

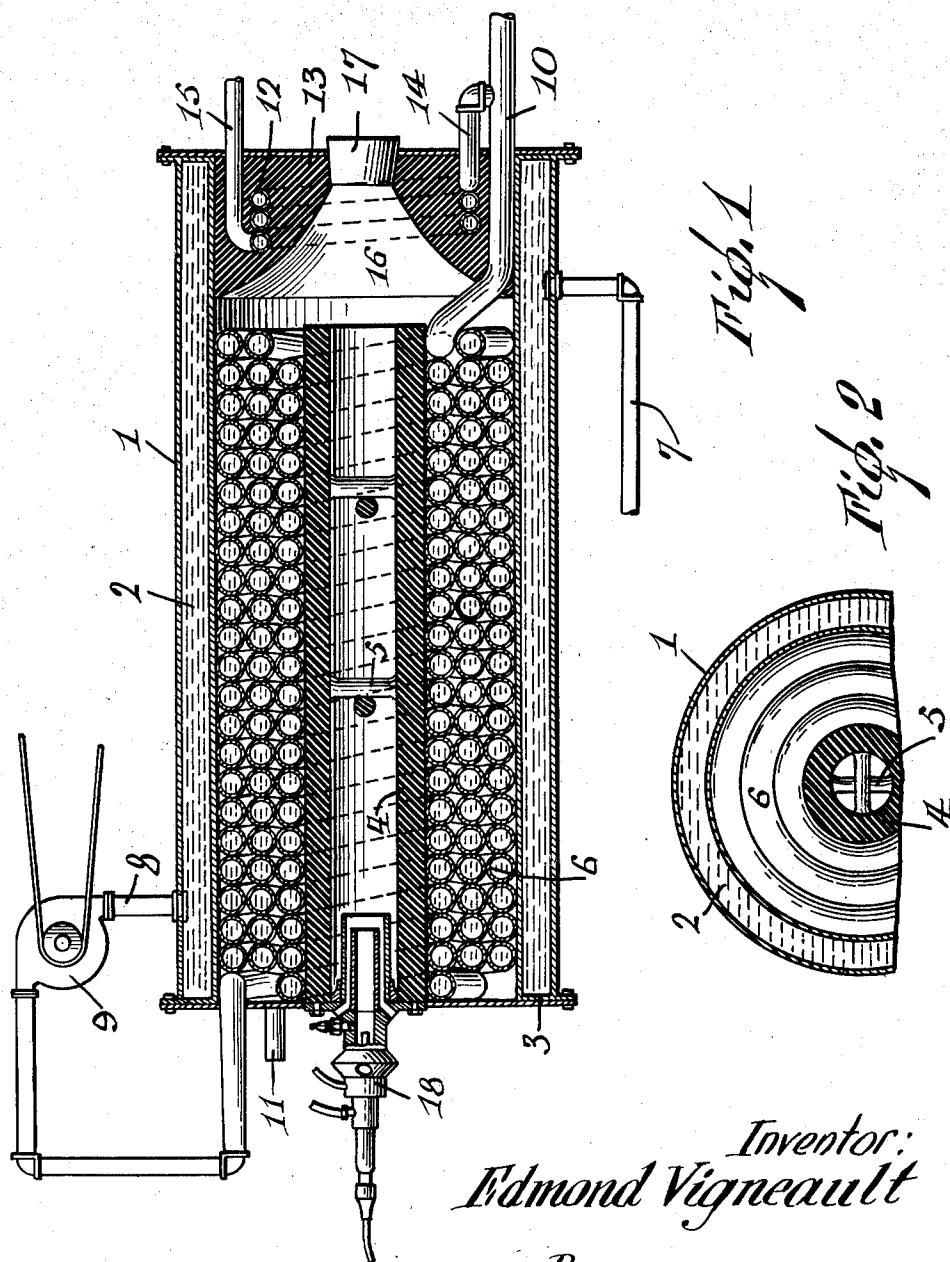
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STEAM BOILER

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STEAM BOILER

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5 Claims. (Cl. 122-248)

The present invention pertains to a novel boiler, and the principal object is to provide a simple and economical construction requiring a relatively small amount of space and having other advantages referred to herein.

The boiler according to this invention differs from the conventional boiler in not having a large water space and having a coiled water tube rather than the conventional spaced tubes. Accordingly, the device comprises an outer cylindrical wall, preferably a double-walled member, with an axial cylindrical tube of fire-resisting and heat conducting material. In the space between this tube or core and the inner wall of the double-walled member is wound the tubing in which the water is vaporized. An oil burner is inserted in one end of the core, and the latter is constructed of a material that acquires a white heat and quickly conducts the heat throughout its entire length.

The water supply is first introduced in the double-walled member where it is preheated while the device is in operation. From this member it is pumped at an elevated pressure into the coiled tubing at one end of the boiler, and is discharged in the form of steam from the other end.

At the last named end, which is opposite the oil burner, may be mounted another ceramic body in which is embedded a superheating coil. The intake of this coil is connected by a branch or by pass to the outlet of the first named coiled tubing. The other end of the auxiliary coil discharges superheated steam.

The invention is fully disclosed by way of example in the following description and in the accompanying drawing, in which

Figure 1 is a longitudinal section of the apparatus, and

Figure 2 is a fragmentary section at right angles to Figure 1.

Reference to these views will now be made by use of like characters that are employed to designate corresponding parts throughout.

As shown more clearly in Figure 1, the outer wall of the boiler is a double walled member 1 providing an annular water chamber 2 for a purpose that will presently appear. At the ends of the member 1 are heads 3 serving as end closures.

Within the member 1 is a co-axial cylindrical hollow core 4 of a suitable fire-resisting material. The core or tube 4 in the present instance is jointless and constitutes a combustion chamber. The interior thereof is preferably braced by intersecting cross bars 5, as shown in both figures.

The space between the member 4 and the inner wall of member 1 is filled with wound tubing 6. The space and the tubing are preferably of such size as to accommodate three coils superimposed one on the other in the radial direction, as shown in Figure 1.

Water is admitted to the chamber 2 by a pipe 7 and exhausted through a pipe 8 at the opposite end of the chamber. In the pipe 8 is inserted a pump 9 that discharges the water at a pressure of approximately 1200 lbs. The pipe 8 is connected to one end of the coiled tubing 6, the other end of the latter being extended at 10 through the opposite end of the boiler to the point of use in the form of steam, for an engine, turbine or any other purpose. A relief tube 11 is provided in one of the heads 3 for exhausting any fumes that may form between the coils of the tubing 6.

The core 4 and the tubing terminate short of one end of the member 1, and in this end is mounted an auxiliary coil 12 preferably received in a suitable ceramic body 13. The tube 12 has an inlet 14 branched from the extension 10 and an outlet 15 extending to the point of use. Both bodies 4 and 13 are heated by means presently to be described, and superheated steam is formed in the coil 12. The body 13 is formed with an opening 16 that tapers outwardly, and the outer, smaller end may be closed by a plug 17.

In the opposite end of the tube 4 is inserted an oil burner 18 which constitutes the subject matter of a co-pending application. The flame from the burner is projected through the tube 4 and to the body 13. If the burner is such as to evolve a substantial quantity of gas, the plug 17 should be removed.

The tube 4 consists of fire-bricks and is of such character as to maintain the heat imparted to it by the flame. It is an excellent conductor of heat and therefore distributes the heat rapidly throughout its entire length and hence to the inner coil of tubing. It also protects the tubing from the direct action of the flame. The member 4 is normally heated to a white heat sufficient to preclude the formation of carbon on its surfaces and between the windings of tubing 6.

In the operation of the device, the water admitted at pipe 7 is pre-heated in the chamber 2 before entering the tubing 6. Thus, the double-walled member 1 is a water jacket that advantageously utilizes considerable heat that would otherwise be lost through the outer walls of the apparatus.

The capacity of the apparatus in terms of rate of steam production is considerably greater than

in an ordinary flue boiler of equivalent size or, conversely, a desired quantity of steam may be generated by the invention in a much smaller and less expensive apparatus than would ordinarily be required. Another advantage of the invention is that steam may be produced almost instantaneously without a comparatively large water reserve as in ordinary boilers. Further, the danger of explosion is not very great because of the tubular construction; and if an explosion should occur, it would be rather insignificant because of the comparatively small diameter of the tubing 6.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claims.

What I claim is:

1. A boiler comprising a double-walled member forming a water chamber between its walls, a tube of fire-resisting material mounted lengthwise in said member, tubing coiled in the space between said tube and the inner wall of said member, means for admitting water to said chamber, a water connection from said chamber to one end of said tubing, a water outlet at the other end of said tubing, and means for heating the interior of said tube, a ceramic body mounted in said wall adjacent to one end of said tube, a super-heating coil embedded in said body, said coil having an inlet connected to the outlet of said tubing.
2. A boiler comprising a double-walled member forming a water chamber between its walls, a tube of fire-resisting material mounted lengthwise in said member, tubing coiled in the space between said tube and the inner wall of said member, means for admitting water to said chamber, a water connection from said chamber to one end of said tubing, a water outlet at the other end of said tubing, a pressure-raising pump in said water connection, and means for heating the interior of said tube, a ceramic body mounted in said wall adjacent to one end of said tube, a super-heating coil embedded in said body,

said coil having an inlet connected to the outlet of said tubing.

3. A boiler comprising a double-walled member forming a water chamber between its walls, a tube of fire-resisting material of substantial thickness mounted lengthwise in said member, tubing coiled in the space between said tube and the inner wall of said member, means for admitting water to said chamber, a water connection from said chamber to one end of said tubing, a water outlet at the other end of said tubing and means for heating the interior of said tube, a ceramic body mounted in said wall adjacent to one end of said tube, a superheating coil embedded in said body, said coil having an inlet connected to the outlet of said tubing.

4. A boiler comprising a double-walled member forming a water chamber between its walls, a tube of fire-resisting material mounted lengthwise in said member, intersecting bracing bars in said tube, tubing coiled in the space between said tube and the inner wall of said member, means for admitting water to said chamber, a water connection from said chamber to one end of said tubing, a water outlet at the other end of said tubing, and means for heating the interior of said tube, a ceramic body mounted in said wall adjacent to one end of said tube, a superheating coil embedded in said body, said coil having an inlet connected to the outlet of said tubing.

5. A boiler comprising a double-walled member forming a water chamber between its walls, a tube of fire-resisting material mounted lengthwise in said member, tubing coiled in the space between said tube and the inner wall of said member, means for admitting water to said chamber, a water connection from said chamber to one end of said tubing, a water outlet at the other end of said tubing, and means for heating the interior of said tube, a ceramic body mounted in said wall adjacent to one end of said tube, a superheating coil embedded in said body, said coil having an inlet connected to the outlet of said tubing, said body having a cavity permitting access to said tube, and a plug in the outer end of said cavity.

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