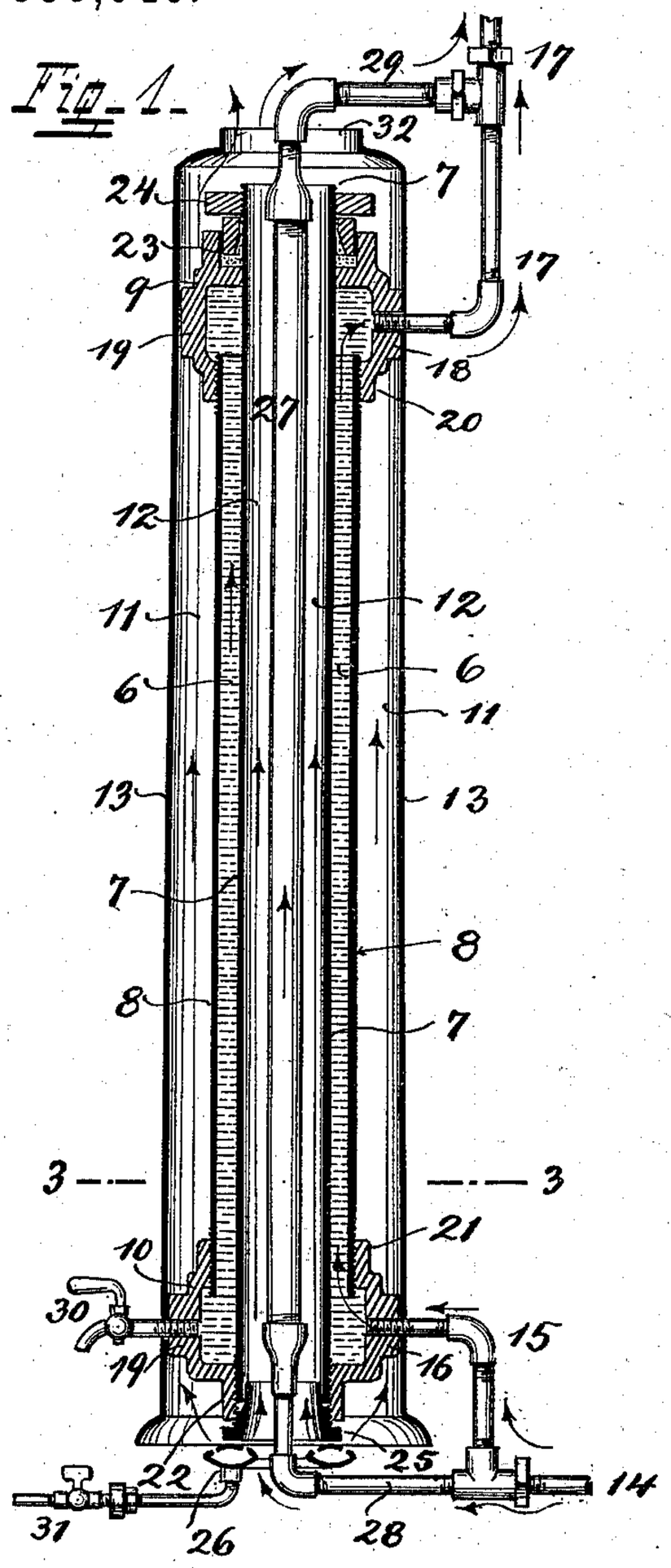


Fig. 2.

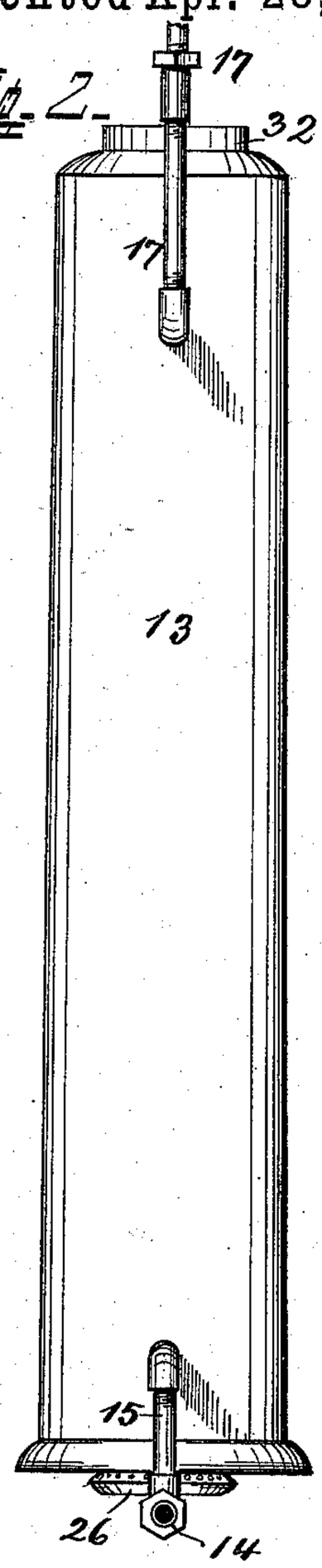
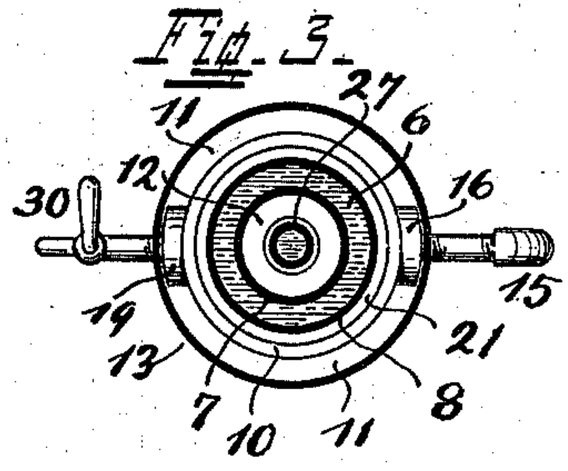


Fig. 3.



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UNITED STATES PATENT OFFICE.

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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 559,040, dated April 28, 1896.

Application filed July 27, 1895. Serial No. 557,297. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HOWARD PHILLIPS, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Improvements in Water-Heaters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

The subject of this invention relates to an appliance for the purpose of heating quickly and conveniently water which is in circulation or under pressure and enters cold at one end to be drawn off heated at the other. It is intended to be connected with the hot-water reservoirs or so-called "boilers," which are used now in kitchens and heated by being put in communication with a water-back within a cooking range or stove. In such combination and during the interim when no water is drawn the heated water accumulates and is stored in such boiler, entering the latter at its side or top, while the cold water leaves it at the bottom to be received by the heater. The latter as well as the boiler form a part the pipe system, being connected to and inserted within the service-pipes thereof. When my apparatus is so used, it does not interfere with present connections with kitchen-ranges or other means for heating, and having its independent fuel supply by gas-burner it may be used either altogether by itself, or when such other devices are not available or not in use it may be used as an auxiliary heater with them.

The object of my invention is therefore to devise such a water-heater which embodies all these features in a practical, cheap, and efficient construction with particular attention to obtaining tight joints against the unequal expansion of the metal, and whereby water is heated quickly and conveniently with the smallest possible outlay for fuel expenses.

In the following specification, and particularly pointed out in the claims at the end thereof, is found a full description of my invention, its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a vertical central section of the device complete. Fig. 2 is a side elevation of the same; and Fig. 3 is a horizontal section of it, taken on a line 3 3 of Fig. 1.

The device consists of an annular tubular water passage or way 6, formed by two concentric tubes 7 and 8, with suitable space between them, connected at their upper and lower ends by heads 9 and 10 and completely submerged in and surrounded on both sides by hot-air flues 11 and 12, open at both ends to obtain a direct draft. The walls of the outer air-flue 11 are formed by tube 8 and a jacket 13 concentrically surrounding it, while the inner air-flue 12 is formed by tube 7 of water-passage 6. The cold water from any source of supply or from the service-pipe enters the lower end of waterway 6 through a pipe 14 15, one end of which latter passes into head 10, to which it is secured by being screwed into a boss 16 projecting therefrom. The water after it is heated leaves at the upper end through a pipe 17, secured in a similar manner to a boss 18 of the upper head 9, and enters the hot-water reservoir.

19 19 are additional bosses on the two heads, which, in conjunction with bosses 16 and 18 and the ends of pipes 15 and 17, serve to hold jacket 13 in position.

Tube 8 is secured in position by being screwed into tapped flanges or necks 20 and 21 at the inner or opposite ends of the heads. The lower end of tube 7 screws into a similar flange 22 of less diameter in the outer end of head 10, while its upper end passes loosely through the outer end of head 9, where a stuffing-box 23 is provided, the gland 24 of which screws on the projecting upper end of tube 7.

The conical end of a screw-threaded plug 25 may be caused to enter the lower end of tube 7 by being screwed into flange 22 of head 10, the object being to produce a close joint and to prevent this end of tube 7 from being pulled out of head 10 when gland 24 of the stuffing-box at its other end is tightened. The joint at this other end is also maintained tight by said stuffing-box against the unequal expansion between head 9 and tube 7.

For fuel I use gas in a suitable form, or a mixture of it with air, which is supplied by a ring burner 26. It is concentric with waterway 6, and lies preferably against the lower end of the latter, so as to cause the flame of the burning gas issuing from a number of jets to divide, a part passing up through the outer air-flue 11, while the other part passes up through the inner air-flue 12. As will be seen, the comparatively thin body of water contained within passage 6 is completely surrounded by flames and intensely-heated air, whereby it becomes quickly heated. The center of the inner hot-air flue 12 is occupied by a waterway 27, in form of a tube, which is also completely surrounded by flame and intensely hot air. It is connected to and receives its supply of cold water from pipe 14 through a pipe 28, forming really a part of the general service-pipe, and discharges the heated water at the upper end through a pipe 29 into pipe 17.

As will be seen, there are two independent circulations, one through pipes 14 15, through the outer water-passage 6, and out through pipe 17, the other through pipes 14 28, through the inner waterway 27, and out through pipes 29 and 17.

30 is a flushing cock and pipe, whereby from time to time the heater may be flushed and relieved of deposits and sediments.

31 is a fuel (gas) pipe, which supplies the burner 26. The products of combustion, if there are any, pass out through the upper open end of flue 11, and if necessary a smoke-pipe may be attached, for which purpose a flange 32 is provided at the upper end of jacket 13.

Having described my invention, I claim as new—

1. In a water-heater adapted for connection to the hot-water reservoirs of domestic use and to be inserted into a service-pipe system supplying water under pressure, the combination of a central waterway 27 forming a part of such service-pipe system by having its open ends connected and inserted thereinto, an annular heating-flue 12 open at both ends surrounding this central pipe, an annular waterway 6 formed by and between concentric tubes 7 and 8, the tube 7 forming the flue 12, said waterway 6 being also inserted within the service-pipe system from which it receives an independent circulation by being connected thereto by branch pipes 15 and 17 at its lower and upper ends respectively, an outer, annular heating-flue 11 formed by a jacket 13 also open at both ends and a burner to supply heat to the heating-flues.

2. In a water-heater adapted for connection to the hot-water reservoirs of domestic use and to be inserted into a service-pipe system supplying water under pressure, the combination of a central waterway 27 forming a part of such service-pipe system by having its open ends connected and inserted thereinto, an annular heating-flue 12 open at both ends surrounding this central pipe, an annular waterway 6 formed by and between concentric tubes 7 and 8, connected at their ends by heads 9 and 10 which also close the space between these tubes, this waterway, surrounding and forming flue 12, being also inserted within the service-pipe system from which it receives an independent circulation by being connected thereto by branch pipes 15 and 17 at its lower and upper ends respectively, an outer, annular heating-flue 11 formed by a jacket 13 also open at both ends being held to its central position by bosses projecting laterally through the space of the outer heating-flue 11, one of said bosses at each end forming also a nipple which receives branch pipes 15 and 17 respectively and a burner to supply heat to the heating-flues.

In testimony whereof I hereunto set my hand in presence of two witnesses.

J. HOWARD PHILLIPS.

Witnesses:
C. SPENGEL,
ARTHUR KLINE.