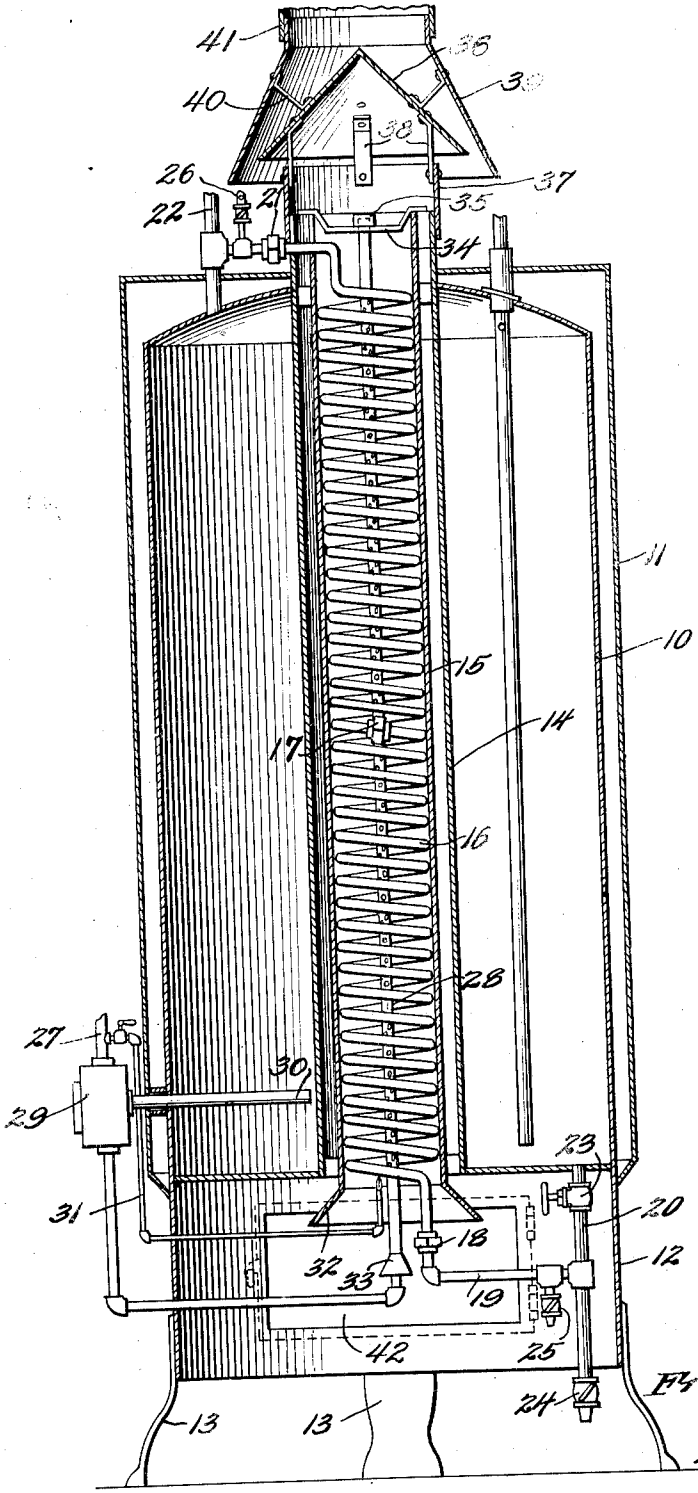
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WATER HEATER

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# UNITED STATES PATENT OFFICE

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## WATER HEATER

Application filed November 4, 1932. Serial No. 641,269.

This invention relates to hot water heaters and among other objects aims to provide an improved automatic heater of the instantaneous, coil and storage tank type. The idea is to deliver heat to a coil within a flue in the storage tank and thereby avoid the possibility of a heavy lime deposit or scale forming in the storage tank where a flame is concentrated on it. Such lime deposits eat holes in the tanks, making expensive replacements necessary within a comparatively short time. Another aim is to provide improved coil connections whereby the coil may be removed from its flue and replaced when necessary without disturbing or disconnecting the storage tank.

Other aims and advantages of the invention will appear in the specification when considered in connection with the accompanying drawing, wherein:

The figure is a central, vertical sectional view of a heater embodying the invention.

Referring particularly to the drawing, there is shown a stand boiler or tank 10 which may be made of galvanized steel having a sheet metal jacket 11 for suitable insulation. The lower end of the tank has a fire jacket 12 in the form of an extension to which legs 13 are connected.

A large tube 14 extends axially through the tank and a concentric vertical tube 15 is spaced from it to provide a flue. The flue may be five or six inches in inside diameter to receive a copper coil 16, the arrangement being such that the coil transfers heat to the water and the air space between the tube 14 and flue 15 prevents direct transfer of heat through the wall of the tube 14. The coil is adapted to be slipped into the upper end of the flue 15 and is preferably made in sections connected by a union coupling 17 so that it may be removed without bending when the ceiling is relatively low. The lower end is shown as having a union coupling 18 connected by pipes 19 and 20 to the bottom of the tank; while the upper end is bent laterally and connected by a union coupling 21 to the service pipe 22 near the top of the tank.

To enable the coil to be removed quickly without disturbing or even draining the tank, a valve 23 is provided in the pipe 20. Incidentally, the pipe 20 is extended and has a combined coil and tank drain valve 24. The coil alone may be drained through a small drain cock or valve 25 when an air valve 26 at the top of the coil is opened.

In this example, the water is heated by gas; although it will be understood that it may be heated electrically. Herein, a main gas inlet pipe 27 supplies gas to a vertical perforated burner tube 28 extending through the flue within the coil 16. The supply is adapted to be regulated automatically by an ordinary thermostatic valve in a casing 29, a thermostat element 30 projecting therefrom into the storage tank near the bottom. A valved pilot tube 31 is connected to the gas inlet pipe 27 above the thermostatic valve and projects upwardly adjacent to the burner tube into a flared hood 32 formed on the lower end of the flue pipe 15. The lower end of the burner tube has an ordinary air mixer 33 which telescopes loosely over the end of the supply pipe and this tube is suspended centrally of the coil by a transverse bracket 34 conveniently made of strap metal loosely supported across the upper end of the flue 15. The upper end of the burner tube projects through the bracket and screw cap 35 above the bracket serves to support the tube. A conical hood 36 is supported above the flue by a nipple 37 and brackets 38, the nipple being telescoped over the flue. A back-draft hood 39 is secured by brackets 40 above and around the conical hood 36 and its upper end is telescoped in the outlet flue 41. The arrangement is such that the gases escape around the conical hood into the outlet flue and any backdraft from the chimney is prevented from entering the flue 15. When the coil 16 is to be taken out, the hood is first removed; then the screw cap 35 is unscrewed so that the bracket 34 may be taken out. Then, the coil may be disconnected at the unions and removed as a unit or in sections, depending upon the height of the ceiling. Thus, the burner tube may be left in place

and the water does not have to be drained from the tank.

The valves 23 and 25 and the lower union coupling 18 in the jacket or fire-box 12 are easily accessible through a hinged door 42 preferably on the front of the jacket.

The burner tube discharges jets throughout the height of the water heating coil 16 in the flue, thereby avoiding any liming effect which results from concentrating a hot flame on the bottom of the tank. This contributes to the long life of the coil and tank. Also, the distribution of the heating jets over the entire coil enables the coil, alone, to act as an instantaneous heater as soon as the stored hot water drops below the minimum temperature permitted by the thermostat. This insures a constant supply of hot water at the faucets even though the hot, stored supply is exhausted. In fact, the capacity of the storage tank may be quite small and its height much less than that of ordinary storage tanks. This greatly reduces the cost. Furthermore, the heater is a compact unit which can easily be installed by any ordinary plumber. Demonstrations have shown that it is very efficient and lime deposits in the tank are practically eliminated.

Obviously, the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and subcombinations.

What is claimed is:—

1. A combined instantaneous and storage water heater comprising, in combination, a storage tank having a vertical tube therein; a flue within and spaced from the tube; a coil of substantially uniform diameter within the flue and connected to the tank; a perforated burner tube extending through the flue and arranged to discharge jets against the coil throughout its height; means for removably supporting the burner tube in the flue; and a fuel supply pipe connected to the burner tube, said coil and burner tube being so arranged as to be removed through the upper end of the flue, a thermostatic element in the tank connected to control the supply of fuel to the burner tube.

2. A combined instantaneous and storage water heater comprising, in combination, a storage tank having a vertical flue therein; a coil within the flue and connected to the tank; a perforated burner tube extending through the flue and arranged to discharge jets against the coil throughout its height; a bracket across the upper end of the flue suspending the burner tube; union couplings at the upper and lower ends of the coil permitting it to be removed from the flue; a valve between the lower end of the coil and the tank; and a drain valve for the coil, whereby the coil may be drained independently of the tank and replaced.

3. A water heater of the class described comprising, in combination, a jacketed storage tank; a vertical pipe extending through the tank providing a central flue; a copper heating coil removably mounted in the flue and connected at its ends to the bottom of the tank and to the hot water outlet; union couplings at the upper and lower ends of the coil; valves in the pipe connections between the coil and the tank permitting it to be drained and removed without draining the tank; a perforated gas burner tube extending through the flue; means for suspending the burner tube in the flue; a gas supply pipe connected to the lower end of the burner tube; a pilot burner adjacent to the lower end of the burner tube; and temperature responsive means in the lower portion of the tank to control the supply of gas to the burner.

4. In a water heater of the class described, a jacketed storage tank having a firebox in its lower end; legs connected to the firebox; a vertical flue extending through the center of the tank; a sectional water-heating coil within the flue having union couplings at its upper and lower ends connecting it to the tank; a vent pipe having a back-draft hood removably connected to the upper end of the flue; a perforated gas burner tube extending through the flue; a bracket at the upper end of the flue suspending the burner tube; a gas supply pipe connected to the lower end of the burner tube; a pilot for the burner tube; an air vent valve in the upper end portion of the coil; a shut-off valve and a drain cock at the lower end of the coil whereby the coil may be drained independently of the tank; and a tank drain pipe below the coil connection to the lower end of the tank.

5. A water heater of the class described comprising, in combination, a vertical insulated tank; a large tube extending through the tank; a flue pipe within and spaced from the tube; a vertical heating coil mounted in the flue and connected to the bottom and top of the tank; couplings for the coil above and below the flue; a perforated burner tube extending centrally through the flue; and means for removably supporting the burner tube in the flue.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature.

FRED. W. GEYER.