

May 16, 1944.

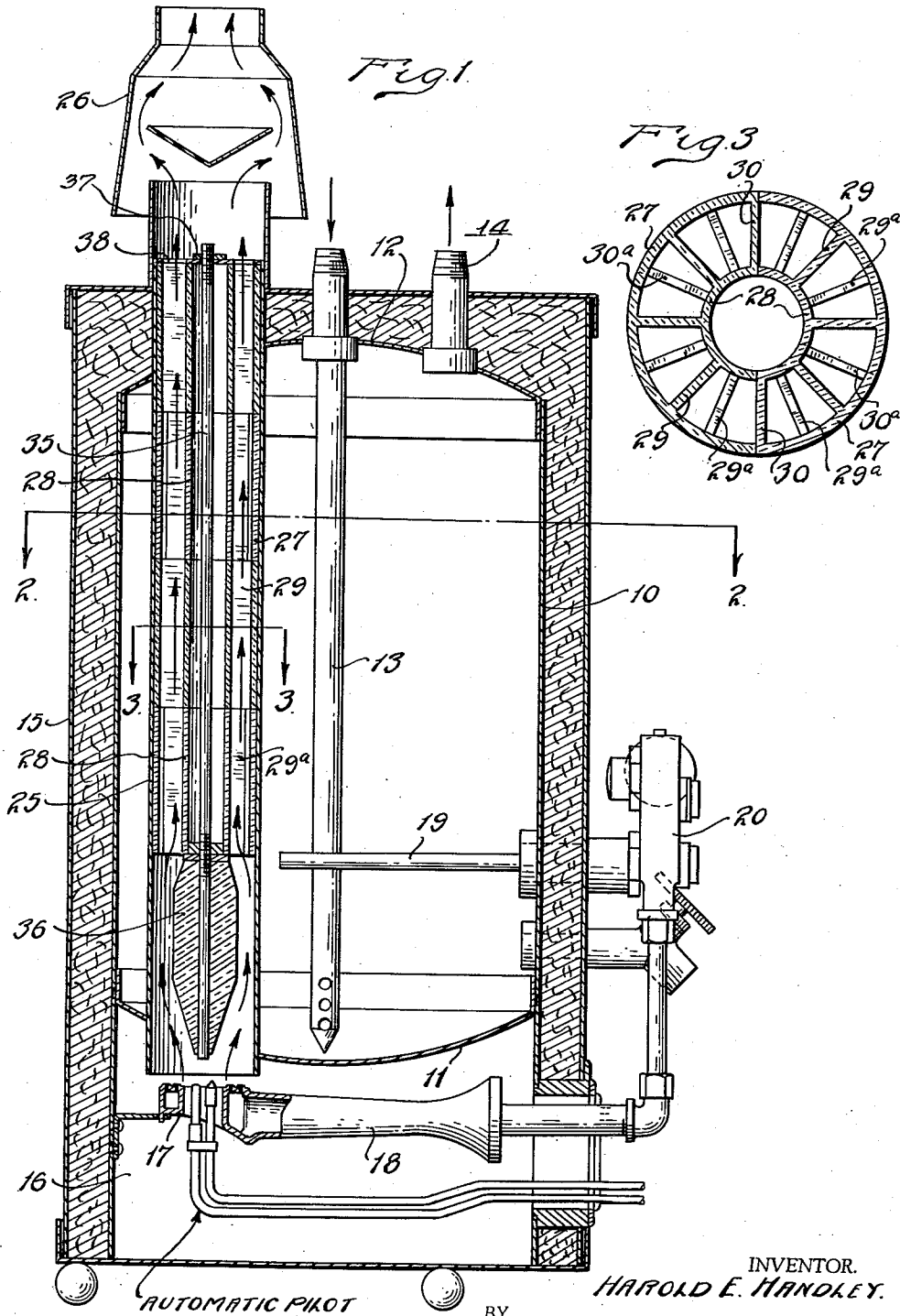
H. E. HANDLEY

2,348,901

WATER HEATER

Filed July 11, 1941

2 Sheets-Sheet 1



AUTOMATIC PILOT

BY

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ATTORNEYS.

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Fig. 2.

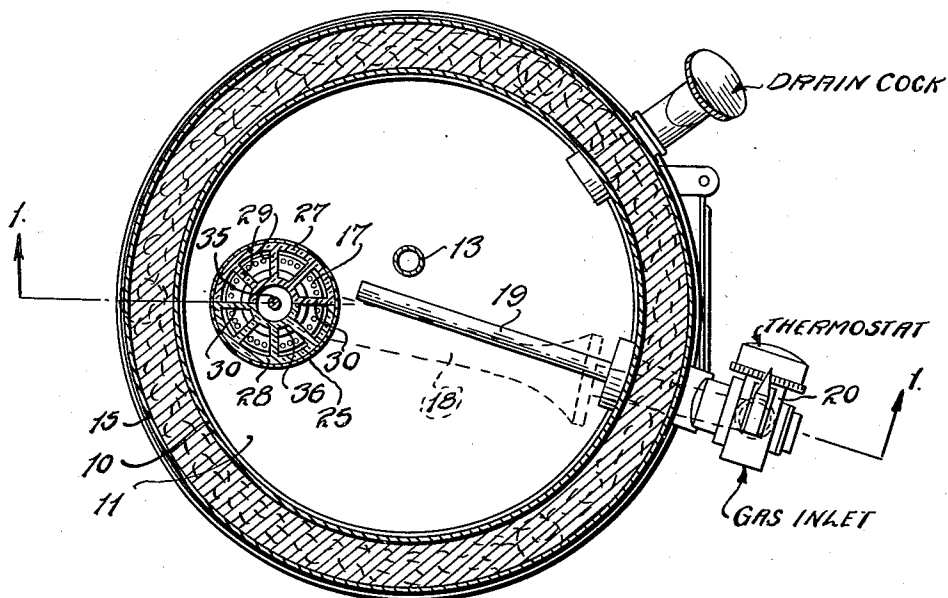
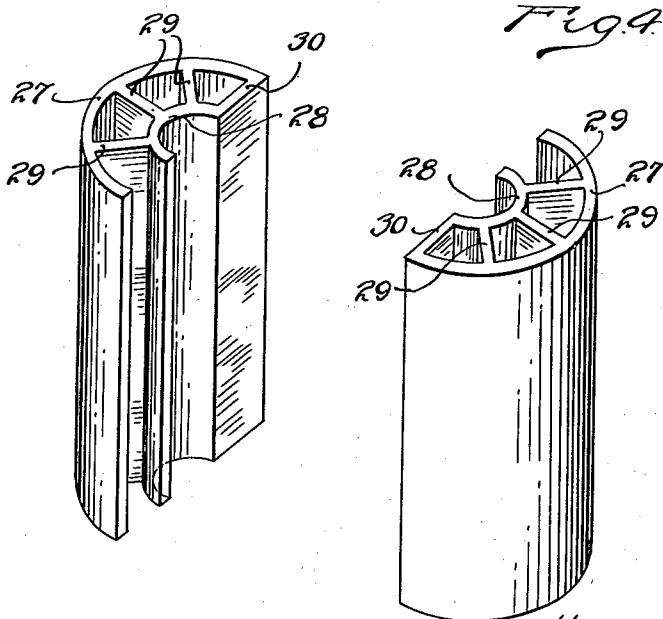


Fig. 4.



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UNITED STATES PATENT OFFICE

2,348,901

WATER HEATER

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Application July 11, 1941, Serial No. 402,043

6 Claims. (Cl. 138—38)

This invention relates to water heaters.

It is an object of the present invention to provide an efficiently constructed water heater in which the problems of condensation are solved without the usual elaborate designs.

A further object of the invention has to do with the provision of a novel flue arrangement which takes heat from the burner gases and transmits it to the water to be heated.

Other objects and features of the invention, having to do with details of construction of the baffles and the assembly, will appear as the description proceeds.

In the drawings:

Fig. 1 is a vertical section through the tank 15 taken on line 1—1 of Fig. 2.

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section of the flue tube taken on line 3—3 of Fig. 1.

Fig. 4 shows respective views of portions of the flue tube illustrating the manner in which it is constructed.

In the drawings, a tank 10 has a bottom 11, a top 12, an inlet pipe 13 and an outlet pipe 14. A suitable casing 15 with insulation surrounds the tank leaving a chamber 16 at the bottom in which is housed a burner 17 with a supply pipe 18. 19 is a thermostat. A suitable control mechanism is shown diagrammatically at 20. Extending through the tank 10 and projecting from each end thereof is a tube 25 of relatively thin heat conducting corrosive resistant metal. The inside of this tube is sealed from the water tank. The tube is positioned directly over the burners 17 and has a diameter slightly greater than the burner. At the top of the tube a flue shield 26 is provided.

Within the tube cast iron baffles are provided. These baffles are shown in Fig. 4 as composed of outer half cylinders 27 and inner half cylinders 28 connected by radial webs 29. The webs indicated at 30 are arranged to contact with the open edges of the half cylinders of an adjacent baffle, to close the segmental space between the web 30 and the next web 29. The two baffles indicated in Fig. 4 form a cylinder which has an outer diameter equal to the inner diameter of tube 25. Eight of these baffles are arranged in stacked relation within the tube 25 and each tier of baffles is rotated relative to the adjacent tiers so that the greatest possible contact with flue gases will be obtained. This is illustrated in Fig. 3 which is a section of Fig. 1 looking down on two tiers of baffles. The webs shown at 29

and 30 are in section and the webs shown at 29a and 30a are those of the baffle immediately below the sectioned baffle.

It will be noted that each baffle is actually semi-circular in cross section so that when placed together the end baffles 30 are located on opposite sides of a diametric line, as illustrated particularly in Fig. 3.

A rod 35 passes down through the center cylinder formed by the baffles, the lower end being embedded in a ceramic or refractory cylinder and cone 36 located in the lower end of tube 25 directly above the burner. The top of rod 35 is held by a nut 37 contacting a spanning member 38 fastened to the top of tube 25. The cone 36 closes the lower end of the inner baffle cylinder.

In the operation of the heater, the flame of the burner impinges directly on the refractory insert 36 and produces a sufficiently high temperature on the inner surface of tube 25 that condensation is eliminated. The heat in this area is so intense that it is beyond the conductivity of the tube. The baffles then take the flue gases, and, through the great surface contacted, remove the heat therefrom and conduct it to the tube 25 where the water absorbs it. No condensation products are allowed to come in contact with the direct heating surface since the baffles, through the cylinders formed thereby, effectively seal the inner surface of tube 25 from the flue gases.

I claim:

1. A baffle construction for the heater tube of a domestic water heater, including a series of baffles in said tube, each comprising two concentric half cylinders of cast iron joined by a plurality of radial webs and arranged in pairs in stacked relation with the webs of each tier of baffles being arranged at angles with adjacent baffles, and a refractory body suspended from said baffles in contact with the inner cylinder formed thereby and concentric with said tube.

2. A baffle construction for the heater tube of a domestic water heater, including a series of baffles in said tube, each comprising two concentric half cylinders of cast iron joined by a plurality of radial webs and arranged in pairs in stacked relation with the webs of each tier of baffles being arranged at angles with adjacent baffles, and a refractory body suspended from said baffles in contact with and closing the lower end of the inner cylinder formed thereby and concentric with said tube.

3. A baffle construction for a domestic water heater, comprising a series of baffles in a tube, each comprising two concentric half cylinders of cast iron joined by a plurality of radial webs and arranged in pairs in stacked relation with the webs of each tier of baffles being arranged at angles with adjacent baffles, and a refractory body suspended from said baffles in contact with and closing the lower end of the inner cylinder formed thereby and concentric with and within said tube directly above the heating element of the heater.

4. A baffle construction for a domestic water heater, including a series of baffles in a tube, each comprising two concentric half cylinders of cast iron joined by a plurality of radial webs and arranged in pairs in stacked relation with the webs of each tier of baffles being arranged at angles with adjacent baffles, and a refractory body suspended from said baffles and concentric with said tube directly above the heating element

of the heater, the outer dimensions of the body being larger than the diameter of the inner cylinder formed by said baffles.

5. A baffle construction for a domestic water heater, comprising a thin metal tube, and a series of baffles in said tube each comprising concentric cylinders of cast iron joined by a plurality of radial webs, said cylinders being arranged in tiers and in rotated relation whereby the radial webs of each vertically adjacent baffle are angularly spaced.

6. A baffle construction for a domestic water heater, comprising a thin metal tube, and a series of baffles in said tube each baffle comprising two concentric half cylinders of cast iron material joined by a plurality of radial webs and arranged in horizontal pairs in stacked relation with the webs of each pair of baffles being arranged at angles with vertically adjacent baffles.

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