May 22, 1928. 1,670,665

W. J. McCLURG

WATER HEATER

Filed Sept. 21, 1925

FIG.1.

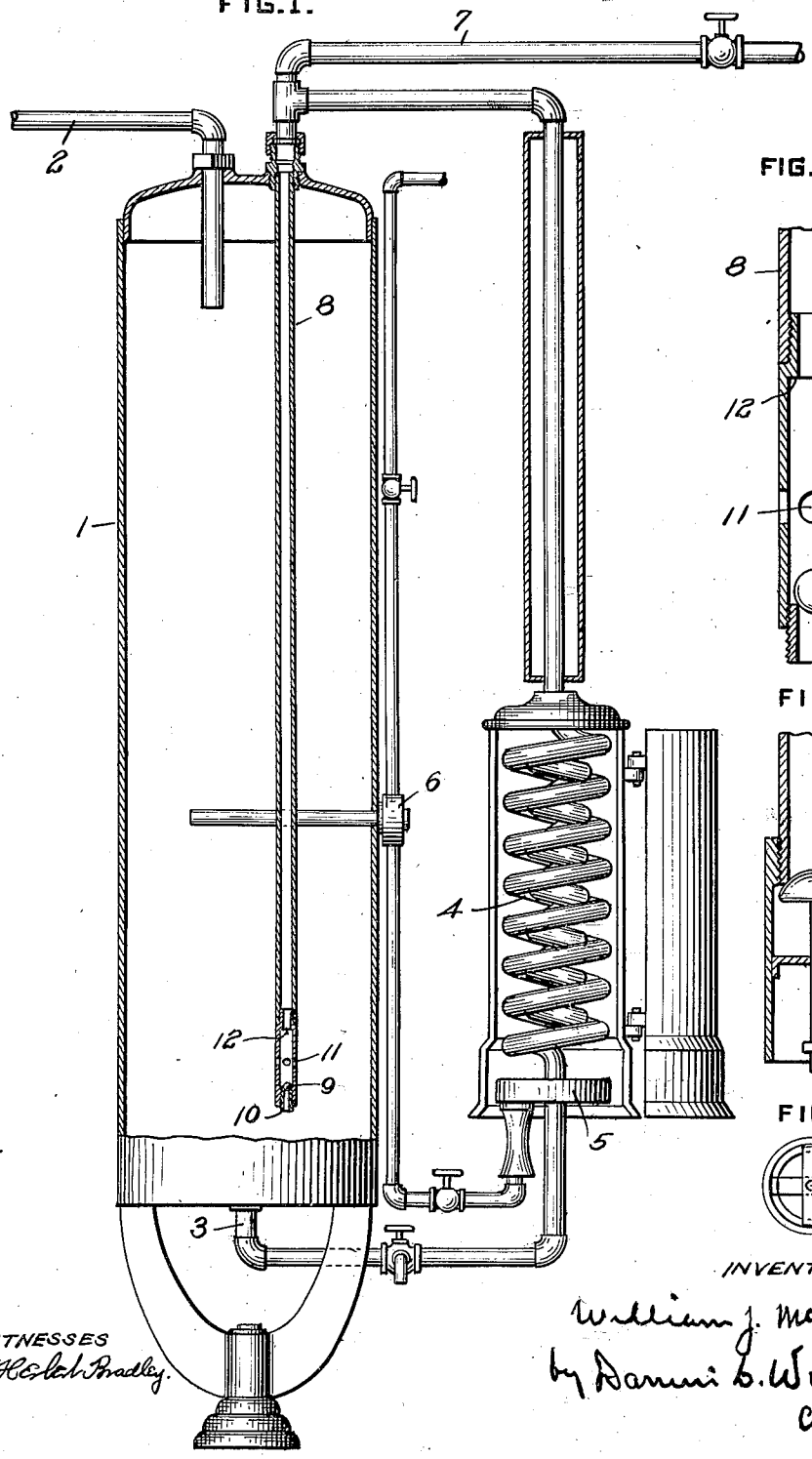


FIG.2.

FIG.3.

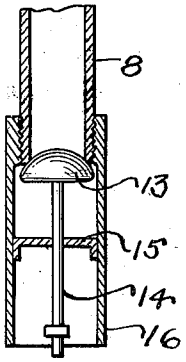


FIG.4.



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WATER HEATER.

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The invention described herein relates to improvements in water heaters which may be commercially divided into two general classes. In one class which will be termed a storage system, a comparatively large body of water is gradually heated to a high temperature. As water is drawn from this body its temperature will be gradually lowered and the withdrawal of water must be stopped until water in the tank can be again heated. In the second class water is heated as it is being drawn for use. In this latter system the water is raised from normal temperature to the desired high temperature while flowing thru and necessitates the application of a very high heat.

The invention described and claimed herein has for its object a combination of these two systems and consists in a gradual heating of water to high temperature mingling such heated water with water at normal temperature thereby raising the temperature of the cold water, and then applying heat to the mingled streams while flowing to the point of use. The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification Fig. 1 is a sectional elevation of apparatus adapted to the practice of the invention claimed herein; Figs. 2, 3 and 4 are detail views illustrating forms of check valves adapted to prevent flow of water from the tank directly to the point of use.

In the practice of the invention the upper portion of a tank 1 of considerable capacity is connected by a pipe 2 to a suitable supply and has at or adjacent to its lower end an outlet 3 connected to a suitable heater. In the construction shown, the heater consists of a coil 4 and a burner 5, the supply of gas being controlled by a thermostat 6 operated by and in accordance with changes of temperature of the water in the tank 1.

The outlet from the coil is connected to a service pipe 7 and also to a pipe 8 which preferably enters the tank at or near the top of the tank and extends down so that its outlet will be adjacent to the outlet 3 from the tank. The circulating pipe 8 is provided preferably adjacent to its outlet end with a valve mechanism adapted to permit of a free movement of water down through the pipe into the tank but will prevent any material upward flow from the tank. A valve mechanism suitable for the purpose is shown in Figs. 1 and 2 and consists of a ball 9 having such a specific gravity that it will normally rest on a stop 10 located below the ports 11 but will be moved upwardly against a seat 12 in case of an upward flow of water through the pipe 8 due to the opening of a valve in the service pipe 7. In lieu of the construction shown in Fig. 2, the check valve may consist of a disc 13 adapted to be seated by the upward flow of water against the lower end of the pipe 8 and provided with a guide stem 14 extending down through cross bars 15 in the cage 16. As the disc has a smaller diameter than the internal diameter of the cage, water can flow downwardly through the pipe 8.

In the operation of the apparatus described herein the coil will be heated by the combustion of the gas causing a circulation of water from the lower end of the tank through the coil and through the pipe 8 into the heater. As soon as the water in the tank has been raised to the desired temperature, the thermostat will operate to close the valve controlling the flow of gas to the burner. When a valve in the service is opened, there will occur an upward movement of water in the pipe 8 causing a seating of the check valve so that water must flow from the tank through the coil to and through the service pipe. In the operation of the ordinary construction of instantaneous water heaters, considerable time elapses after opening the service valve before the water is raised to the desired temperature and as the water enters the coil at a temperature of about 70 degrees or lower, a large quantity of gas is required to heat the water to the required temperature. In using the apparatus described herein, water at the desired temperature will be delivered immediately on opening the service valve. As water is drawn from the tank cold water will flow in thereby lowering the temperature in the tank. The lowering of the temperature in the tank will cause the thermostat to operate to opening the gas valve in the heater thereby reheating the water flowing from the tank. This reheating of the water will require comparatively little gas as the water flowing to the coil will not be very much below that desired for use.

I claim herein as my invention:

1. In a water heater the combination of a tank having inlet and outlet openings arranged respectively adjacent to opposite

ends of the tank, a heater connected to the outlet of the tank, a connection extending from the heater into the tank and adapted to discharge water flowing from the heater into the tank at a point intermediate the inlet and outlet of the latter, means for preventing a reverse flow of water through such connection, a service pipe connected to the heater, and a thermostat disposed within said tank in the region of said discharge connection for regulating the operation of the heater to maintain a substantially constant temperature of the water in said tank.

2. In a water heater the combination of a tank having inlet and outlet openings arranged respectively adjacent the top and bottom of the tank, a heater connected to the outlet of the tank, a connection extending from the heater into the tank and adapted to discharge water flowing from the heater into the tank at a point intermediate the inlet and outlet of the latter, means for preventing a reverse flow of water through said connection, a service pipe connected to the heater, and a thermostat device disposed within said tank for regulating the operation of the heater to maintain a substantially constant temperature of the water in the tank.

In testimony whereof, I have hereunto set my hand.

WILLIAM J. McCLURG.