

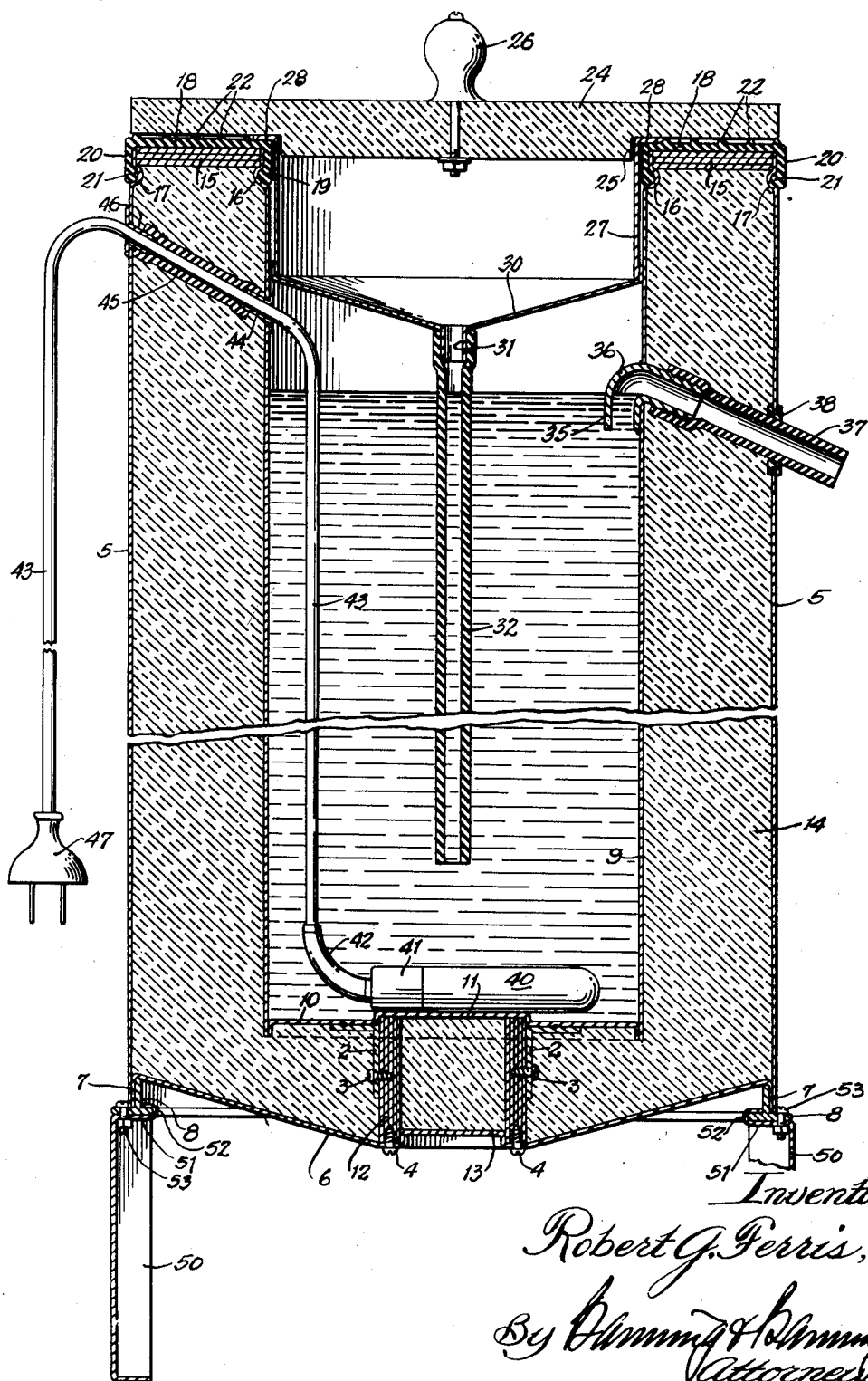
Oct. 13, 1942.

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2,299,053

WATER HEATER

Filed June 25, 1941



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UNITED STATES PATENT OFFICE

2,299,053

WATER HEATER

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Application June 25, 1941, Serial No. 399,639

4 Claims. (Cl. 219—38)

My present invention, which relates to certain new and useful improvements in a water heater, is a continuation-in-part of my earlier applications filed December 24, 1938, and March 27, 1940, under Serial Nos. 247,617 and 326,226, respectively.

A main object is to provide an improved water heater of the storage type from which hot water is discharged by the introduction of cold water, the heater remaining full, or substantially so, at all times. Another object is the provision of means in a heater of this type for preventing the discharge pipe from overflowing or dripping due to expansion or vaporization of the water during heating. Another object is the provision of a removable cover whereby to facilitate cleaning of the interior of the tank. Another object is the provision of hollow supporting means for the tank affording a simple and strong construction. And a still further object is the provision of electrical heating means readily accessible within the tank and withdrawable or disconnectible therefrom for convenience in repairing, adjustment or replacement.

These and other objects will appear from the following description wherein reference is made to a suggestive embodiment of the invention shown in the accompanying drawing which shows a vertical section through the present water heater.

The heater comprises a casing with side walls 5, preferably cylindrical, and with a centrally apertured, downwardly sloping conical bottom 6, whose outer edges are down-turned to provide a flange 7. An inverted T-iron 8 of circular form provides a base ring over whose web the bottom is rested with its flange engaging the outer face of the web. The lower end of the casing laps past the flange 7 to which it is desirably connected as by welding.

Positioned within the casing, and in spaced relation therewith, is an open top tank, desirably of sheet metal, provided with side walls 9 and with a bottom 10 that may be centrally upwardly embossed as at 11 to fit around a support 12, preferably made of a fibrous insulating sheet which is wound into a hollow cylinder. This cylinder may be rested upon the casing bottom adjacent an up-raised boss 13 by which it is centered in position. Depending from the tank bottom and secured thereto as by spot welds are angle straps 2 whose vertical arms are connected to the cylinder by screws 3, the cylinder in turn being joined to the casing bottom by other screws 4. The space extending around 55

and below the tank to the sides and bottom of the casing is filled with a suitable packing 14, preferably glass wool which provides a desirable insulation whereby heated water within the tank may remain so over a prolonged period. The top edge of the tank walls terminates in a plane substantially the same as the top edge of the casing walls.

The tank is maintained centrally within the casing with the aid of an annular spacer ring 15, desirably of plywood, whose underside, adjacent its inner and outer edges, is seated against a pair of opposed facing circumferential beads 16 and 17 formed conveniently as by inward crimping of the walls of the tank and casing, respectively. The ring thus supported presents its upper side in flush relation with the top edges of the tank and casing walls, and serves to protect the compressible insulation material therebelow. Fitted over the plywood ring is a closure desirably in the form of a channel ring 18 having inner and outer depending flanges 19 and 20 adapted to engage fixedly with the walls of the tank and casing, respectively, adjacent their upper ends. An adhesive may be applied over the inner contacting surfaces of the channel ring to provide a seal that will prevent any water or vapor leakage into the insulation. This ring is preferably made from some suitable insulating and proofing material which is resilient, such as rubber, whereby to minimize heat losses and provide an effective seal which will prevent passage of water therethrough or therearound. Adjacent the lower end of each flange is an inwardly extending bead 21 adapted to engage and resiliently lock within the outer annular channels resulting from the inward crimps which produce the beads 16 and 17 in the tank and casing walls, as already described. The upper surface of the channel ring is desirably formed with a plurality of concentric ridges 22, the one furthest to the inside being spaced appreciably from the flange 19 for a purpose that will presently appear.

Associated with the tank unit just described is a removable closure cover 24, preferably a solid insulating disk made from some such material as vapor-sealed Celotex which, upon its underside, is formed with a peripheral recess 25. A lifting knob 26 extends upwardly from the cover. The recessed underside of the disk is adapted to fit over and seat upon the channel ring with whose ridges 22 it may engage. A cylindrical bowl 27 having at its top an out-turned flange 28 is adapted to underlie the cover.

The bowl flanges which extend over and rest upon the channel ring lie to the inside of the innermost ridge thereon and desirably below the tops thereof so as to be free of engagement with the closure cover. The upper end of the bowl, including its flange, is accommodated within the peripheral recess on the underside of the cover. The bowl which is removably seated upon the channel ring is closely fitted thereto so as to remain centered in place, and the internal diameter of the peripheral recess in the cover is just slightly less than that of the bowl so that the latter serves to maintain the former in concentric relation with the tank.

To the lower end of the cylindrical bowl is affixed a conical bottom 30, these two elements constituting a funnel unit. In the center of the conical bottom is a drain opening from which depends a nipple 31 to which may be connected a filler tube 32, preferably of rubber or the like, adapted to depend into the tank to a point relatively close to its bottom. When the funnel unit is removed, the depending tube also comes out so that the tank is substantially free of any obstructions therein.

A siphon tube 35 passes through the walls of the tank with which it is in sealed connection at a point near its upper end. This tube, which is of larger diameter than the filler tube, proceeds first upwardly, is then bent at 36 at its topmost point, and then proceeds downwardly at an incline to connect with a discharge hose 37 or the like which extends outwardly through an insulating gasket 38 that is supported in the casing walls. The lower end of the hose terminates below the inlet end of the siphon tube 35 whereby the tube in its entirety may serve as a siphon for the discharge of water from the tank, as will presently appear.

An electrical heating unit is adapted to be loosely rested upon the tank bottom. As shown, this unit is contained within a tube 40 in one end of which is a thermostat 41. From this tube is extended an upwardly bent nipple 42 with which a rubber cord 43 is in sealed connection. The cord passes on up to a point near the upper end of the tank where it is extended through an insulated bushing 44 fitted within an opening in the tank wall just below the depending funnel unit, the bushing connecting with a short insulated tubing 45 which traverses most of the distance between the tank and casing walls to join at its outer end with a second bushing 46 which is extended through an opening in the casing walls by which it is supported. Through the continuous insulated passageway thus provided between the walls of the tank and casing the rubber cord is adapted to be inserted, thereby carrying with it enclosed electrical connections (not shown) to a plug 47 which is fitted to the outer end of the cord. By this arrangement it will be apparent that when the plug is fitted into a socket in connection with a source of electrical current, the heating unit will be energized to maintain at an elevated temperature the water which is contained within the tank.

Since the tank when full will require ample support, I have provided the insulating cylinder 12 whose outer face is of substantially the same diameter as is the boss in the tank bottom so as to seat therewithin and be maintained concentric therewith. This cylinder is also sustained at its bottom end by the conical casing bottom 6 which provides a truss support therefor. The upwardly extending boss 13 formed in the center

of the casing bottom fits within the cylinder 12 so as to maintain the lower end thereof in concentric relation with the tank. In this way the load of the tank is adequately supported at points around a circle free of contact with metallic parts and with a minimum heating loss. The space within the cylinder support is also insulated, and this support is also connected to the bottoms of the tank and casing so that, in the event of inversion, these two units will not shift or move relatively to each other.

The tank in its entirety is adapted to be maintained in an elevated position as by means of a plurality of legs 50 each by preference in the form of an angle or channel iron. The upper end of each leg is closed over by a web 51 which underlies the base of the inverted T-iron 7 and then extends at 52 around and over the inward flange thereof. When the leg is then fitted to the base ring by an outward radial movement, the hooked end 52 of the web will engage with the flange of the T-iron and thereby position the leg accurately to receive a connecting bolt 53 which is adapted to pass through a pair of registering apertures in the base ring and web. When a nut is tightened upon the bolt, the leg is then immovably affixed in place. Three or more such legs are desirably attached to the base ring so that the tank in its entirety is assured of an adequate elevated support.

Water which is poured into the bowl at the top will enter the tank near the bottom, thereby forcing the already heated water therein to flow up and out through the siphon tube and discharge hose in connection therewith. The outflow of water thus initiated will continue after the bowl is emptied, and until the level of water in the tank falls below the inlet end of the siphon tube, at which point the entering air will break the vacuum. No further discharge will occur thereafter, even though there be the usual expansion of water in the tank due to rise in its temperature. The siphon tube 37 is desirably larger than is the filler tube 32 so as to prevent overflowing, no matter how much water be placed in the bowl to await passage into the tank. The thermostat may be adjusted to close and open the circuit at, for example, 130° F. and 170° F., respectively, consequently any cold water introduced through the filler tube 32 will cause the circuit to close and the heater to operate until the water is brought to the desired temperature when the thermostat will automatically open the circuit again.

One of the outstanding features of my invention is the ease and facility with which the cover and funnel may be removed so as to expose the tank for cleaning or emptying, and also the heating unit for adjustment, repair, or replacement. In certain uses for which my heater is particularly adapted, such as applying water for cleaning milk cans on farms, it is possible that the cleaning water will be poured back into the heater for reheating. In so doing, a deposit is soon built up within the tank to hamper its utility. Frequent and thorough cleanings may therefore be important. Also the means by which my heater is rendered accessible for disassembly, cleaning and repairing is an outstanding advantage. Another feature of merit is the assured center support of the tank within the casing without the use of any metallic parts. This applies to the hollow cylindrical support at the bottom, the plywood spacing ring which is of high insulating value plus the channel ring support at the top,

and even the insulated connections (rubber) between the tank and (1) the closure cover which is fitted thereto, (2) the siphon tube, and (3) the tank and casing walls at the point where the electrical connections pass therethrough. By such a construction I minimize heat losses—an important consideration in a heater of the storage type.

I claim:

1. In a water heater in which water is heated by interiorly arranged heating means, a casing open at the top, a tank within the casing open at the top, a filler of insulating material between the tank and the casing, a cover adapted for removably fitting over the casing and tank and heat insulating means extending between the casing and the tank adjacent the tops thereof and providing in itself the sole seat whereon the cover is fitted and also a non-metallic heat path between the interior of the tank and the casing.

2. In a water heater in which water is heated by interiorly arranged heating means, a casing open at the top, a tank within the casing open at the top, the tank and the casing tops lying in substantially the same plane, a filler of insulating material between the tank and the casing, a cover adapted for removably fitting over the casing and the tank, and heat insulating means and vapor sealing means extending between the tank and the casing adjacent the tops thereof and providing in itself the sole seat whereon the cover is fitted and also a non-metallic heat path between the interior of the tank and the casing.

3. In a water heater in which water is heated

by interiorly arranged heating means, a casing open at the top, a tank within the casing open at the top, the tank and the casing tops lying in substantially the same horizontal plane, a filler of insulating material between the tank and the casing, heat insulating and vapor sealing means extending between the tank and the casing adjacent the tops thereof and providing a non-metallic heat path between the interior of the tank and the casing, said means including an insulated spacer ring extending between the tank and the casing at the top thereof to afford protection to the filler therebelow and an insulated closure means fitted over the spacer ring and providing a seal against the entrance of water past the spacer ring.

4. In a water heater in which water is heated by interiorly arranged heating means, a casing open at the top, a tank within the casing open at the top and spaced therefrom, the tank and casing tops lying in substantially the same plane, a filler of insulating material between the tank and the casing, a funnel supported within the heater, a horizontal ring of resilient insulating material capping the upper edges of the casing and the tank, and a flat annular ring of rigid insulating material interposed between the walls of the tank and the casing and rigidly spacing the same adjacent said ring of resilient material, said rings of insulating material forming a heat path of low heat conductivity between the tank and the casing.

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