C. L. HOLDEN.

WATER HEATER.

APPLICATION FILED AUG. 14, 1913.

1,146,566. Patented July 13, 1915.

Fig. 1.

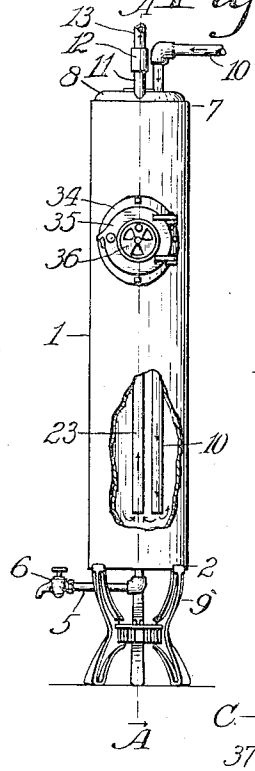


Fig. 2.

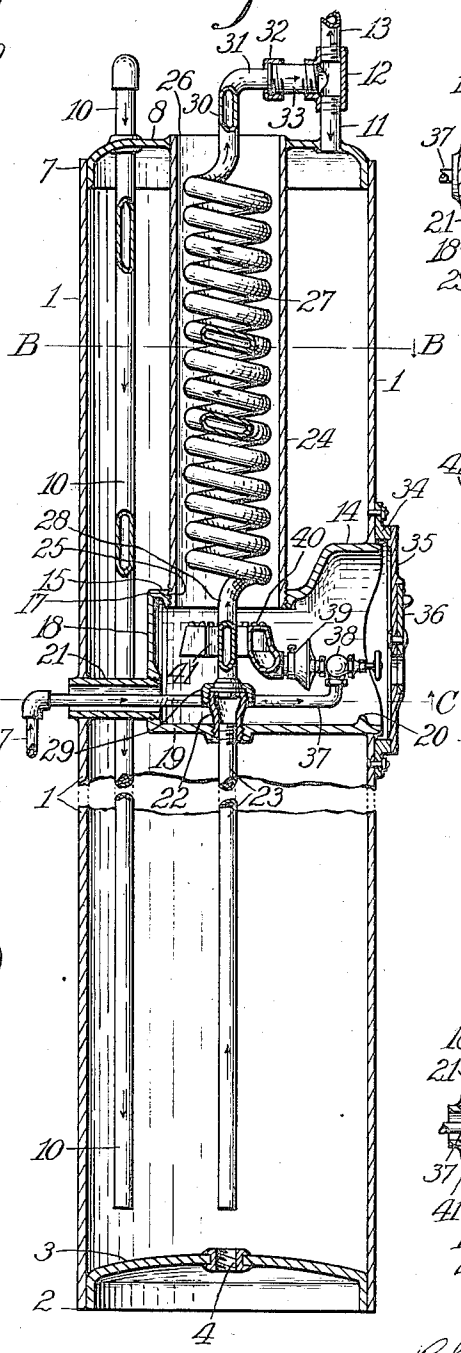


Fig. 3.

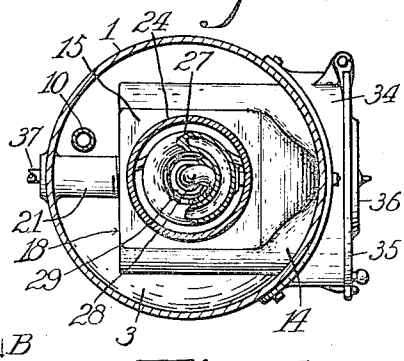


Fig. 4.

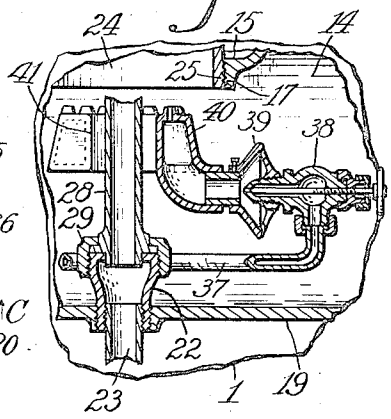


Fig. 5.

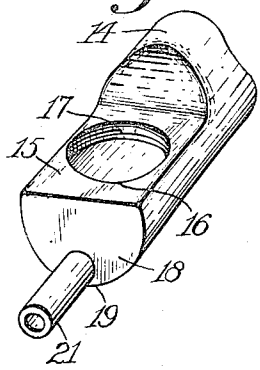
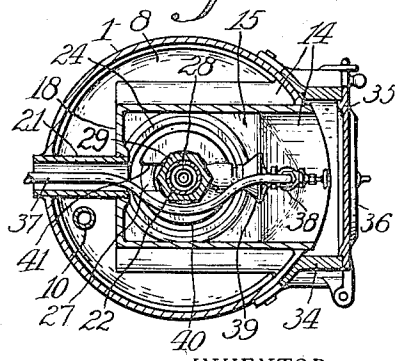


Fig. 6.



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WATER-HEATER.

1,146,566. Specification of Letters Patent. Patented July 13, 1915.

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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 a new and useful Water-Heater, of which the following is a specification, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This invention relates to apparatus for heating either large or small quantities of water, particularly for domestic purposes and especially by means of gas fuel, the invention having reference more particularly to a range boiler for containing heated water for kitchen use and for bathing purposes.

An object of the invention is to provide an improved reservoir and apparatus for heating water in an economical manner and which shall be so constructed as to be convenient for the attendant, especially in the warmer seasons when warm water is not constantly needed, and when it becomes necessary to frequently heat more or less water for the bath tub or other purposes.

Another object of the invention is to provide an improved water heater that shall be capable of heating the water rapidly and immediately delivering the heated water, especially when only a relatively small quantity may be desired, without necessitating the heating of a large volume of water in the reservoir, which water heater shall be so constructed as to permit the attendant to assume a comfortable position when starting the gas burner and observing its action, the aim being to eliminate the inconvenience and danger arising from the common practice of setting the gas burner relatively low for heating water, or near to the floor, where it is difficult to ignite the gas at the burner and observe its action while regulating the gas supply, while the attendant is necessarily in an awkward stooping position and exposed to danger of being burned by explosions of the gas when ignition does not properly take place at the burner.

A still further object of the invention is to provide an improved water heater that shall be so constructed as to be adapted to be shipped from the factory advantageously and readily set up for use, and which may be readily repaired economically.

With the above mentioned and other objects in view, the invention consists in a water reservoir or tank in which the water may circulate and provided in the normally upper portion thereof with heating apparatus adapted to heat and deliver water for immediate use, and adapted also for heating the water in the reservoir. The invention consists also in the novel parts and in the combination and arrangement of parts as hereinafter particularly described and further defined in the accompanying claims.

Referring to the drawings, Figure 1 is a front elevation of the improved water heater partially broken away; Fig. 2, a vertical section of the water heater approximately on the line A A in Fig. 1 on an enlarged scale and partially broken away; Fig. 3, a horizontal section on the line B B in Fig. 2; Fig. 4, a fragmentary section reproducing a portion of Fig. 2 on an enlarged scale; Fig. 5, a perspective view of the fire box portion of the water heater, and Fig. 6 a section on the line C C in Fig. 2 looking upward.

In the different figures of the drawings, corresponding reference characters indicate corresponding elements or features of construction herein referred to and described.

The invention as preferably constructed comprises a cylindrical shell 1 which is upright when in normal position, and its lower end 2 is provided with a bottom 3 preferably having a drain hole 4 therein with which a drain pipe 5 provided with a stop cock 6 is connected. The normal upper end or top 7 of the shell is provided with a head 8. When desired, the reservoir is supported upon a range boiler stand 9. An inlet pipe 10 is connected to, and extended through the head 8 and thence downward within the reservoir toward bottom 3 for delivering water to the lower portion of the reservoir. A short pipe 11 is connected with the head 8 for conducting heated water from the reservoir or for conducting heated water from the primary heating boiler or coil to the reservoir, and preferably a pipe-T 12 is connected to the pipe and has a service pipe 13 connected thereto.

In practically carrying out the objects of the invention an improved heating furnace is provided which is approximately L-shaped in contour and preferably comprises two separate parts, one part being a fire-box which may suitably be formed as a steel or a malleable iron casting and comprises a cylindrical front portion 14 and an inner

or rear portion having a flat top 15, the part being horizontally arranged in the reservoir intermediately of the bottom 3 and the top 8 thereof, preferably relatively closer to the top than to the bottom so that a person in standing position may readily see into the fire-box, the front portion of which is open and secured in a suitable opening in the shell 1, preferably by electrically welding. The flat top 15 has a circular aperture 16 therein preferably provided with screw threads 17. The inner or rear end of the fire-box part is suitably connected to the portion of the shell opposite to that to which the front is connected, in order to securely support the fire-box, the rear end preferably being closed by an end wall 18. The under or bottom portion 19 of the fire-box being concave or trough-like is preferably provided with a ridge 20 adjacent to the front for preventing water from condensation escaping from the fire-box, the ridge extending transversely so as to retain the water until evaporated. A tube 21 is secured in the normal lower portion of the end wall 18 and also in the adjacent portion of the shell 1 and assists in supporting the fire-box while admitting air thereto. A pipe union member 22 is secured in a suitable aperture in the under portion 19 and a circulating pipe 23 is screwed into the member and extends downward toward the bottom 3. The remaining part 24 of the furnace is tubular and has screw threads 25 on one end thereof that are connected with the screw threads 17 in the aperture 16, the part extending upward into a suitable aperture in the head 8, its upper end 26 being secured therein to the head, as by electrical welding. The tubular part constitutes a furnace wall and secondary heating boiler, the top of which may be provided with a flue pipe.

A primary boiler in which the water may be heated while passing therethrough may be variously constructed, either as shown in Letters Patent No. 1,010,764, granted to me December 5, 1911, or as a coil 27 which is arranged in the tubular part 24 and has a downwardly extending inlet neck 28 which is provided with a union nut 29 that is detachably connected to the member 22, the nut being accessible through the front of the fire-box. The pipe 23 and the coil 27 are thus practically continuous. The coil has a terminal outlet end portion 30 extending upward and from which extends a lateral or horizontal portion 31 provided with a union nut 32 that is detachably connected with a nipple 33 screwed into the pipe-T 12 and therefore in communication with the service pipe 13 and also with the interior of the reservoir through the pipe or nipple 11.

A door frame 34 is secured to the shell 1 so as to extend about the front of the fire-box and suitably supports a door 35 which preferably is provided with a register or air regulator 36 through which air may enter to the fire-box for supporting combustion. The tube 24 being at right angles to the fire-box part serves as a draft flue, so that any suitable fuel may be used, gas however being preferable, and a gas supply pipe 37 is extended through the tube 21 toward the fire door 35 and is provided with a regulating valve 38 to which a mixer 39 is connected and adapted to permit the mixing of atmospheric air with the gas, a suitable gas burner 40 being connected with the mixer, the burner having an opening 41 to receive the neck 28, so that the burner may be readily removed away from the neck if desired. The regulating valve and the mixer are arranged with the burner in the fire-box, as will be seen. It will be clearly understood from the foregoing that various parts may be shipped separately and be readily connected together when the apparatus is erected for use, and it will be apparent also that various parts may be readily disconnected for the purpose of making repairs.

In practical use the attendant, who may be unskilled, while standing in a comfortable position at the front of the reservoir and ready to move away if necessary, opens the door 35, slightly opens the regulating valve 38 and immediately ignites the gas escaping from the burner 40, and if proper ignition occurs he regulates the gas supply and closes the door, adjusting the air regulator 36 so that proper combustion takes place, the flame being observed through the air regulator. The water entering the primary boiler or coil 27 through the pipe 23 is rapidly heated and may be drawn off through the service pipe 13 or permitted to enter the upper portion of the reservoir, the water in the latter being more gradually heated by the tubular portion 24 and the fire-box portion of the furnace. The water continues to circulate and gradually becomes heated throughout the reservoir or until the fire is extinguished.

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

1. A water-heater including a furnace comprising a horizontal fire-box part and a flue part connected to the top of the fire-box part between the ends thereof, a single circulating pipe tightly secured in the bottom of the fire-box part between the ends thereof, and a conduit in the flue part connected with the top of the circulating pipe.

2. A water-heater including a normally upright closed reservoir, a horizontal fire-box part having a front end that is tightly secured to the upper portion of the side wall of the reservoir, the fire-box part being within the reservoir and nearer to the top than the bottom thereof, a flue part connected to

the top of the fire-box part and to the top of the reservoir, a circulating pipe that is longer than the flue part and tightly secured in the bottom of the fire-box part, the pipe extending toward the bottom of the reservoir, and a conduit in the flue part and connected in the fire-box part with the upper end of the circulating pipe.

3. A water-heater including a normally upright closed reservoir, a horizontal fire-box part having two open end portions tightly secured in two opposite portions of the side wall of the reservoir and near to the top than the bottom of the wall, the fire-box part being within the reservoir, a flue part connected to the top of the fire-box part and the top of the reservoir, a circulating pipe that is longer than the flue part and tightly secured in the bottom of the fire-box part, the pipe extending from the fire-box part toward the bottom of the reservoir, and a primary heating boiler in the flue part and having an inlet neck extending into the fire-box part, the neck being connected in the fire-box part with the upper end of the circulating pipe.

4. In a water heater, a furnace comprising a fire-box part that has a cylindrical front end and a closure wall in the opposite rear end thereof, a flue part connected to the normal top portion of the fire-box part adjacent to said closure wall, and a tube connected to the lower portion of the closure wall.

5. In a water heater, a furnace comprising a fire-box part that has a cylindrical front end and a closure wall in the opposite rear end thereof, said part having a flat top portion, and a flue part connected to said flat top portion, the bottom of said part opposite said flat portion having a circulating pipe connected thereto, and a conduit in said flue part and having a portion that extends through said fire-box part to said circulating pipe.

6. In a water heater, the combination of an upright cylindrical shell and a fire-box part contained entirely in the upper portion of the shell and secured at one end in one portion and extending toward the opposite portion thereof, the under side of the part having a transverse ridge on the upper side thereof, a head connected to the top of said shell, a furnace part connected to the top of the inner portion of said fire-box part and to said head, a door frame secured to said shell at the front of said fire-box part, and a door mounted on said frame.

7. In a water heater, the combination of an upright cylindrical shell, a fire-box part horizontally arranged in the upper portion of the shell and connected to the wall thereof, a head connected to the top of the shell, a tubular furnace part connected to the top of said fire-box part and also to said head, a union member secured in the under portion of said fire-box part, a pipe connected with the lower portion of said member, a primary heating boiler in said tubular part and having an inlet neck extending into said fire-box part to said union member, and a nut connecting said neck to said member.

8. In a water heater, the combination of an upright cylindrical shell, a fire-box part horizontally arranged in the upper portion of the shell and having an open front secured in a portion of the upright shell, the rear portion of the said part having a closure wall, a head secured to the shell opposite to said part at a distance therefrom, a bottom secured to the shell opposite to said part at a relatively greater distance than the head from said part, a tube connected to said closure wall and also to the opposite portion of the shell, a tubular part connected to the top of said fire-box part and also to said head, a gas-burner arranged in said fire-box part, and a supply-pipe extending through said tube into said part and connected with said burner.

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

CHARLES L. HOLDEN.

Witnesses:
E. T. SILVIUS,
J. M. MCLAUGHLIN.