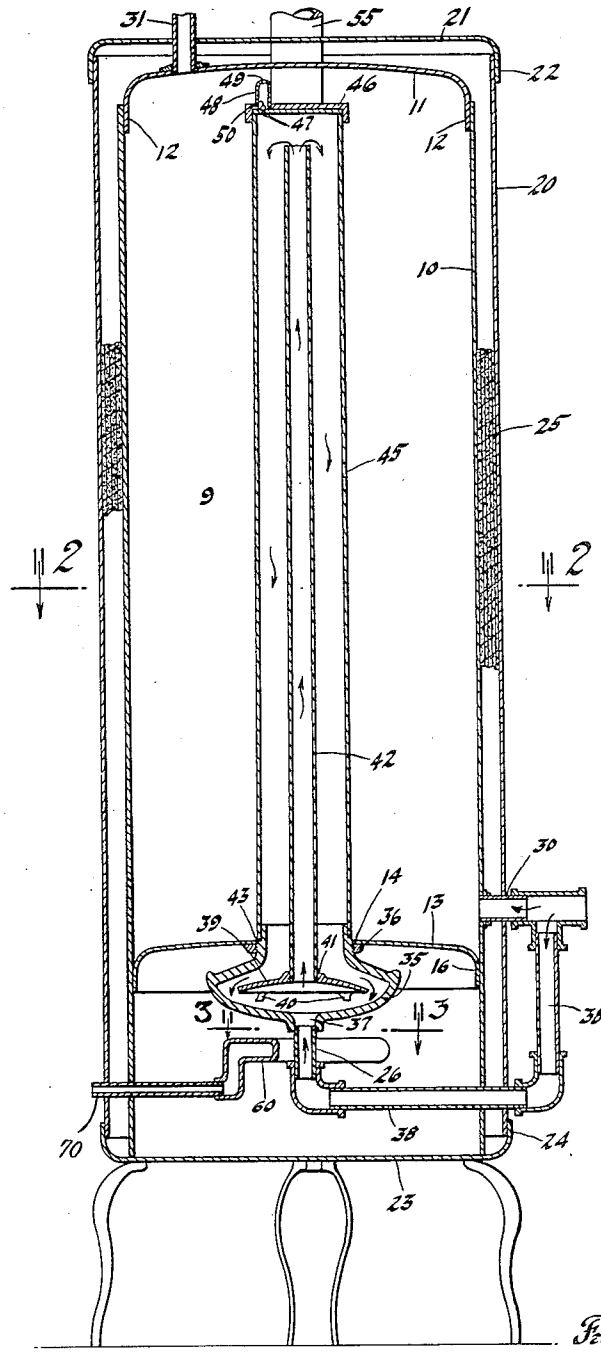
Oct. 27, 1931. F. W. BIRTCH 1,829,334

WATER HEATER

Filed May 2, 1928 2 Sheets-Sheet 1

Fig. 1



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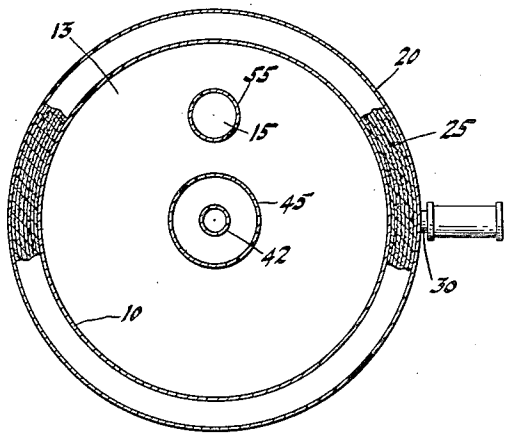


Fig. 2

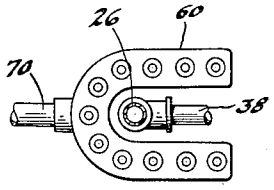


Fig. 3

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UNITED STATES PATENT OFFICE

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WATER HEATER

Application filed May 2, 1928. Serial No. 274,534.

One object of my invention is to provide a device for heating water in residences and the like which will be efficient in operation and economical in the use of fuel.

Another object of my invention is to provide a water heater wherein the sediment and foreign matter carried by the water which is heated and then used is permitted to settle at the bottom of the tank and is not disturbed by the heating means nor by drawing off the water for use.

Another object of my invention is to provide a heater wherein the usable water in the tank is heated to a higher degree in the upper portions of the tank than in the lower portions thereof, thereby providing the hottest water adjacent the withdrawal conduit in the upper portion of the tank.

Another object is to provide a device for indirectly heating the usable water by means of a circulating water column within the main tank, whereby heat is transmitted to the water in the tank throughout the greater portion of its depth thereby more efficiently utilizing the heating value of fuel consumed than is done where the source of heat is applied to a restricted portion of the tank surface.

Another object of my invention is to provide a water heater wherein the usable water is heated by a secondary column of water which circulates in a closed circuit through the usable water and which circuit has such connection with the usable water in the main tank as to equalize differences of pressure that may occur between the main tank and the closed circuit.

With these and other objects in view my invention consists in the arrangement, combination and construction of the various parts of my improved device as described in the specification, claimed in my claims, and shown in the accompanying drawings, in which:—

Fig. 1 is a sectional elevation of my device.

Fig. 2 is a view taken on the line 2—2 of Fig. 1.

Fig. 3 is a view taken on the line 3—3 of Fig. 1.

My invention comprises a water container 9 preferably of metal and having sides 10 and provided with a top closure 11 which has its downwardly extending flanges 12 welded or otherwise suitably secured to the top edges of the sides 10 and which has a bottom closure 13 provided with a central opening 14 and a non-central opening 15 which is shown in Fig. 2. The plate 13 has downwardly extending flanges 16 around its edges which are welded or otherwise suitably secured to the sides 10 adjacent the bottom of the tank but sufficiently removed from the bottom to provide a chamber 26 beneath the tank within which water connections and a heating device, to be hereinafter described, may be positioned. Around the outside of the tank 9 is positioned a shell 20 of larger diameter but similar shape to the tank 9. The shell 20 is provided at its top with a crown plate 21 the edges of which are bent downwardly and welded or otherwise secured as at 22 to the top edges of the shell 20. A closure 23 is provided for the bottom of the shell and has upwardly extending flanges 24 which are welded or otherwise suitably secured to the lower edges of the shell 20. The bottom plate 23 provides a rest for the lower edges of the tank sides 10. Between the shell 20 and the tank sides 10 is positioned and secured suitable insulating material such as corrugated asbestos 25 with sealed air pockets or chambers. This insulating material is also positioned between the crown plate 21 and the top 11 of the tank and it extends downwardly to the bottom plate 24. It will be understood, of course, that suitable openings are provided through the shell 20 and the bottom portion of the tank sides 10 beneath the bottom 13 of the tank 9 through which water pipes and fuel pipes may be extended into the chamber 26 and also for giving access to said chamber so that the fixtures positioned therein may be assembled and adjusted. The tank is provided with an inlet pipe 30 which is connected with suitable source of water supply and which is positioned in the lower portion of the tank, an outlet pipe 31 is provided in the top of the tank which leads in a conventional

manner to the various faucets and taps in the building to be supplied.

Positioned beneath and extending through the opening 14 in the tank bottom 13 is a bottle shaped casting 35. The neck of the casting is inserted through the opening 14 and is provided with external threads which engage the threads of a collar 36 secured to the under side of the bottom 13 about the opening 14. An opening 37 is provided in the bottom of the casting in which a suitable water supply pipe 38 may be fitted. Within the casting is positioned an inverted saucer shaped plate 39 which is of smaller diameter than the larger portion of the casting 35 and has its edges spaced from the sides of the casting 35. This plate 39 is secured in the casting by a plurality of legs 40 which extend between the edges of the plate and the sides of the casting to which they are secured. The plate 39 has a central opening 41 in which is fitted the end of the tube 42 which extends upward as shown. The neck of the casting 35 which extends above the tank bottom 13 is provided with shoulders 43. A second tube 45 of greater diameter and length than the tube 42 is positioned within the tank with its lower ends fitted upon the shoulders 43 of the casting 35. The top of the tube 45 is provided with a cap 46 and this cap is provided with an opening 47 and a dome shaped nipple 48 is fitted around the opening, a vent opening is provided in the top of the nipple 48 and a ball 50 is positioned within the nipple 48 and guided thereby to normally rest over and close the opening 47. The purpose of this arrangement is hereinafter more fully explained.

The non-central opening 15 in the tank bottom 13 is fitted with a pipe 55 which extends upwardly through the tank and out through the top thereof as shown in Fig. 1. This pipe is provided to carry away the flue gases from the chamber 26 at the bottom of the tank.

The supply pipe 38 which leads to the casting 35 is connected with the supply pipe 30 which leads into the tank 9 as shown.

Positioned in the chamber 26 is a horseshoe-shaped gas burner 60 as shown in Fig. 3, having its arms extending on either side of the supply pipe 38 and beneath the bottom of the casting 35. The burner is supplied with gas from a suitable source through the pipe line 70 and may be thermostatically controlled by any suitable means.

The tank is filled and kept filled through the supply line 30, water also passes from the supply line 30 through the pipe 38 into the casting 35 through the opening 37 and fills the tubes 42 and 45. Heat is applied to the casting 35 by the gas burner 60 and the water therein is heated and caused to circulate upwardly through the tube 42 in the direction of the arrows, out of the top of the tube 42 and downwardly through the tube 45 on the outside of the tube 42 back into the casting 35, downwardly around the edge of the plate 39 and up again through the tube 42. Any air which may be trapped in the tubes 42 and 45 will upon circulation of the water force the ball 50 up from its seat over the opening 47 in the cap 46 on the tube 45 and pass around the ball in the nipple 48 and out through the vent opening 49. Any difference in pressures existing or occurring in the tank 9 and the tubes 42 and 45 will be equalized through the inlet pipe 30 and the casting feed pipe 38 thus insuring maintenance of equal pressure within and without the tube 45. The constant and rapid circulation of a relatively small amount of water, which is not replaced by new water, through the closed circuit formed by the tubes 42 and 45 and casting 35 prevents the gathering of any sediment in the casting 35 where it may interfere with the conduction of heat applied by the burner. The circulation of the heated water in the closed circuit as described, supplies the hottest water to the top of the tank and heats the upper portion of the tank first and to a greater degree than the lower portion is heated, thus the hottest water is always in its natural position at the top of the tank and the replacement water coming in to the lower portion of the tank is gradually heated as it rises to the top, thus eliminating any circulation or disturbance of the water in the tank which would tend to prevent the settling of precipitated sediment in the bottom of the tank or to stir up any sediment which has already settled and suspend it in the water which is being used. The settling of sediment on the bottom 13 of the tank in no way interferes with the heating of the water as it does in many of the constructions now in use where the heat is applied to the tank bottom.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is:

1. A water heater comprising a tank having a water inlet in the lower portion thereof and a water outlet in the upper portion thereof, means for heating water in said tank by circulating hot water therethrough comprising a heating basin secured to the lower portion of said tank, a tube connected with said basin and having a closed end extended within said tank forming a return conduit for circulating hot water, a second tube of smaller diameter than said first tube having one end secured in said heating basin and extending within said first tube to a point adjacent the closed end thereof for delivering hot water from said basin to the upper end of said first tube, means within said basin for direct-

ing heated water into said second tube, a connection between said basin and said tank inlet whereby water is supplied to said basin and differences in pressure within said basin and tubes and said tank are eliminated, and means for heating said basin positioned adjacent thereto.

2. A water heater comprising an insulated container having a water inlet and a water outlet, a closed water circuit extending within the container comprising a heating basin positioned beneath the bottom of the container and having a water inlet and outlet therein, a closed tube secured about said basin outlet and extending within said container, a second tube of smaller diameter within said first tube and having an open end terminating short of the top of said first tube, a baffle plate positioned within said heating basin and having its edges spaced from the sides thereof and supporting said second tube in a central opening therein, and a conduit connecting said container inlet and said heating basin inlet whereby the pressures within said container and said closed water circuit are equalized.

3. A water heater comprising a tank having a water inlet and a water outlet therein, a heating basin secured in the bottom of said tank and having connection with said tank inlet, a tube having its upper end closed and extending vertically from said heating basin to the upper portion of the tank, a second tube of smaller diameter than said first tube secured in said basin and extending within said first tube to a point adjacent the upper end thereof for delivering heated water from said basin to the upper end of said first tube, means in said basin for directing water through said smaller tube, and a source of heat positioned adjacent said basin.

4. A water heater comprising a tank having a water outlet in the upper portion thereof, a secondary hot water circuit for heating said tank comprising a basin, a conduit within said tank leading from said basin to the upper portion of said tank, a second conduit within said tank enclosing said first conduit for returning water discharged from said first conduit to said basin, means in said basin for directing returning water to said first conduit, a water supply connection for said basin, a pressure equalizing connection between said secondary circuit and said tank, and means for heating said basin.

5. In combination, a water storage tank, and a device for heating water therein comprising a conduit having a closed end, a receptacle secured to the opposite end thereof and having connection with a water supply, a second conduit of smaller diameter within said first conduit having one end secured in said receptacle and having its opposite end terminating adjacent the closed end of said first conduit, means in said receptacle for directing water to said second conduit whereby water may pass from said receptacle through said second conduit and return to said receptacle through said first conduit, said device being positioned with said conduits extending within said tank and said receptacle on the outside of said tank, means for applying heat to said receptacle, and a connection between said device and said tank whereby differences in pressure therein may be eliminated.

6. In combination with a water storage tank, a device for heating said tank comprising a receptacle and means adjacent thereto for heating water therein, means for delivering heated water from said receptacle to a point within said tank, said means maintaining the delivered water separate from that in the tank, and means surrounding said delivery means for returning said heated water to said receptacle and maintaining said circulating water separate from the water in said tank, and a connection between said circulatory system and said tank for equalizing pressures therein.

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