Oct. 26, 1965 S. V. JAKOBSSON 3,213,832

DOUBLE FIRED HEATING BOILER

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Fig.1

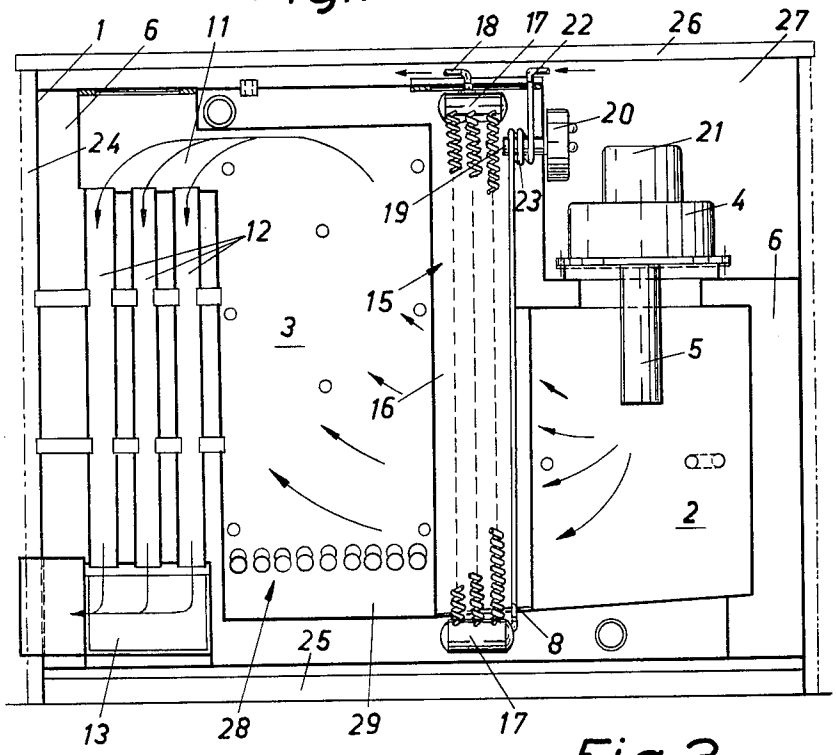
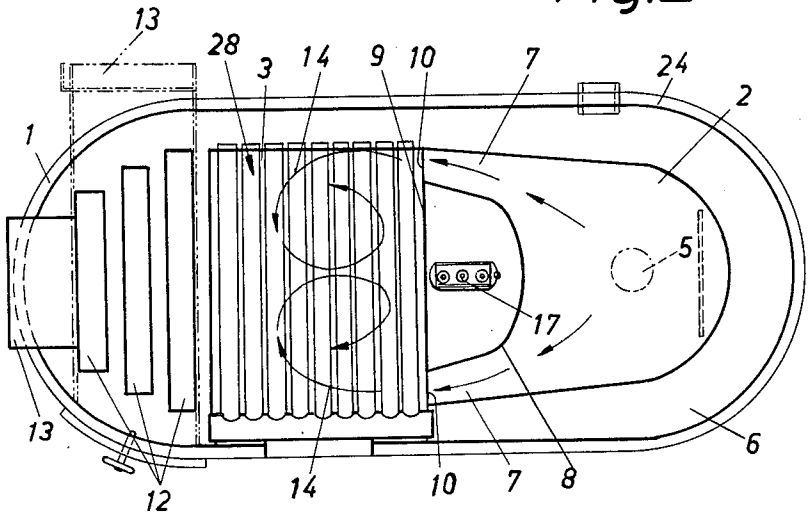


Fig.2



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DOUBLE FIRED HEATING BOILER

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3 Claims. (Cl. 122—2)

My invention has reference to a heating boiler with a combustion chamber for gaseous or liquid fuels and a furnace for solid fuels, such fuels being, for example, coal, wood, garbage, etc., said combustion chamber housing a burner assembly with a vertically downwards directed burner jet and from the upper end of the essentially vertical furnace for the solid fuels there being one or several gas channels extending down through the water compartment.

The main feature of the invention is to be seen in a vertical, separate portion, communicating with the lower and upper portions of the water compartment, said separate portion being situated between the combustion chamber and the furnace and having such dimensions as to cause the flue gases from the combustion chamber to the furnace to pass through passages on both sides of and beyond said vertical water compartment portion. Due to this construction the heating boiler will have, in spite of its small external dimensions, a great heat transmitting surface and its efficiency will be astonishingly high. The heating boiler will be well adapted to be used especially in houses and villas without cellars where it might be located in a laundry room or a bath room without requiring any considerable space.

When the boiler—as is the case almost without exception—is provided with a hot-water heater, it is according to a preferred embodiment of the invention advisable to arrange the hot-water heater in said vertical water compartment portion, the sensory body of the thermostat projecting into said water compartment portion. Due to the position of the vertical water compartment portion there is obtained a very fast heating of the water in the same which in turn results in a fast heating of the water in the hot-water heater and in a maintaining of the water in the same at a high temperature.

According to another embodiment of the invention a tube sling of the cold water conduit encloses the sensory body of the thermostat which is enclosed in the boiler water in said vertical water compartment portion. An advantage of this embodiment is to be seen therein that the burner assembly is started every time hot-water is required, i.e., every time a hot water tap is opened.

An example of a device in accordance with the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 shows a vertical longitudinal section through a heating boiler according to the invention, and

FIG. 2 shows a horizontal section through the same.

1 denotes the outer sheet mantle of the heating boiler, 2 the combustion chamber for liquid fuel, e.g., fuel oil of a certain quality, 3 the furnace for solid fuels, and 4 the burner assembly which with advantage is of the high pressure type. The burner assembly 4 is at its lower portion provided with a vertical burner tube 5. The radiation energy from the burner jet is transmitted to the surrounding water compartment or mantle 6. The flue gases are forced to stream from the combustion chamber 2 through channels 7 on both sides of a vertical portion 8 of the water compartment. This vertical portion 8 communicates at its upper and lower parts with the water compartment 6. One wall 9 of such vertical portion 8

simultaneously forms one of the walls of the furnace 3. From the upper end of the latter and opposite the outlets 10 of the gas channels 7 into the furnace 3 there starts a flue gas exhaust or outlet 11 which with three parallel channels 12 extends through the water compartment 6 and discharges in a horizontal channel 13 connecting the heating boiler with the chimney.

Due to this construction the flue gases will have to follow a long path through the boiler. At the passage through the channels 7, the flue gases will be somewhat compressed which increases their speed. As indicated by the arrows 14 in FIG. 2 the result of passing the flue gases in two streams into the furnace 3 along two opposite walls of the same will be that the gas streams will be forced to stream upwards in a helical path to the outlet 11 while continuously changing direction. Each time the flue gases abut against a wall of the water mantle and are forced to change direction, the gas stream is delivering some of its heat. When the flue gases reach the chimney, their temperature will be only about 100–200° C.

In the vertical portion 8 of the water chamber 6 there is arranged a hot-water heater 15 which according to the shown embodiment is of a so called combined type, i.e., it is provided with a tube battery as well as with two stores 17. The tube battery 16 has such a length—the total tube length normally exceeds 110 yards—that it ensures a practically constant temperature of the hot-water escaping through the conduit 18. At a temperature of 80° C. of the boiler there are produced say 250 gallons of hot water per hour with a temperature of 55° C.

Into the water compartment portion 8 there projects the sensory body 19 of the boiler thermostat 20 which can be adjusted in such a way that the motor 21 of the burner assembly is automatically started when the temperature of the water decreases to say 75° C. and is stopped when the temperature of the boiler water exceeds, e.g., 80° C. The conduit 22 for feeding cold water to the hot-water heater 15 is with a tube sling 23 laid around the sensory body 19.

An advantage in this device is to be seen therein that in case the boiler water has a temperature of about 78° C. and the motor of the burner assembly 4 is not started but nevertheless hot water is taken out from the conduit 18 the cold water stream passing through the tube sling 23 will cool the sensory body 19 to such a degree that the motor 21 is immediately started by the thermostat 20. The water in the vertical water chamber portion 8 will then by the hot gas stream surrounding this portion quickly be heated and thus ensure the obtaining of a high temperature of the hot water in the conduit 18.

The heating boiler is externally well insulated. Outside the sheet mantle 1 there is arranged an insulating layer 24 preferably comprising glass fibres and below the boiler bottom there is further arranged an extra insulating air layer 25. The boiler is at its upper portion provided with a pivoted cover 26 protecting all the control means, such means comprising the thermostat 20, a hygrometer, heat regulators, the connecting and disconnecting devices for the high pressure burner assembly 4 etc., in a space 27 above the combustion chamber 2. The grate 28 of the furnace 3 is water cooled.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims. Thus, the different details of the heating boiler may be constructively modified in many ways within the scope of the appended claims. The channels 7 extend according to the shown embodiment so far down into the boiler that the flue gases through the channels 7 will sweep over the grate 28. The

tube sling 23 about the sensory body 19 of the thermostat 20 may be replaced by a double mantled sleeve connected to the conduit 22 and enclosing the sensory body, the cold water passing through said sleeve. It is also possible to use a burner assembly intended for the combustion of gas.

What I claim is:

1. A double-fired boiler comprising a combustion chamber for fluid fuel, a furnace for solid fuel disposed alongside and extending above said combustion chamber, a directly heated common water pilot enclosing said combustion chamber and said furnace, said furnace having oppositely positional vertically disposed lateral walls and a vertically disposed transverse wall extending between said lateral walls at one end thereof, said combustion chamber having oppositely positioned vertically disposed lateral walls and a vertically disposed U-shaped transverse wall arranged between said lateral walls of the combustion chamber and cooperating therewith to form two vertically extending outlet passages for respectively discharging flue gas from said combustion chamber into the lower position of said furnace along said lateral walls of the furnace, and said transverse wall of the furnace and said U-shaped transverse wall of the combustion chamber cooperating with each other to provide therebetween a vertically extending water compartment communicating at its upper end with the upper portion of the water jacket and its lower end with the lower portion of the water jacket, and an indirectly heated water heater extending vertically in said water compartment.

2. A double-fired boiler according to claim 1, which includes a cold water inlet tube for said water heater, a fluid fuel burner mounted on said combustion chamber, and a thermostat including a sensory element projecting into said water compartment in association with said cold water inlet tube for controlling the operation of said fuel burner.

3. A double-fired boiler according to claim 2, in which said cold water inlet tube is wrapped around said sensory element in the form of a sling.

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