March 8, 1938. F. E. WOLCOTT 2,110,251

WATER HEATER

Filed Sept. 23, 1935 2 Sheets-Sheet 1

Fig. 1.

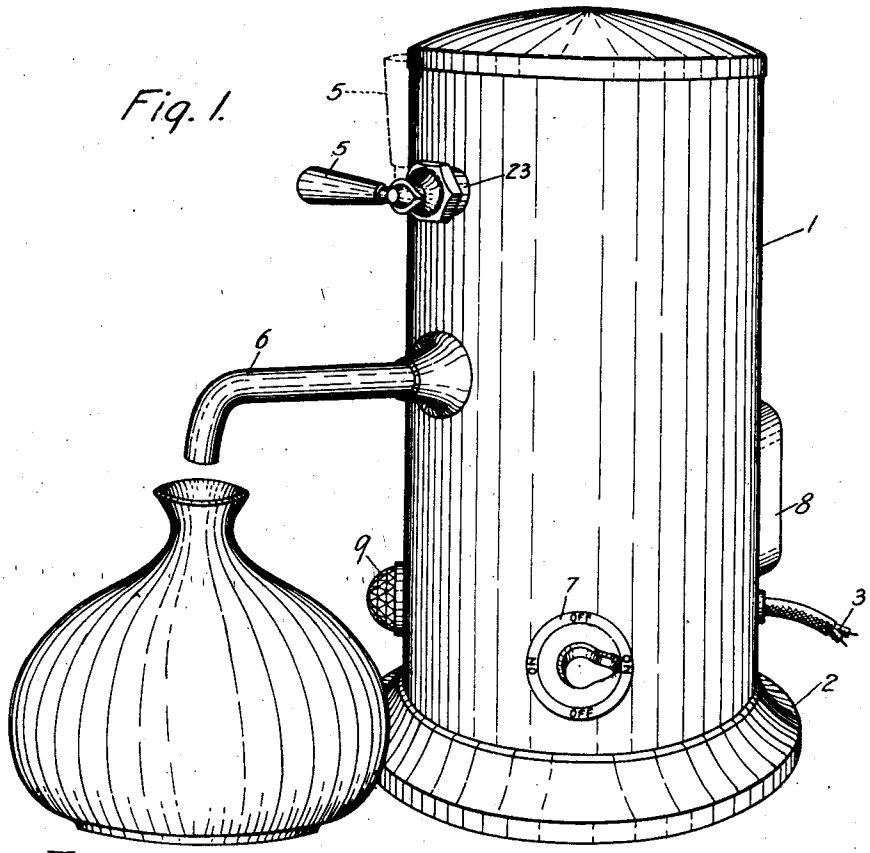


Fig. 7.

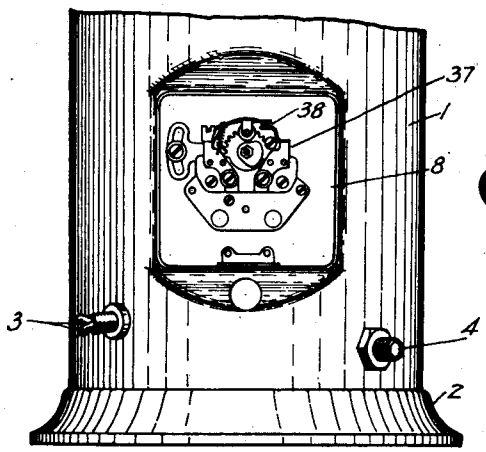
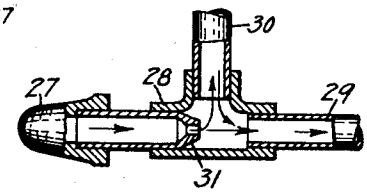


Fig. 6.



INVENTOR
Frank E. Wolcott
BY
ATTORNEY

March 8, 1938. F. E. WOLCOTT 2,110,251

WATER HEATER

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Fig. 2.

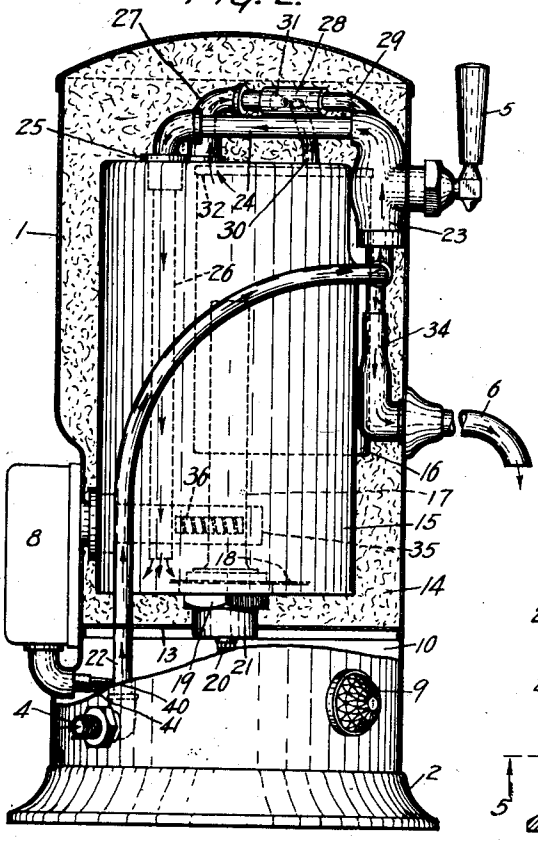


Fig. 3.

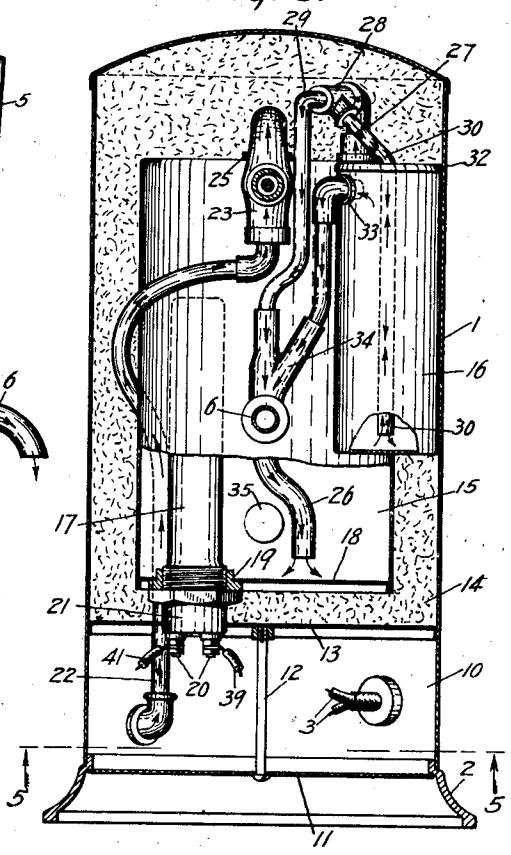


Fig. 4.

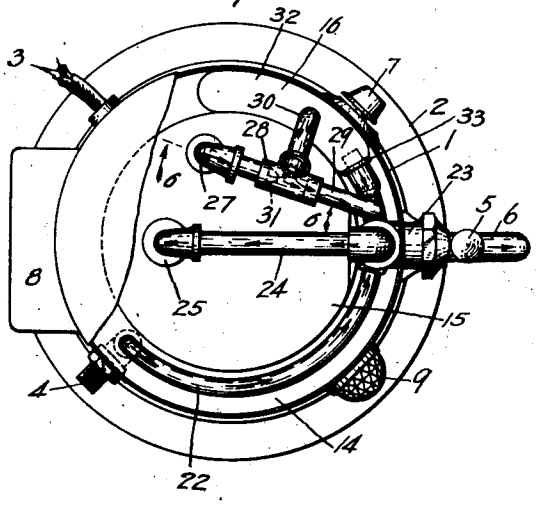
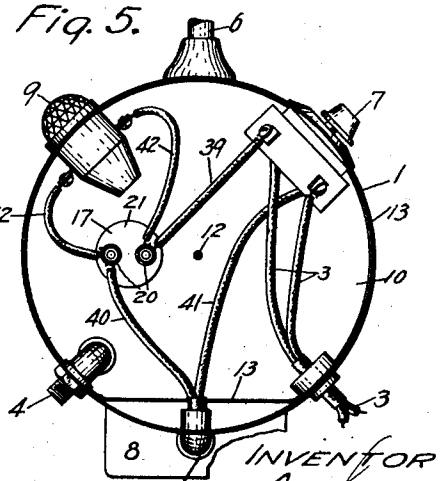


Fig. 5.



INVENTOR
Frank E. Wolcott
BY
ATTORNEY

Patented Mar. 8, 1938 2,110,251

UNITED STATES PATENT OFFICE

2,110,251

WATER HEATER

Frank E. Wolcott, West Hartford, Conn., assignor to The Silex Company, a corporation of Connecticut

Application September 23, 1935, Serial No. 41,659

41 Claims. (Cl. 219—39)

My invention relates to water heaters.

It has among its objects to produce an improved water heater and, more particularly, such a heater of the automatic type which is markedly effective and quick in operation while being inexpensive and safe in use. Further objects of my invention are to provide such a heater having improved controlling means for controlling the supply of water to be heated and thereby controlling the discharge of heated water, together with improved means for heating the water in the heater and controlling the temperature thereof, and improved means for taking care of the expansion of the heated water and leakage in the water supply line. Still other objects of my invention are to provide an improved water heater having improved and markedly safe heating means eliminating building up of pressure in the main heating tank or reservoir and also having improved overflow and leakage discharging means associated with said reservoir and leading to and from a supplementary reservoir while also associated with the discharge or outlet means for the main reservoir. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In these drawings,—

Figure 1 is a perspective view of the exterior of the illustrative heater;

Fig. 2 is a side elevation of the inner structure, the outer casing being broken away to facilitate illustration;

Fig. 3 is a view like Fig. 2 but taken from the front, the connections of control valve and spout also being shown in section and the heating tank and overflow tank also being broken away at the bottom to facilitate illustration;

Fig. 4 is a top plan view of the heater, the top cover being broken away and the insulation omitted to facilitate illustration;

Fig. 5 is a section on line 5—5 of Fig. 3.

Fig. 6 is an enlarged detail section on line 6—6 of Fig. 4, and

Fig. 7 is a detail view showing a portion of the thermostat mechanism, the external cover thereof being removed.

In this illustrative construction, I have shown my invention as applied to a water heater of the type adapted to be used in restaurants or the like, as on the back bar, and to be used for general water heating purposes, such, for example, as heating the water used in coffee making or the like. As illustrated, it comprises, generally speaking, a tubular outer casing 1 housing the heating and controlling mechanism, hereinafter described, and also being mounted on a base 2 and having current supplied thereto through line conductors 3, and water through an inlet 4, while the supply and discharge of water is controlled by a valve operative by a handle 5 and the heated water is discharged through a spout 6. As shown, the heater is also controlled by a switch 7 and thermostatic mechanism hereinafter described and accessible through a cover 8 while a light or so-called bull's eye 9 indicates whether the current is on.

Referring more particularly to the internal construction, note that within the casing 1, a chamber 10 is provided above the base 2 which is adapted to house the various connections to the heater while providing an air space between the main heating portion thereof and the base. As shown, a bottom plate 11 for this chamber is disposed beneath a suitable shoulder at the top of and inside the base 2, and this bottom 11 is also connected by an axial screw connection 12 with a top member 13 also forming the bottom of an insulation containing chamber 14. Herein, this chamber is, preferably, packed with mineral wool and carries within the same and spaced from the walls thereof, a heating tank or reservoir 15 and an overflow or expansion reservoir 16, the latter herein being carried by the reservoir 15 and disposed between the latter and the inner wall of the casing 1.

As regards the heating means for the water in the tank 15, while the same may assume various forms and be heated by other means than electric heating means, it will be noted that I have herein illustrated the same as comprising an upstanding wholly enclosed immersion type electric heating element 17. As shown, this element extends directly upward through the bottom 18 of the tank 15 and is suitably attached and seated in said bottom, as indicated at 19, while having conductors connected to suitable terminals 20 carried on a depending projection 21 which extends down through the top member 13 of the chamber 10 and into the latter in such manner as to make these terminals readily accessible. Herein this immersion heater element 17 is of a standard construction having the resistance wire cast in the same and having the portion of the element which is in the fluid, of flattened rectangular cross section, this type of element being found effective, but it will be understood that I do not wish in any way to be limited to any particular element, as other standard immersion type heaters may be used. With such a construction and a 1600 watt element it is found that very quick heating of the entire capacity of the tank 15 is made possible, the heat from the unit 17 being quickly transferred to the water surrounding the same.

Next considering the water connections for the tanks 15 and 16, it will be noted that the

inlet 4 extends into the chamber 10 and then upward through a pipe 22 which extends through the top 13 of the chamber 10 and through the chamber 14 in the casing 1 and around the tank 15 to a point at the front of the latter where it is connected to a valve 23 controlled by the handle 5. Herein, the valve is such that by only a quarter turn of the valve handle 5 the supply of water through the valve is established or cut off, the valve herein being of the well known "Quaturn" type; although obviously other forms of valves may be used if desired. As shown, the water also passes from the valve 23 through a pipe 24 leading across above the top of the tank 15, and then is directed downward into the latter through a suitably packed or sealed connection 25 and a pipe 26 forming the water inlet into the tank 15 and which extends down substantially to the bottom of the tank as shown in Figure 2. Note also that herein the pipe 26 is at the back of the tank substantially in rear of the connections of the spout 6 and also in rear of the heater element 17, and that the pipe 26 is curved adjacent its lower end (Fig. 3) in such manner as to pass down close to the bottom 18 at the far side of a thermostat, hereinafter described, from the heating element 17. Thus, with the pipe 26 disposed as described, all of the incoming cold water will be received at the bottom of the tank 15 and acted upon by the heater element 17 in such manner as to cause the hot water to rise to the top of the tank 15.

Operatively connected at the top of the tank are improved outlet connections communicating with the spout 6 for drawing off hot water whenever the valve handle 5 is operated. Herein, these include a discharge connection 27 connected through a suction or siphoning connection 28, hereinafter described, to a pipe 29 which leads down outside the tank 15 and through the chamber 14 inside the front of the casing 1, and is connected to the discharge spout 6. Thus, assuming that the water in the tank 15 is hot, whenever the valve handle 5 is turned through a quarter turn to open position, hot water will flow from the tank 15 through these discharging connections 27, 28 and 29 to the spout 6, this being due to the fact that whenever the valve handle 5 is operated, additional water to be heated is supplied to the tank 15 from the inlet 4 and to the pipe 22, valve 23, and pipes 24 and 26 to deliver the incoming water at the bottom of the tank 15 and thus force the hot water out at the top thereof.

Associated with the discharge connections described are also improved overflow connections. These, herein, include a pipe 30 connected to the suction or siphoning connection 28 at one side thereof and between a nozzle 31 at one end thereof and the connection of the pipe 29 to the opposite end thereof. This pipe 30 extends down along the outside of the tank 15 and through a suitable tight cover 32 on the overflow tank 16 which as previously described is located between the tank and the outer casing 1. Herein, this tank 16 is of a curved conformation adapting it to conform to both the curvature of the tank 15 and that of the casing 16, and is of such depth as to give it a substantial capacity, with the pipe 30 delivering into the same closely adjacent its bottom. Moreover, at the top of the tank 16 a pipe connection 33 is provided which leads down toward the bottom of the discharge pipe 29 and is connected thereto by a suitable union 34 so that the discharge from both pipes 29 and 33 may pass out through the spout 6. As a result of the construction above described, any water caused by expansion to overflow from tank 15 when valve 23 is closed, is enabled to pass freely into the supplementary tank 16 through the pipe 30. Further, whenever the valve handle 5 is operated to draw off hot water through the spout 6, the effect of the water flowing rapidly through the restriction presented by nozzle 31 is to suck or siphon any water in the tank 16 up through the pipe 30 and thereby cause this water to be withdrawn from the tank 16 and discharged with the other hot water, the tank 16 usually being completely emptied each time that the water is drawn. Also it will be noted that the capacity of the tank 16 is such as to take care of any normal water expansion, and that should there be a leak in the inlet line, as, for example, due to a faulty packing in the valve 23, the water rising in the reservoir 16 will overflow therefrom through the pipe 33 and drip out through the spout 6.

Operatively disposed in an improved manner relative to the heater and water inlet and also in the bottom of the tank 15, is improved thermostatic control means. These means herein are in the form of a wholly closed cylinder 35 which extends transversely of the bottom of the tank 15, through the wall thereof and a suitable packing, and houses a suitable thermostatic element responsive to temperature changes in the water. This termostatic element may be of various standard constructions, but herein I have illustrated a preferred form of standard Hart type control rod such as used on electric ranges for oven temperature control and including a spirally disposed expansible element 36 housed in a suitable casing and operative to effect rotary movement of a cam mechanism 37 which, in turn, controls contacts 38 housed in the thermostat casing 8 on the exterior of the casing 1. This thermostat mechanism being adjustable in well known manner, it will be evident that the temperature in the tank 15 may be set within the desired predetermined limits and that the current flow will be maintained or interrupted as necessary by the thermostat to maintain the temperature of the water within the desired limits.

The circuit connections in my improved construction are illustrated in Figure 5. The switch 7, which is of any usual double pole type and housed within the chamber 10, has certain terminals connected to the conductors 3, while a conductor 39 also leads from one of the switch terminals to one of the terminals 20 of the electric heater element 17. Current is thus supplied through this element in a usual manner and to the other terminal 20 thereof, which is, in turn, connected by a conductor 40 leading to the contacts 38 of the thermostat, which are connected through another conductor 41 back to a terminal of the switch 7. Further, it will be noted that the signal light or indicator 9 is connected by conductors 42 across the terminals 20 of the heating element 17. Thus, current flow through the resistance unit 17 is controlled by the switch 7, while the thermostat 35 also controls the circuit of the unit 17, and the signal light 9 is on whenever current is flowing through the heating element 17. Here attention is further directed to the fact that all of these circuit connections and conductors are disposed in the chamber 10 below the top 13 thereof and in such manner as to be readily accessible when desired

from the bottom of the chamber 10 by simply unscrewing the screw connection 12 and removing the bottom plate 11.

In the use of my improved construction, it will be evident that whenever it is desired to draw off hot water, it is only necessary to operate the valve handle 5 to move the valve 23 from its closed to its open position, and thereby admit additional water to the bottom of the tank 15 which forces out the hot water from the top of the tank to the spout 6. Moreover, it will be evident that both flows will be interrupted upon a reverse operation of the valve handle 5; while the heating element 17 will be continued in operation whenever the switch 7 is in circuit closing position, in such manner as to heat the additional water in the tank 15 up to the desired temperature limit. The temperature of the water in the tank 15 will also be maintained between desired limits by the thermostat 35 which will function to open and close the contacts 38 and thereby open and close the circuit to the element 17, whenever the temperature of the water exceeds or falls below a predetermined temperature range. Of course, also, whenever the thermostat closes the circuit of the heating element, the signal light 9 will be on.

As a result of my improvements, it will be noted that an electric water heater is provided wherein it is possible to heat the water in the tank 15 to the desired temperature very effectively. Further, all the heat generated by the heater element is quickly absorbed by the water and a full tank of water is maintained at all times. Moreover, due to my improved construction, it is possible to maintain the desired temperature with very small current consumption; the current, under conditions of normal use of the heater, being required to be on for less than one minute an hour in order to maintain the desired temperature. Attention is further directed to the increased safety of the heater due to the provision of my improved overflow tank in its connections, and to the fact that the same eliminate problems incident to the expansion of the water and leaking resulting therefrom. Here attention is also particularly directed to the fact that in my improved construction, there is no building up of pressure in the tank; the latter, instead, and also the expansion tank, always communicating with the atmosphere through the spout 6 as a result of my improved structure and the location of the controlling valve in the inlet of the main tank. Also, the improved provisions for emptying the expansion tank whenever hot water is discharged, insure the continual effectiveness of the tank, while the overflow from this tank through the spout, being operative in all positions of the valve, also provides a convenient means of indicating that there is a leak in the inlet valve. These and other advantages of my improved construction will, however, be clearly apparent to those skilled in the art.

While I have in this application specifically described one embodiment which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in other forms and used in connection with liquids other than water, without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. In a water heater, a tank for storing liquid during heating and dispensing having inlet and outlet connections, heating means for heating liquid stored in said tank, and means controlling the flow through said inlet for at will preventing discharge during heating or effecting discharge from said tank through said outlet.

2. In a water heater, a tank for storing liquid during heating and dispensing having inlet and outlet connections including an outlet communicating with the atmosphere, heating means for heating liquid stored in said tank, and inlet valve means operative independently of said heating means for effecting discharge from said tank through said outlet.

3. In a water heater, a tank for storing liquid during heating and dispensing having inlet and outlet connections and constantly communicating with the atmosphere, heating means for heating liquid stored in said tank, and means reversely operative while said heating means remains operative for effecting flow from said tank through said outlet by controlling the flow through said inlet.

4. In a water heater, a tank for storing liquid during heating and dispensing having inlet and outlet connections and constantly communicating with the atmosphere, heating means for heating liquid stored in said tank responsive to the temperature in the latter, and means for effecting flow from said tank through said outlet by controlling the flow through said inlet and reversely operative while said heating means remains operative or inoperative.

5. In a water heater, a tank having inlet and outlet connections leading into and out of said tank, heating means for the liquid in said tank, and inlet flow controlling means operative independently of said heating means and also controlling the flow through said outlet connection.

6. In a water heater, a tank having inlet and outlet connections leading into and out of said tank, heating means for heating the liquid in said tank between dispensing operations, and inlet flow controlling means also controlling flow through said outlet connection and maintaining said tank in constant communication with the atmosphere through said outlet connection.

7. In a water heater, a tank having inlet and outlet connections, heating means for heating the liquid stored in said tank while flow through said outlet is interrupted, and means for maintaining said tank during heating in constant communication with the atmosphere through said outlet connection.

8. In a water heater, a tank having inlet and outlet connections, heating means for the liquid in said tank, temperature controlled controlling means for starting and stopping said heating means, and means for maintaining said tank during heating in constant communication with the atmosphere through said outlet connection.

9. In a water heater, a tank having inlet and outlet connections, heating means for the liquid in said tank controlled by the temperature of the heated liquid, and means for maintaining said tank during heating in constant communication with the atmosphere through said outlet connection having a single controlling valve in said inlet connection operative independently of said heating means and controlling the flow through said outlet connection.

10. In a water heater, a tank having cold water inlet and hot water outlet connections, heater means heating water in said tank, temperature controlled means controlling said heating means, said tank during heating having constant com-

munication with the atmosphere through said outlet connection, and a controlling valve in said inlet connection operative independently of said heating and controlling means and controlling the flow through said outlet connection.

11. In a water heater, a storage tank having inlet and outlet connections, heating means for the liquid stored in said tank, temperature controlled controlling means for said heating means, and controlling means operative to effect or interrupt discharge through said outlet while said heating means remains operative or inoperative and while said tank remains in constant communication with the atmosphere through said outlet.

12. In a water heater, a storage tank having cold water inlet and hot water outlet connections, heater means for liquid in said tank, and a supplementary tank having means for delivering to said supplementary tank from said outlet connection overflow from said first mentioned tank due to expansion therein.

13. In a water heater, a storage tank having a cold water inlet and hot water outlet connections, heater means for heating water in said tank, and a supplementary tank delivering to said outlet connection and having connections for receiving from said first mentioned tank overflow due to expansion therein.

14. In a water heater, a tank having a cold water inlet and hot water outlet connections, heater means for heating water while in said tank and a supplementary tank delivering to said outlet connection and having connections for receiving from said first mentioned tank overflow due to expansion therein, both said tanks having constant communication with the atmosphere through said outlet connection.

15. In a water heater, a storage tank having discharge controlling means and inlet and outlet connections and constantly communicating with the atmosphere through its outlet, heating means for liquid in said tank, and an expansion tank receiving overflow from said first mentioned tank due to expansion and likewise constantly communicating with the atmosphere.

16. In a water heater, a tank having discharge controlling means and cold water inlet and hot water outlet connections and constantly communicating with the atmosphere through said outlet, heating means for said tank, and an expansion tank receiving overflow from said first mentioned tank due to expansion and likewise constantly communicating with the atmosphere through said outlet connection.

17. In a water heater, a storage tank having discharge controlling means and inlet and outlet connections and constantly communicating with the atmosphere through its outlet, heating means for liquid in said tank, and an expansion tank receiving overflow from said first mentioned tank due to expansion and likewise constantly communicating with the atmosphere and having emptying means delivering through said outlet during discharge from said first mentioned tank.

18. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank having connections delivering to said supplementary tank overflow from said first mentioned tank due to expansion therein, and suction means in said outlet for withdrawing water from said supplementary tank whenever water is withdrawn from said first mentioned tank.

19. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank having a connection to the tank outlet delivering overflow from said first mentioned tank to said supplementary tank, and suction means comprising a nozzle in said outlet discharging across the inlet of the connection leading from the latter to said supplementary tank.

20. In a water heater, a storage tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank receiving overflow due to expansion in said first mentioned tank, and means for delivering the overflow from said supplementary tank to said outlet.

21. In a water heater, a storage tank having discharge controlling means and inlet and outlet connections and constantly communicating with the atmosphere through its outlet, heating means for liquid in said tank, and an expansion tank receiving overflow from said first mentioned tank due to expansion and likewise constantly communicating with the atmosphere and having overflow means delivering through said outlet in any position of said controlling means.

22. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank receiving overflow due to expansion in said first mentioned tank, and suction means for discharging liquid in said supplementary tank through said outlet.

23. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank receiving overflow due to expansion in said first mentioned tank, suction means for discharging liquid in said supplementary tank through said outlet, and an overflow connection for said supplementary tank likewise connected to said outlet.

24. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank receiving overflow due to expansion in said first mentioned tank and communicating with said outlet, and valve means in said inlet controlling the discharge through said outlet.

25. In a water heater, a tank having inlet and outlet connections, heater means for liquid in said tank, a supplementary tank receiving overflow due to expansion in said first mentioned tank and communicating with said outlet, valve means in said inlet controlling the flow through said outlet, and suction means in said outlet for withdrawing liquid from said supplementary tank whenever said valve is open.

26. In a water heater, a main tank having inlet and outlet connections, heater means for liquid in said tank, a valve in said inlet connections, a spout connected to said outlet connection, a supplementary tank receiving the overflow from said first mentioned tank, and a suction means in said outlet connection delivering liquid in said supplementary tank to said spout whenever said valve is open.

27. In a water heater, a main tank having inlet and outlet connections, heater means for liquid in said tank, a valve in said inlet connections, a spout connected to said outlet connection, a supplementary tank receiving the overflow from said first mentioned tank, and an overflow connection from said supplementary tank leading to said outlet and spout.

28. In a water heater, a heater tank having cold water inlet and hot water outlet connections including an inlet pipe leading down

through the top of said tank into the bottom thereof and an outlet pipe at the top of said tank, and immersion type heating means projecting upward in said tank along said inlet pipe.

29. In a water heater, a heater tank having cold water inlet and hot water outlet connections including an inlet pipe leading down through the top of said tank into the bottom thereof and an outlet pipe at the top of said tank, and immersion type heating means projecting upward in said tank along said inlet pipe, said tank having constant communication with the atmosphere during heating through said outlet pipe.

30. In a water heater, a heater tank having cold water inlet and hot water outlet connections including an inlet pipe leading down through the top of said tank into the bottom thereof and an outlet pipe at the top of said tank, and immersion type heating means projecting upward in said tank along said inlet pipe, said tank having constant communication with the atmosphere during heating through said outlet pipe, and valve means in said inlet pipe controlling the flow through both pipes.

31. In a water heater, a storage tank having inlet and outlet connections including an inlet pipe leading downward from the top of said tank into the bottom thereof and an outlet pipe at the top of said tank, heating means for liquid in said tank, and valve means in said inlet connection controlling the flow of cold water into the bottom of said tank and the consequent discharge of hot water through said outlet pipe at the top of said tank.

32. In a water heater, a heater tank having inlet and outlet connections, heating means therefor, a casing enclosing said tank, and a supplementary tank inside said casing receiving the overflow from said first mentioned tank arising from expansion during heating and delivering to said outlet.

33. In a water heater, a heater tank having inlet and outlet connections, heating means therefor, a casing enclosing said tank, and a supplementary tank inside said casing receiving the overflow from said first mentioned tank arising from expansion during heating and delivering to said outlet, both of said tanks having constant communication with the atmosphere through said outlet.

34. In a water heater, a heater tank having inlet and outlet connections, heating means therefor, a casing enclosing said tank and housing insulation therefor, and a supplementary tank substantially within the longitudinal limits of said heater tank inside said casing and between the same and said first mentioned tank and receiving the overflow from the latter arising from expansion during heating.

35. In a water heater, a heater tank having inlet and outlet connections, heating means therefor, a casing enclosing said tank and housing insulation therefor, and a supplementary tank substantially within the longitudinal limits of said heater tank inside said casing and between the same and said first mentioned tank and receiving the overflow from the latter arising from expansion during heating, said supplementary tank being carried by said first mentioned tank in contact therewith.

36. In a water heater, a heater tank having inlet and outlet connections, heating means therefor, a casing enclosing said tank and housing insulation therefor, and a supplementary tank substantially within the longitudinal limits of said heater tank inside said casing and between the same and said first mentioned tank and receiving the overflow from the latter arising from expansion during heating, said supplementary tank conforming to the adjacent surfaces of said first mentioned tank and casing.

37. In an electric water heater, a heating tank having cold water inlet and hot water outlet connections therefor including an inlet delivering through the top of said tank to a point adjacent the bottom thereof and an outlet at the top, immersion type electric heating means for said tank projecting upward in the latter along said inlet, and thermostatic controlling means for said heating means including an element projecting transversely into the lower portion of said tank.

38. In an electric water heater, a heating tank having cold water inlet and hot water outlet connections therefor including an inlet delivering through the top of said tank to a point adjacent the bottom thereof and an outlet at the top, immersion type electric heating means for said tank projecting upward in the latter along said inlet, and thermostatic controlling means for said heating means including an element projecting transversely into the lower portion of said tank, said tank having constant communication with the atmosphere during heating through said outlet.

39. In an electric water heater, a heating tank having inlet and outlet connections therefor in the bottom and top thereof including an outlet constantly communicating with the atmosphere, electric heating means in said tank, thermostatic control means for said heating means, and a valve means in said inlet controlling the flow of cold water through said inlet to the bottom of said tank and the resultant discharge of hot water through said outlet.

40. In an electric water heater, a heater tank having cold water inlet and hot water outlet connections, including a spout, valve means for controlling the flow of cold water to said tank and hot water through said spout, electric heating means in said tank, thermostatic control means in said tank controlling the circuit of said heating means, a switch likewise controlling said circuit, and an indicator light having connections to said circuit for lighting said light whenever current is flowing through said electric heating means.

41. In an electric water heater, an upstanding heater tank having cold water inlet and hot water outlet connections, including a spout, valve means above said spout controlling the admission of cold water to said tank and the flow of hot water through said spout, electric heating means in said tank, thermostatic control means in said tank controlling the circuit of said heating means, a switch likewise controlling said circuit and the circuit of said thermostatic means, and an indicator light having a circuit connected to said heater circuit for lighting said light whenever current is flowing through said electric heating means, said tank being disposed and insulated in an enclosing casing and said casing having a chamber below the insulation therein housing the connections for said circuits.

FRANK E. WOLCOTT.

CERTIFICATE OF CORRECTION.

Patent No. 2,110,251. March 8, 1938.

FRANK E. WOLCOTT.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 35, after "water" insert the words from the tank 15; page 5, first column, line 29, claim 31, after "liquid" insert the word stored; same page, second column, lines 45 and 57, claims 40 and 41 respectively, after "connections" strike out the comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 12th day of April, A. D. 1938.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)