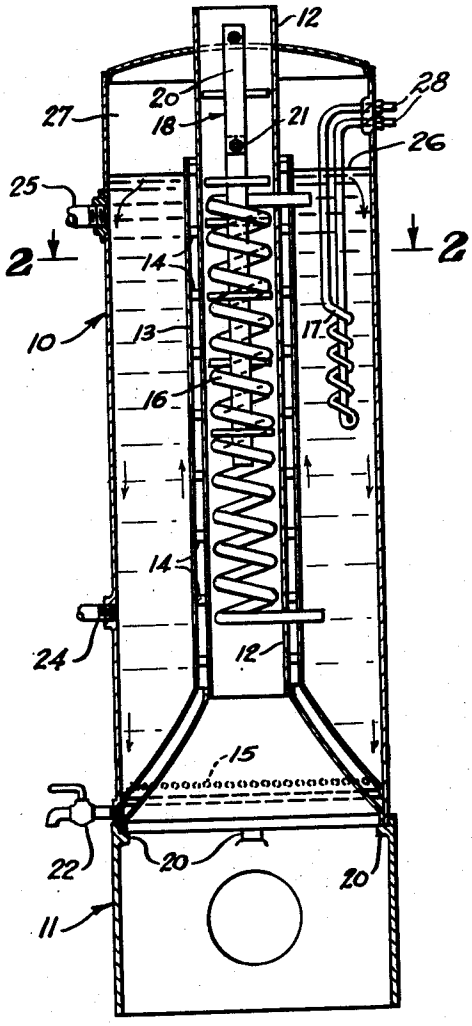
June 16, 1953 C. Z. ALEXANDER 2,642,046

STAND BOILER WITH VERTICAL FLUE, CIRCULATING COIL, AND INDIRECTLY HEATED DOMESTIC SUPPLY

Filed July 22, 1950 2 Sheets-Sheet 1

Fig. 1



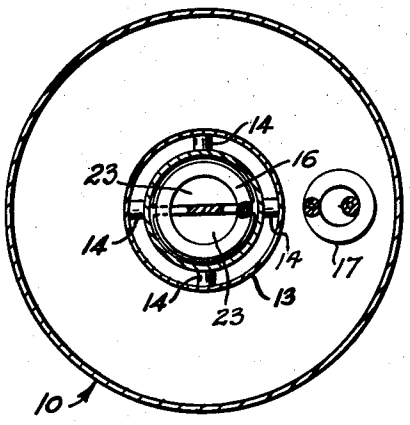


Fig. 2

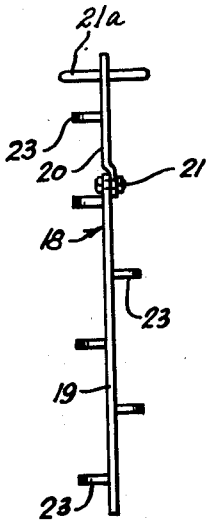


Fig. 3

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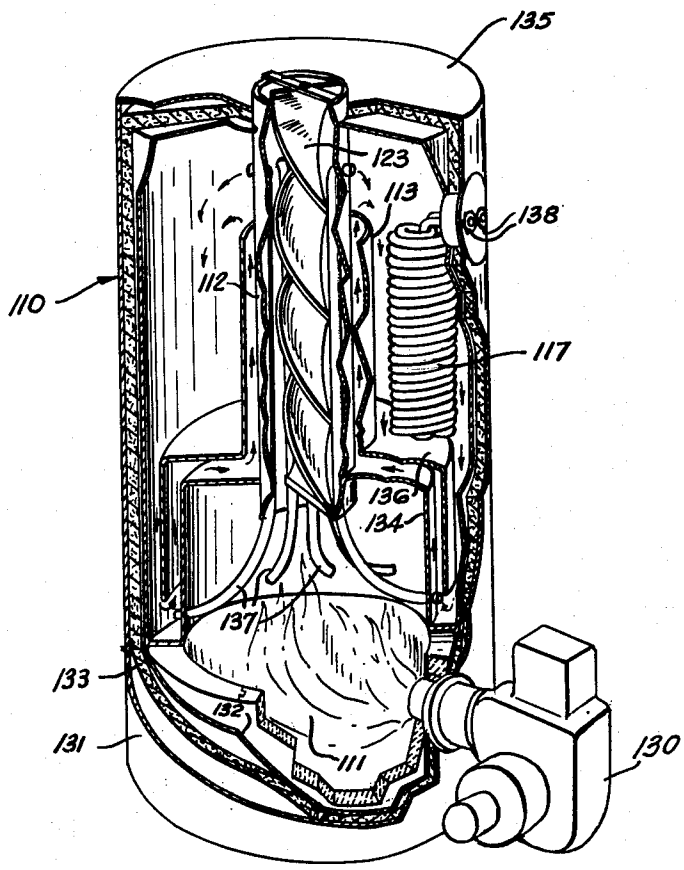


Fig. 4

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Patented June 16, 1953 2,642,046

UNITED STATES PATENT OFFICE

2,642,046

STAND BOILER WITH VERTICAL FLUE, CIRCULATING COIL, AND INDIRECTLY HEATED DOMESTIC SUPPLY

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Application July 22, 1950, Serial No. 175,440

1 Claim. (Cl. 122—16)

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This invention relates to water heaters and boilers for domestic heating.

It is an object of the instant invention to provide an efficient boiler and water heater of inexpensive design.

A further object is the creation of a boiler or water heater in which the temperature of the water can be quickly raised with a minimum consumption of fuel.

Another object is to provide a boiler and water heater of such simplicity that servicing can be easily performed by the most inexperienced.

Other objects of the instant invention will become apparent in the course of the following specification.

In the accomplishment of these objectives, a water heater is made in the form of a hollow tank with a flue passageway along the longitudinal center line, the flue flaring outwardly and downwardly at the bottom to form a canopy over the fire box. Within the tank and concentric with the flue is a shell terminating interiorly of the tank at the top and having openings around the base which permit a flow of water from the main body to the restricted space between the flue and shell for quickly heating the confined water which rises to be expelled over the top of the shell and to mix with the main body of water for a repetition of the cycle. A domestic hot water supply coil is located within the tank.

In accordance with an important feature of this invention, the usual outside expansion tank is eliminated and is substituted by an air compression chamber located in the top portion of the tank.

In addition to the heating of hot water in special coils the tank may be used for circulating hot water through heat radiators. Thus, the apparatus of the present invention may constitute a complete unit for installation in a home, which will heat it and supply it with hot water.

The invention will appear more clearly from the following detailed description when taken in conjunction with the accompanying drawings showing by way of example a preferred embodiment of the inventive idea.

In the drawings:

Figure 1 is a sectional view of a water heater constructed in accordance with the principles of this invention;

Figure 2 is a sectional view along the line 2—2 of Figure 1, on an enlarged scale;

Figure 3 is a side view of the baffle;

Figure 4 is a section through a differently constructed water heater.

Referring now in greater detail to Figures 1 to 3 of the drawings where like reference numerals indicate like parts, reference numeral 10 indicates the tank and 11 the fire box.

The tank 10 is a hollow cylindrical container

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formed from suitable material and along the longitudinal center line of which is a cylindrical flue pipe 12. At the bottom, the flue pipe 12 flares outwardly and downwardly to the bottom rim of the boiler where the two members are attached by welding or other suitable means, the flaring bottom of the flue forming a canopy over the fire box. At the top, the flue pipe 12 is similarly attached to the tank along the jine of jointure, and may even extend above the tank, as illustrated, for convenience in hooking up with the smoke stack (not shown).

Concentrically formed around the surface of the flue pipe within the tank is a shell 13 held in spaced relationship therewith by any suitable spacers 14. At the bottom, the shell 13 forms a second canopy in spaced relationship with the canopy of the flue and is fastened to the inner surface of the tank. The second canopy has formed therethrough adjacent the bottom edge a plurality of circumferentially spaced openings 15 communicating with the space between the canopies. At the top, the shell terminates within the tank (Fig. 1).

Within the flue pipe 12 and intermediate the top of the shell 13 and the top of the expanded base portions or canopies of the flue and shell is a spiral tube 16 the lower end of which passes through the flue and shell and terminates in the main body of water as illustrated. The upper end of the spiral tube similarly passes through the flue and shell 13.

A domestic hot water supply coil 17 of known design is located within the tank and may be placed in the path of heated water discharged from the upper end of the spiral tube 16.

Within the flue 12 and coacting with the spiral tube 16 is a baffle 18 formed from two upright members 19 and 20 joined by any suitable means 21 (Fig. 3) and having along opposite sides a number of similar horizontal members 23 of semi-circular form, the members having a diameter less than the inside diameter of the flue. Adjacent horizontal members are oppositely directed and serve in the manner of the threads of a screw for inserting the baffle within the spiral coil 16. At the top of the upright member 20 an opening is made and through which a pin 21a is passed to hold the baffle in any desired position relative to the spiral tube. Any suitable means (not shown) may be used for supporting the ends of the pin 21a against the inner surface of the flue.

The sediment precipitated out of the water will fall to the bottom of the tank and to prevent clogging of the restricted space between the flue and shell, a cock 22 is threaded through the tank to form a controlled passageway between the restricted space and the outside.

The fire box 11 may be lined with the usual

refractory material (not shown) and has an inwardly directed flange 20 on which the bottom of the tank or boiler rests. Of course, the flange 20 can be reenforced for the weight supported. Any suitable fluid can be used for firing the boiler and with only slight modification a solid fuel can also be used.

In operation, water fills the tank 10 to about the line 26, leaving a space 27 in the upper part of the tank 10, which serves as an air compression chamber and a substitute for an expansion tank. The water in the restricted space between the flue and shell is first heated and rises around the flue to spill over the top of the shell and mix with the water of lower temperature in the upper part of the tank for a repetition of the cycle. In addition to the circulation of the water in the constricted space, the water adjacent the outer surface of the shell will also absorb heat and cause a circulation in the direction of the arrows except as interrupted by the flow of water through the openings in the base of the shell. Of course, water from the tank will fill the spiral tube 16 which, inserted in the path of the products of combustion, will force the heated water out of the upper end of the spiral coil. The domestic hot water supply coil 17 will be heated and will supply hot water through the pipes 28 to the users.

Water for heating purposes is supplied to radiators through a pipe or outlet 25 which is on the opposite side of the tank relative to the outlet or top of the spiral tube and in the plane thereof. Water is returned into the tank 10 through a pipe or inlet 24 spaced above the canopies and substantially in the plane of the inlet or bottom of the spiral tube and on the side of the tank opposite to the bottom of the tube by means of a pump (not shown).

It is apparent that the described apparatus provides a most effective and inexpensive means for supplying heating and hot water to home dwellers. While the tank shown in the drawings is used for supplying hot water, it is easily adaptable to supply steam or vapor.

The device shown in Figure 4 includes a tank 110 and a fire box 111, the heat being supplied by a burner 130.

The tank 110 includes an outer casing 131, an inner casing 132 and a heat insulated lining 133.

A flue pipe 112 is located within the tank 110. At the bottom, the pipe 112 extends outwardly to form a casing 134 which is attached to the tank 110. At the top, the pipe 112 is attached to the cover 135 of the tank 110.

A shell 113 extends concentrically around the flue pipe 112 and terminates in a casing 136 which extends around the casing 134 and which terminates at a substantial distance from the bottom of the casing 134 so as to provide free circulation of water. At the top, the shell 113 terminates within the tank.

The inner surfaces of the flue pipe 112 are curved and are provided with helical baffles or ribs 123.

Pipes 137 are embedded in the flue pipe 112. The lower ends of the pipes 137 extend through the chamber enclosed by the casing 134 and terminate within the tank in the space between the bottom edges of the casings 136 and 134. The upper ends of the pipes 137 are located within the tank above the upper end of the shell 113.

Hot water for domestic use is heated within the coil 117 and is circulated through passages 138.

The circulation of heated water within the tank is indicated by arrows in Figure 4. In addition, water is heated within the pipes 137 and is continuously circulated therethrough.

The described apparatus is most suitable for quickly and conveniently supplying hot water for domestic and other use.

It will be understood that the invention is not limited to the exact disclosure herein described but may lend itself to a variety of expressions within the scope of the appended claim.

What is claimed is:

A domestic hot water heating unit comprising a fire box, a tank vertically disposed above the fire box, a flue vertically disposed through the tank along the longitudinal center line thereof, the flue at the bottom flaring outwardly and downwardly and forming a canopy over the fire box, a shell disposed in the tank, the shell being concentric with the flue and terminating interiorly of the tank at the top and terminating at the bottom in a second canopy in spaced relationship with the first mentioned canopy, the second mentioned canopy having formed therein a plurality of openings communicating with the space intermediate the first and second mentioned canopies, the tank having formed therein a water inlet adjacent the top of the second mentioned canopy and a water outlet below the top of the shell, the inlet and outlet being on the same side of the tank, water for the tank to a level intermediate the outlet and the top of the shell, a water circulating spiral pipe disposed in the flue, the end of the spiral pipe at the bottom extending through the flue and the shell and terminating interiorly of the tank on the side opposite the inlet and substantially in the plane thereof, the end of the spiral pipe at the top extending through the flue and the shell and terminating interiorly of the tank on the side thereof opposite the outlet and substantially in the plane thereof, a domestic hot water supply coil disposed in the tank below the water level thereof and coacting with the end of the spiral tube at the top, and a baffle coacting with the spiral tube removably disposed in the flue, the baffle comprising an upright member, a plurality of spaced horizontal members of semi-circular form disposed on the upright member, the diameter of the horizontal members being less than that of the flue and successive members being oppositely directed and spaced apart a distance coacting with the pitch of the spiral tube.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
534,494	Coe	Feb. 19, 1895
1,016,398	Burroughs	Feb. 6, 1912
1,166,424	Backstrom	Jan. 4, 1916
1,552,292	Fuller	Sept. 1, 1925
1,616,143	Schnepp	Feb. 1, 1927
1,899,523	Ott et al.	Feb. 28, 1933
1,935,919	Ronstrom	Nov. 21, 1933
1,980,424	Morgan	Nov. 13, 1934
1,993,674	Larsen	Mar. 5, 1935
2,077,776	Schmitt	Apr. 20, 1937
2,286,677	Greth	June 16, 1942
2,355,466	Perry	Aug. 8, 1944