Dec. 8, 1931. L. E. PETERS 1,835,329

WATER HEATER

Filed Aug. 17, 1929

Fig. 1.

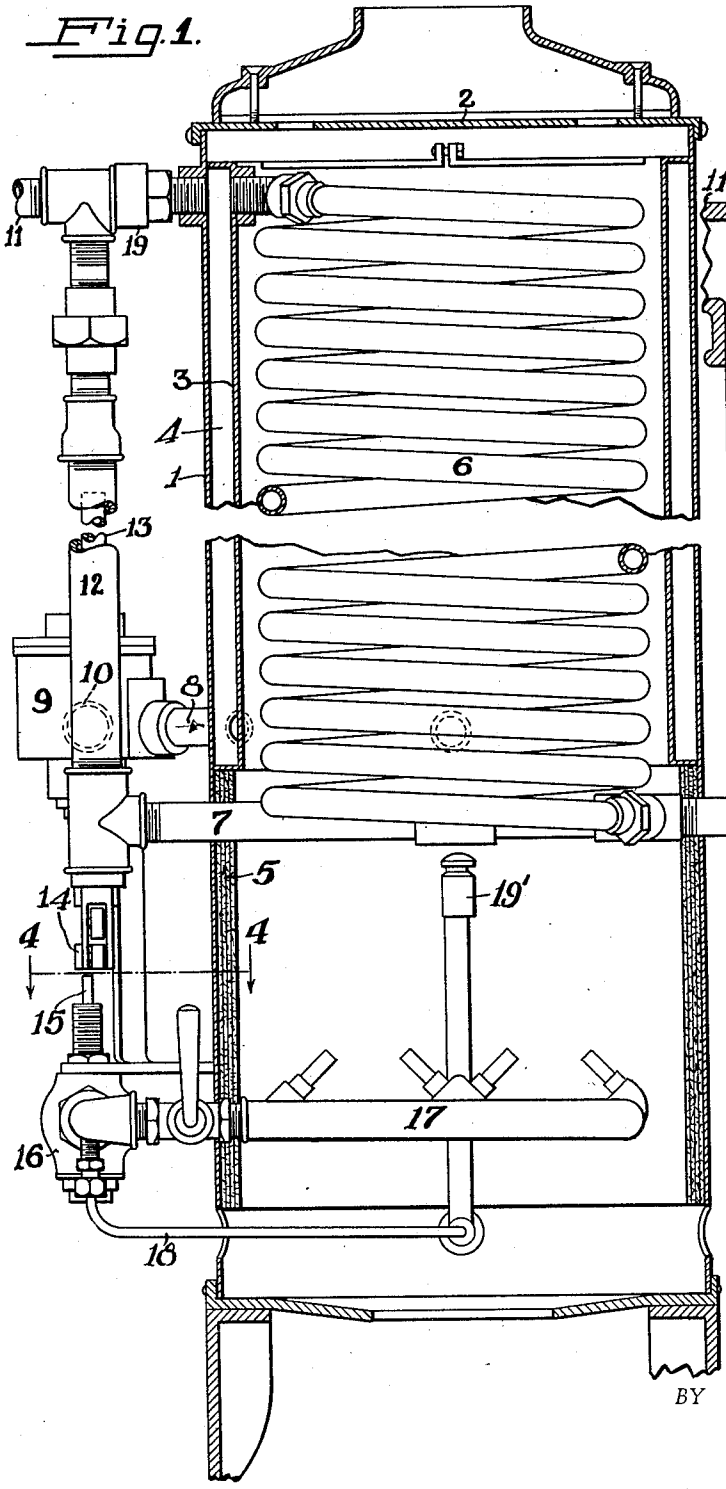


Fig. 2.

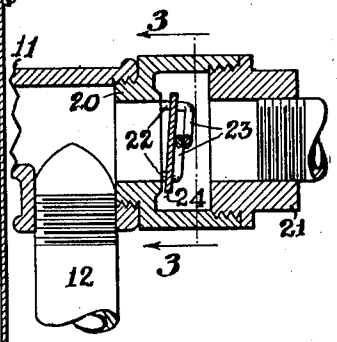


Fig. 3.

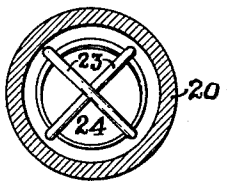
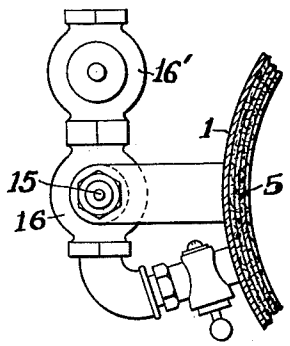


Fig. 4.



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UNITED STATES PATENT OFFICE

LESLIE E. PETERS, OF SAN FRANCISCO, CALIFORNIA

WATER HEATER

Application filed August 17, 1929. Serial No. 386,683.

This invention relates to improvements in water heaters of the type adapted to instantaneously deliver hot water.

An object of my invention is to provide an improved water heater embodying means for causing a continuous circulation of water therein.

Another object of my invention is to provide an improved water heater embodying a hollow jacket which is adapted for use both as a water storage reservoir and as an enclosing casing.

A further object of my invention is to provide an improved water heater wherein a pilot light is utilized to cause a continuous circulation of pre-heated water through the heater.

A still further object of my invention is to provide an improved water heater embodying thermostatic control means for automatically regulating the amount of fuel delivered to the heater in proportion to the amount of water drawn therefrom.

A still further object of my invention is to provide an improved and efficient water heater embodying novel means for maintaining a constant circulation of pre-heated water therein, whereby the coils of the heater may be prevented from contracting and expanding rapidly as well as maintained in a condition free from harmful accumulations of lime or sediment.

Other objects more or less apparent will present themselves or will be specifically pointed out in the description to follow.

In the accompanying drawings:

Figure 1 is a vertical sectional view of a water heater constructed in accordance with my invention;

Figure 2 is a vertical sectional view of a check valve used with my improved heater to automatically control the circulation of water therethrough;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Referring to the drawings, the numeral 1 represents a cylindrical shaped outer shell or casing having a perforated top 2 suitably secured thereto. Secured as by welding to the inner surface of the outer shell 1 at points near its top and center, is an inner cylindrical shaped shell 3, which is so spaced from the outer shell as to provide a suitable chamber or reservoir for the holding of quantities of water, the water acting as a heat insulator. Suitably secured to the inside surface of the outer shell 1, is a lining of asbestos or other suitable fire proof material 5.

Located in the upper part of the casing is a coiled pipe 6, one end of which extends through the inner shell 3 near the top edge thereof and communicates with the chamber 4, while its lower end is connected to a pipe 7 extending through the lining 5 and outer shell 1. A water inlet pipe 8 connected to the outer shell 1 and communicating with the lower part of the chamber 4, serves to admit quantities of cold water to the said chamber from a water pressure valve 9 which connects with a suitable water supply through a pipe 10. A water outlet pipe 11 communicating with the chamber 4 and connected to the outer shell 1 at a point adjacent the connection of the coil 6 to the inner shell 3, permits heated water to be withdrawn from the heater. A substantially upright water discharging pipe 12 connected to the outlet pipe 11 and the pipe 7 permits water to proceed from the coil 6 to the said outlet pipe. The upright pipe 12 encloses a thermostatic control means 13 of the well known rod type carrying a projecting arm 14 which is adapted to come in contact with the upwardly projecting stem 15 of a gas regulating valve 16. The rod of the thermostatic control means 13 moves downwardly in the usual manner when heated water passes through the upright pipe 12 thereby causing the arm 14 thereof to press the stem 15 downwardly to open the valve 16. The gas regulating valve 16 is connected to a gas operating valve 16′ which in turn is connected to a suitable source of gas or other fuel supply. The water pressure valve 9 is suitably connected by an actuating means to the gas operating valve 16′, and when the water is withdrawn through pipe 11, the water pressure valve 9 opens the gas operating valve 16′ to allow suitable quantities of gas

to pass therethrough. The gas regulating valve 16 is connected to a burner 17 located in the casing 1 beneath the coil 6, so when the cold water passing through pipe 12 causes the thermostatic control means 13 to open the valve 16, suitable quantities of gas are admitted to the burner to properly heat the water passing through the said coil. Suitably connected by a pipe 18 to the gas supplying apparatus is a pilot burner 19′ which is so positioned beneath the pipe 7 of coil 6 that the flame thereof plays on the said pipe 7 and maintains the water passing therethrough in a pre-heated state. Located on the water outlet pipe 11 between the upright pipe 12 and the outer shell 1, is a check valve 19 which is so constructed as to permit the circulation of water through the heater when the pressure from the source of water supply has been removed by the discontinuance of the flow of water thorugh the outlet pipe. The check valve comprises a female part 20 into which is screwed a male part 21. The check valve 19 is similar in construction to the one shown and described in my co-pending application entitled "Check valves for heating apparatus," Serial No. 381,545, filed July 27, 1929. With their inwardly bent legs 22 secured within suitable holes provided in the end of the female part 20 for that purpose, are two members 23 which cross each other at approximately right angles and at a point approximately in the center of the large opening through the valve. The upper two legs of the cross members 23 are longer in length than the two lower legs, thereby causing the cross members to assume an inclined position. Located between the cross members 23 and the end of the female part 20 with its lower edges resting on the two lower legs 22, is a circular disc 24 which is of such size as to completely cover the large opening at the end of the female part 20. The lower legs 22 are slightly bent and inclined in an upward direction so as to cause the disc to fall back against the cross members 23 and into its normal position when no pressure is being exerted against its outside surface. When a pressure is caused by water being withdrawn through the outlet pipe 11, the disc 24 is actuated against the end of the female part 20, thereby closing the opening through the latter. The closing of the opening through the female part 20 prevents water from being withdrawn directly into the pipe 11 from the chamber 4, thereby causing the water withdrawn through the outlet pipe to pass from the lower end of the coil 6 through the pipe 7 and into the upright pipe 12. Upon the shutting off of the water passing through the outlet pipe 11, the pressure is removed from the outside surface of the disc 24 and the same drops back against the cross members 23, thereby allowing water to pass through the end of female part 20. After the pressure is removed from the outlet pipe 11, the warm water in the coil 6 rises and passes into the upright pipe 12 through the check valve 19, from whence it again proceeds into pipe 7 and the lower end of the said coil.

When water is not being withdrawn through the outlet pipe 11, the pilot burner 19′ causes the water in the pipe 7 to become heated, after which it rises through the coil 6 and passes through the check valve 19 into the upright pipe 12. A constant circulation of water is thereby maintained in the heater at all times, irrespective of whether water is being withdrawn therefrom or not. The water in the chamber 4 lies dormant when the pressure is removed, thus serving as an insulator to prevent the heat, generated within the casing, from escaping through the walls of the latter.

When quantities of water are being withdrawn through the outlet pipe, the pressure caused thereby, permits the water pressure valve 9 to open and allow cold water to flow through the inlet pipe 8 into the chamber 4, from whence it proceeds through the coil 6 into the upright pipe 12. The thermostatic control means 13 is actuated by the warm or hot water passing through the upright pipe 12 to permit suitable quantities of gas to pass through the gas regulating valve 16 to the burner 17 for the proper heating of the water passing through the coil 6. The circulation of the pre-heated water through the heater when no water is being withdrawn therefrom is very desirable, for not only is the temperature in the coil reduced below the point of precipitation but the accumulation of lime or other harmful substances within the coil is greatly reduced. The fact that the heating elements of my improved heater are kept in a heated condition, rapid expansion and contraction thereof is practically eliminated, thereby extending the length of life of my heater considerably beyond that of other heaters.

It is apparent to those skilled in the art that my improved heater may be constructed in other forms than the one shown and described, so for this and other apparent reasons I desire my invention included broadly within the spirit of the appended claim.

Having described my invention what I claim is:

In a water heater, a casing including an inner shell and an outer shell having a water containing chamber located between the said shells, water inlet means communicating with the chamber at its lower end, water outlet means communicating with the chamber at its upper end, a coil mounted in the casing having its top end connected to the chamber near the water outlet means, and its lower end connected to a discharge pipe located externally of the casing, a burner mounted in the casing having fuel supply means connect-

ed thereto, thermostat means located in the discharge pipe and adapted to be actuated by the temperature of the water passing through the discharge pipe to control the amount of fuel supplied to the burner by the supply means, said discharge pipe connecting with said outlet means, a check valve mounted in the outlet means between the chamber and the point of connection of the outlet means with said discharge pipe, said check valve being so constructed and arranged as to remain in an open position when no hot water is being withdrawn from the heater thereby allowing normal convection circulation from the coil through said chamber and said valve into said discharge pipe but arranged to close when hot water is drawn from the heater whereby water is caused to flow from said chamber through said coil and discharge pipe to said outlet means.

In testimony whereof I affix my signature.

LESLIE E. PETERS.