March 26, 1935. P. L. F. FEYLING 1,995,608

WATER HEATER

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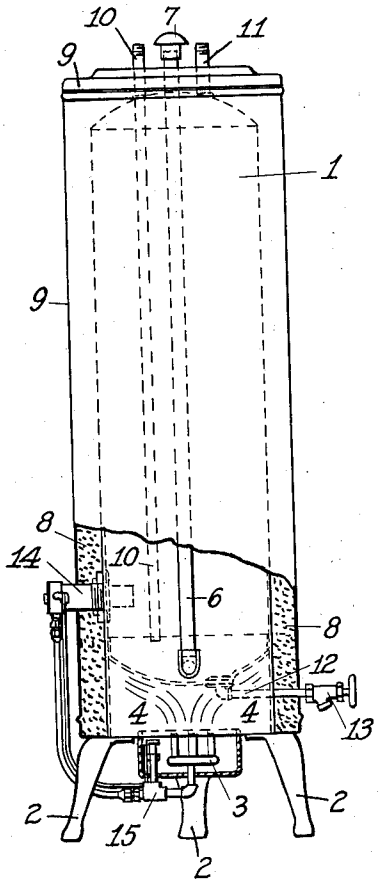


Fig. 1

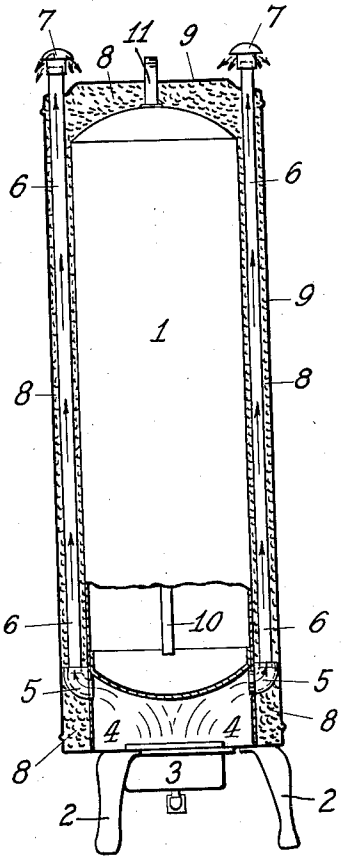


Fig. 2

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WATER HEATER

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4 Claims. (Cl. 122—14)

The present invention relates to hot water heaters and more particularly to slow recovery water heaters.

It is an object of the present invention to provide a water heater having a maximum thermal efficiency and a minimum heating surface.

It is another object of the invention to provide a slow recovery water heater having such a construction that the flue gas leaves the heater with a controlled amount of heat removed therefrom.

It is a further object of the invention to locate the heating surface at the lowest region of the body of water.

It is also within the contemplation of the invention to provide a slow recovery water heater of such a construction that it can be practically, perfectly insulated against heat losses.

A further object of the invention is to provide a slow recovery water heater of such a construction that a pilot flame of minimum size is capable of supplying sufficient heat to balance the heat losses and to prevent the body of water from being cooled off sufficiently to cause the operation of the thermostat.

Other objects and advantages will become apparent from the following description taken in conjunction with the drawing in which

Fig. 1 is an elevational view, partly broken away and partly in a section for purposes of clarity; and

Fig. 2 is a view similar to Fig. 1 except the view is taken approximately at right angles to Fig. 1.

Referring more particularly to Fig. 1, the reference character 1 designates a water or storage tank which is supported upon a plurality of legs 2 which are adapted to stand upon the floor or some other supporting surface. Of course, other appropriate means may be employed for supporting the water tank as those skilled in the art will readily understand.

Underneath tank 1, a burner 3 is located. As may be seen from the drawing, the burner is adapted to play upon and to heat the bottom of the tank 1. Between the bottom of tank 1 and the burner 3, a combustion chamber 4 is located. This chamber is sufficiently large to accommodate the flame of burner 3 and to permit the proper combustion of the flame.

Associated with the combustion chamber is an outlet to carry off the products of combustion. It is preferred to utilize a plurality of waste gas outlets 5 in association with the upper part of the combustion chamber 4 as may be clearly seen from Fig. 2. Each discharge outlet 5 is connected to a flue pipe or tube 6. In practice, it is preferred to extend the tubes or pipes 6 to a region higher than the top of the water tank 1. Usually it is preferred to provide the top of each flue pipe or tube with a suitable draft diverter or hood 7 to prevent the entry of a down draft.

Surrounding tank 1 and the flue pipes or tubes 6 is an insulating layer 8. As is well known, this layer of insulation thermally isolates water tank 1 and flue pipes 6 and prevents the loss of heat. In the preferred embodiment, a shell or casing 9 completely houses the insulation. Shell 9 may be made of an appropriate material such as metal or the like.

A cold water inlet pipe 10 brings the water into tank 1 and hot water outlet pipe 11 leads the hot water out of the tank in the usual manner. A drain pipe 12 and drain valve 13 are located at the bottom of the tank to drain off the tank when desired.

For the purpose of controlling the temperature of the water of the tank, a thermostat, as well known by those skilled in the art, controls the operation of burner 3. The gas burner also has a suitable safety pilot 15 associated therewith in a customary manner.

The operation of the present slow recovery water heater is obvious to those skilled in the art. Burner 3 heats the water in the tank by heating the bottom of the tank. The waste products of combustion or flue gases from burner 3 leaves the combustion chamber 4 via discharge outlets 5 and flue pipes 6. When the flue gases leave the flue pipes via draft hoods 7, they are at a relatively low temperature. All of the desired heat is removed from the flue gases before being discharged. In this manner, the heat is utilized efficiently and very little heat is wasted.

As soon as the water is heated to the desired temperature thermostat 14 operates in the usual way and shuts off burner 3. If no water is withdrawn from the tank, the pilot light gives sufficient heat to counter balance the heat losses. Due to the fact that the body of water in tank 1 remains at practically the same temperature, thermostat 1 does not become operative. As a result, the water heater functions with great economy.

It is to be noted that the principles ordinarily employed for a regular water heater of the under-fired or sidearm type as one having a separate heater cannot be used in a slow recovery heater due to the fact that the heating surface would be too large and the flue gas would have such a low temperature that excessive condensation on

the heating surface would occur. The disadvantages of such prior art construction have been overcome by the present invention.

It is to be observed that the present invention provides a water heater particularly a slow recovery water heater which has a reduced heating surface in comparison with prior art heaters and which is simple in construction, easy to manufacture and economical in first cost and in operation.

It is also to be noted that the present invention provides a water heater having such a construction that the flue gases are not cooled to such an extent that they deposit a condensate on the heating surface while at the same time all of the desired heat is removed from the flue gas.

It is further to be observed that the present invention provides a water heater which has such a construction that the water is heated and is kept hot in practically an ideal way due to the fact that the heating surface is located at the lowest portion of the body of water and the unheated surface is located at the highest level in the tank which is practically completely insulated.

It is also to be observed that the present invention provides a water heater in which the bottom is heated and the sides and top are insulated practically perfectly.

Furthermore, the present invention provides a water heater in which channels or tubes or pipes are used for the discharge of flue gas or waste products of combustion and the flue gas channels or tubes are hidden in a layer of insulation between the inner surface of the casing and the outer surface of the water tank so that the tubes are insulated from a region adjacent to the combustion space or chamber below the water tank to the top of the tank.

Moreover, practical tests and experiments have demonstrated that the present water heater has such a construction that a pilot flame of minimum size is capable of balancing the heat losses so that the hot water within the water tank is practically never cooled off sufficiently when standing to cause the operation of the thermostat.

I claim:

1. A slow recovery water heater comprising an elongated water tank having a convex bottom and heating surface, a gas burner located underneath said convex surface and adapted to heat the water, a closed combustion chamber surrounding the bottom of said tank and said burner, a plurality of insulated waste gas flues spaced about the periphery of said tank for removing products of combustion of said burner to a region just above the top of said water tank at such temperature that a condensate is not deposited in said gas flue, and a hot water outlet connected to the top of said water tank and not depending to the lower part thereof.

2. A slow recovery water heater comprising an elongated water tank having a convex bottom and heating surface, a gas burner located underneath said convex surface and adapted to heat the water, a closed combustion chamber surrounding the bottom of said tank and said burner, a plurality of insulated waste gas flues spaced about the periphery of said tank for removing products of combustion of said burner to a region just above the top of said water tank at such temperature that a condensate is not deposited in said gas flue, a hot water outlet connected to the top of said water tank and not depending therein, and a pilot light of such size as to be capable of supplying sufficient heat to balance the heat losses whereby the water in the tank is maintained hot under normal, idle conditions.

3. A slow recovery water heater comprising an elongated cylindrical water tank having a convex bottom and heating surface, a gas burner located underneath said surface and adapted to heat the water, a closed combustion chamber surrounding the bottom of said tank and said burner, a plurality of waste gas flues connected to and spaced about said combustion chamber and extending upwardly along side of said tank to a region just above the top thereof, a down draft hood positioned on top of each waste gas flue pipe, an insulating jacket encasing said water tank and insulating said waste gas flues to prevent the loss of heat and chilling thereof and to prevent the cooling of products of combustion to such an extent that a condensate is deposited, and a hot water outlet connected to the top of said water tank.

4. A slow recovery water heater comprising an elongated cylindrical water tank having a convex bottom and heating surface, a gas burner located underneath said surface and adapted to heat the water, a closed combustion chamber surrounding the bottom of said tank and said burner, a thermostat associated with said tank and adapted to turn the gas off and on in the gas burner to regulate the heating of water in the tank, a plurality of waste gas flues connected to and spaced about said combustion chamber and extending upwardly along side of said tank to a region just above the top thereof, a downdraft hood positioned on top of each waste gas flue pipe, an insulating jacket encasing said water tank and insulating said waste gas flues to prevent the loss of heat and chilling thereof and to prevent the cooling of products of combustion to such an extent that a condensate is deposited, a pilot light of such a size as to be capable of supplying sufficient heat to balance the heat losses whereby the water in the tank is never cooled off sufficiently to make the thermostat operative under normal, idle conditions, and a hot water outlet connected to the top of said water tank and not depending therein.

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