Feb. 12, 1929. 1,702,058

T. E. MURRAY

SUPERHEATER

Original Filed May 29, 1924

Fig. 1.

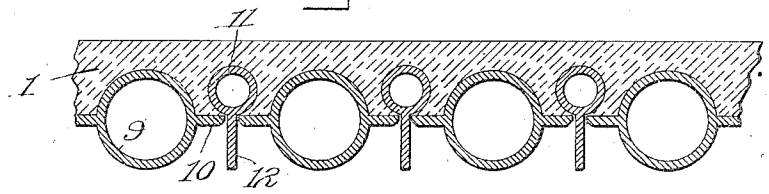


Fig. 2.

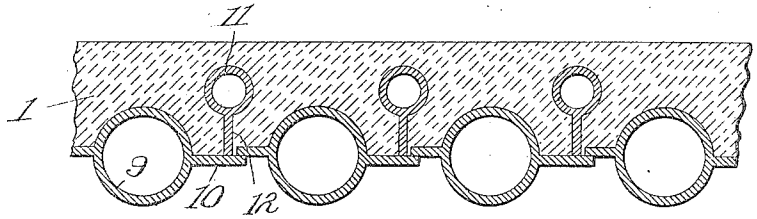


Fig. 3.

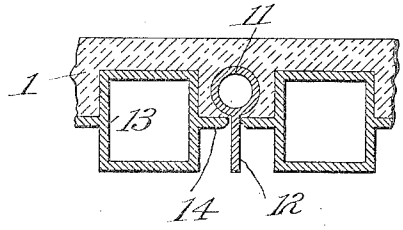
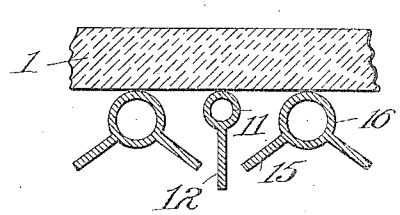


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SUPERHEATER.

Original application filed May 29, 1924, Serial No. 716,534. Divided and this application filed July 20, 1927. Serial No. 207,175.

The present application is a division of my copending application Serial No. 716,534 filed May 29, 1924. The present invention aims to provide a boiler wall having water tubes and superheater tubes arranged alongside one another and provided with heat conducting elements which are exposed to the direct radiant heat of the furnace chamber. The invention also provides a combination of a superheater with a water wall of the character hereinafter described. And the improvements described though applicable chiefly to superheaters may be employed in a variety of apparatus in which it is desired to apply the heat of the furnace to a liquid or a fluid passing through a tubular structure. The invention will be apparent from the following specification when read in connection with the accompanying drawings and the features of novelty will be defined in the appended claims. In the drawings—

Fig. 1 is a horizontal section through a boiler wall formed in part by water conducting tubes and in part by superheater tubes;

Fig. 2 is a horizontal section of a slightly modified embodiment of the invention;

Figs. 3 and 4 are horizontal sections illustrating other alternative embodiments of the invention.

Referring first to Fig. 1, the boiler tubes 9 are provided each with a pair of opposite flanges 10 and the latter are set against the face of the wall 1 so that practically one half of each tube 9 is embedded in the wall. The superheater consists of smaller tubes 11, embedded entirely within the wall, each having a single flange 12 which projects beyond the wall into the furnace for substantially its full width, being located between the flanges 10 of adjacent boiler tubes. The metallic facing along the wall is practically continuous so as to protect the latter from deterioration under the high heat.

According to Fig. 2, boiler tubes 9 with flanges 10 are employed, similar to those of Fig. 1. But the flanges 10 of the adjacent tubes are made to contact and preferably to overlap so as to entirely cover the face of the wall. The superheater tubes 11 are set farther back in the wall and their flanges 12 are extended just to the surface of the wall and into contact with the flanges 10 of the boiler tubes. With this arrangement the flanges of the superheater tubes are not directly exposed to the heat of the furnace, but take their heat from the flanges 10 of the boiler tubes with which they are in contact (and to which they may be welded to maintain a more intimate connection).

In Fig. 3 I have illustrated a construction substantially like that of Fig. 1, except that the boiler tubes 13 are rectangular in cross-section so as to project (for the same area of cross-section) a shorter distance into the furnace and back into the wall, than where circular tubes are used. The flanges 14 on these tubes are spaced apart as in Fig. 1 just enough for the passage of the flanges 12 of the superheater tubes 11.

According to Fig. 4, the tubes are not embedded in the wall but are located on the face thereof. The superheater tube 11, however, is shielded by the fins 15 on the water tubes 16 which are directed over the greater part of the space between two such tubes, leaving between them only room for the flange 12 on the superheater tube 11.

In the case of Fig. 4, the only protection of the superheater tube 11 from the direct radiant heat of the furnace is in the water tubes and fins by which it is surrounded. Where the superheater tube 11 is embedded in the wall, as in the other figures, it is not essential that the water tubes have flanges between them to shield the superheater tubes.

Though I have described with great particularity of detail certain embodiments of my invention, yet it is not to be understood therefrom that the invention is restricted to the particular embodiments disclosed. Various modifications may be made by those skilled in the art without departure from the invention as defined in the appended claims.

What I claim is:—

1. A boiler having water tubes arranged alongside of each other and spaced apart with flanges between and located on the inner side of a furnace wall in combination with a superheater comprising tubes embedded in the same wall with heat conducting elements extending therefrom at least to the furnace chamber.

2. A boiler having water tubes arranged alongside of each other and spaced apart with flanges between them and located on the inner side of a furnace wall in combination with a superheater comprising tubes embedded in the same wall with heat conducting

elements extending therefrom at least to the furnace chamber between the boiler tube flanges.

3. A boiler having water tubes arranged alongside of each other and spaced apart with flanges between them and located on the inner side of a furnace wall in combination with a superheater comprising tubes located outside of said flanges and having heat conducting elements extending inward from such superheater tubes.

4. A boiler having water tubes arranged alongside of each other and spaced apart and located on the inner side of a furnace wall in combination with a superheater comprising tubes embedded in the same wall with heat conducting elements extending therefrom at least to the furnace chamber.

5. A boiler having water tubes arranged alongside of each other and spaced apart and located on the inner side of a furnace wall in combination with a superheater comprising tubes embedded in the same wall with heat conducting elements extending therefrom at least to the furnace chamber between the boiler tubes.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.