May 27, 1952 W. G. G. CUDDON 2,598,111

WATER-HEATING MEANS

Filed Aug. 6, 1947

Fig. 1

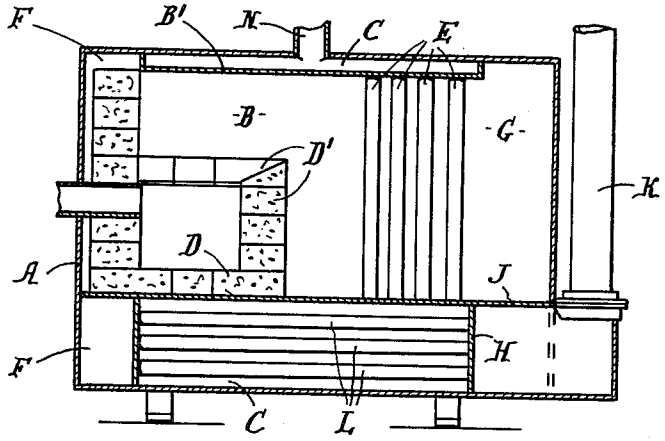


Fig. 2

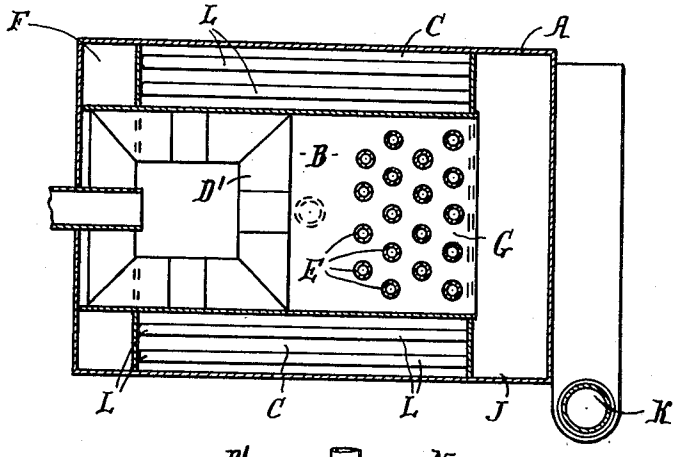
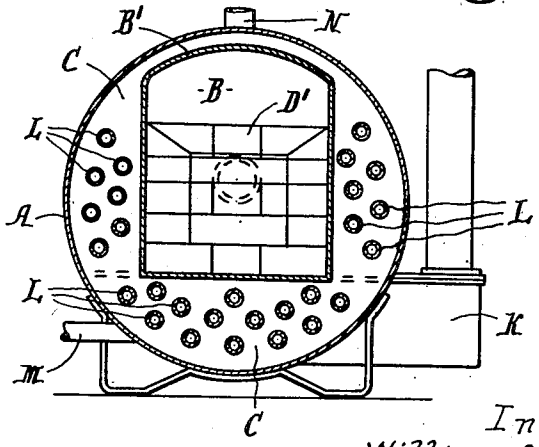


Fig. 3



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WATER-HEATING MEANS

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1 Claim. (Cl. 122—147)

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This invention relates to an improved construction of boiler designed more particularly for use in the heating of water in connection with any ordinary hot water circulating system or installation, as for instance, in the heating of buildings or other enclosed spaces or chambers, or for the supply of hot water to any particular service reticulation. The construction of boiler forming the subject of the invention may, however, by the observance of suitable provisions in its details of construction be adapted for use in the generation of steam.

The invention comprises a new construction of boiler and the combination therewith of a heating or furnace chamber specially adapted for the installation therein of an oil burner unit. The said construction provides for the heat radiation from the burner being more effectively employed in heating the water, and for the more effective circulation of the hot gases through the volume of water contained in the boiler.

In fully describing the invention, reference will be made to the accompanying sheet of drawings, in which:

Figure 1 is a longitudinal vertical section of the complete boiler.

Figure 2 is a sectional plan thereof, and

Figure 3 is a cross sectional elevation through about the middle line of the boiler, and looking towards the front end thereof.

In giving effect to the invention as shown in the drawings, the boiler A is made to extend horizontally and is preferably of cylindrical type. Extending longitudinally through it, is a heating chamber B which is so made and positioned as to provide spaces C all round between its walls and the inside of the boiler. This chamber B is formed with a crown B1 curving in conformity with the boiler wall and situated a short distance away from the boiler surface. In the forward end of the heating chamber a fire brick hearth D is constructed to rest on the chamber bottom and to extend up its two sides for a distance. The back end of the hearth is made with a raised fire bridge, D1.

This hearth space is designed to hold an oil burner of suitable nature and the heat from such burner is thus directed to act upon the crown B1 of the heating chamber and to pass up and across the fire-bridge D1 to the back end of the chamber B so that the walls and crown thereof are thus heated by the direct action of the burner. Suitable means of access are provided for attention to the burner, in the usual manner.

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Within the rear end of the chamber B a number of water tubes E are distributed over its area, such tubes passing vertically to connect the space C beneath the chamber, with that above it. The gases from the burner pass around these tubes.

The boiler casing is so designed that it encloses spaces F at its forward and rear ends, which are divided off from the water holding chamber C. This space at the rear end is also divided off into upper and lower divisions G and H by a partition J disposed at about the level of the bottom of the heating chamber B. The rear end of the heating chamber opens into this upper division G. From the rear end of the lower division H an escape flue K leads away. This is suitably positioned across the rear to provide the best draught over the heating area concerned in the boiler.

The upper part of the rear is connected to the space F at the front end of the boiler by means of a number of fire tubes which pass through the boiler length on the respective sides of the heating chamber B. The forward space, at its lower part, is connected to the lower division of the rear space by means of a number of fire tubes L which pass through within the bottom of the boiler area. Thus the heat from the heating chamber B is led by the draught into the upper division G of the rear space F, from thence through the fire tubes L along within both sides of the boiler to the front end, and then back through the fire tubes in the bottom of the boiler to the escape flue K.

If desired the fire tubes L may be baffled in a manner to provide for the heated gases being caused to travel through them to and fro along the length of the boiler any desired number of times, before passing finally to the escape flue K.

The feed water for the boiler is led into the bottom as at M and the heated water drawn away from the top as at N.

The boiler is made generally to provide the requisite facilities for servicing the various parts.

When the boiler is to be used for the generation of steam its construction will be effected in a manner to provide for such, and in accordance with established practice in these circumstances. For such purpose the boiler will be provided with a dome or other steam collecting space and the water circulating outlet N be dispensed with.

I claim:

A water heater comprising the combination with a horizontal cylindrical boiler casing, of a heating chamber disposed longitudinally within

the casing so as to provide for a water holding space extending around the bottom, the sides and the top of the chamber between it and the casing and to provide for heat spaces in the casing at the front and rear ends of the casing, a plurality of fire tubes connected to the front and rear heat spaces and extending along through the water space at the sides of the chamber within the casing, a plurality of fire tubes connected to the heat space at the front end of the casing and extending along the water space beneath the chamber to a flue escape at the rear end of the boiler casing, the heat gases from the heating chamber passing out from the rear end thereof, and then forwardly through the fire tubes at the sides of the chamber, and then rearwardly through the fire tubes below the bottom of such chamber, to the escape flue at the rear of the boiler, a hearth having raised sides and back fire bridge disposed in the forward end of the chamber, said sides and back fire bridge extending a substantial distance vertically in

said chamber, and a plurality of water tubes passing vertically through the chamber to connect the space below and above the chamber distributed over the area thereof and arranged in the chamber behind the back fire bridge.

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