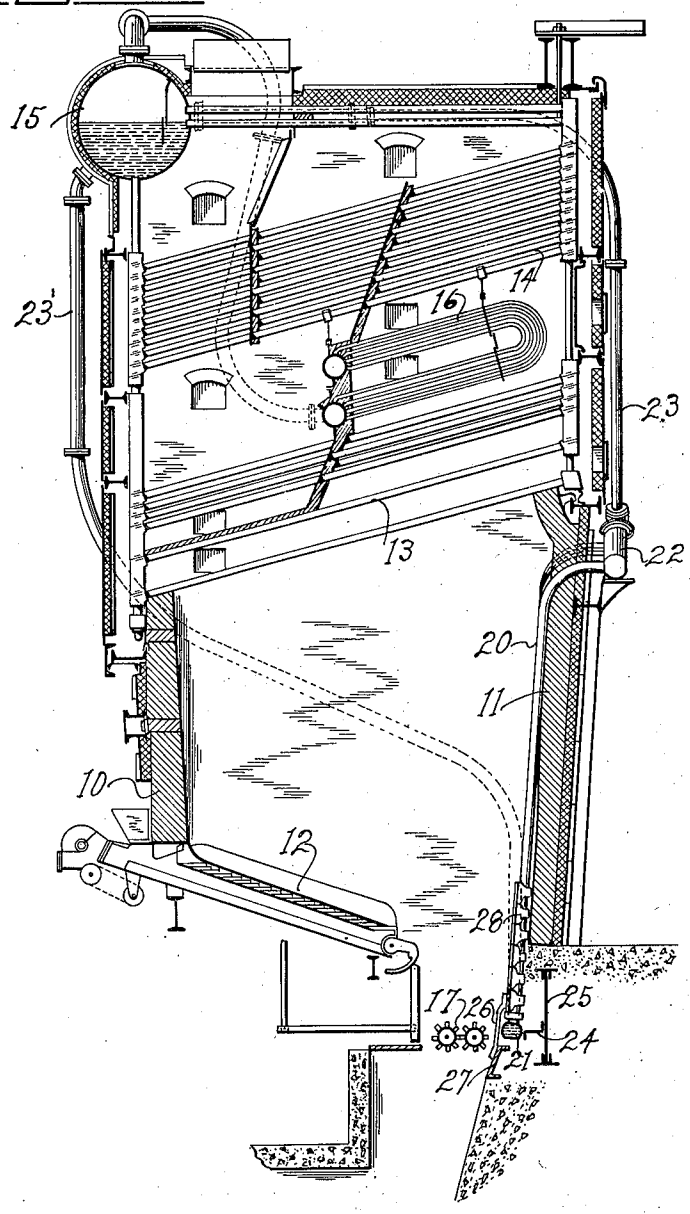
Nov. 17, 1936. H. J. KERR 2,061,404

WATER COOLED FURNACE

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Fig. 1



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Fig. 2

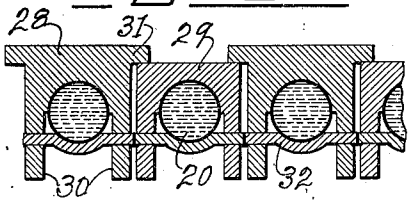


Fig. 3

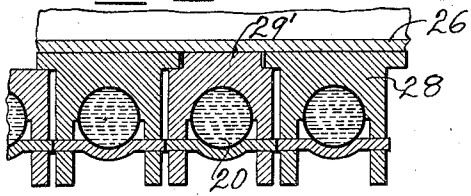


Fig. 4

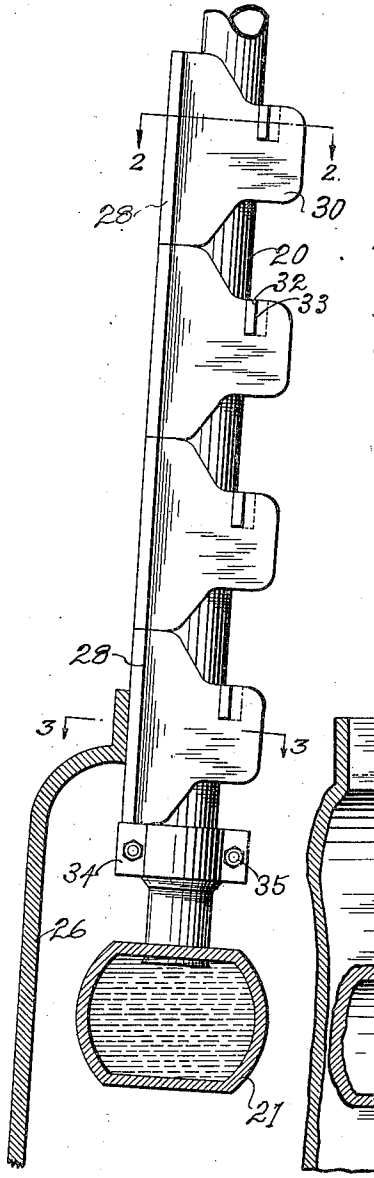
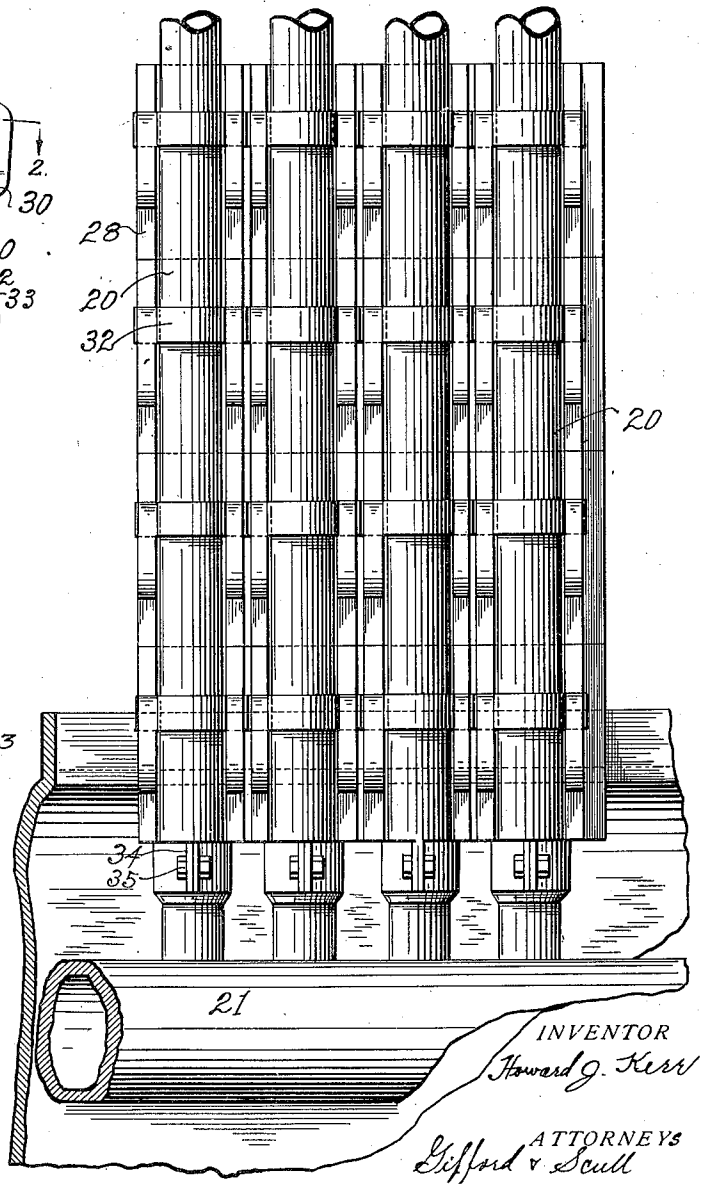


Fig. 5



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WATER COOLED FURNACE

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Application September 30, 1925, Serial No. 59,457
Renewed May 10, 1932

8 Claims. (Cl. 122—6)

This invention relates to a furnace for a boiler that is water cooled to avoid troubles due to clinkers, and will be understood from the description in connection with the accompanying drawings, in which Fig. 1 is a vertical section through a boiler; Fig. 2 is a horizontal section along the line 2—2 of Fig. 4; Fig. 3 is a horizontal section along the line 3—3 of Fig. 4; Fig. 4 is an elevation, partly in section, viewed from one edge and Fig. 5 is a similar view from the rear.

In the drawings, reference characters 10 and 11 indicate the front and rear walls of the furnace chamber of a typical Babcock and Wilcox boiler in connection with which this invention is illustrated. The boiler is shown as being provided with an underfeed stoker 12 and banks of inclined water tubes 13 and 14 that the connected to the usual headers, which are, in turn, connected to the steam and water drum 15 at the top of the boiler. A pipe connects the steam and water drum to the superheater 16, in the usual manner. A device for breaking clinker is indicated at 17, located in the discharge chute between the rear end of the stoker 12 and the rear wall of the furnace.

In order to avoid clinker troubles, a series of parallel tubes 20 are located along the rear wall of the boiler and are connected to lower and upper headers 21 and 22, the major portions of the tubes being located inside the furnace, but the upper ends being bent and passed outwardly through the rear wall 11. A pipe 23 connects the header 22 to the steam space of the drum 15, and a pipe 23' connects the water space of this drum to the lower header 21. Struts 24 extending from the girder 25 carry the horizontal thrust of header 21 due to its weight and the weight of the clinker on the clinker grinders 17. A plate 26 is attached to the support 27 to protect header 21 from the heat of the clinker.

The spaces between the tubes 20 near their lower ends are closed by means of metal pieces 28 and 29, as most clearly shown in Figs. 2, 4, and 5. These metal pieces have flat front faces and are provided on their rear faces with extensions 30 that are spaced apart sufficiently to pass over the tubes 20. The pieces 28 are somewhat thicker than the pieces 29, and are provided with shoulders 31 which contact with the front faces of the pieces 29, thereby closing the space between the tubes and preventing the escape of radiant heat. Cross-pieces 32 which fit into slots 33 in the extensions 30 serve to retain the pieces 28 and 29 in place on the tubes 20. Tube clamps 34, which may be clamped to the tubes 20 by means of the bolts 35 and may also be spot-welded to these tubes, prevent the rows of pieces 28 and 29 from moving downwardly, thus avoiding the danger of forcing the header 21 off of the ends of the tubes 20. The plate 26 is curved near its upper edge and the upper end of this plate rests against the flat faces of the pieces 28. The pieces 29', as shown in Fig. 3, that are level with the upper edge of the plate 26 have their front faces extended slightly to contact with the plate 26 and prevent air leakage. The plate 26 extends below the header 21 along one side of the ash and clinker discharge chute.

It has been found that where ash and clinker are discharged from the rear end of a stoker, they often stick to the rear wall or side of the discharge chute, and the clinker and slag which pass down the wall build out into the furnace and prevent the proper discharge of the ash and clinker from the furnace. By the present invention the rear wall of the discharge chute is kept sufficiently cool to prevent the slag from sticking thereto, and troubles due to the accumulation of the clinker on the wall are thereby avoided. Besides, a considerable amount of heat is utilized as it passes into the water within the tubes 20, and finally into the boiler proper.

I claim:

1. In a boiler, a furnace, water tubes for cooling a part of the furnace wall, metallic blocks along said tubes, said blocks being spaced apart and having overlapping edges to prevent escape of radiant heat, and means for detachably securing each block to a tube independently of the others.

2. A furnace having a wall cooling means, comprising water tubes, connections between the ends of the tubes to provide a water circulation therethrough and metallic blocks between the tubes and the interior of the furnace and in close contact with the tubes, the inner surface of the blocks being exposed directly to the radiant heat of the furnace, said blocks being supported on and attached to the tubes, the blocks on each tube having their body portions spaced from the body portions of the blocks on adjacent tubes and their edges overlapping the edges on the blocks on adjacent tubes to prevent the passage of radiant heat between the blocks.

3. In a furnace, a wall comprising a row of spaced tubes, a plurality of blocks secured to each tube and having faces disposed towards the inside of the furnace, certain of said faces ex-

tending inwardly more than the faces on adjacent blocks, and having shoulders overlapping the faces on said adjacent blocks.

4. In a furnace, a wall comprising a row of spaced tubes, a plurality of blocks secured to each tube and having faces disposed towards the inside of the furnace, said blocks having outward extensions disposed between adjacent tubes, and cross-pieces engaging said tubes and received within open slots in said extensions, said slots extending parallel to the length of the tubes.

5. In a boiler, a furnace, furnace wall cooling tubes connected to the boiler drum, metallic blocks along said tubes, said blocks being spaced apart and having overlapping edges to prevent escape of radiant heat, and means for detachably securing each block to a tube independently of the others.

6. In a boiler, a furnace wall, furnace wall cooling tubes having their upper ends connected to the steam space of the boiler drum and their lower ends connected to the water space of the boiler drum, metallic blocks along said tubes, said blocks being spaced apart and having overlapping edges to prevent escape of radiant heat and means for detachably securing each block to a tube independently of the others.

7. In a coal burning furnace having cooling means including water tubes, connections between the ends of the tubes to provide a water circulation therethrough, metallic blocks between the tubes and the interior of the furnace and in close contact with the tubes, and means for detachably securing the blocks on the tubes so that they are supported thereby and so that some may be removed from the tubes independently of other blocks, the inner surface of the blocks receiving heat from the furnace and adjacent blocks having their edges overlapping.

8. In a fluid heat exchange apparatus, a row of spaced metallic tubes arranged along a furnace wall so that a fluid flowing through them absorbs heat transmitted through the tube walls from burning fuel in the furnace, a row of heat transmitting blocks carried wholly by each tube along its furnace side, and separate blocks securing bars extending across and contacting the cooler sides of the tubes and cooperating with the blocks so that each of the blocks can be separately released and replaced, each block having spaced extensions formed with aligned slots extending longitudinally of the tubes and receiving said separate bars when said extensions straddle the tube.

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