May 28, 1946. A. H. HABERSTUMP 2,401,151

WATER HEATER

Filed Aug. 9, 1943 2 Sheets-Sheet 1

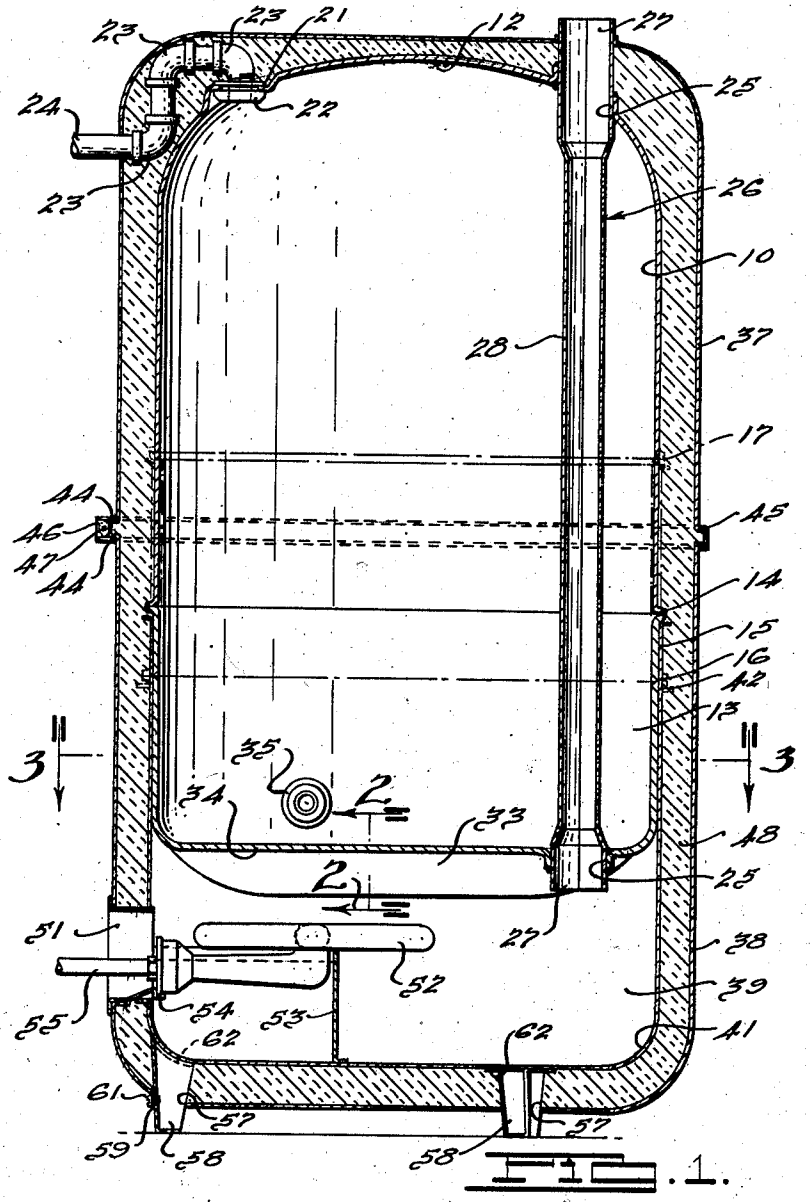


FIG. 1.

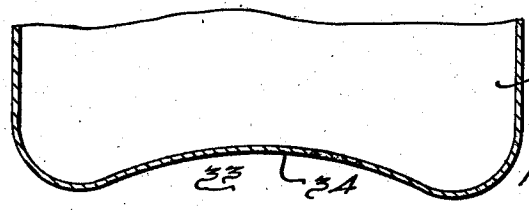


FIG. 2.

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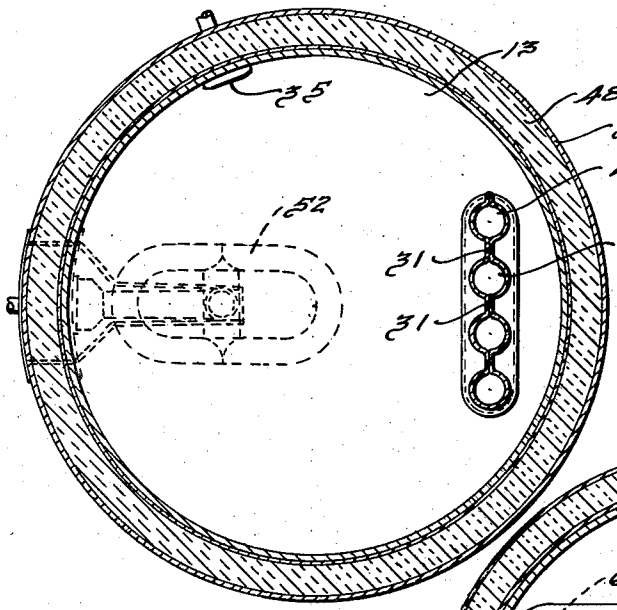


FIG. 3.

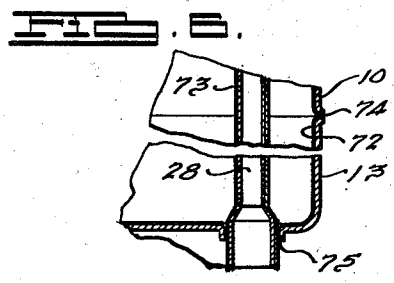


FIG. 6.

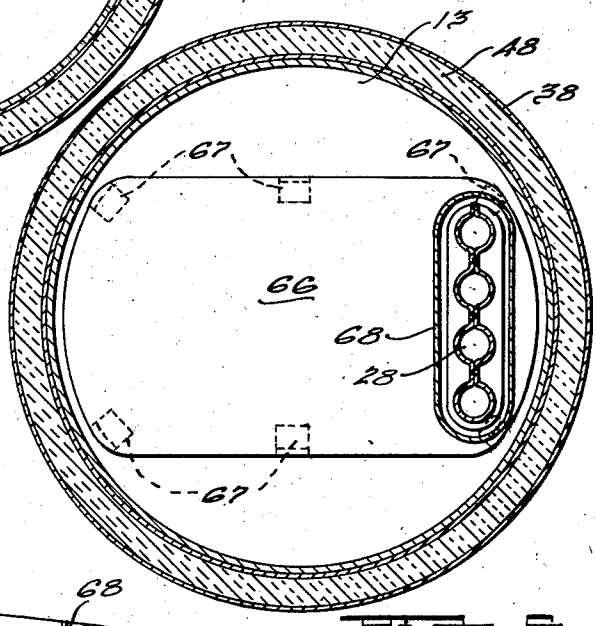
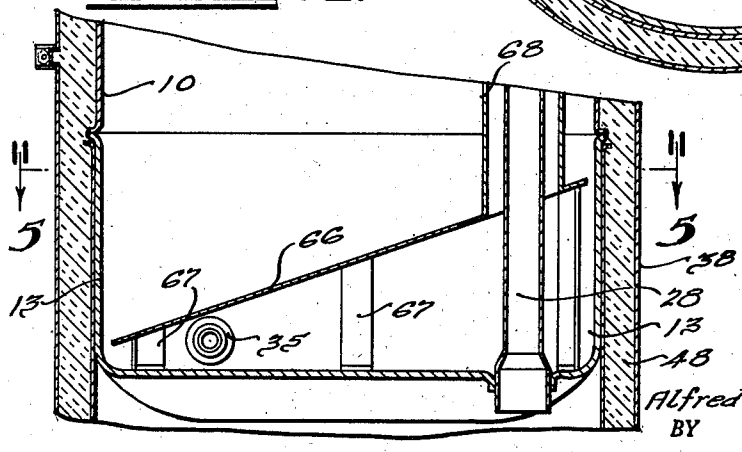


FIG. 5.

FIG. 4.



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WATER HEATER

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Application August 9, 1943, Serial No. 497,893

16 Claims. (Cl. 122—156)

This invention relates to water heaters and particularly to a water heater of the insulated type of variable capacity and wherein a convection flow of water is produced.

The tank is made of a plurality of stampings, the height of which may vary to change the tank capacity. The stampings are made in a single set of dies and by trimming the open end before assembly to various heights the desired capacity is obtained. A gas, coal, oil, or other type of fuel burning equipment is disposed in the bottom of the insulating cover directly below the bottom of the tank. A flue, having a plurality of passageways, extends through the tank and the top of the outer cover. The flue extends below the bottom of the tank to prevent the products of combustion from flowing directly thereinto. A baffle may be disposed near the bottom of the tank, sloping from the front directly over the burner upwardly to the back and having a sleeve connected thereto and disposed about the flue to produce a more rapid convection movement of the water. This produces rapid heating and delivering of the water to the top portion of the tank to which the outlet pipe is attached.

Accordingly, the main objects of this invention are: to form a hot water heater from a tank and an outer casing between which insulating material is disposed and an additional inner case below the tank spaced from the outer casing to form insulating receiving space therebelow; to form a tank and outer casing from pot-like stampings, the depth of which may be adjusted so that when combined the capacity of the resulting tank may be varied; to provide a flue through the bottom and top of the tank, having a plurality of passageways to increase the contact surface with the water; to provide a tank having an arcuate bottom portion disposed normal to the flue which extends therebelow to prevent the products of combustion from moving directly thereinto; to provide a baffle sloping from a point directly over the burner to the rear about the flue in communication with a sleeve encompassing the flue and secured to the baffle for directing the heated water from the burner toward the flue and upwardly thereabout to the top of the tank; and, in general, to provide a tank and method of construction which produces tanks of various capacities from a single set of dies and which is economical of manufacture and use.

Other objects and features of this invention will be either specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a sectional view of a water heater embodying features of this invention;

Fig. 2 is a sectional view of the structure illustrated in Fig. 1, taken on the line 2—2 thereof;

Fig. 3 is a sectional view of structure illustrated in Fig. 1, taken on the line 3—3 thereof;

Fig. 4 is a broken view of structure, similar to that illustrated in Fig. 1, showing a further form which the invention may assume;

Fig. 5 is a sectional view of structure illustrated in Fig. 4, taken on the line 5—5 thereof; and

Fig. 6 is an enlarged broken sectional view of structure similar to that illustrated in Fig. 4, showing a modified form of the invention.

Referring to Figures 1 to 3, inclusive, the water heater embodies a tank 10 made from a top stamping 12 and a bottom stamping 13 of heavier gauge material than the stamping 12. These stampings are pot-shaped and provided at their peripheral edge with an outwardly directed flange 14 which abuts each other and are welded together. It will be noted from Fig. 1 that the stamping 13 may have the portion 15 cut off at 16 and flanged outwardly so as to reduce the capacity of the resulting tank by the area disposed between the lines 14 and 16. This may reduce a tank having a 60 gallon capacity to one having a 50 gallon capacity.

Similarly, stamping 12 may be trimmed at the line 17 and flanged thereat and abutted against the flange 14, or the one at the point 16. This will further reduce the capacity of the tank by the area between the lines 14 and 17, or between the lines 17 and 16. This might reduce a tank having a 60 gallon capacity tank to a 40 gallon capacity tank, or to a 30 gallon capacity. It will thus be seen that by varying the shearing operation on the open end of the stampings 12 and 13, that a large variation of capacities may be obtained for the resulting tank. This is important as the trade demands such variation in capacity and applicant avoids the necessity of providing a plurality of die sets, one for each capacity, by the present arrangement. This embodies a single die set which produces like stampings which may be sheared to different lengths to provide different capacities.

An outlet opening 21 is provided in the top end of the stamping 12, having a threaded collar 22 welded, swaged, or otherwise secured thereto. A plurality of elbows 23 connect the outlet opening 21 to the conduit 24 at the top side portion of the water heater. Aligned, elongated flanged

openings 25 are provided in the top and bottom of the stampings 12 and 13, through which the smoke flue 26 extends. The end portions 27 are elongated in shape to mate with the flange in the openings 25 and to be sealed thereto as by welding.

The intermediate portion 28 between the elongated ends 27 are formed into a plurality of tubes 29 joined by webs 31 which are disposed therebetween. The webs 31 are the opposite side portions of the flue which have been moved into abutting relation. The bottom elongated portion 27 of the stack extends some distance below the bottom of the stamping 13 so as to provide an area 33 in which the products of combustion are trapped and prevented from moving directly into the flue. This area 33 is formed by arching the bottom of the tank at 34, as illustrated in Figs. 1 and 2. A water inlet opening, similar to the outlet opening 22, is provided in the side wall of the tank near the bottom thereof, as at 35.

A pair of similar stampings 37 and 38 struck from the same die are employed to form the outside wrapper about the entire tank assembly including the combustion chamber 39. This chamber is formed by a pot-like stamping 41, which extends over the wall of the stamping 13 and is provided with an outwardly directed flange 42 which mates with and is welded to the flange at the abutted ends 16 of the stampings 12 and 13. The stampings 37 and 38 are provided with outwardly directed flanges 34 which are encompassed by an inwardly directed channel-shaped band 45 which has its ends flanged outwardly at 46 and secured together by suitable means, herein illustrated as by a bolt 47. The upper tank stamping 12 is spaced from the outer top stamping 37, while the stamping 41 is spaced from the outer bottom stamping 38. Depending upon the capacity of the tank, the length of the stampings 37 and 38 are varied to conform to the tank capacity.

An insulating material 48 is disposed between the spaced walls of the tank and stamping 41 and the outer stampings 37 and 38 to insulate the tank as well as the combustion chamber. A collar 51 extends through the wall of the stampings 38 and 41 to provide a passageway through which a burner 52 may be inserted or removed from the combustion chamber 39. Suitable supporting elements 53 and 54 maintain the burner in predetermined relationship to the bottom portion of the tank. A suitable conduit 55 delivers gas to the burner herein illustrated, for heating the water. It is to be understood that the combustion chamber 39 could be constructed to burn coal, oil or other fuels when substituted for gas for heating the water.

It will be noted that the elbows 23, which form the top portion of the outlet conduit, are enclosed by the upper stamping 37 and that the outlet pipe 24 extends through a small aperture in the wall of the stamping. A similar inlet pipe extends through an aperture in the wall of the stamping 38 in communication with the inlet opening 35. The stamping 38 is provided with a number of apertures 57 through which the legs 58 extend for supporting the hot water unit. Tabs 59 are struck outwardly when forming the apertures having a hole therein through which a screw 61 extends to secure the tab to the leg. The upper part of the legs are flanged at 62 and are welded to the bottom surface of the stamping 41. On the structure as herein illustrated, three legs 58 are provided for supporting the entire water heating unit. It is to be understood that any number of legs may be utilized and attached to the bottom of the stampings, as herein illustrated.

In Figs. 4 and 5, a further form of the invention is illustrated, that wherein a baffle 66 is supported by legs 67 on the bottom of the stamping 13. The baffle slopes from the water inlet and burner toward the flue 28. The water delivered between the baffle and tank bottom will be heated and will move by convention toward the flue. About the flue an elongated sleeve 68 is disposed in spaced relation thereto. The water moving upwardly under the baffle 66 will continue such upward movement within the sleeve 68 while in intimate contact with the flue surface. The sleeve 68 terminates near the top of the tank so that a small quantity of water will be immediately heated to a high temperature and delivered to the top outlet portion of the tank when the burner is ignited. This eliminates the necessity of heating all of the water of the tank to a desired degree before any portion thereof can be withdrawn at a desired temperature. Otherwise, the structure described in relation to Figs. 4 and 5 is similar to that illustrated in Figs. 1 to 3.

In Fig. 6, an enlarged section of a tank discloses that the tank and flue are made of stainless-clad steel sheets with the stainless surface disposed toward the tank interior. The stainless surface 72 on the stampings 10 and 13 is disposed on the inside of the tank, which is also true of the stainless surface 73 on the flue 28. When the abutted flanges of the stampings 10 and 13 are welded together, the stainless material will seal the joint 74 on the tank interior so that it will have a continuous stainless surface. Similarly, the joint 75 welded between the flue 28 and the flange at the slot in the tank bottom and top will be filled with the stainless steel material and a continuous surface of stainless steel will be present on the flue as well as the joints thereof with the tank. In other words, the entire tank interior will be of stainless steel while the outer, heavier body material of the tank will be of a cheaper and more workable steel.

What is claimed is:

1. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, and a casing encompassing said tank and element.

2. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, a casing encompassing said tank and element and spaced therefrom, and insulating material disposed in said space.

3. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, a casing encompassing said tank and element and spaced therefrom, insulating material disposed in said space, and legs secured to the bottom of said tank and extending through the casing.

4. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, a casing encompassing said tank and element and spaced

therefrom, insulating material disposed in said space, legs secured to the bottom of said element and extending through the casing, and means securing said legs to said casing.

5. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation, and a casing made of two like stampings encompassing said tank and element when joined together near the center of the tank.

6. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation, a casing made of two like cylindrical pot-shaped stampings having their open ends flanged outwardly and encompassing said tank and element, and a channel-shaped band extending over said flanges for joining the adjacent open ends of the stampings together.

7. In a water heater, a cylindrical tank, a cylindrical pot-shaped element telescoped over and secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation, a casing made of two like cylindrical pot-shaped stampings having their open ends flanged outwardly and encompassing said tank and element, a channel-shaped band extending over said flanges for joining the adjacent open ends of the stampings together, said stampings being disposed in spaced relation to said tank and element, and insulating material disposed in said space.

8. In a water heater, a tank made from two pot-shaped stampings which are joined together at their open ends, said tank having aligned elongated flanged slots in its top and bottom, a flue comprising a plurality of circular passageways with flanges therebetween terminating at the ends in elongated openings which extend through the flanged slots in the bottom and top of the tank and are sealed therewith, and a casing disposed over said tank through which the top portion of the flue extends, and insulating material disposed between said tank and casing.

9. In a hot water heater, a tank made from pot-like stampings of stainless-clad steel with the stainless surface on the inside, the open ends of the stampings being flanged outwardly and secured together by welding with the stainless steel surface on the inside of the tank maintained continuous, a flue made of stainless-clad steel with the stainless surface on the outside extending through the bottom and top of said tank and secured thereto with the stainless surface continuous with that of the inside of the tank, a pot-shaped element secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, a casing made of two like pot-shaped stampings extending over the bottom and top of the tank and element, and means for joinin the open ends of the casing stampings together.

10. In a hot water heater, a tank made from pot-like stampings of stainless-clad steel with the stainless surface on the inside, the open ends of the stampings being flanged outwardly and secured together by welding with the stainless steel surface on the inside of the tank maintained continuous, a flue made of stainless-clad steel with the stainless surface on the outside extending through the bottom and top of said tank and secured thereto with the stainless surface continuous with that of the inside of the tank, a pot-shaped element secured to the bottom portion of said tank with the bottoms of the element and tank in spaced relation to form a combustion chamber, a casing made of two like pot-shaped stampings extending over the bottom and top of the tank and element, means for joining the open ends of the casing stampings together, and insulating material disposed between said outer casing and the tank and element.

11. In a hot water heater, a tank made of pot-shaped stampings joined together at their open ends with the bottom of one of the stampings forming an arcuate dome at the top of the tank and with the bottom of the other stamping formed as an arch extending from one side to the other of the tank, a flue extending through the top and bottom of the tank with the bottom portion of the flue projecting to the bottom of the arch to prevent the products of combustion from passing directly therein, the upper portion of said flue extending above the dome, a pot-shaped element secured to the bottom portion of the tank with the bottom of the tank and element in spaced relation to form a combustion chamber, and pot-like stampings extending over the top and bottom of the tank and element and secured together at their open ends.

12. In a hot water heater, a tank made of pot-shaped stampings joined together at their open ends with the bottom of one of the stampings forming an arcuate dome at the top of the tank and with the bottom of the other stamping formed as an arch extending from one side to the other of the tank, a flue extending through the top and bottom of the tank with the bottom portion of the flue projecting to the bottom of the arch to prevent the products of combustion from passing directly therein, the upper portion of said flue extending above the dome, a pot-shaped element secured to the bottom portion of the tank with the bottom of the tank and element in spaced relation to form a combustion chamber, and pot-like stampings extending over the top and bottom of the tank and element and secured together at their open ends, said casing at the top having an opening through which the upper portion of the flue extends.

13. In a hot water heater, a tank made of pot-shaped stampings joined together at their open ends with the bottom of one of the stampings forming an arcuate dome at the top of the tank and with the bottom of the other stamping formed as an arch extending from one side to the other of the tank, a flue extending through the top and bottom of the tank with the bottom portion of the flue projecting to the bottom of the arch to prevent the products of combustion from passing directly therein, the upper portion of said flue extending above the dome, a pot-shaped element secured to the bottom portion of the tank with the bottom of the tank and element in spaced relation to form a combustion chamber, pot-like stampings extending over the top and bottom of the tank and element and secured together at their open ends, said casing at the top having an opening through which the upper portion of the flue extends, and legs secured to the bottom of said element which extend through said casing.

14. In a hot water heater, a tank made of pot-shaped stampings joined together at their open ends with the bottom of one of the stampings forming an arcuate dome at the top of the tank

and with the bottom of the other stamping formed as an arch extending from one side to the other of the tank, a flue extending through the top and bottom of the tank with the bottom portion of the flue projecting to the bottom of the arch to prevent the products of combustion from passing directly therein, the upper portion of said flue extending above the dome, a pot-shaped element secured to the bottom portion of the tank with the bottom of the tank and element in spaced relation to form a combustion chamber, pot-like stampings extending over the top and bottom of the tank and element and secured together at their open ends, said casing at the top having an opening through which the upper portion of the flue extends, legs secured to the bottom of said element which extend through said casing, and a collar extending through the casing and element to form an opening through which the fuel is conducted to the combustion chamber.

15. In a hot water heater, a tank made of pot-shaped stampings joined together at their open ends with the bottom of one of the stampings forming an arcuate dome at the top of the tank and with the bottom of the other stamping formed as an arch extending from one side to the other of the tank, a flue extending through the top and bottom of the tank with the bottom portion of the flue projecting to the bottom of the arch to prevent the products of combustion from passing directly therein, the upper portion of said flue extending above the dome, a pot-shaped element secured to the bottom portion of the tank with the bottom of the tank and element in spaced relation to form a combustion chamber, pot-like stampings extending over the top and bottom of the tank and element and secured together at their open ends, said casing at the top having an opening through which the upper portion of the flue extends, legs secured to the bottom of said element which extend through said casing, a collar extending through the casing and element to form an opening through which the fuel is conducted to the combustion chamber, a gas burner supported within said chamber adjacent to said archway remote from said flue, a collar extending through said casing and element forming an opening through which the burner is insertable, and a conduit extending through said opening to said burner.

16. In a hot water heater, an insulated tank, a flue extending through the top and bottom of said tank away from the center thereof, a baffle above the tank bottom sloping upwardly toward said flue, a sleeve about said flue joined to said baffle, and a burner beneath the bottom of said tank opposite to said flue under the lower portion of said baffle.

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