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FURNACE WALL

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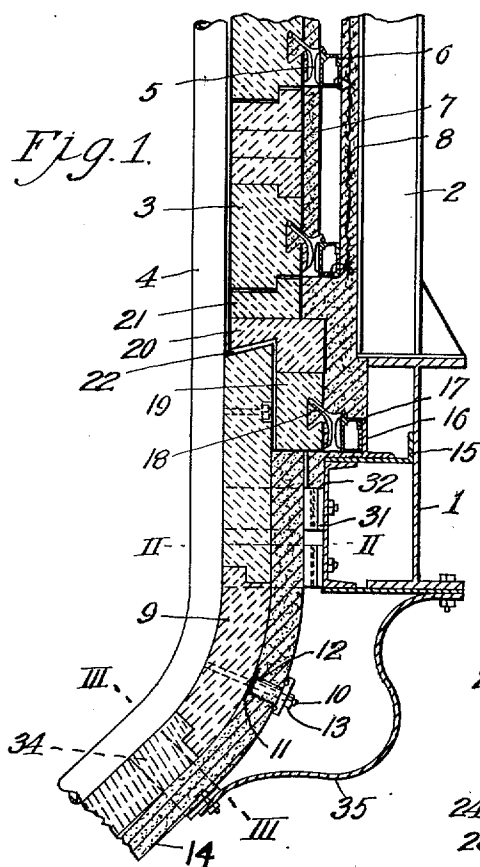
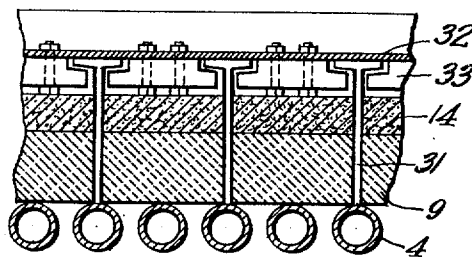
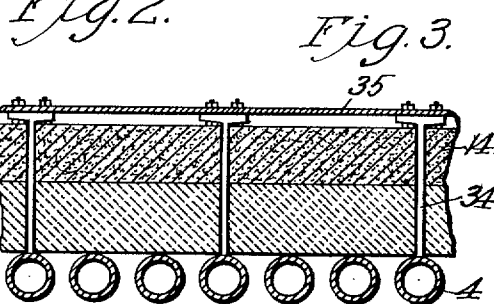
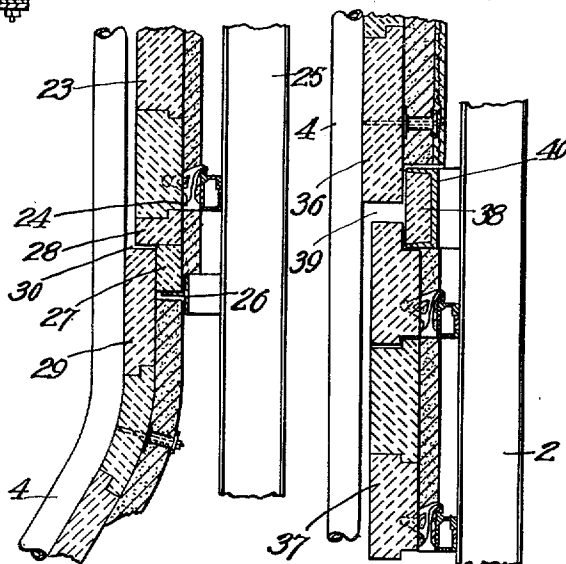
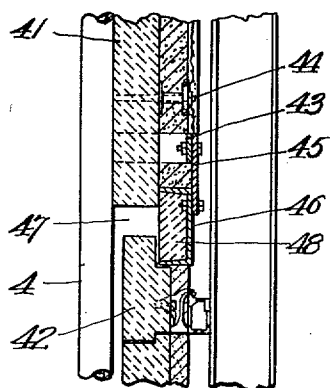


Fig. 6.

Fig. 4.

Fig. 5.

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## UNITED STATES PATENT OFFICE

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## FURNACE WALL

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2 Claims. (Cl. 122-6)

1

This invention relates to boiler supports and enclosing walls for that type of boiler having a series of boiler tubes extending in generally parallel relation to the enclosing walls and capable of longitudinal expansion independently of such walls. One of the objects of the invention is to produce a construction of this type in which the wall is constructed in multiple sections, some of the sections being fixed to the skeleton support or framework of the furnace and the other sections to the boiler tubes to move therewith, together with means for sealing the joint between the wall sections upon the expansion and contraction of the boiler tubes.

Another object of the invention is to produce a construction of the type indicated which is effective, regardless of whether the boiler tubes expand upwardly or downwardly, depending upon which end of the boiler is fixed.

With the general objects named in view and others as will hereinafter appear, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing, in which:

Figure 1 is a fragmental vertical section through a boiler tube furnace embodying the invention, in which the boiler tubes are mounted for downward expansion.

Figure 2 is a section on the line II—II of Figure 1.

Figure 3 is a section on the line III—III of Figure 1.

Figure 4 is a fragmental vertical section through a slightly modified construction of the type shown in Figures 1 through 3.

Figure 5 is a fragmental vertical section through a wall construction in which the boiler tubes are supported for upward expansion.

Figure 6 is a similar view, but of a slightly modified construction.

In the said drawing, where like reference characters identify corresponding parts in all of the figures and referring primarily to the construction shown in Figures 1 through 4, 1 and 2 respectively indicate horizontal and vertical supports forming part of the skeleton framework of the furnace. Fixedly secured to the uprights or vertical supports 2, in any suitable manner, are a plurality of tile or refractory 3 forming a furnace wall generally paralleling downwardly expansible boiler tubes 4. It is to be noted by reference to Figure 1 that the horizontal support projects beyond the plane of the end of

2

the wall 3, such projecting portion in effect constituting an extension from the horizontal or fixed wall support. By preference the wall 3 comprises a series of horizontal belts, predetermined tile of each belt being suspended from hangers 5 which are supported by wall boxes 6, secured in any suitable manner to the uprights 2, the wall being completed by a pair of plastic sealing coatings 7 and 8 if desired.

Below the fixed wall 3 a secondary wall or section movable with the tubes is provided, said wall comprising a series of refractory or blocks 9 carried by bolts or the like 10 constituting wall supporting means, welded or fastened to and outwardly projecting from predetermined boiler tubes 4. The wall 9 may be held in position by clamping washers 11 below clamping sleeves 12 and clamping nuts 13, the outer face of the wall being finished by a plastic coating 14, if desired. In Figure 1, the expansion joint between the two wall sections is completed by securing an auxiliary horizontal beam 15 to the beam 1, said beam 15 supporting an angle iron 16 to which a wall box 17 is fastened. Detachably carried by the wall box or support 17 are tile hangers 18 carrying a plurality of tile 19, 20 and 21 which overlap the upper end of the tube and tile wall 9 and provide an inwardly and downwardly opening expansion joint 22. Figure 4 is much the same construction, the fixed wall 23 being suspended from tile hangers 24, and the upright furnace support 25 carries an inwardly projecting shelf 26 supporting a plurality of tile 27 and 28, overlapping the upper end of the tube and tile wall 29 to form an expansion joint 30.

Under some conditions it may be desirable to tie the lower ends of the tubes 4 to the furnace framework 1—2 to insure that said tubes do not bow inwardly away from the furnace wall. A construction of this nature is illustrated in Figure 1, in which outwardly projecting T-shaped angles or guide means 31 are welded or fastened to the tubes 4, the outer surfaces of the heads of said T-irons being in vertical sliding engagement with vertical angle plates 32 secured to the framework beam 1, and being held in guided position by shouldered clamp plates 33, see Figure 2. This arrangement provides a tie-back for the tubes and limits their movement inwardly or outwardly in relation to the furnace. The structure shown in Figure 1 may be completed by a shield to guard against air infiltration by welding T-irons 34 (see Figure 3) to predetermined tubes 4, the heads of said T-irons being

3

4

secured to a flexible bowed metal sealing plate 35 having its upper end secured to the underside of the beam 1.

In the construction illustrated by Figures 5 and 6, the tube and tile or movable wall is shown above the fixed or suspended wall. In Figure 5, 36 illustrates the tube and tile wall secured in any suitable manner to the boiler tubes 4, and 37 illustrates the fixed or suspended wall, secured in any suitable manner to the furnace upright 2. In this construction, the expansion joint comprises a tile 38 overlapping the joint 39 between the wall sections, said tile being carried by a channel iron 40 or the like, rigidly secured in any suitable manner to said upright 2. In Figure 6, 41 and 42 respectively, indicate the movable tube and tile wall and the fixed or suspended wall. In this construction a downwardly projecting plate 43 is secured to predetermined bolts 44 carried by the boiler tubes 4, and said plate may carry an extension plate 45 to which an inwardly opening channel 46 is fixedly secured. Received within the channel 46 and bridging the expansion joint 47 between the two wall sections, is an expansion joint sealing tile 48. Otherwise this construction may be similar to those previously described.

From the above description and drawing, it will be apparent that I have produced a construction embodying all of the features of advantage set forth as desirable, and while I have described and illustrated the preferred embodiment, it is to be understood that I reserve the right to make all changes properly falling within the spirit and scope of the appended claims.

I claim:

1. In a water wall furnace having a series of adjacent tubes exposed to the heat of the furnace, said tubes comprising vertically extending sections and angularly extending sections, a vertical metal framework externally paralleling and independent of the vertical section of the tubes, a series of tiles carried by the framework and forming a wall, a plurality of bolts welded to and

outwardly projecting from the angular sections of the tubes, tiles carried by said bolts and forming another wall, and an expansion joint formed between the walls by an overlapping of said walls, each wall being capable of independent movement without opening the joint.

2. In a water wall furnace having a series of adjacent tubes exposed to the heat of the furnace, said tubes comprising vertically extending sections and angularly extending sections, a vertical metal framework externally paralleling and independent of the vertical section of the tubes, a series of tiles carried by the framework and enclosing the tubes, a second series of tiles carried by the angular section of the tubes and enclosing the same, and an expansion joint formed by an overlapping of the two series of tiles whereby the two series of tiles may shift without opening said joint.

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