May 4, 1937. D. CONEKIN 2,079,546

STEAM AND HOT WATER BOILER

Filed June 24, 1936 2 Sheets-Sheet 1

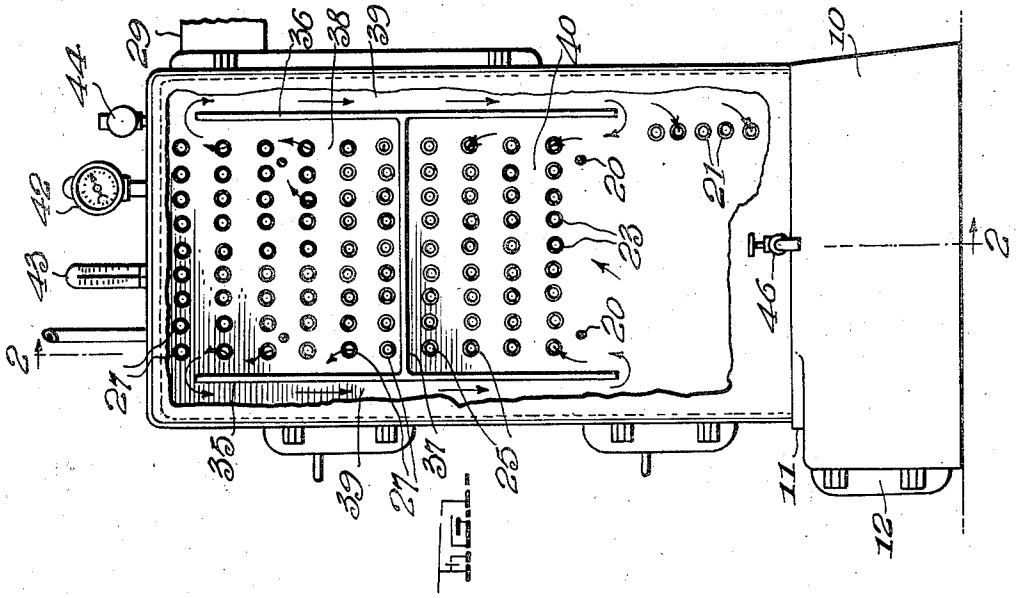


FIG. 1

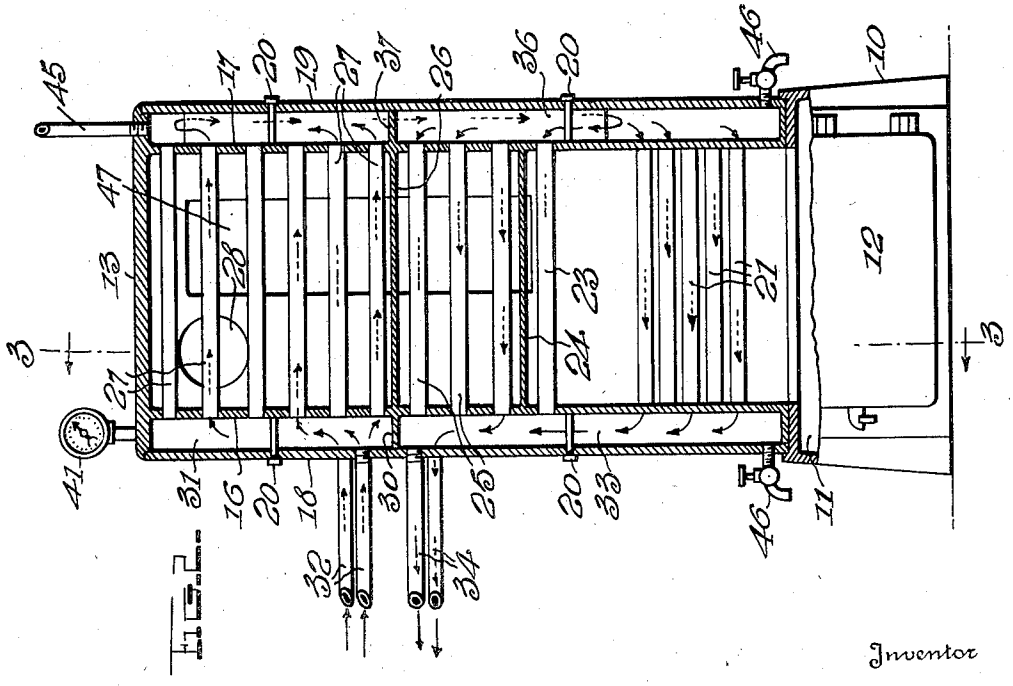


FIG. 2

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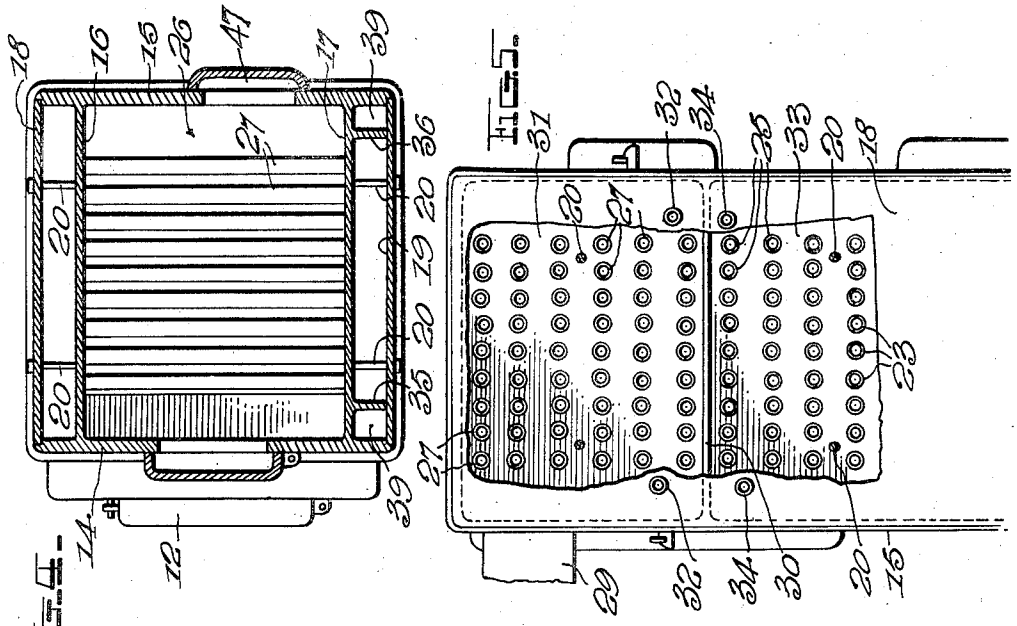


Fig. 4.

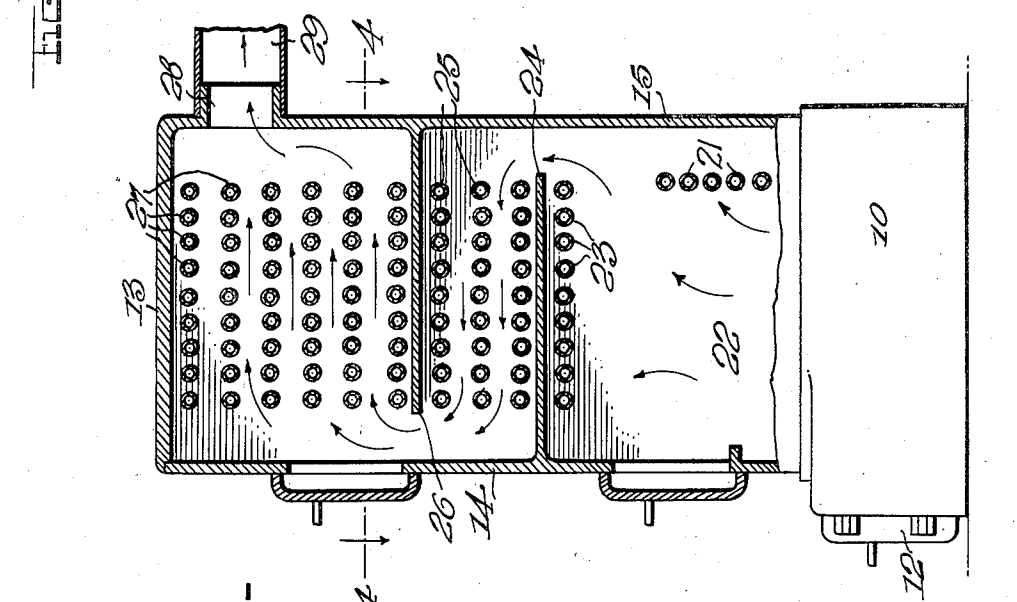


Fig. 5.

Fig. 6.

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STEAM AND HOT WATER BOILER

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Application June 24, 1936, Serial No. 87,085

5 Claims. (Cl. 122—264)

The present invention relates to improvements in boilers as used in steam, hot water and vapor heating systems, and has for its primary object the provision of a simple, compact and convenient construction of the water tube type wherein provision is made for ready access to the tubes in case repair or substitution thereof becomes necessary.

A further object is the provision of an arrangement capable of easy, economical manufacture and insuring lengthy, satisfactory life in use, as well as one which lends itself to ready variation as to size and capacity and which for ordinary use in homes will be small, compact and highly desirable.

The above and other objects of the present invention will more clearly appear in the course of the following detailed description of the best mode so far devised for carrying the invention into practical effect, and by reference to the accompanying drawings, forming a part of this specification, and wherein

Figure 1 is a side elevation, the adjacent side plate being removed to show the interior of the water transfer compartment.

Figure 2 is a vertical transverse sectional view taken substantially on line 2—2 of Figure 1.

Figure 3 is a vertical longitudinal sectional view taken substantially on line 3—3 of Figure 2.

Figure 4 is a horizontal sectional view taken substantially on line 4—4 of Figure 3, and

Figure 5 is a partial side view looking at the opposite side with respect to Figure 1, and with the rear side plate broken away to show the interior of the water inlet and outlet compartments.

Referring now to these figures, the boiler as proposed by my invention is preferably of rectangular form and its main frame or casting seats in use upon a supporting base 10, which may support a suitable grate structure (not shown), if solid fuel is to be used and which has for this purpose a space 11 to form an ash pit and a door 12 to this space and also for draft purposes.

The main frame or casing of the improved boiler comprises a top wall 13, front and rear walls 14 and 15 and side walls 16 and 17, it being noted the side portions of the top, front and rear walls extend appreciably beyond the side walls and are rabbeted, grooved or otherwise formed, preferably in casting, to receive the top and side edges of side plates 18 and 19.

The side plates 18 and 19 when in place are, as plainly seen in Figures 2 and 4, spaced from the corresponding side walls 16 and 17 for a purpose which will presently appear, and are preferably connected by stay bolts 20 of a character to permit ready removal of these side plates whenever it becomes necessary or desirable to plug, repair or replace any of the water tubes as presently described. These side plates may be bolted to the main frame or casting around the edges thereof, or secured in any suitable manner either permanently or with ready removal in mind.

The space between the side walls 16 and 17 is occupied by a series of vertically spaced horizontal rows of transverse water tubes whose ends are suitably fixed in and open through the side walls 16 and 17 and into the spaces between these side walls and the respective side plates 18 and 19. In the specific arrangement shown, it will be noted from Figure 3 in particular there is a vertical row 21 of water tubes at the rear of the lower portion or fire box 22 of the boiler, and above this fire box is one horizontal row 23 of tubes below a horizontal baffle wall 24 extending rearwardly from the front wall 14 to a point spaced from the rear wall 15. Above baffle 24 are three rows 25 of tubes below a second horizontal baffle wall 26 extending from the rear wall 15 to a point spaced from the front wall 14. Then, a series of horizontal rows 27 of tubes are arranged between the upper baffle 26 and the top wall 13, and it is obvious the products of combustion in fire box 22 are forced to a circuitous path rearwardly of the lower baffle 24 and forwardly of the upper baffle 26 in their travel to the upper rear outlet 28 centrally of the upper portion of rear wall 15, and during this travel the heat products sweep through the tubes 23, 25 and 27 so as to provide for a very thorough, complete interchange of heat units. It is to be understood, however, the above relation in numbers of tubes to the baffle walls 24 and 26 may be varied to a considerable extent, and that in practice the outlet 28 receives one end of the smoke pipe 29.

Referring to Figures 1 and 2, it will be noted from the latter that the side space between side wall 16 and side plate 18 is divided by a horizontal partition 30 outstanding from side wall 16, into an upper receiving chamber 31 with which feed or system return pipes 32 communicate, and a lower outlet chamber 33 with which outlet pipes 34 communicate, and it will be further noted that partition 30 is about level with the upper baffle wall 26 so that the return water through pipes 32 circulates through the water tubes 27 above said baffle wall into the upper portion of the opposite side space.

From Figure 1, it will be seen that the space between side wall 17 and side plate 19 is divided by virtue of parallel front and rear vertical partitions 35 and 36 in spaced parallel relation to the adjacent side portions of the front and rear walls 14 and 15, and a horizontal partition 37 at the level of the opposite side partition 30, extending between the said vertical partitions 35 and 36, so that water flowing through tubes 27 from the receiving compartment 31 finds its way into a chamber 38 between partitions 35 and 36 above partition 37. However, partitions 35 and 36 terminate at their upper and lower ends in substantially spaced relation to the top and bottom of their respective side space and consequently water in chamber 38 will overflow the upper ends of said vertical partitions and drop through the channels 39 between partitions 35 and 36 and the front walls 14 and 15 and thus find its way into the lower chamber 40, that is, the space below horizontal partition 37 for passage through the tubes 21, 23 and 25 to outlet compartment 33 and finally to the system through outlet pipes 34.

In the above operation the return water is preliminarily heated at a point where it effectively absorbs the heat units from the products of combustion just prior to the outlet of these products through the smoke pipe, and subsequently passes through and above the combustion space in a condition to readily absorb the greater portion of the heat units at this point.

It is obvious that for the above purposes, oil, gas or solid fuel may be employed and that the boiler may be provided with various indicators and guides such as an altitude gauge 41, steam gauge 42, thermometer 43 and relief valve 44. It is also preferable that an air vent pipe 45 extend, as best seen in Figure 2, from the upper portion of the space between side wall 17 and side plate 19. This vent pipe may be arranged to outlet in any manner suitable to relief of the apparatus from the danger of air locks.

It is also obvious various other features such as clean-out valves 46 and the like may be employed without affecting the rugged strength, ready accessibility, and general efficiency of the improved construction above outlined. A clean-out door 47 may be arranged in the rear wall as seen in Figures 2 and 4.

What is claimed is:

1. A steam and water boiler consisting of a rectangular body having its top, bottom, front and rear walls extending uniformly beyond the side walls thereof, side plates fixed to the extending portions of the first-mentioned walls to form side spaces between said plates and the side walls, vertical partitions partially along one side wall in the respective side space forming vertical channels between the same and the front and rear walls, a horizontal partition dividing the space between said vertical partitions, a horizontal partition dividing the other side space into an upper receiving compartment and a lower outlet compartment, outlet pipes leading from the latter compartment, return pipes leading from the receiving compartment, a series of water tubes extending between the side walls and opening at their ends into the said side spaces above the horizontal partitions, and a series of water tubes extending between the side walls and opening at their ends between said side spaces below the horizontal partitions, the said channels forming circulating waterways between those portions of the respective side space above and below the horizontal partition thereof.

2. A steam and water boiler comprising an upright rectangular body, the side walls of which form tube anchoring sheets and the other walls of which project uniformly beyond said side walls, side plates normally secured in spaced relation to said side walls to form side spaces, a horizontal partition on each side wall in its side space, the partition of one side space completely dividing the same into upper and lower compartments, return and outlet pipes respectively communicating with said compartments, tubes extending between, and opening through, the side walls above and below said partitions, and means in the other side space forming vertical water channels at opposite ends of the partition thereof communicating between the portions of said space above and below its partition.

3. A steam and water boiler comprising a body having side walls and side plates anchored to the body laterally beyond said side walls to form water spaces between the walls and plates, means dividing the said spaces into upper and lower compartments, tubes extending between, and opening through, the side walls into said compartments, the upper and lower compartments of one side space being cut off from one another, return and outlet pipes respectively communicating with said latter compartments, and means forming communicating water channels in the other side space between the upper and lower chambers thereof and confining said channels to communication between the lower chamber and the upper portion of the upper chamber.

4. A steam and water boiler comprising a body having side walls and side plates anchored to the body laterally beyond said side walls to form water spaces between the walls and plates, means dividing the said spaces into upper and lower compartments, tubes extending between, and opening through, the side walls into said compartments, the upper and lower compartments of one side space being cut off from one another, return and outlet pipes respectively communicating with said latter compartments, and means within the other of said side spaces forming vertical water channels between the lower compartment thereof and the upper portion of the upper compartment.

5. A steam and hot water boiler comprising a body or shell forming water spaces at its opposite sides, means horizontally dividing said spaces into upper and lower compartments, water tubes extending between, and opening into, the said compartments, return and outlet pipes respectively communicating with the upper and lower compartments of one side space, and means forming vertical water channels in the other side space, said channels opening at their lower ends into the lower portion of the lower compartment and at their upper ends into the upper portion of the upper compartment.

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