

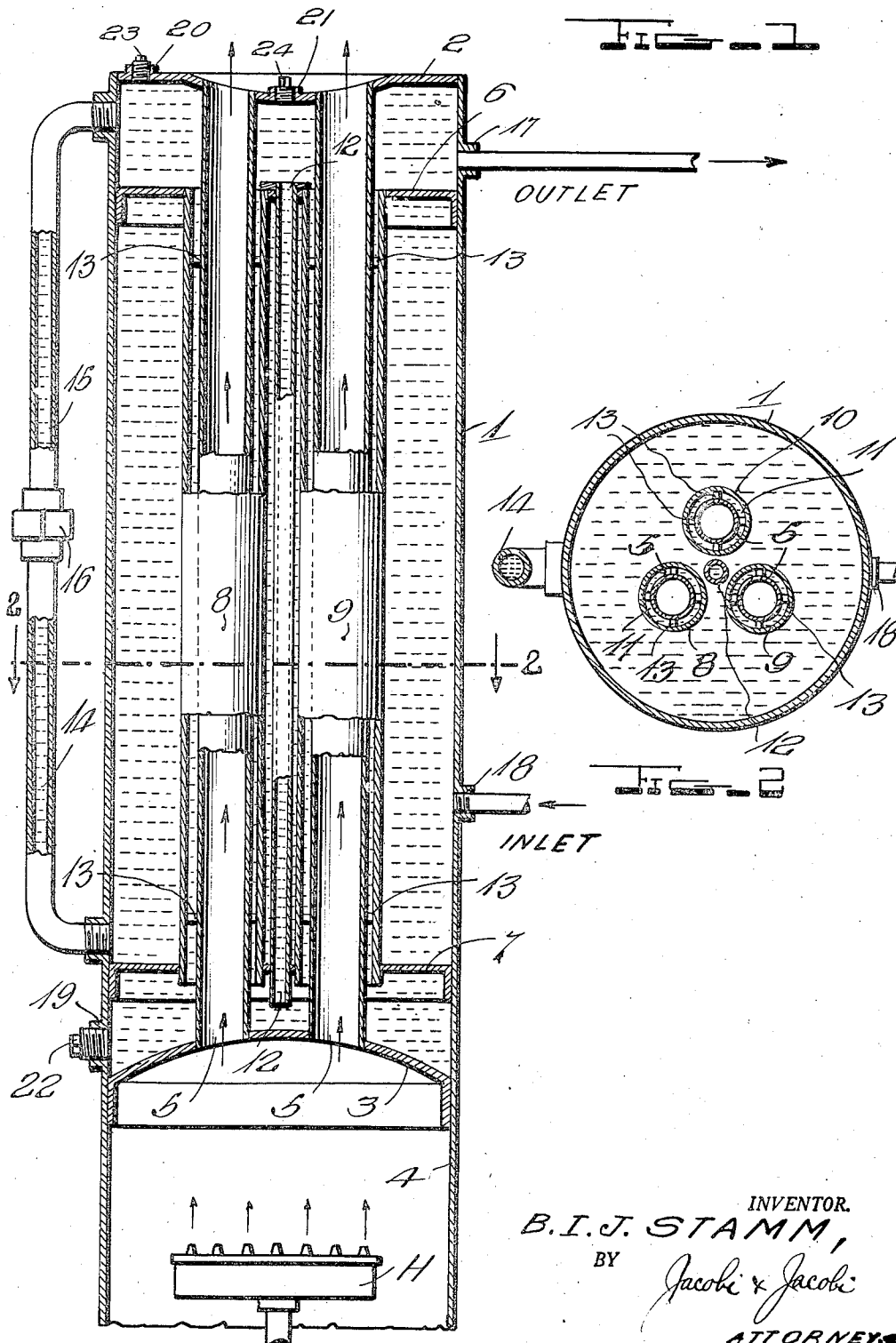
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WATER HEATER AND BOILER

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WATER HEATER AND BOILER

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10 Claims. (Cl. 122—17)

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It is an object of this invention to produce a multiple chambered heater for water.

It is an object of this invention to produce a heater which is specially constructed to produce a rapid and forced transfer of heated water as well as water being heated from the heating chamber to a draw-off chamber.

It is an object of this invention to produce a special construction wherein the water being heated is confined in spaces representing small volumes of the water content as compared with the whole volume contained in the device.

It is an object of this invention to provide a water heating tank having a plurality of chambers in which water is substantially trapped for controlled heating and transfer from the lowest chamber to the topmost chamber. Although the water is substantially trapped in each chamber, all of the chambers are in communication with each other.

Further objects of the invention and other features of novelty will be revealed as the drawing is described in detail. The drawing is merely illustrative of one embodiment of my invention.

Figure 1 is substantially a vertical longitudinal centrally located section of my invention.

Figure 2 is a transverse section on the line 2—2 of Figure 1 looking in the direction of the arrows.

In the drawing like reference characters refer to like parts.

My water heater comprises a hollow body provided with an outer wall 1, a top wall 2 and a bottom wall 3. The outer wall 1 is extended below the bottom wall 3 to form a skirt 4 to provide a compartment for the heater element H which is suitably spaced from the bottom wall 3. The top and bottom walls are connected by a plurality of flues 5 which may be fastened at their ends by any suitable means such as welding (not shown).

The hollow body is divided into three chambers by a pair of partitions 6 and 7 which are respectively spaced and secured to define a large central storage chamber and smaller chambers at the top and bottom of my heater. The pair of partitions 6 and 7 are connected by tubes 8, 9 and 10 which are arranged to surround the flues 5 in suitably spaced relation thereto and concentric with their companion flues to define transfer or circulating conduits 11 for the water being heated by the flues 5. The partitions 6 and 7 are also connected by a down-flow tube 12 which, together with conduits 11, form a complete liquid circuit or path for a forced circulation of

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water between the lower and upper chambers.

The flues 5 and the companion tubes 8, 9 and 10 may be arranged in substantially concentric relation to each other and to aid in maintaining a suitably spaced relation between the flues and the companion tubes spacing elements 13 may be secured to the tubes 8, 9 and 10 or to the flues 5 or to both, as by welding or other suitable means.

The lower portion of the large central chamber is connected to the upper chamber by suitable sections 14 and 15 of a pipe having its said sections detachably connected by a union 16. By using a union the pipe sections 14 and 15 may be screwed into threaded openings formed in the wall of the tank or body and then disposed in alignment and connected with each other. The upper chamber containing the heated water is provided with an outlet 17 whereby hot water may be drawn off from the heater.

The central chamber is provided with a suitable inlet 18 to automatically replace the volume of water drawn off. Both the upper and lower chambers are provided with clean out openings 19, 20 and 21, having screw threaded portions to receive threaded plugs.

It is to be noted that all outside connections and clean out openings are provided with screw threaded bosses to provide suitably enlarged or elongated screw threaded connections whereby the pipes and plugs may be securely fastened.

The top 2 and the bottom 3 may be welded to and thereby sealed within the wall 1 or secured by other or additional means such as rivets.

It is also noted that I have shown three up-flow conduits 11 and only one down-flow tube, but it is understood that the number of up-flow conduits and down-flow tubes is purely a question of a suitable number and suitable size to produce rapid heating and efficient results.

It is also to be noted that the down-flow tube 12 extends to a lower level than the lower ends of the tubes 8, 9, and 10. This feature aids in the circulation of the water between the upper and lower chambers. The large central chamber is a storage chamber which is heated much more slowly than the smaller chambers.

Let us assume the heater is full of water and the heating element H is turned on and ignited to start the heating operation. The flames arising from the element set up heated convection currents which pass rapidly up the flues 5, heating the surrounding water in the conduits 11 formed by the tubes 8, 9, and 10, and since the volume of water is small between the flues 5 and tubes 8, 9, and 10, it is rapidly heated and

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is forced to rise rapidly to the upper chamber. The upward surge or flow in the conduits 11 is compensated or balanced by a rapid down flow through the tube 12. The heat of radiation from the element H heats the water in the lower chamber and aids in the upward flow of heating water in the conduits 11 and consequently, assists in the forced downward flow in the down-tube 12. The central chamber of water is being slowly heated by contact with the tubes 8, 9, 10 and 12 and the partitions 6 and 7. When water is drawn off through the outlet 17, the drawn-off water is instantly replaced through the inlet 18 through the central chamber which is in communication with the upper chamber through the pipe sections 14 and 15 and the detachable joint 16. The central chamber serves as a storage reservoir for warm water after intervals of heating. When sufficient water has been heated for the purpose intended, the flow of fluid into the heating element may be turned off.

From the foregoing description, the construction and operation of my improved water heater and boiler will be readily understood and it will be seen that I have provided a comparatively simple, inexpensive and efficient means for carrying out the various objects of the invention.

While I have particularly described the elements best adapted to perform the functions set forth, it is apparent that various changes in form, proportion and in the minor details of construction, may be resorted to, without departing from the spirit or sacrificing any of the principles of the invention.

Having fully disclosed my invention, what I claim is:

1. A water heater comprising an outer wall and top and bottom walls defining a water containing vessel or tank and a skirt portion defining a compartment adapted to receive a heating element, said tank having a pair of partitions located respectively near the top and bottom of said tank and defining a large central chamber and smaller chambers at the top and bottom of said tank, said top and bottom walls being connected by a plurality of heating flues, said partitions being connected by water confining tubes, said tubes being arranged in closely spaced relation about companion flues, said partitions being also connected with a down-flow tube in direct communication with the upper and lower chambers and an up-feed pipe supported by said heater making direct communication with the upper chamber and the lower portion of the central chamber, in combination with a feed water inlet connected to the central chamber and a dispensing outlet connected with the upper chamber.

2. The water heater as set forth in claim 1 in which the up-feed pipe is supported on the outside of the tank by the outer wall of the tank.

3. The water heater as set forth in claim 1 in which the up-feed pipe comprises sections connected by a detachable union.

4. The water heater as set forth in claim 1 in which the down flow tube is centrally located and supported by said partitions.

5. The water heater as set forth in claim 1 in which the flues and confining tubes are substantially and concentrically arranged with respect to each other.

6. A water heater having a hollow body having top and bottom walls, said hollow body containing partitions dividing said body into a large

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central storage chamber and an upper draw-off chamber and a lower heating chamber, said top and bottom walls being connected by water heating flues which extend longitudinally through the top and bottom walls of the said hollow body, said partitions being connected by tubes extending entirely and longitudinally through the central storage chamber, said tubes surrounding said flues and being narrowly spaced therefrom, said partitions being also connected by a down-flow tube having its lower end portion extending to a lower level than the lower ends of the other tubes, said central chamber having an inlet portion, said upper chamber having an outlet portion, said central chamber being connected to the outlet chamber by connected sections of pipe.

7. The water heater specified in claim 6 in which the surrounding tubes of the flues are arranged in substantially spaced relation concentrically thereof.

8. The water heater specified in claim 6 in which the surrounding tubes of the flues are maintained in spaced relation by means located between said tubes and said flues, said means being secured in their located positions by suitable fastening means.

9. In a water heater, a vertically disposed cylindrical tank open at its lower end having a head at its upper end, said tank being of an even diameter throughout its height, a lower head fitting snugly in said tank and having sealed engagement with the wall of the tank in upwardly spaced relation to the lower end of the tank to provide a heating chamber in the tank under the lower head, horizontal partitions fitting snugly in said tank and having sealed engagement with the wall of the tank in spaced relation to the upper and lower heads and dividing the tank into a main chamber and upper and lower chambers, flues extending vertically in said tank through said chambers and having their ends mounted through the upper and lower heads, tubes about said flues in concentric spaced relation thereto and having their ends mounted through said partitions and defining passages about said tubes, and a tube extending vertically in the tank centrally thereof with its ends mounted through said partitions and its lower end terminating adjacent the lower head whereby water flowing downwardly through the central tube will be discharged therefrom into contact with the lower head.

10. In a water heater, a vertically disposed cylindrical tank having upper and lower heads and a heating chamber under the lower head, partitions in said tank having sealed engagement with the wall of the tank and spaced from said heads and dividing the tank into a main water chamber and upper and lower water chambers, a pipe extending vertically through the main water chamber with its ends passing through said partitions and its lower end entering the lower chamber and terminating adjacent the lower head for discharge of water against the lower head, flues extending vertically in said tank and passing through said chamber with their ends mounted through the upper and lower heads, and tubes surrounding said flues in spaced relation thereto with their ends mounted through said partitions and establishing communication between the upper and lower water chambers, there being an inlet for the main chamber and an outlet for the upper water chamber.

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