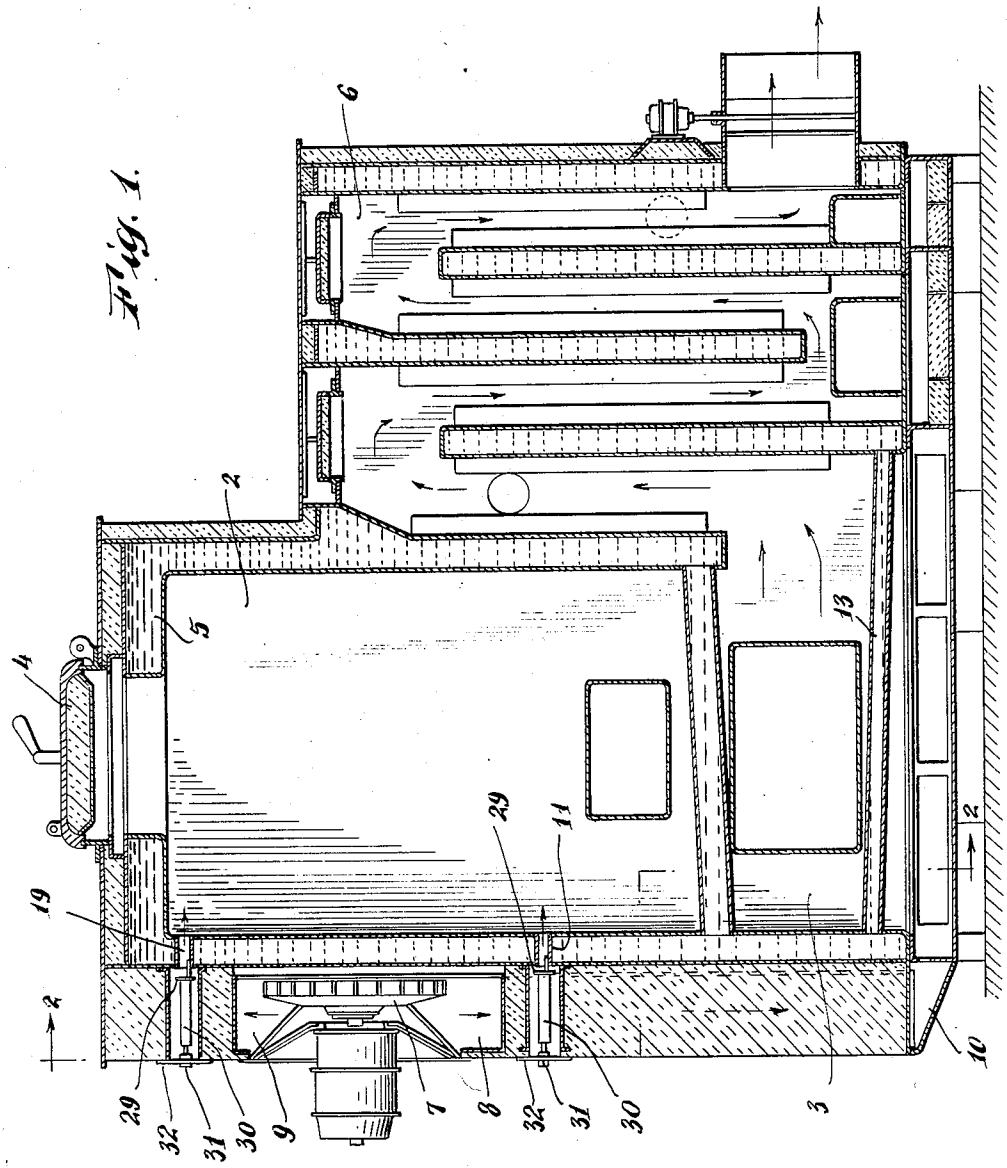
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BOILER

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Fig. 1.



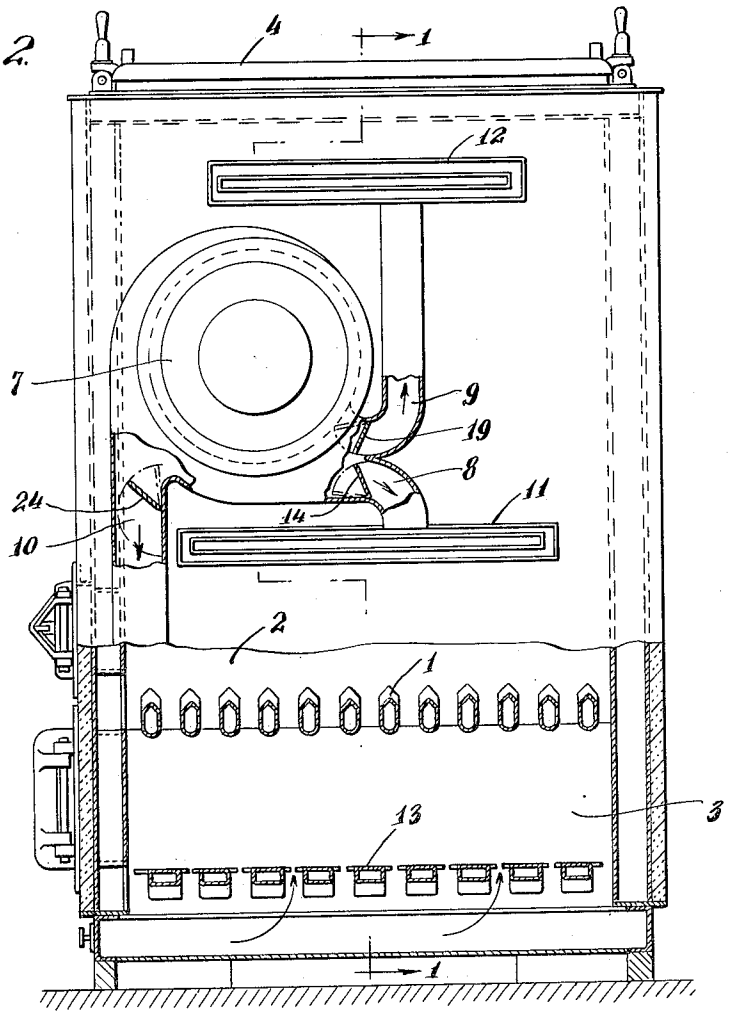
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Fig. 2.



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BOILER

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Application August 30, 1945, Serial No. 613,619
In Sweden October 27, 1944

2 Claims. (Cl. 122—371)

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The present invention relates to improvements in hot water boilers provided with a furnace.

The principal object of the invention is to provide a furnace divided into an upper and a lower combustion chamber and surrounded by a water jacket. According to this feature of the invention, a main heating room at the rear of the furnace is provided with water channels which communicate with the water jacket, and a fan is provided for supplying combustion air under pressure to the upper and the lower combustion chamber at different levels. The upper combustion chamber is arranged for inverse combustion of solid fuel and to serve as a fuel magazine. In this way the fuel magazine will be set under pressure and unburnt gases will be prevented from accumulating in the fuel magazine at the same time as the combustion air will be preheated when flowing downwards.

This and other objects and features of the invention will become more apparent from the description which follows with reference to the accompanying drawings showing an embodiment of a hot water boiler in which:

Fig. 1 is a section of the boiler along the line 1—1 in Fig. 2, while Fig. 2 is a section along the line 2—2 in Fig. 1.

The furnace is subdivided by means of grate 1 into an upper combustion chamber 2 and a lower combustion chamber 3. The furnace is provided with an opening 4 at the top thereof adapted to be used when firing the upper combustion chamber 2 which thereby serves simultaneously as a fuel magazine. The walls of both combustion chambers are provided with a water jacket 5 communicating with the water channels of the main heating room 6. A fan 7 supplies combustion air under pressure to the upper combustion chamber through ducts 8 and 9 and to the lower combustion chamber through duct 10. The air leaves ducts 8 and 9 through slits 11 and 12, placed respectively in the upper and substantially medial parts of chamber 2, while duct 10 leads the air to a position below chamber 3 into which it enters through grate 13 at the bottom thereof. Slits 11 and 12 may be shaped as spreader nozzles arranged to spread the air out fanwise in the side extension of chamber 2.

The duct 10 may be extended below grate 13 in such a manner that a stream of air meets the combustion gases flowing through grate 1 at an angle. Grates 1 and 13 are preferably inclined respectively upwards and downwards away from the front wall of the furnace, the purpose being to provide thermosiphon circulation from the

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water channels of the main heating room 6 through grate 13, then up through the front wall of chamber 3 and grate 1 to the rear wall of chamber 2.

The air supply duct 8 is regulated by means of a damper 14, while the air supply duct 9 is governed by means of a damper 19, and the duct 10 leading to the lower combustion chamber is provided with a damper 24.

The dampers are in each case so disposed that they tend to take up their natural operative position according to whether the fan is operated or uncoupled.

A furnace according to the invention has the advantage that it may be operated either with or without stoking. If no stoking is desired, combustion takes place in chamber 2, substantially in the lower part thereof, hence inverse combustion, and additional air supplied below grate 13 meets the combustion gases passing through grate 1 into chamber 3. In this case, no fuel is provided in the lower chamber 3, and the upper chamber 2 serves both as a magazine and as a combustion chamber.

If on the other hand the furnace is to be stoked in the usual manner, no fuel is provided in the upper chamber 2 and combustion takes place in the lower chamber 3.

The invention is obviously not limited to the embodiment herein shown and described but may be varied in a great many ways without departing from the idea of the invention.

What I claim is:

1. A hot water boiler having in combination a furnace, a first water-cooled grate dividing said furnace into an upper chamber and a lower chamber, the lower part of said upper chamber being arranged for inverse combustion of solid fuel, and the upper part of the said upper chamber being arranged to serve as a fuel magazine, a second water-cooled grate arranged in the lower chamber adjacent to but spaced from the lower end thereof, a water jacket surrounding said furnace, a main heating room at the rear of said furnace, water channels in said main heating room communicating with said water jacket, said first grate being inclined upwardly towards the rear of said furnace and the second grate downwardly towards the rear, both of said grates communicating respectively the first at the front and rear with said water jacket, and the second at the rear with the first water channel of said main heating room and at the front with said water jacket, whereby a natural thermosiphon is provided for circulation of water through said grates,

jacket, and channels, an impeller fan for supplying combustion air under pressure to said upper and lower chambers, ducts and spreader nozzles extending from said fan and communicating with the upper part of the upper chamber and below the center thereof, and a duct extending from said fan and opening into the space defined by the second grate and the lower end of the furnace for supplying air under pressure upwardly through the said second grate to comingle with the combustion gases flowing downwards from the upper combustion chamber through said first mentioned grate into the lower chamber and for combustion of solid fuel falling down on the second grate.

2. A hot water boiler comprising a furnace, a first water-cooled grate dividing said furnace into an upper chamber and a lower chamber, a second water-cooled grate disposed in said lower chamber adjacent to and spaced from the lower end thereof, a water jacket surrounding said furnace, a main heating chamber at the rear of said furnace and opening into said lower chamber of the latter, water channels in said main heating chamber communicating with said water jacket, said first grate being inclined upwardly towards the rear of said furnace and said second grate being inclined downwardly towards the rear of said furnace, said first grate communicating at its front and rear ends with said water jacket and said second grate communicating at its front end with said water jacket and at its rear end with the foremost of said water channels, and means for supplying air under pressure to said

furnace including an impeller fan, duct means extending from said fan and opening into said upper chamber through spreader nozzles at the top and below the center thereof, and duct means extending from said fan and opening into said lower chamber below said second grate for supplying air under pressure upwardly through said second grate to comingle with the combustion gases flowing downwards from the upper combustion chamber through said first grate and for combustion of solid fuel falling down on said second grate.

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