July 28, 1936. C. E. BRONSON 2,049,153

SUBMERGED WATER HEATER FOR BOILERS

Filed Feb. 13, 1936

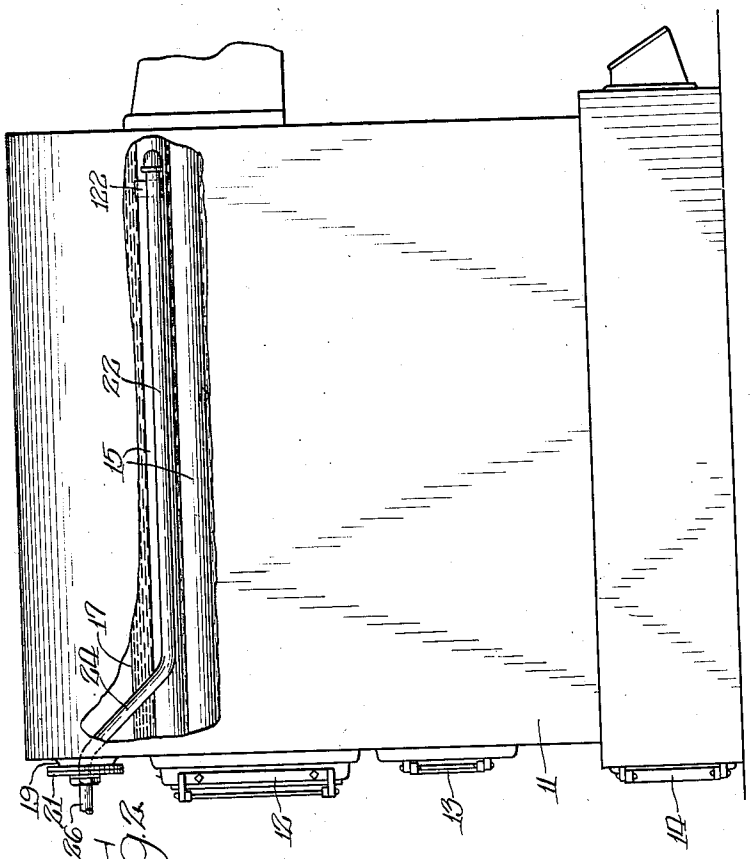


Fig. 2.

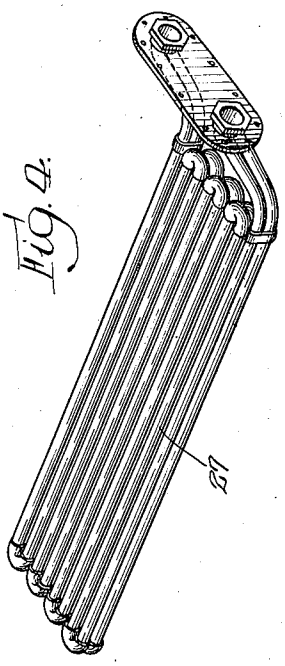


Fig. 4.

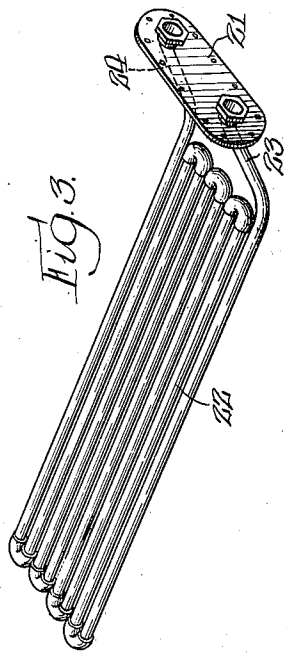


Fig. 3.

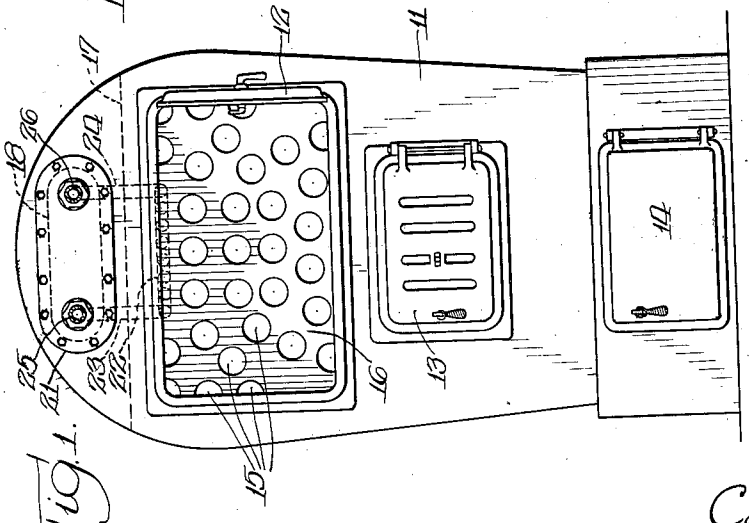


Fig. 1.

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SUBMERGED WATER HEATER FOR BOILERS

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Application February 13, 1936, Serial No. 63,687

3 Claims. (Cl. 122—32)

My invention pertains to certain features of novelty and betterment in boilers and relates more particularly to water-heating coils in the boilers, such, for example, as are employed for the supplying of hot water for domestic or other purposes.

An aim of the invention is the provision of an appliance of the specified character in which the parts are so formed and related to one another that the structure possesses substantial and material advantages in simplicity of construction, economy in production, ease of assembly, and, more especially, efficiency in operation.

To the attainment of these and other desirable objects and purposes, the tubes of the boiler through which the hot products of combustion flow are so positioned with reference to one another not only to secure marked and outstanding efficiency in the operation of the boiler, but also with their upper ones, just below the water-line of the boiler, spaced apart sufficiently to accommodate the water heating coils which at their front ends are associated or joined with a higher supporting plate or member.

Such spacing or separation of the tubes permits the heating coil either to be located in the space indicated or the provision of such space allows the coil to be otherwise satisfactorily positioned.

That is to say, the water-heating coil need not necessarily actually and completely occupy such space, but the latter, nevertheless, permits the coil to be located in a position which it could not otherwise occupy.

To enable those acquainted with this art to understand the new invention, both from structural and functional standpoints, a present preferred embodiment of the same is illustrated in the accompanying drawing forming a part of this specification and to which reference should be had in connection with the following detailed description, like reference numerals being employed to designate the same parts of the structure throughout the several views.

In this drawing:—

Figure 1 is a front view of a boiler equipped with the present invention and with one of its doors open;

Figure 2 is a side view of the boiler partly broken away to reveal a portion of its interior construction and with the specified door in closed position;

Figure 3 is a perspective view of one type of heating-coil assembly for use in the boiler; and

Figure 4 is a similar presentation of a slightly different or modified form of water-heating coil.

Referring to the views of the drawing, it will be noted that the front wall 11 of the boiler has the usual or a suitable number of hinged doors 12, 13 and 14 of which the uppermost one 12 is illustrated in open position in Figure 1 disclosing the plurality or multiplicity of flues or tubes 15 grouped in the manner shown and extended through the common front-head or tube-sheet 16, the internal structure of the boiler being of more or less standard or any suitable construction except for the arrangement and disposition of the tubes 15 which are arranged to leave a space in the transverse central part of the boiler between the tubes of the topmost row, all as is clearly shown in Figures 1 and 2, the water-line or water-level above these tubes being indicated by the dotted line 17.

Above such water-level line, the front plate or wall 11 has an aperture 18 therethrough accommodating a suitable frame 19 to which is screwed or bolted a plate 21 forming the front of, and constituting one main supporting member of, the heating-coil assembly, comprising in addition to such plate a single-row metal pipe-coil 22 having upwardly-sloping tubular terminals 23, 24, mounted in any approved manner on the plate 21 as in the usual way indicated in Figure 3. The opposite end of the heating-coil is supported in any convenient manner as by an appropriate member 122 mounted on the tubes.

The construction is such that when the heating-coil-assembly is in place, plate 21 covers and closes the opening through the frame 19 and the coil proper 22 occupies horizontally the space between tubes of the upper row, all such tubes, and the heating-coil proper of course, being below the water-level, whereby the water in the boiler is heated in the usual way by the hot combustion gases flowing through the tubes and the water in the boiler heats the contents of the coil.

A cold water inlet or admission pipe 25 is connected to one of the terminals 23 or 24 and a hot-water discharge-pipe 26 is joined to the other terminal, whereby the water to be heated enters the submerged coil through the inlet-pipe and after being properly raised in temperature by the surrounding hot water in the boiler is delivered to point or points of consumption through the delivery pipe, all as will be readily understood.

Instead of using a coil-assembly with a single row of pipes connected together, as illustrated in Figure 3, a similar coil 27, as shown in Figure

4, composed of a double row of pipes suitably joined together in series relation may be employed.

From the foregoing description and the accompanying illustrations in the drawing, it will be apparent that the water-heating coil is located just below the water-level in the boiler, this being the locality where the boiler water temperature is the highest, such placing of the coil in this most advantageous position being rendered possible by the spacing of the uppermost tubes in the manner fully shown.

The transfer of heat from the water in the boiler to the water in the coil creates a desirable circulation of the boiler water due to the fact that the colder water, by reason of the convection currents created, descends toward the bottom of the boiler and the water of higher temperature rises to the top.

It has been found that greater heat transmission results when the heating-coil is located just below the water-level and it is for this reason that the tube separation or spacing has been resorted to in order to accommodate the heating-coil in the situation depicted.

Those skilled in this art will readily understand that the invention is not limited and restricted to the precise and exact features of construction presented hereinabove and that various modifications may be resorted to without departure from the substance or spirit of the invention claimed hereinafter and without the sacrifice or loss of the substantial benefits and advantages accruing from its employment.

I claim:

1. The combination of a boiler having a plurality of tubes for the flow of the hot combustion gases therethrough with the uppermost tubes spaced apart substantially horizontally for the accommodation of a water-heating-coil, a water-heating-coil at least in part in said space, said uppermost tubes and said coil being below the water-level in the boiler, means to admit the water to be heated into said coil, and means to deliver the heated water from said coil.

2. The structure presented in claim 1 in which a wall of the boiler has an aperture therethrough at a higher elevation than the water-level in the boiler, in combination with a plate secured in position closing said aperture, and in which structure said means to admit the water into said coil and to deliver it therefrom comprise upwardly-directed pipes connected to the ends of said coil and mounted on said plate.

3. The structure presented in claim 2 in which a wall of the boiler has an aperture therethrough at a higher elevation than the water-level in the boiler, in combination with a plate secured in position closing said aperture, and in which structure said means to admit the water into said coil and to deliver it therefrom comprise upwardly-directed pipes connected to the ends of said coil and mounted on said plate.

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