

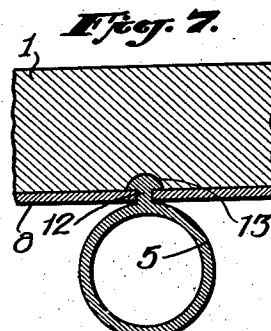
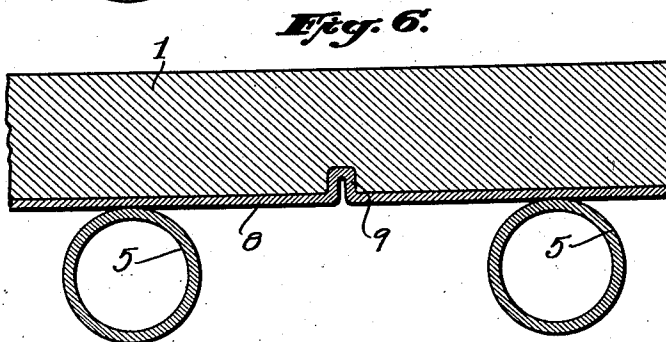
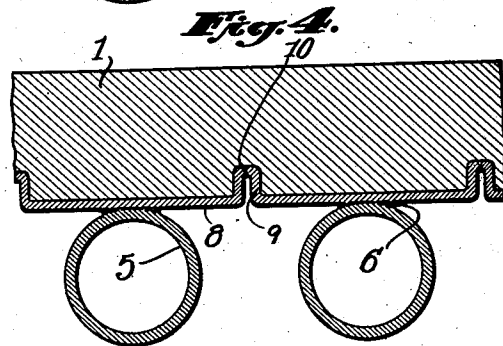
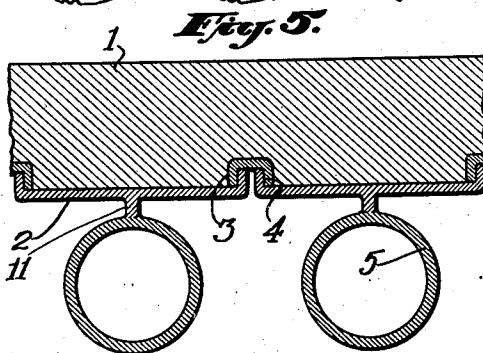
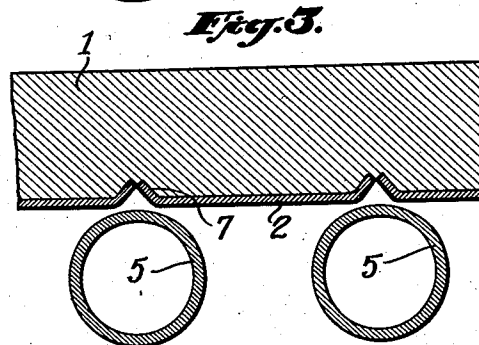
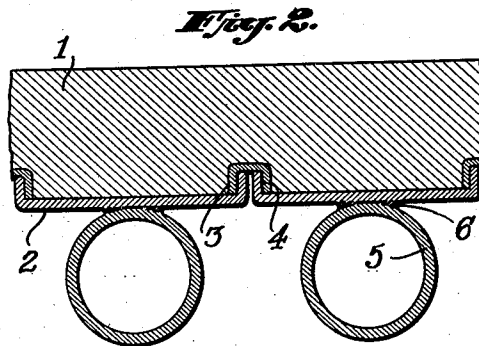
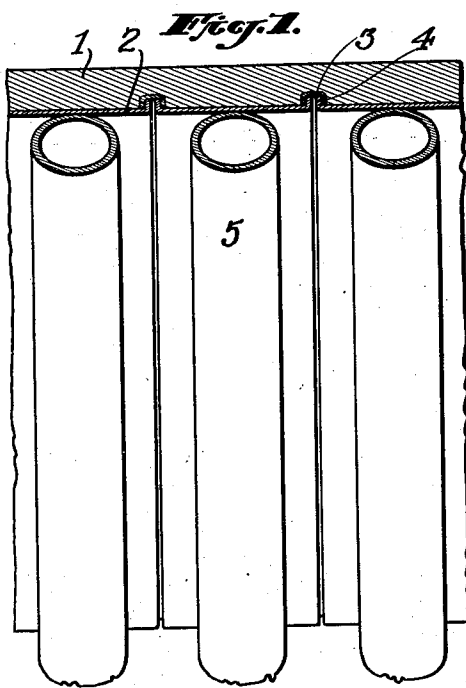
Aug. 26, 1930.

T. E. MURRAY

1,774,150

BOILER WALL

Filed March 14, 1928



INVENTOR

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BY

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UNITED STATES PATENT OFFICE

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BOILER WALL

Application filed March 14, 1928. Serial No. 261,493.

The invention aims to provide an improved wall structure for boiler furnaces, particularly for furnaces operating at very high temperatures such as those fired with powdered coal, oil or gas.

The accompanying drawings illustrate embodiments of the invention.

Fig. 1 is a perspective front view of a section of a wall;

Fig. 2 is a horizontal section of the same; Figs. 3 to 7 inclusive are similar views illustrating modifications.

Referring first to Figs. 1 and 2, the principal part of the structure is a wall 1 of brick work or similar refractory insulating material or materials, which may be in one or more layers. On the inner face of this refractory material it is faced with metal plates 2 which may be of sheet steel preferably of special compositions highly resistant to oxidation at high temperatures, or coated with such compositions.

The plates may be united to the refractory backing by anchors imbedded in the latter, or in any other usual or suitable way. Channels 3 open toward the inner face of the wall and are arranged at intervals corresponding to the width of the plates, and the latter are provided with backwardly bent flanges 4 fitting in said channels. A slight space is left between the flanges in each channel when the wall is erected, permitting lateral expansion of the plates when heat is applied to the furnace.

In front of the structure thus described, and which may be referred to as a whole as a refractory wall, is a row of water tubes 5 connected into the boiler circulation and preferably in upright position so as to facilitate circulation at a high rate of speed.

The burning fuel produces an intense heat which is radiated directly against the tubes 5 and, in the spaces between the tubes, against the metal faced refractory wall. The tubes with the water in them create a comparatively cool zone adjacent to the metal plates and protect them so that they are durable even under extreme conditions. The high temperature will produce a certain expansion of the plates relative to the insulating material,

which will be taken up in the flanged expansion joints. The plates may be in turn coated with a mineral coating and may be specially protected in line with the spaces between the tubes, as set out in detail in my previous application No. 177,533 filed March 23, 1927.

In a previous British patent of mine, No. 227,156, I have shown a somewhat similar wall faced with plates and tubes, arranged alternately along the width of the wall. In the present arrangement the metal facing passes continuously back of the tubes. The tubes may be fastened to the metal facing of the wall or may be separate from such facing. In Fig. 2 they are shown united to the plates 2 by welding metal 6 deposited at the joint.

According to Fig. 3 the tubes 5 are spaced slightly away from the metal face. Also in this figure the facing plates 2 are provided at their adjacent edges with inclined flanges 7 fitting in recesses in the refractory material and adapted to yield by bending when the plates expand laterally.

According to Fig. 4 the metal facing is made in sections 8 with U-shaped or similar bends 9 fitting in recesses in the refractory material and adapted to yield to permit the sections to expand toward one another. A number of such sections may be formed from a single plate, the complete wall being made of a number of such plates. The sections or the plates may be welded together, for example, at an expansion bend as indicated at 10.

Fig. 5 illustrates an arrangement in which the tubes 5 are spaced away from the sections or plates 2 but connected to them by means of a web 11. For example the web 11 may be a rib rolled integrally with a plate 2 and welded to a tube.

Fig. 6 illustrates a construction like that of Fig. 4 except that the tubes 5 are located against the metal facing of the wall but not fastened thereto.

According to Fig. 7 the tube 5 has welded on to it studs 12 which pass through openings in the metal facing 8 and are riveted by an enlarged head 13 to fasten the tube to the plate.

Each of the several arrangements and lo-

cations of the tubes shown and described herein may be used with any one of the arrangements of the metal wall facing. The tubes in each case except Fig. 3 are illustrated as located at the center of each plate or corresponding section of the metal facing, with one tube for each section. Where the tubes are fastened to the metal facing this is important in permitting expansion of the sections with the least lateral strain on the tubes. And in any case it is advantageous to have the tubes arranged uniformly with respect to each section. Where they are not fastened to the metal facing, they may be located in front of the joints so as to afford special protection to the latter, as illustrated for example in Fig. 3; or they may be located between the joints as in Fig. 6.

Various other modifications may be made without departing from the invention as defined in the following claims.

What I claim is:

1. A boiler furnace wall comprising a backing of refractory material with a metal inner face in sections between which are expansion joints and water tubes located entirely in front of said inner face and having substantially their entire circumference exposed to the heating gases and partially protecting said inner face from the direct radiant heat of the burning fuel.

2. A boiler furnace wall comprising a backing of refractory material with a metal inner face in sections between which are expansion joints and water tubes located entirely in front of said sections having substantially their entire circumference exposed to the heating gases and united to said sections and partially protecting said metal face from the direct radiant heat of the burning fuel.

3. A boiler furnace wall comprising a backing of refractory material with a metal inner face in sections between which are expansion joints and water tubes in front of and united to said sections, one to each section.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.