

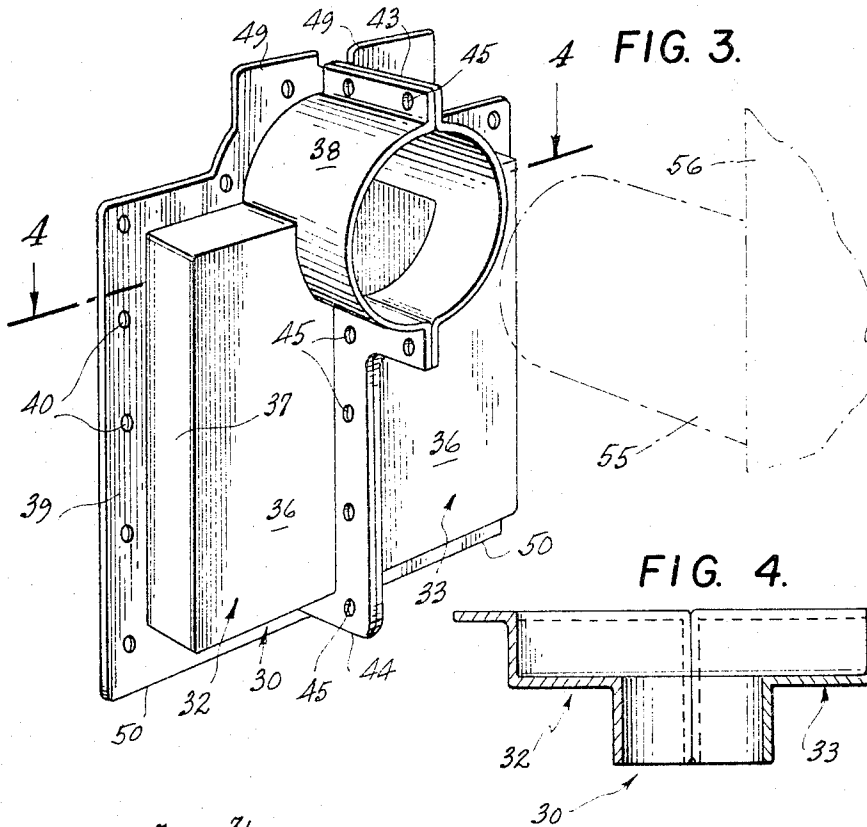
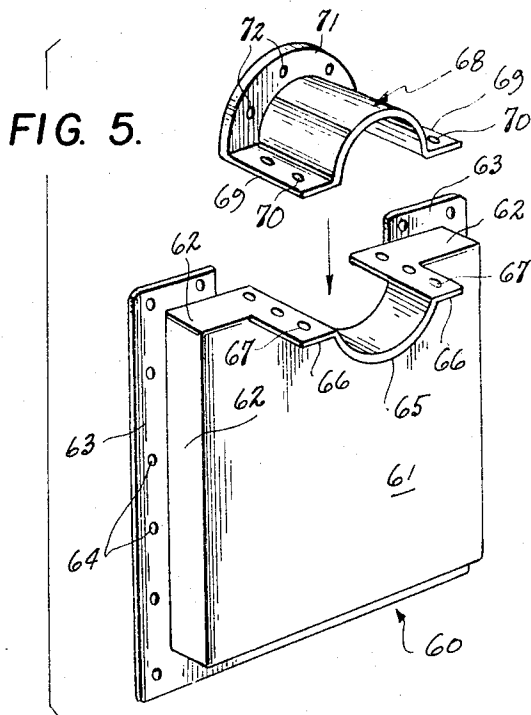
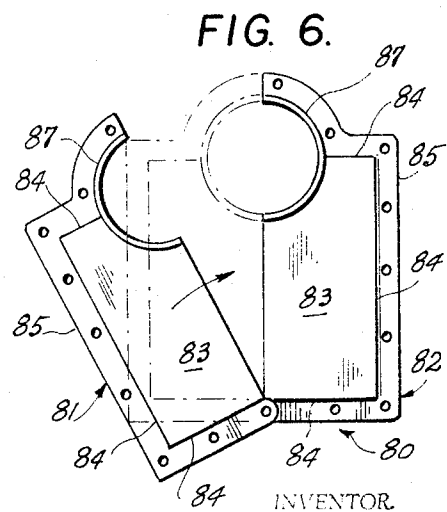
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BOILER CONSTRUCTION

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BOILER CONSTRUCTION

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This invention relates generally to fire tube boilers.

It is generally well known to those skilled in the art that fire tube boilers as now constructed present problems to servicemen when attempting to remove the tubes from the boiler during time of repair or cleaning. With conventional boilers it is necessary that time be allowed to pass by for sufficiently cooling the furnace before letting a workman enter therein for disconnecting the fire tubes from the opposite boiler walls to permit their removal. Such practice is time consuming, uncomfortably cramped and possibly hot to the workman and presents an undesirable situation which has long been wanting for improvement.

Accordingly, it is a principal object of the present invention to provide an improved fire tube boiler having self-contained means to allow removal of the fire tubes from the boiler without the necessity to cool the furnace for a relatively long period because it does not require that a workman enter therein for accomplishing the same.

Another object is to provide an improved fire tube boiler wherein the workman may stand on the outside of the furnace at the front and rear side of the boiler to accomplish the fire tube removal.

Still another object is to provide a fire tube boiler having access doors on the opposite front and rear walls of the boiler to permit admittance to the opposite ends of the fire tubes.

Another object is to provide a fire tube boiler having a rear wall door having self-contained connection means to the chimney flue duct.

Another object is to provide a fire tube boiler having a removable rear wall door which includes a portion of the chimney flue duct and which when removed allows sufficient room for a workman to work unencumbered by objects in his way.

Other objects are to provide a fire tube boiler having the above objects which is simple in design, inexpensive to manufacture, rugged in construction, easy to service and efficient in operation.

These and other objects will be readily apparent upon a study of the following specification and the accompanying drawings wherein:

FIGURE 1 is a side cross sectional view through a boiler incorporating the present invention,

FIG. 2 is a cross sectional view taken on line 2—2 of FIG. 1,

FIG. 3 is a perspective view of the rear wall access door,

FIG. 4 is a cross sectional view taken on line 4—4 of FIG. 3,

FIG. 5 is a perspective exploded view of a modified form of the present invention, and

FIG. 6 is a rear elevational view of still another modified form thereof shown partly in opened position.

Referring now to the drawings in detail the numeral 10 represents a fire tube boiler according to the present invention wherein there is a furnace 11 surmounted by a boiler element 12. A suitable burner 13 in the furnace provides a means for furnishing heat within the device.

The boiler element is comprised of a housing 14 having opposite side walls 15, a front wall 16, a rear wall 17, and top wall 18 enclosing a central water or steam chamber 19, across which a plurality of horizontal fire tubes 20 extend supported at their opposite ends in the front and

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rear walls of the boiler. A plurality of sleeves 21 are firmly secured in the front and rear walls by means of welding process and the fire tubes are fitted within the sleeves; it being understood that the tubes are of a diametrical dimension equivalent to that of the sleeve so to fit tightly therewithin.

A front door 22 is mounted on the outer side 23 of the front wall 16, the door being positioned to cover the ends of the fire tubes. The front door comprises a panel 24 having a peripheral side wall 25 therearound to form a chamber 26 therein. A flange 27 on the side wall 25 has a plurality of openings 28 therethrough for receiving bolts 29 secured in threaded openings in the boiler front wall. Thus the chamber 26 provides communication between the tube ends.

A rear door 30 is likewise mounted on the outer side 31 of the rear wall 17 in a position to cover the rear ends of the fire tubes. The rear door is comprised (as shown in FIGS. 1, 2, 3 and 4) of a left and right door element 32 and 33 respectively.

The boiler element 12 has a horizontal plate 34 forming a bottom wall of the water or steam chamber 19. A plurality of openings 35 are made through the boiler rear wall 17 at a location below the plate 34, the openings 35 providing a means for movement of burner flames and heat out of the furnace and subsequently through the boiler as is indicated by the arrows in FIG. 1 of the drawings.

Each rear door element further covers the openings 35 in a manner similar to covering the fire tube ends.

Each rear door element comprises a panel 36 having a side wall 37 partly therearound. At one corner the side wall is interrupted by a semi-circular chimney flue duct clamp 38. A flange 39 on the side wall 37 has openings 40 therethrough to receive bolts 41 secured in threaded openings 42 in the boiler rear wall 17. A flange 43 on the upper edge of the clamp 38 and a Z-shaped flange 44 on the lower side of the clamp and one edge of panel 36 are provided with openings 45 for receiving a bolt 46 used to secure the door elements 32 and 33 together. Nuts 56 secure the bolts 46.

An upper track 47 and a lower track 48 made of angle iron welded to the outer side 31 of rear wall 17 provide means for sliding the door elements horizontally toward and away from each other. The upper and lower edges 49 and 50 respectively of the flange 39 are slidable within the tracks.

The two door elements 32 and 33 enclose a lower chamber 51 and an upper chamber 52 separated by an intermediate wall 53 having an asbestos gasket 54 in abutment with the outer side 31 of the boiler wall; the gasket providing a tight seal between the chambers. The lower chamber allows communication between the openings 35 and a lower number of fire tubes, whereas the upper chamber provides communication between the upper number of fire tubes and a chimney flue duct 55 leading to chimney 56. The clamp 38 clamps around the outer side of the duct 55.

In operative use, when access is desired to remove the fire tubes, the front door is taken off by removing bolts 29. Likewise the rear door bolts 41 and 46 are removed, the doors slid apart to expose the opposite ends of the fire tubes.

In FIG. 5, a modified construction is shown wherein rear door 60 includes a main panel 61, peripheral side wall 62, and flange 63 having bolt openings 64. It further includes the lower half of a semi-cylindrical clamp 65 having flange 66 with bolt openings 67. An upper clamp 68 has flanges 69 with openings 70 therethrough for securement to the flanges 66. Clamp 68 also has a flange 71 with openings 72 therein for securement to the rear wall of the boiler.

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In FIG. 6 another modified rear door 80 is shown wherein door elements 81 and 82 each have a panel 83, side walls 84, flange 85 with openings 86 therethrough. Each element 81 and 82 has a side semi-cylindrical clamp 87 at their upper end and the elements are pivotally secured together by a pin 88 at their lower end. When the elements are pivoted toward each other the clamps secure around the duct 55 providing connection between the boiler and chimney.

Thus a novel method has been shown whereby access is provided to both ends of all fire tubes and the duct is out of the way of the workman.

While various changes may be made in the detail construction, it is understood that such changes will be in the spirit and scope of the present invention as is defined in the appended claims.

What is claimed is:

1. In a fire tube boiler the combination of furnace and boiler element, said furnace having a burner to provide heat means to said boiler element surmounted on said furnace, said boiler element comprising a housing having opposite side walls, a front wall, a rear wall, a top wall and a horizontal intermediate wall enclosing a water or steam chamber, a plurality of fire tubes between said front and rear walls, a front door covering the front ends of said fire tubes, and a rear door covering the rear ends of said fire tubes, said rear wall having a plurality of openings below said water or steam chamber, said front and rear doors being removable from said boiler to provide access to said front and rear ends of said fire tubes, wherein said rear door includes connection means between said boiler and a chimney flue duct, wherein each rear door comprises a pair of rear door elements, each of said rear door elements having a clamp member for securement around said chimney flue duct, each said door element comprising a vertical panel spaced apart by chamber means from said rear wall of said boiler, a side wall partly around the periphery of said panel, a flange on each side wall of said door element, openings in said flange to receive bolts for securement to said rear wall of said boiler, and secondary flanges on each rear door element for securing said rear door elements together.

2. In a fire tube boiler the combination of a furnace and boiler element, said furnace having a burner to provide heat means to said boiler element surmounted on said furnace, said boiler element comprising a housing having opposite side walls, a front wall, a rear wall, a top wall and a horizontal intermediate wall enclosing a water or steam chamber, a plurality of fire tubes between said front and rear walls, a front door covering the front ends of said fire tubes, and a plurality of openings in said rear wall below said water or steam chamber, said front and rear doors being removable from said boiler to provide access to said front and rear ends of said fire tubes, wherein said rear door includes connection means between said boiler and a chimney flue duct, wherein said rear door comprises a pair of rear door elements, each

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of said rear door elements having a clamp member for securement around said chimney flue duct, wherein each said rear door element comprises a vertical panel spaced apart by chamber means from said rear wall of said boiler, a side wall partly around the periphery of said panel, a flange on each side wall of said door element, openings in said flange to receive bolts for securement to said rear wall of said boiler, and secondary flanges on each rear door element for securing said rear door elements together, wherein each said clamp member comprises a semi-cylindrical member receivable over the outer side of said chimney flue duct, and said secondary flanges comprising a flange along one straight edge of said clamp member and a Z-shaped flange along the other straight edge of said clamp member and adjacent opposing edges of said rear door element panels, said secondary flanges of one rear door element being in abutment with the secondary flanges of the other rear door element when said rear door is mounted on said boiler in operative position.

3. In a fire tube boiler the combination as set forth in claim 2, wherein each said rear door chamber means comprises a lower chamber and an upper chamber separated by an intermediate wall, and an asbestos gasket along the edge of said intermediate wall for abutment with said rear wall of said boiler.

4. In a fire tube boiler the combination as set forth in claim 3, wherein said lower chamber communicates with said rear wall openings below said water and steam chamber and the lower number of fire tube ends, and said upper chamber communicates with the upper number of fire tube ends and said chimney flue duct.

5. In a fire tube boiler the combination as set forth in claim 4, wherein said front door comprises a panel, a flange on said side wall and openings in said flange for receiving bolts to mount said door on said front wall of said boiler, said door enclosing a central compartment which communicates with the front ends of said lower number of fire tubes and the front ends of said upper number of fire tubes.

6. In a fire tube boiler the combination as set forth in claim 5, wherein the upper and lower edges of said rear door elements is slidably received with an upper and lower track respectively, said tracks being mounted on the said rear wall of said boiler.

7. In a fire tube boiler the combination as set forth in claim 6, wherein said clamp members are at one end of each of said rear door elements and the opposite end of said rear door elements are pivotally secured together.

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