Aug. 13, 1946. W. SAMPSON 2,405,610

FURNACE FLOOR STRUCTURE

Filed Feb. 17, 1944

Fig. 1.

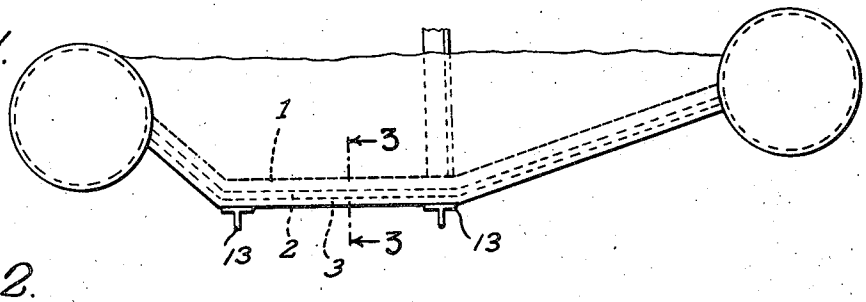


Fig. 2.

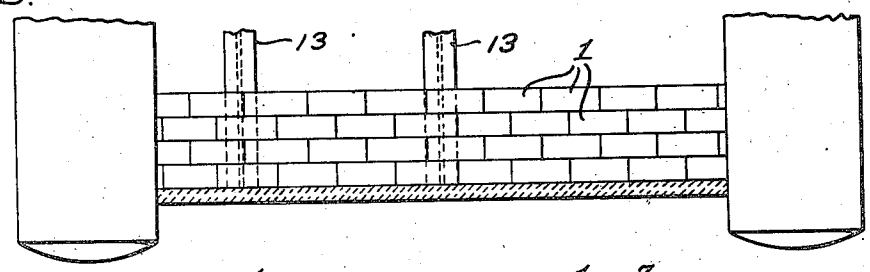
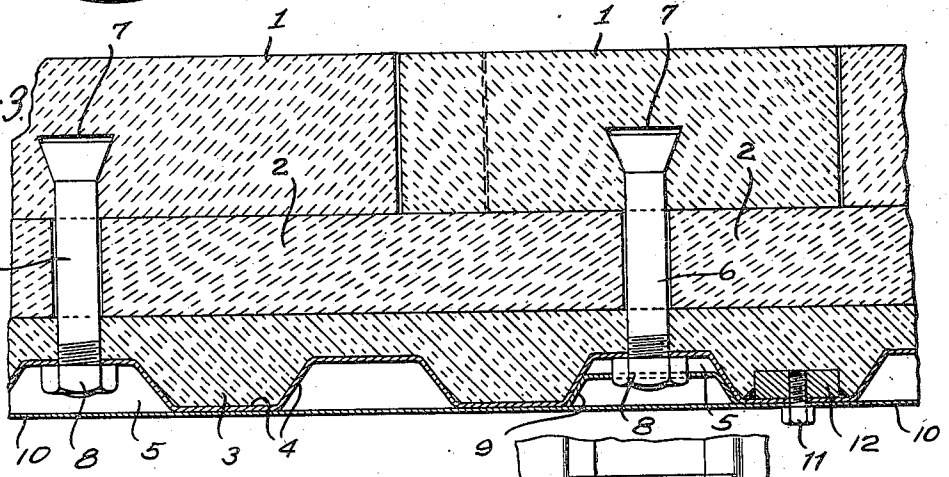


Fig. 3.



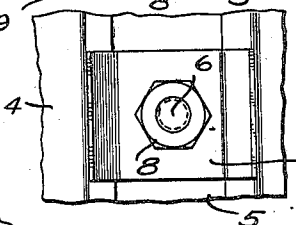
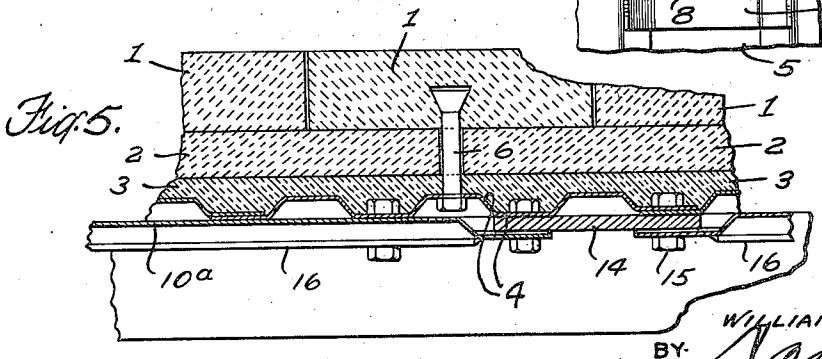


Fig. 4.

Fig. 5.



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FURNACE FLOOR STRUCTURE

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8 Claims. (Cl. 72—68)

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In the construction of steam boilers it is common practice for the fire bricks of the furnace floor to be fitted without attachment to the supporting plating in order to obviate leakage through the plating particularly of oil in oil fired water tube boilers. The firebricks are very liable to displacement and in marine boilers explosions in the vicinity of the ship may cause complete upheaval of the bricks especially if laid on the plating of the double bottom or on plating in contact with it.

The object of the present invention is to provide firebrick lined plate construction suitable for boiler furnace floors, casings, walls and roofs which will be tight and capable of withstanding severe shock without disturbance of the brick lining.

According to the invention the bricks are attached to troughed metal plating by anchoring bolts which pass through the bases of the inwardly projecting troughs, the nuts lying within the troughs on the outside of the plating. The bricks may be arranged in two layers with a layer of nonconducting material interposed between them and the troughed plating. To make the structure tight, external flat plating is secured to the troughed plating as by studs or screws passing through the bases of the outwardly projecting troughs into flat bars contacting the troughs.

In the case of boiler floors so constructed, it is preferred to support them clear of the ships plating on T, channel or similar bars secured to the boiler structure for instance to the vertical supports thereof.

As will be understood the troughing of the plating affords increased strength so that the troughed plating and the flat plating may be of comparatively light gauge.

Boiler casing walls and roofs may be similarly constructed to obviate leakage of gas or air.

The accompanying drawing illustrates two ways of carrying out the invention, Fig. 1 being a diagrammatic view of the two lower water drums of a water tube boiler of well known type including means for supporting flooring according to the invention. Fig. 2 is a plan view of the form of the invention shown in Fig. 1. Fig. 3 is a sectional view, on an enlarged scale, taken on the line 3—3 of Fig. 1. Fig. 4 is an underside view of a portion of Fig. 3. Fig. 5 is a view, similar to Fig. 3, of the other form of the improved flooring.

Referring first to Fig. 3, 1—1 represent two abutting firebricks of a layer which is backed by a second layer 2 of other bricks intended to break joint with the bricks 1. 3 is a layer of non-conducting material interposed between the brick layer 2 and the floor troughing. The flooring is produced by corrugating a panel or panels 4 of thin metal plate so that sloping sides exist between flat regions at both surfaces of the panel constituting inner and outer troughs capacious yet stiff in character. Into certain of these outer troughs, such as those marked 5 extend the threaded ends of bolts 6 having tapered heads engaging undercut or dovetail recesses 7 in the bricks 1. Nuts 8 for the bolts 6 lie within the troughs 5 on the outside of the plating and may be locked by washers such as the washer 9 which, as shown in Figs. 3 and 4, fits the nut and has sloping sides fitting the sloping sides of the troughs. Such washers are held in position by flat plating 10, the diverging end portions of the washers resting on the plating. To make the structure tight, the external flat plating 10 is secured to the troughed plating as by studs or screws 11 passing through the bases of the outwardly projecting troughs into flat bars 12 welded to the inside of the troughs. The stud or screw holes may extend through the bars 12, the studs or screw heads being suitably packed; or the stud or screw holes may extend only partly through the bars 12. A boiler floor constructed as in Fig. 3 can be supported clear of say ships plating by the channel members 13 shown in Fig. 1.

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In the alternative form of flooring shown in Fig. 5, the corrugated panels 4 make contact with external plating 10a having joggled ends that are separated from the panels by external flat bars 14, bolts and nuts 15 serving to clamp the parts together at those regions. Lap joints between panels may be located at any desired one of such clamping regions. The structure may be stiffened transversely of the troughing by tie bars 16 extending between the joggled ends of the plating 10a and welded thereto.

It will be understood that the forms of the invention disclosed are preferred forms only and that changes may be made in the apparatus without departing from the principles of the invention. Accordingly the invention is not to be limited excepting by the scope of the appended claims.

What I claim is:

1. A furnace lining structure comprising metal plating corrugated to produce troughs between flat regions, lining bricks, and anchoring bolts adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with

nuts lying within the troughs on the outside of the plating.

2. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, and an anchoring bolt for each brick, said bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating.

3. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, said bricks having an undercut recess in the face thereof adjacent the metal plating, and an anchoring bolt for each brick, said bolts having a tapered head adapted to engage the recess in a brick, the bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating.

4. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, said bricks having an undercut recess in the face thereof adjacent the metal plating, a layer of non-conducting material interposed between the bricks and said plating, and an anchoring bolt for each brick, said bolts having a tapered head adapted to engage the recess in a brick, the bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating.

5. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, said bricks having an undercut recess in the face thereof adjacent the metal plating, an anchoring bolt for each brick, said bolts having a tapered head adapted to engage the recess in a brick, the bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating, flat plating outside the troughed plating, flat bars attached to the inner face of the flat regions of the corrugated metal plating, and studs connecting the flat plating to the flat bars.

6. In a vapor generator, a furnace floor construction, comprising a layer of firebricks, said bricks having an undercut recess in one face, metal panels corrugated to produce troughs having sloping sides between flat regions at both surfaces, an anchoring bolt for each brick having a tapered head adapted to engage the recess in the bricks, said bolts extending through the plating into troughs on the outside of the plating, nuts in said troughs cooperating with said bolts, and washers having sloping ends fitting the nuts and sloping sides of the associated troughs, the diverging end portions of the washers resting on a flat region of the troughs.

7. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, said bricks having an undercut recess in the face thereof adjacent the metal plating, an anchoring bolt for each brick, said bolts having a tapered head adapted to engage the recess in a brick, the bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating, external flat plating having joggled ends, flat bars interposed between such joggled ends and the troughed plating, and screw threaded means clamping the joggled ends to the flat bars and troughed plating.

8. In a vapor generator, a floor comprising metal plating corrugated to produce troughs between flat regions, lining bricks, said bricks having an undercut recess in the face thereof adjacent the metal plating, an anchoring bolt for each brick, said bolts having a tapered head adapted to engage the recess in a brick, the bolts being adapted to attach the bricks to the metal plating, said bolts passing through the bases of inwardly projecting troughs of the plating and fitted with nuts lying within the troughs on the outside of the plating, flat plating outside the troughed plating having joggled ends, flat bars interposed between such joggled ends and the troughed plating, bolts and nuts clamping the joggled ends to the flat bars and troughed plating, and tie bars extending between and welded to the joggled ends of the flat plating.

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