

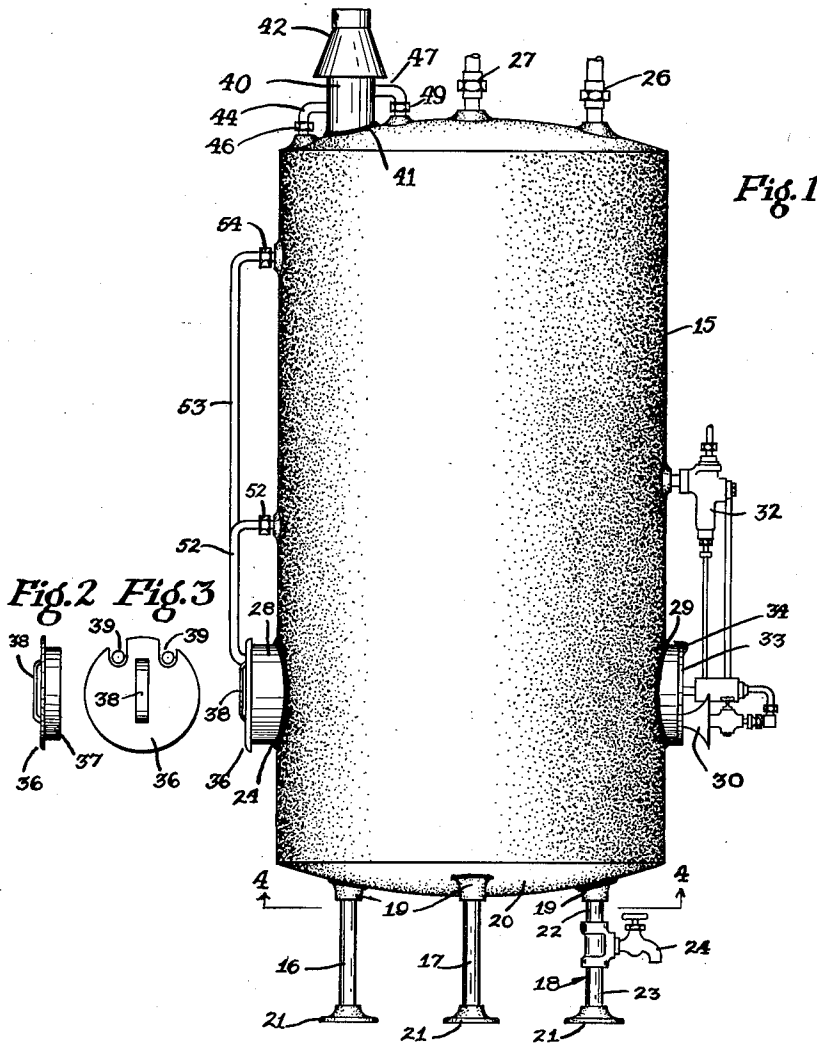
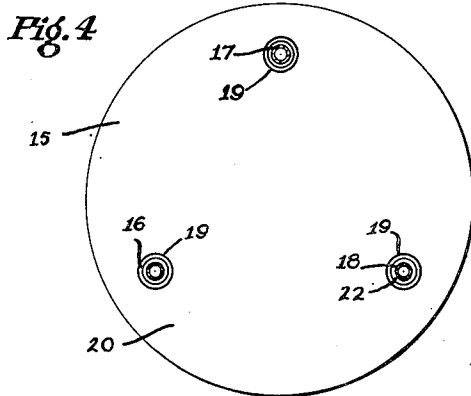
Nov. 18, 1952

V. R. ROSTEK
STAND BOILER WITH VERTICAL FLUE AND
WATER CIRCULATING COIL THEREIN

2,618,246

Filed March 15, 1949

3 Sheets-Sheet 1



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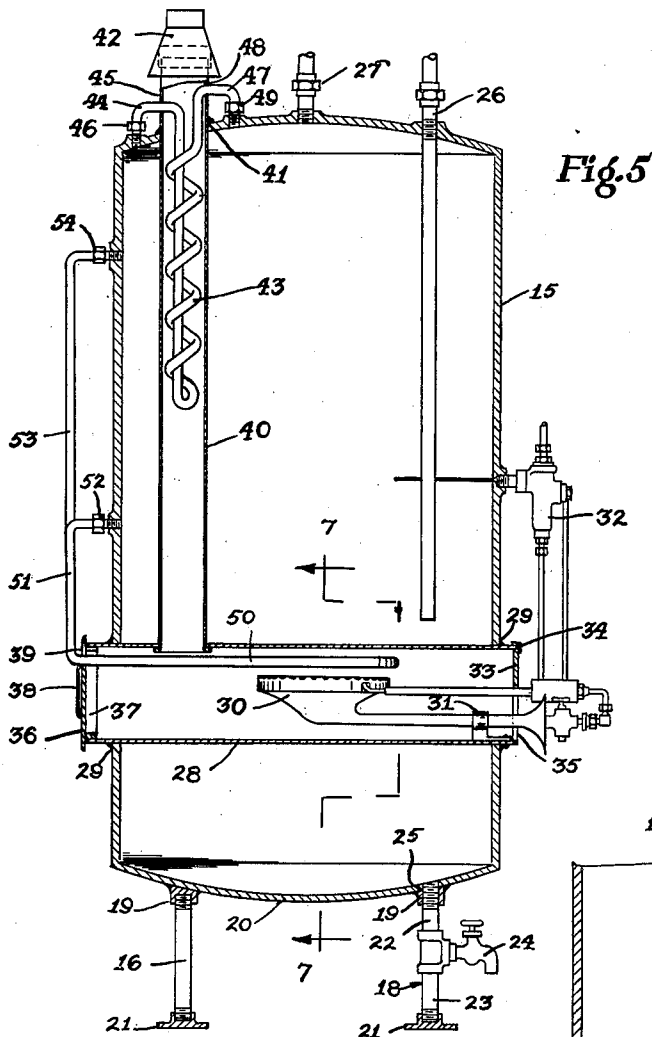


Fig. 5

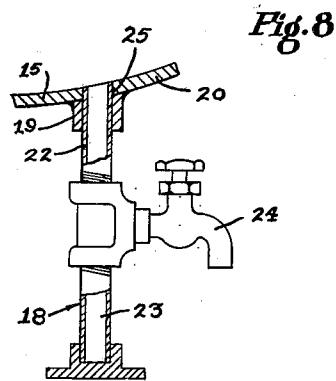


Fig. 8

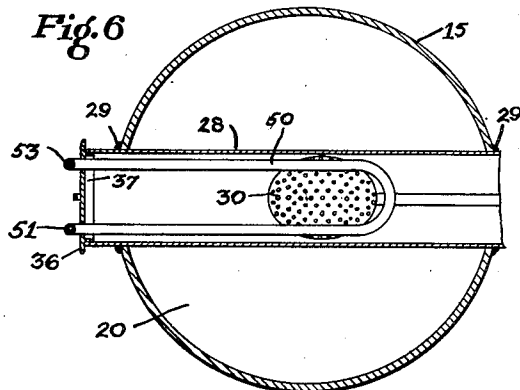


Fig. 6

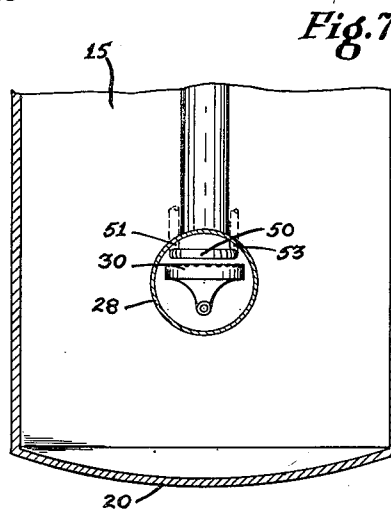


Fig. 7

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3 Sheets-Sheet 3

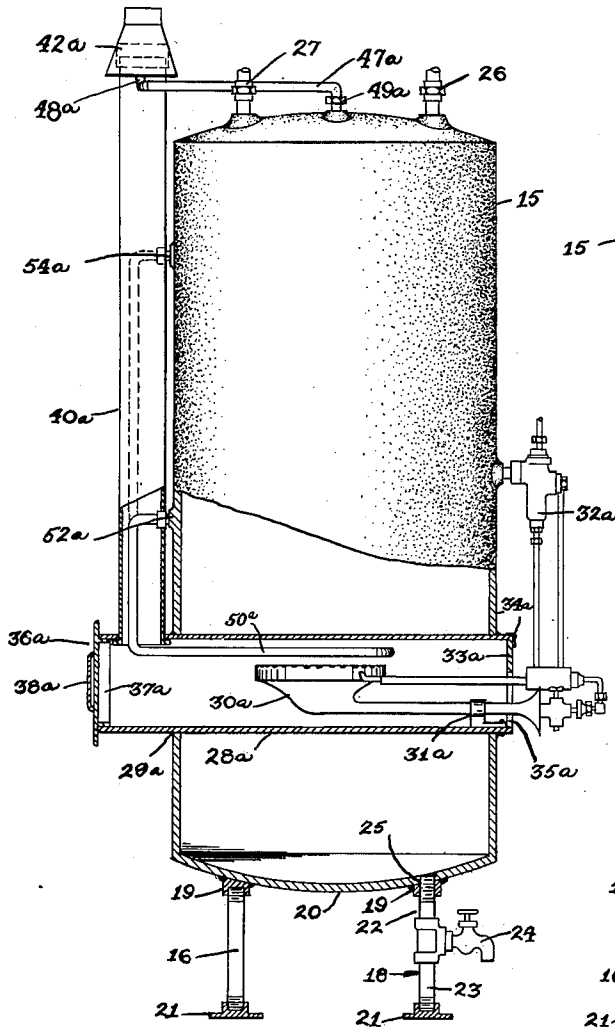


Fig. 9

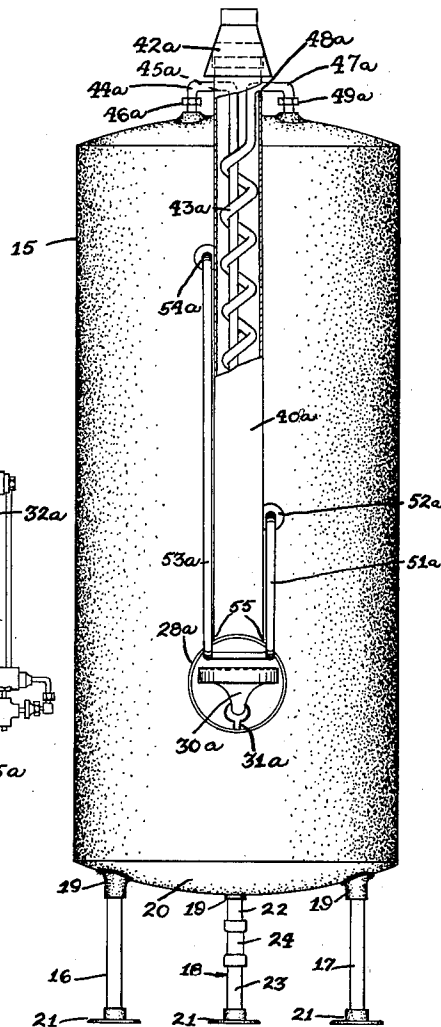


Fig. 10

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UNITED STATES PATENT OFFICE

2,618,246

STAND BOILER WITH VERTICAL FLUE AND
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Application March 15, 1949, Serial No. 81,576

4 Claims. (Cl. 122-16)

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My invention relates to new and useful stand boiler with vertical flue and water circulating coil therein, particularly those known as household water heaters of the upright boiler type.

In heaters of this general style where the heating element is located outside of and below or underneath the boiler a considerable amount of the available heat is lost or wasted due to the insulating effect caused by rust and other sediment precipitated to and resting on the bottom of the boiler or tank. Therefore, one object of this invention is to provide means for locating the heating element or heat producing means within the boundaries or confines of the boiler or tank a suitable distance above the bottom thereof to produce better heating results.

Another object of the present invention is to provide a hot water heater adaptable to thermostatic control and capable of using gas, oil, electricity, charcoal or wood as the heating medium or fuel.

Another object of the invention is to construct a water heater comprising a boiler or tank having a heating chamber disposed across the lower part a distance above the bottom of said boiler with a stack or flue leading from and in communication with said heating chamber and extending through the boiler or located completely exteriorly thereof, said heating chamber containing a fuel burning device such as a gas, oil or electric burner or a grate for charcoal, wood or coal and a water heating coil, and said stack or flue housing a spiral coil which assists in heating water and functions as a baffle to disperse heated gases about the turns of the coil, both of said coils being suitably connected with the boiler to cause water to flow through them.

A further object of the invention is to provide a stand for the apparatus which may consist of sockets secured to the exterior of a wall of the boiler to receive suitable lengths of pipes, generally called nipples, for supporting the appliance at any predetermined height above a floor or other surface on which the stand rests, the lower ends of the nipples being closed by caps.

A still further object of the invention is to utilize one of the legs of the stand as a drain controlled by a valve or spigot.

With the above and other objects in view this invention consists of the details of construction and combination of elements hereinafter set forth and then designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same I will describe its con-

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struction in detail referring by numerals to the accompanying drawings, forming a part hereof, in which:

Fig. 1 is a side elevation of a water heater constructed in accordance with the invention.

Fig. 2 is a side or edge view of the rear end closure cap for the heating chamber.

Fig. 3 is an outer face view thereof.

Fig. 4 is a section on the line 4-4 of Fig. 1 to show one arrangement of the legs forming the stand.

Fig. 5 is a vertical sectional view of the heater with some parts left in elevation.

Fig. 6 is a fragmentary horizontal sectional view on the center line of the heating chamber with the U-shaped coil and the gas burner in plan.

Fig. 7 is a fragmentary sectional view on the line 7-7 of Fig. 5, the supporting legs being left off.

Fig. 8 is an enlarged sectional elevation of one of the legs used as a drain and illustrating one method of connection to the boiler and the assembly of a spigot.

Fig. 9 is a sectional elevation of a modified construction of the water heater.

Fig. 10 is a back view thereof with heating chamber closure cap removed and the stack or flue partly broken away to show the spiral coil.

In carrying out my invention as herein embodied 15 represents a boiler or tank of any desirable size and shape although in most instances one of cylindrical configuration is preferred and in use such a boiler is preferably set with one end up and is known as an upright boiler. Such a boiler may be wholly or partially covered with asbestos or otherwise heat insulated, as is well known.

The boiler is mounted on any suitable supporting stand preferably comprised of three legs 16, 17 and 18 consisting of nipples or sections of pipe screwed into sockets 19 welded onto the outside of the bottom wall 20 of said boiler. Different length nipples may be used to vary the height of the boiler from the floor or other supporting surface to meet the requirements or desirabilities of the installation. The lower ends of the nipples have caps 21 screwed thereon to provide extended flat contact surfaces.

If desired, one of the legs, as 18, may be composed of two short nipples 22 and 23 and a spigot 24 between them. In such a case the socket 19 receiving the leg 18 has a bore completely through it, Fig. 8, and the bottom wall 20 of the boiler 15 has a hole 25 in alignment with the socket bore. This provides for draining the boiler through one

of the legs. It should be apparent that all of the legs or two of them, when one is used as a drain, can be rods or posts threaded at both ends and it is to be understood that reference herein to nipples is to include equivalents such as rods.

The boiler is provided with a supply or cold water inlet 26 and a hot water outlet 27 suitably located and connected as usual.

Referring particularly to Figs. 1 to 7, inclusive, a duct 28 is projected diametrically through the lower part of the boiler a distance above the bottom thereof with both normally open ends of said duct extending outside of the side walls of said boiler and the joints between the duct and the walls of the boiler are made watertight, as by welding at 29. This provides a heating chamber.

From the front end of the duct 28 is inserted any suitable heating element and only for convenience of illustration the heating element is shown as a gas burner 30 removably held in place by a bracket 31 and controlled manually or by thermostatic mechanism of conventional construction and generally indicated by the numeral 32. The forward end of the duct 28 or heating chamber is closed by a door 33 preferably hinged at 34 and provided with the necessary openings 35 to permit it to be swung past the outer end of the burner and any adjacent parts of the thermostatic control mechanism.

The rear end of the duct 28 or the heating chamber formed thereby is closed by a cap 36 which may include a collar 37 to telescope into the duct and having a handle 38 to readily manipulate said cap. Said cap also has apertures 39 to permit passage over certain parts to be presently described.

Connected with the duct 28, near the rear end thereof, by a watertight joint is a stack or flue 40 which extends upwardly within the boiler from and above said duct and projects through the top wall of said boiler. This provides a communication between the heating chamber, within the duct, and the exterior of the boiler. A watertight joint is formed where the flue passes through the boiler top by welding 41 or other suitable means and on the upper end of said flue may be mounted a draft diverter hood 42.

The above method of assembling the spiral coil permits it to be readily withdrawn from the flue after the hood 42 is removed and the union fittings disconnected and its replacement is just as easily accomplished by reversing the operations herein outlined. The turns of said spiral coil lie adjacent the inside surface of the flue and, to some extent, function as baffles to direct the hot gases all about the coil for the efficient and speedy exchange of heat from the gases in the flue to the circulating water in the spiral coil.

Another coil 50, possibly of the U-shape type, is suitably mounted in the upper part of the duct 28, or the heating chamber formed thereby, above the heating device or fuel carrier 30 and the intake leg 51 of said coil 50 extends through the rear end of said duct and is bent for connection to the lower part of the side of the boiler by a union fitting 52 or equivalent connector. The outlet leg 53 of the coil 50 also extends through the rear end of the duct 28 and is bent for connection to the upper part of the boiler by a union fitting 54 or equivalent connector.

The above described assembly of the U-shaped coil 50 permits its removal or replacement by disconnecting the union fittings and drawing the coil out of the rear end of the duct 28. Prior

to withdrawal or replacement the closure cap 38 must be removed and when in place the intake and outlet legs of said coil 50 extend through the apertures 39 in said cap.

Now referring especially to Figs. 9 and 10, the duct 28a extends through a diameter of the boiler, adjacent the bottom thereof, with the ends of said duct projecting outside of the boiler walls and the joints made watertight, as by welding 28a. The main difference is that the rear end of the duct extends a sufficient distance beyond the boiler that the flue or stack 40a can be connected to said duct outside of the boiler and extend upwardly along side of the same with the draft diverter hood 42a on top.

The heating element or fuel carrier 30a is mounted in the duct by a bracket 31a and may be controlled by thermostatic mechanism 32a. The forward end of the duct is closed by a door 33a hinged at 34a and provided with openings 35a to accommodate certain associated parts as set forth in connection with the first described form. The rear end of said duct is normally closed by the cap 36a including the collar 37a and having a handle 38a but does not require apertures unless the intake and outlet legs of the U-shaped heating coil are extended through the rear end of the duct.

The same kind of spiral heating coil 43a is located in the flue with the intake and outlet legs 44a and 47a, respectively, extending through the respective slots 45a and 48a in the upper end of the flue 40a and detachably connected to the boiler by the union fittings 46a and 49a, respectively.

The other, or U-shaped, coil 50a is mounted in the duct 28a above the fuel carrier 30a and the intake and outlet legs 51a and 53a, respectively are extended rearwardly within the duct and then through apertures, for example, slots 55, Fig. 10, or through the outer end of said duct and then bent upward and detachably connected to the boiler by the respective union fittings 52a and 54a, respectively.

The operation of both forms of the apparatus are substantially the same although where the flue or stack is located within the boiler additional heat can be transferred directly through the flue walls, from hot gases passing through the flue, to the body of water within the boiler.

In actual practice, while the heater is in operation, heat generated by the heating element or fuel carrier will be transferred through the walls of the duct and since the latter is located above the bottom of said boiler no precipitated sediment will cling to the duct and heat transfer will not be interfered with thus obtaining greater efficiency. In addition much of the heat usually lost will be transferred to the circulating water in the U-shaped coil to assist in quickly heating the body of water in the boiler. Further, considerable heat which usually passes off through the flue will be utilized by transference from the gases flowing through the flue, to the circulating water in the spiral coil.

By utilizing the heat at the several locations practically all generated heat is transferred to the water in the boiler and its temperature will be efficiently and quickly raised thus producing a saving in fuel.

Of course I do not wish to be limited to the exact details of construction herein shown and described as these may be varied within the scope of the appended claims without departing from the spirit of my invention.

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Having described my invention what I claim as new and useful is:

1. A water heater comprising an upright hot water boiler, a horizontal duct secured in opposite side walls of said boiler adjacent the lower end thereof and extending across the interior of the same, a heating element within said duct, a vertical flue projecting from the duct with which it communicates at a position offset from the location of the heating element and extending through the top of the boiler, and a water heating coil within said flue and having both ends communicating with the upper portion of the interior of said boiler.

2. A water heater according to claim 1, in combination with a second coil mounted in the duct above the heating element, an inlet leading from the lower portion of the boiler above the duct to said second coil, and an outlet leading from said second coil to the upper portion of the boiler.

3. A water heater consisting of a boiler, a tubular duct of uniform diameter projecting through opposite walls of said boiler adjacent the bottom thereof and entirely across the interior of the same, said duct adapted to contain a heating element, a flue in communication with the duct and extending above the top of the boiler, and a water heating coil within said flue and having both ends projecting through the walls of the flue and communicating with the upper portion of the interior of said boiler.

4. A water heater consisting of a boiler to contain water to be heated therein, a tubular duct projecting across a diameter of the interior of said boiler with the ends of said duct extending outside

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of said boiler, a heating element in said duct, a flue connected to said duct and projecting upwardly within the boiler and through the top wall thereof, the interiors of said duct and flue being in communication, and a water heating coil within the upper portion of said flue and having both ends thereof projecting through the flue walls outside of the boiler and connected to and communicating with the upper portion of the interior of said boiler.

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