

Jan. 11, 1927.

1,614,242

R. C. HOYT

WATER HEATER COIL

Filed Nov. 23, 1925

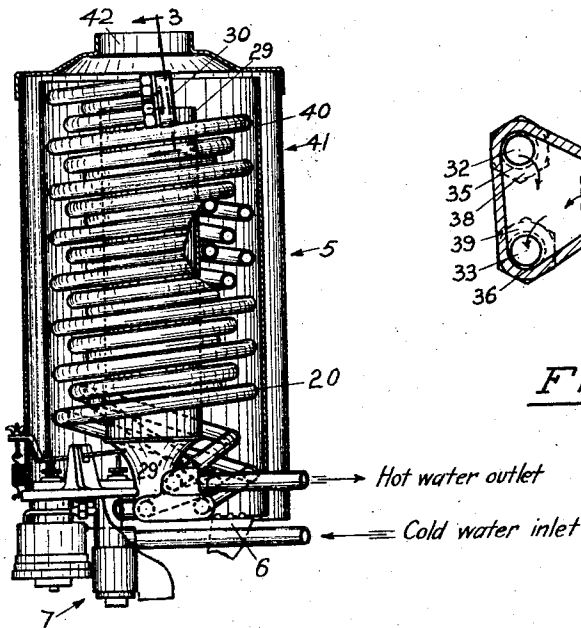


Fig. 1

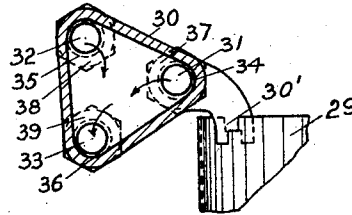


Fig. 3

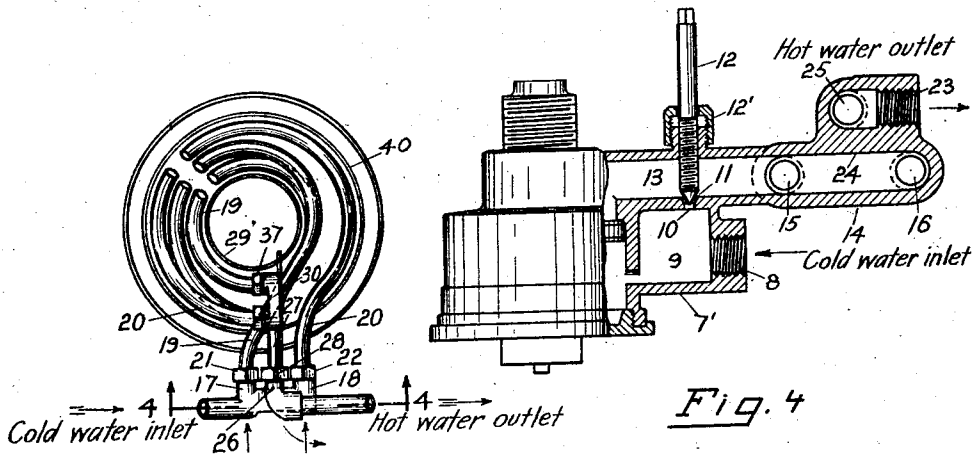


Fig. 2

Fig. 4

CLICK ANYWHERE on THIS PAGE to RETURN to HOYT WATER HEATER INFORMATION at InspectApedia.com

INVENTOR
BY *Robert C. Hoyt*
M. C. Frank
ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT C. HOYT, OF OAKLAND, CALIFORNIA, ASSIGNOR TO HOYT HEATER COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

WATER-HEATER COIL.

Application filed November 23, 1925. Serial No. 70,828.

My invention relates to water-heater coil-units adapted to be heated by heating elements beneath them for the quick heating of the water passing through the units, and it has special reference to a unit of this kind in which the arrangement is such as to produce a constant flow of hot water from the unit.

In ordinary water heaters that I am familiar with, the coils have their inlets at the bottom and are arranged to rise above a burner or heating element so that the flame therefrom comes in direct contact with the coils only at their initial convolutions, thus leaving the upper parts of the coil unit, especially the outlets of the coils, comparatively unaffected by the direct heat from the burner flame. By such an arrangement it is almost impossible to keep the outflowing water at a high degree of temperature when water is drawn continuously from the heating coils.

The principal object of this invention is to arrange the heating coils in such a manner that a continuous flow of hot water therefrom is assured when the burner is functioning. For this purpose my invention includes an arrangement by which the water that has been heated on its way towards the upper part of the heating coils is reheated before passing out of the terminal coil.

A further object is to protect the terminal coil from overheating.

Still further objects and advantages of my water-heater coil-unit will appear as the invention is unfolded in the following detailed description having reference to the accompanying drawings, in which:

Figure 1 is a side elevation of the principal parts of an automatic water heater equipped with a coil unit of my invention, certain parts being in section and others broken away in order to better illustrate the coil and the header arrangements;

Fig. 2 is a plan of the heater with the top cover removed, and shows the upper and the lower headers with sections of tubes leading therefrom and the relative curves of the coil tubes at the top and bottom of the heater.

Fig. 3 is an enlarged sectional view of the upper header along the line 3—3 in Fig. 1 and shows the spacing between the coil openings in the header, and that the header is common to the coil openings; and

Fig. 4 is a side elevation of the valve casing, with parts in vertical section taken along the line 4—4 in Fig. 2 of the lower header, and shows the cold water inlets and the hot water outlet and how the latter is separated from the former.

In an automatic water heater 5, of which only sufficiently is shown for the purpose of illustrating the present invention in connection therewith, I support a suitable burner or heating element 6 in any preferred manner at the base of the heater and supply gas to the heating element through connection with a controlling valve 7 for automatically regulating the flow of gas to the element 6 and is supported in the heater 5 by any suitable means.

The casing 7' of the control valve extends laterally so as to provide a threaded water inlet 8 to a lower chamber 9, which has at its top a valve opening 10 for the seating therein of the needle valve 11 integral with the stem 12 (see Fig. 4). The stem 12 is adjustably secured in the usual stuffing box 12' and extends through an upper passage 13 and the needle valve regulates the water flow to the passage, which is in communication with a header 14, common for coil tube openings 15 and 16 in two outwardly threaded extensions 17 and 18 on the header. Adapted to extend outwardly and then upwardly from the extensions 17 and 18 are an inner heating coil 19 and an outer heating coil 20, the inner heating coil 19 having its inlet connected with the extension 17 by a suitable coupling nut 21, and the outer heating coil having its inlet connected with the extension 18 by a similar nut 22.

In the header 14 is a threaded outlet 23, which is separated from the openings 15 and 16 by a wall 24 but communicates with an opening 25 in an upper threaded extension 26 on the header, and a heating coil 27 positioned intermediate the coils 19 and 20 is connected with the extension 26 by a nut similar to the other coupling nuts.

For the purpose of providing a vent for certain vapors arising in the vicinity of the lower center of the heating element 6 and in order to serve as an inner wall for confining the flame, arising from the heating element 6, to the vertical path of the coils 19, 20 and 27, the heater 5 has therein a tube or flue pipe 29, preferably contracted at its lower end, as shown at 29' in Fig. 1. This

lower end piece of the tube may be a separate member or integral with the main portion of the tube and is supported in any suitable manner adjacent to the heating element and in virtually central relation thereto. At its upper end the tube 29 serves as a support for an upper header 30, as at the notched hold 30' Fig. 3. This header is common for openings 31, 32 and 33 in three outwardly threaded extensions 34, 35 and 36 on the header. Of these extensions, the extension 34 has the inner heating coil 19 connected therewith at its outlet by the coupling nut 37; the extension 35 has the outer heating coil 20 connected therewith at its outlet by the coupling nut 38; and likewise the extension 36 has the intermediate heating coil 27 connected therewith at its inlet by the coupling nut 39.

In co-operation with the tube 29 the inner wall 40 of a jacket 41 serves as an outer wall for the confinement of the flame from the heating element to the vertical path of the coils, and the jacket is at its top provided with a usual vent 42 for leading the products of combustion away from the heater.

It is clear from the foregoing that the inflowing water will travel through the coils 19 and 20 and through the upper common header 30, before it reaches the intermediate coil 27, so that it enters the intermediate coil as hot water and follows that coil in its descending spiral convolutions towards the inlets to the coils 19 and 20 in the lower header 14. Since the exit 25 of the intermediate coil is separated from the inlets to the coils 19 and 20, it is further seen that the inflowing cold water can have no cooling effect upon the water exiting from the intermediate coil and that therefore a continuous stream of hot water will be delivered at maximum efficiency from the heater 5, and also that, by the arrangement of the terminal convolution of the intermediate coil 27 above the initial convolution of the inner coil 19 (see Fig. 2), the inner coil serves as a means of protecting the intermediate coil from being overheated by the direct flame.

It finally should be observed that the water, which is to be heated, flows through two coils while the water which already has been heated flows through a single coil, so that the velocity of the hot water is considerably greater than that of the cold water.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States the following:

1. A water-heater coil-unit comprising an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element and to allow the circulation of water to be heated by said element, and an intermediate coil connected with the first-mentioned coils at their upper ends and descending towards

their inlets to the unit; the lower end of the intermediate coil being above the lower end of one of the other coils for protection against overheating and the exit of said intermediate coil being separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

2. A water-heater coil-unit comprising an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element and to allow the circulation of water to be heated by said element; an intermediate coil connected with the first-mentioned coils at their upper ends and descending towards their inlets to the unit, the exit of the intermediate coil being separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil, and the initial convolution of the inner coil being below the terminal convolution of the intermediate coil for protecting said coil from being overheated.

3. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element for the circulation through said coils of water to be heated by said element; (2) a suitably supported common header for the inlets to said coils; (3) a suitably supported common header connecting said coils at the upper ends thereof; and (4) an intermediate coil connected with said upper header and communicating with the first-mentioned coils at said upper header, the intermediate coil descending towards the inlets of the first-mentioned coils and having its exit separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

4. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element for the circulation through said coils of water to be heated by said element; (2) a suitably supported common header for the inlets to said coils; (3) a suitably supported common header connecting said coils at the upper ends thereof; and (4) an intermediate coil connected with said upper header and communicating with the first-mentioned coils at said upper header, the intermediate coil descending towards the inlets of the first-mentioned coils and having its exit above, and separated from, the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

5. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating

element for the circulation through said coils of water to be heated by said element; (2) a suitably supported common header for the inlets to said coils; (3) a suitably supported common header connecting said coils at the upper ends thereof; and (4) an intermediate coil having its upper end positioned below the upper ends of the first-mentioned coils and connected to said upper header and communicating with said coils, the intermediate coil descending towards the inlets of the first-mentioned coils and having its exit separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

6. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element for the circulation through said coils of water to be heated by said element; (2) a suitably supported common header for the inlets to said coils; (3) a suitably supported common header connecting said coils at the upper ends thereof; and (4) an intermediate coil having its upper end positioned below the upper ends of the first-mentioned coils and connected to said upper header and communicating with said coils, the intermediate coil descending toward the inlets of the first-mentioned coils and having its exit above, and separated from, the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

7. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted

to extend above a suitably supported heating element for the circulation through said coils of water to be heated by said element; (2) a suitably supported common header detachably connected with said coils at their inlets; (3) a suitably supported common header detachably connected with said coils at their upper ends; and (4) an intermediate coil detachably connected with said upper header and communicating with the first-mentioned coils at their upper ends through said upper header, the intermediate coil descending towards the lower header and having its exit detachably connected therewith but separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

8. In combination, a water-heater coil-unit comprising (1) an inner and an outer coil having inlets at their lower ends and adapted to extend above a suitably supported heating element for the circulation through said coils of water to be heated by said element; (2) a suitably supported flue pipe extending within the convolutions of the inner coil and supporting the upper ends of both the inner and the outer coil; and (3) an intermediate coil also supported by said flue pipe and connected with the first-mentioned coils at their upper ends and descending towards their inlets to the unit, the exit of the intermediate coil being separated from the inlets to the first-mentioned coils so that only hot water will pass through and issue from the intermediate coil.

In testimony whereof I affix my signature.

ROBERT C. HOYT.