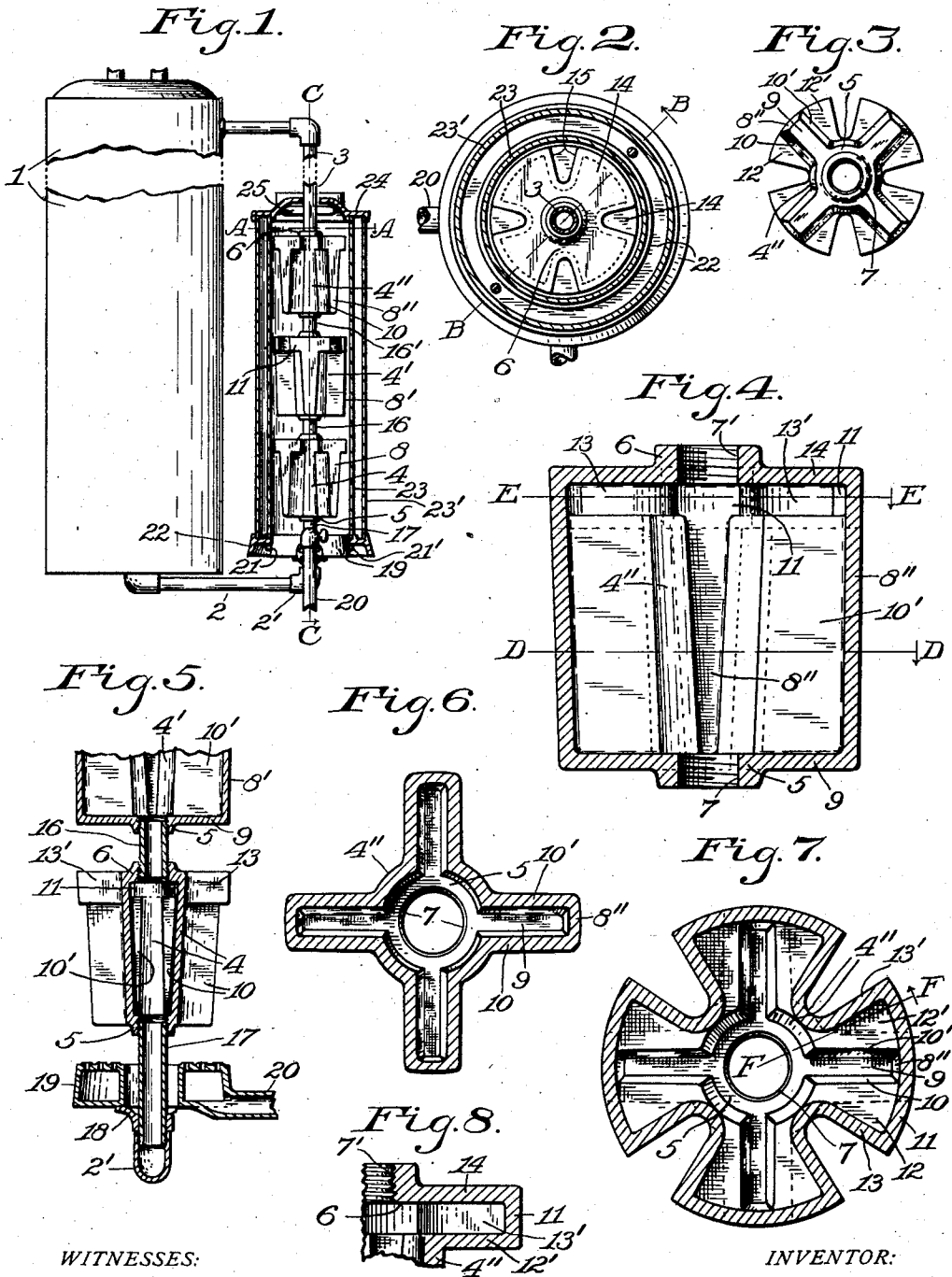


C. L. HOLDEN.
WATER HEATER.
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1,010,764.

Patented Dec. 5, 1911.



WITNESSES:

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WATER-HEATER.

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To all whom it may concern:

Be it known that I, CHARLES L. HOLDEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus for heating water for various purposes, particularly in dwellings, the invention having reference especially to the type of water heater for heating boiler described in Letters Patent No. 846,472, granted to me March 12, 1907, in which a boiler is shown comprising a shell having a plurality of series of hollow radiating branches thereon, the shell increasing in diameter from the lower to the upper end thereof.

The object of the present invention is to provide an improved water-heater which shall have the greatest amount of heating surface exposed to the action of the heat of the fire that may be had within the limits of convenient general dimensions of the boiler, to the end that gas may be used economically as fuel for heating the water; a further object being to improve the construction of the body and branches of the boiler described in said Letters Patent, whereby increased heating surfaces may be obtained and greater economy in fuel consumption result in operation.

A still further object is to provide a heating boiler of the above-mentioned character that will be adapted to be repaired in an economical manner, or to be cleared of lime scale which in many cases forms in boilers.

The invention consists particularly in a heating boiler comprising a shell having different diameters, the larger portions of which have lateral branches, which branches have lateral extensions at the upper portions thereof which provide increased heating surfaces and also serve as baffles for retaining the heat of the fire, the spaces between the baffles constituting combustion chambers, one above another formed partially by

a jacket inclosing the boiler; and the invention consists further in the parts and combinations and arrangements of parts as hereinafter particularly described and claimed.

Referring to the drawings, Figure 1 is an elevation of the improved water-heater in connection with a reservoir or tank, the jacket or casing of the boiler being in vertical section; Fig. 2, a horizontal section of the heating apparatus on the line A A in Fig. 1, showing particularly the top of the boiler; Fig. 3, a plan of a section of the boiler detached from the other sections and inverted; Fig. 4, a vertical sectional view of one of the sections of the boiler on the plane of the line B B in Fig. 2; Fig. 5, a fragmentary vertical section of the boiler and gas burner therefor on the line C C in Fig. 1; Fig. 6, a horizontal section on the plane of the line D D in Fig. 4; Fig. 7, a horizontal section on the plane of the line E E in Fig. 4; and Fig. 8, a fragmentary vertical section on the plane of the line F F in Fig. 7.

In the different figures of the drawings similar reference characters indicate like elements or features of construction herein referred to.

The improved water heater may be variously arranged for use and is especially advantageous in connection with an upright reservoir or tank 1 having an outlet pipe 2 and an inlet pipe 3 connected to opposite end portions thereof for the circulation of the water while being heated in a well known construction and arrangement, the reservoir or tank obviously being connected to a supply pipe and a hot-water delivery pipe.

The boiler comprising the essential feature of the water heater preferably comprises a plurality of sections, each having a series of lateral branches thereon, but it is obvious that in a relatively small size of heater one section alone may be employed, as will be apparent hereinafter. In a convenient size three identical hollow main sections are employed, each section having hollow lateral branches thereon, and plain cylindrical sections extend between them, the main sections having relatively large shells

4, 4', 4'', which are each tapering, being of less diameter at the lower end than at the upper end, each shell having a bottom 5 and a top 6 in which are threaded apertures 7 and 7' respectively, and the shell of each section has a suitable number of lateral branches, each having a V-shaped end as 8, 8', 8'', each branch having a relatively narrow bottom 9 extending from the bottom 5, and upwardly diverging sides 10 and 10' extending from the bottom 9 upward toward but not as far as the plane of the top 6, the chambers in the branches communicating with the interior of the shell or body portion of the section. The upper portion of the end of each branch, as 8, is connected integrally with a curved horizontally extending upright wall 11, and horizontal bottom plates 12 and 12' extend laterally outward from the sides 10 and 10' and are integral therewith and with the shell and also the wall 11, there being upright walls 13 and 13' extending upward from the plates 12 and 12' and from the wall 11 to the shell, being cast integral therewith. A top plate 14 extends integrally from the top 6 to the wall 11 and from each wall 13 to the wall 13', being integral therewith, and it has notches 15 therein between the planes of the walls 13 and 13' of two adjacent branches for the escape of the fumes of combustion and the ascending heat, while the bottom plates 12 and 12' serve as baffles to retard the flow of the heat currents. The boiler preferably comprises also other sections 16 and 16' of the boiler shell and they are of less diameter and relatively shorter than the main section shells, each smaller section being composed of a pipe nipple screwed into the aperture 6 of one section and the aperture 7 of another section above, and it will be clear therefore that the main sections may be readily disconnected so as to be more readily cleared of scale or to be replaced by a new one if found to be cracked or defective in construction, without entailing the loss of the whole boiler, the remaining sections being assumed to be serviceable. The lowermost main section has a pipe nipple 17 connected to the bottom thereof that is connected to an elbow 2' which is connected to the circulating pipe 2. The top 6 of the uppermost main section is connected to the circulating pipe 3. A bracket 18 is arranged on the pipe 17 and supports an annular gas burner 19 provided with an inlet 20 as is usual, the gas burner being provided with brackets 21 and 21' on which a base ring 22 is removably supported, the base ring being the lower end of a jacket comprising inner and outer shells 23 and 23' and a top 24 having an outlet opening 25 for escape of the fumes, the inner shell 23 being of suitable diameter to slip conveniently over the boiler

and permit the heat to rise between the shell of the jacket and the ends of the branches of the boiler. It will be seen that combustion chambers are formed above the top of each main section which permits of practically equal distribution of heat against the heating surfaces of the main sections, and the bottom plates 12 and 12' provide considerably increased heating surfaces on which the heat currents directly act while retarded in the flow upward. The direct heat acting on the smaller boiler sections 16 and 16' tends to rapidly heat the water flowing therethrough and accelerate the circulation of the water.

In practical use the gas escaping from the burner 19 is ignited in the customary manner and suitably regulated, and the heat of combustion is confined by the inclosing jacket to the heating surfaces of the boiler in which the water is rapidly heated and circulates therethrough as will be understood, the water flowing from the reservoir or tank 1 through the pipe 2 and upward through the boiler and thence through the pipe 3 into the upper portion of the reservoir.

Having thus described the invention, what is claimed as new, is—

1. A boiler including a shell having longitudinal branches thereon provided each with a lateral branch extending transversely thereof.

2. A boiler including a shell having lateral hollow branches and also hollow baffles in communication with the interior of the shell and the branches.

3. A boiler including a shell having longitudinal branches and also horizontally extending branches, the branches being in communication one with another and with the shell.

4. A boiler including a shell having lateral branches thereon provided each with baffles on the upper portions thereof that extend laterally each toward another from the sides of the branches.

5. A boiler including a shell having a greater diameter at its top than at its bottom and provided with lateral branches that have transverse branches at their tops, the transverse branches of each lateral branch extending toward the transverse branches of an adjacent lateral branch.

6. A boiler including a shell having lateral branches thereon, the end wall of each branch having a curved transverse wall thereon, transverse bottom plates extending laterally from the side walls of the branch, upright walls on the bottom plates extending from the shell to the curved wall, and a top plate on the curved wall and the upright walls.

7. In a heating boiler, the combination of

a plurality of hollow tapering main sections, each section having a plurality of hollow longitudinally extending branches that are in communication therewith, the sections being spaced apart, each branch having laterally extending hollow branches on the portion thereof that is adjacent the larger end of the main section, and tubular sections, each extending through the space between and secured to two of the main sections. 10

In testimony whereof, I affix my signature in presence of two witnesses.

CHARLES L. HOLDEN.

Witnesses:

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