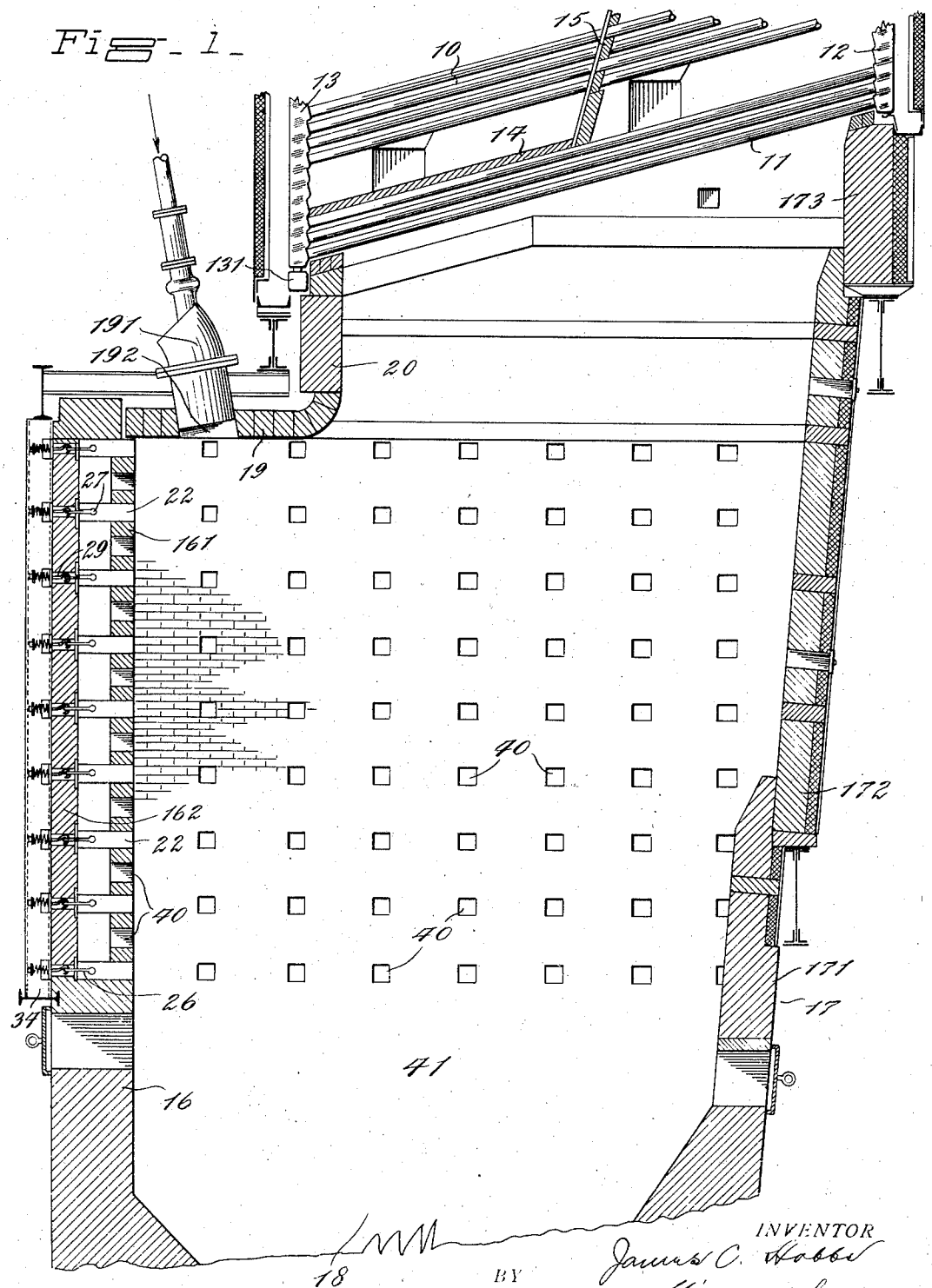
April 15, 1930. J. C. HOBBS 1,754,514

FURNACE WALL

Original Filed Dec. 5, 1925 2 Sheets-Sheet 1

Fig. 1.



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Original Filed Dec. 5, 1925 2 Sheets-Sheet 2

Fig. 2.

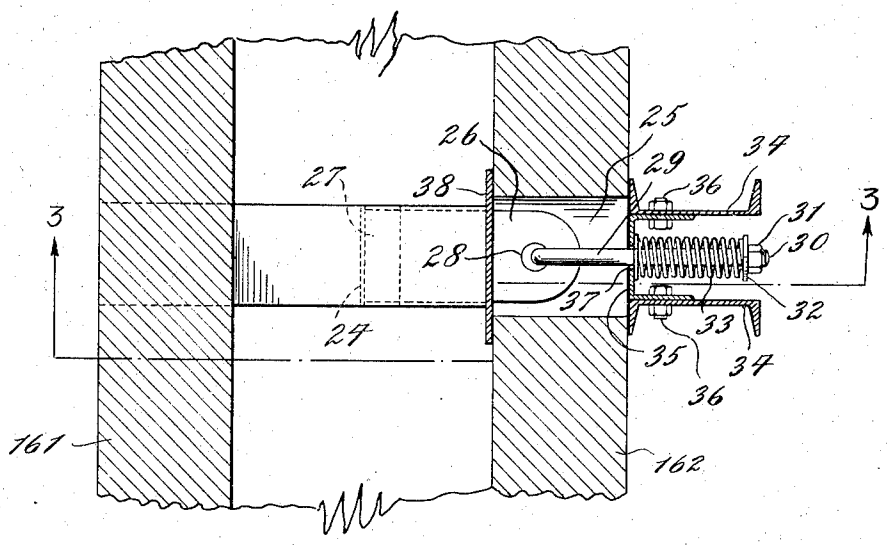
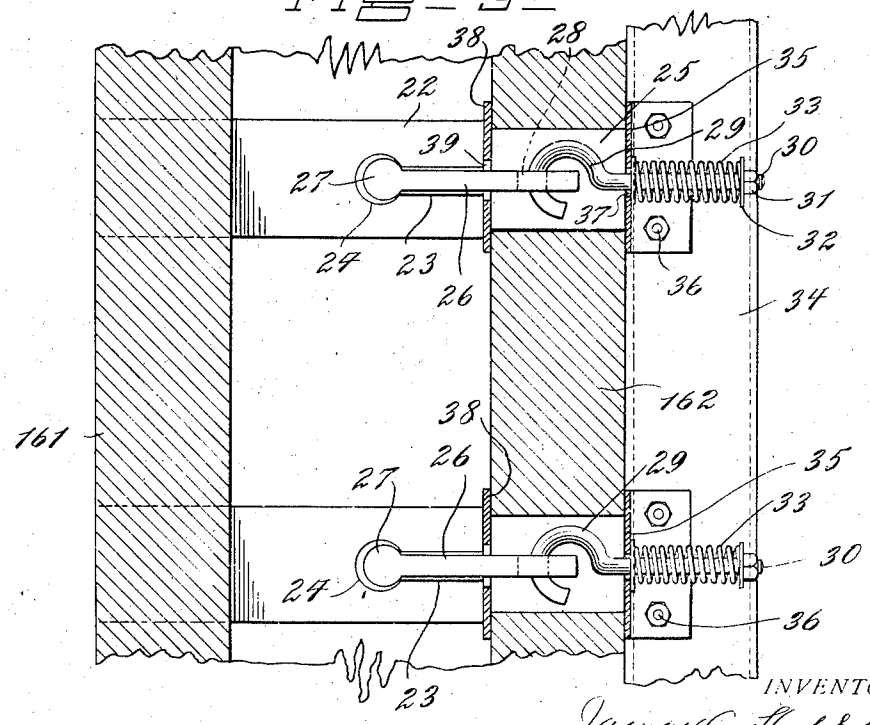


Fig. 3.



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UNITED STATES PATENT OFFICE

JAMES C. HOBBS, OF PAINESVILLE, OHIO

FURNACE WALL

Application filed December 5, 1925, Serial No. 73,313. Renewed September 10, 1929.

My invention relates to new and useful improvements for holding furnace walls in position.

Other objects of my invention will appear in the specification and will be particularly pointed out in the claims.

My invention will best be understood by reference to the accompanying drawings in which I have illustrated one embodiment of my invention and in which Fig. 1 is a longitudinal vertical section through a portion of a steam boiler and the furnace therefor embodying my invention; Fig. 2 is a fragmentary horizontal section through a portion of the front furnace wall, and Fig. 3 is a section taken on the plane of the line 3—3 of Fig. 2.

Like reference characters indicate like parts throughout the drawings.

Referring now to the drawings and first to Fig. 1, 10 is a portion of an upper bank of horizontally inclined water tubes, and 11 is a lower bank spaced from the upper bank, the two banks being connected at one end to an uptake header 12, the opposite ends being connected to a downtake header 13, which is, in turn, connected to a mud drum 131. In the form shown, a horizontally inclined baffle 14 is located above the lower bank of tubes 11, while an inclined baffle 15 extends from the free end of the baffle 14 across the space between the two banks and across the upper bank of tubes 10, as illustrated.

The furnace for the boiler comprises a front wall 16, a rear wall 17, which, in the form shown, comprises three sections 171, 172, and 173. One of the side walls for the furnace is indicated at 18. Extending from the top of the front furnace wall 16 is a roof arch 19, from the inner end of which a vertical section 20 extends upwardly to the mud drum 131.

At least one of the furnace walls, and as here illustrated, the front furnace wall, comprises an inner wall 161 and an outer wall 162 which is spaced from the inner wall. My invention comprises refractory members 22 which are in the form of special tile secured to one of the spaced walls and here illustrated as the inner wall. The refractory members 22 are provided with grooves 23 having enlarged portions 24 at their inner ends, suitable metallic members 26 having bulbs at their ends being received in the grooves 23, the bulb ends 27 being received in the enlarged ends 24 of the openings. The members 26 form part of a flexible connection for yieldingly holding the wall to which the refractory members are secured at a plurality of points, suitable openings 25 being provided in the outer furnace wall through which such yielding connections pass. The outer ends of the metallic members 26 are provided with openings 28 in which are engaged the hooks on attaching members 29, the outer ends of which are preferably screw-threaded, as at 30, to receive nuts 31 which engage spring plates 32. Suitable springs 33 surround the hook members 29 and engage at their outer ends the spring plates 32 and at their inner ends preferably engage fixed members which are associated with and preferably form buck-stays for the outer wall 162. In the form illustrated, the fixed members comprise spaced channels 34 which are connected by other channels 35, the flanges of which are secured to the channels 34 by bolts 36 and the intermediate portions of which overlap the outer wall and are seated thereagainst, as is indicated in Fig. 3. The channels 35 are, of course, provided with suitable openings 37 through which the hook members pass. Sealing plates 38 are also preferably provided which extend over the openings 25 and are seated against the outer wall on the inner side thereof, the sealing plates being provided with suitable openings 39 through which the metallic members 26 pass. Combustion air may be admitted to the space between the inner and outer walls through any suitable conduit, the inner wall preferably being provided with a plurality of openings 40 through which the air which passes through the space between the two walls and becomes heated therein, is supplied to the combustion space 41 of the furnace.

In the form of my invention illustrated, the furnace is fired with powdered fuel which is supplied through a powdered fuel burner 191

which extends through an opening 192 in the roof 19.

It will be apparent that the inner and outer walls are free to move in any direction in planes parallel to each other. The grooves and the bulbs connected thereto permit relative vertical movement between the two walls at the same time the spacing means permits relative motion between the two walls in a direction at right angles to the planes of the two walls. In the illustrated form the refractory members 22 extend across the space between the two walls into engagement with the outer wall. The yielding means, permitting movement of the inner wall in a direction at right angles to the planes of the two walls, thereby evens the load so that an excessive strain is not placed on any one or two holders and thereby avoids breakage of the refractory members, such as might occur when the tile which comes into action might be called upon to take practically all of the strain until it failed and then cause the next to be loaded and fail in turn.

It will be understood that the arrangement which I have shown is merely illustrative and that the embodiment of my invention may be widely varied. It will, for example, be understood that the members which extend from the inner wall into engagement with the outer wall are only illustrative and that the yielding means which permit relative movement between the two walls in a direction substantially at right angles to the planes of the two walls may be widely varied.

It is further to be understood that while I have illustrated my invention embodied in a furnace having a double wall, it is also applicable to a single wall.

I claim:

1. In a furnace wall, an inner wall, an outer wall, means for maintaining the two walls in spaced relation, and yielding means for permitting relative movement of the two walls in a direction substantially at right angles to the planes of said walls, the parts being constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

2. In a furnace wall, an inner wall, an outer wall, means for maintaining the two walls in spaced relation, and yielding means for permitting movement of the inner wall in a direction substantially at right angles to the planes of said walls, the parts being constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

3. In a furnace wall, an inner wall, an outer wall, means for maintaining the two walls in spaced relation, and yielding means for permitting movement of the inner wall in a direction substantially at right angles to the planes of said walls at a pluralty of points, the parts being constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

4. In a furnace wall, an inner wall, an outer wall, spacing means for the two walls comprising special tiles secured to one of said walls and extending into the space between the two walls, and yielding means attached to said special tiles for permitting movement of one of said walls at a plurality of points in a direction substantially at right angles to the planes of said walls, the parts being constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

5. In a furnace wall, an inner wall, an outer wall, spacing means for the two walls comprising special tiles secured to one of the walls and extending through the space between the two walls into engagement with the other wall, and yielding means attached to said special tiles for permitting movement of one of said walls at a plurality of points in a direction substantially at right angles to the planes of said walls, the parts being constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

6. In a furnace wall, an inner wall, an outer wall spaced therefrom, fixed members associated with one of said walls, refractory members secured to the other wall, and yielding means for connecting said refractory members to said fixed members whereby the one wall is yieldingly held through said refractory members at a plurality of points in spaced relation to the other wall.

7. In a furnace wall, a first wall, a second wall spaced therefrom, fixed members associated with the second wall and located at the side thereof remote from the first wall, refractory members secured to the first wall and extending into engagement with the second wall, and yielding means for connecting said refractory members to said fixed members whereby the first wall is yieldingly held through said refractory members at a plurality of points in spaced relation to the other wall and permitted to move in a plane at right angles to the planes of said walls.

8. In a furnace wall, an inner wall, an outer wall spaced therefrom, the outer wall being provided with a plurality of openings, the inner wall being provided with a plurality of refractory members extending into engagement with the outer wall, and yielding means attached to said refractory members and extending through said openings whereby the inner wall is yieldingly held at a plurality of points in spaced relation to the other wall, and permitted to move in a direction substantially at right angles to the planes of said walls.

9. In a furnace wall, an outer wall provided with a plurality of openings, an inner wall provided with a plurality of refractory mem-

bers extending into engagement with the outer wall, and flexible means attached to said refractory members and extending through the openings in the outer wall, and having a fixed portion for permitting movement of the inner wall in a direction substantially at right angles to the planes of the walls.

10. In a furnace wall, an inner wall, an outer wall spaced therefrom, fixed members associated with one of said walls, refractory members secured to the other wall, and springs for connecting said refractory members to said fixed members whereby the one wall is yieldingly held through said refractory members at a plurality of points in spaced relation to the other wall.

11. In a furnace wall, an inner wall, an outer wall spaced therefrom, one of said walls being provided with a plurality of openings, the other wall being provided with a plurality of refractory members, yielding means attached to said refractory members and extending through said openings having a fixed portion whereby the wall to which said refractory members are secured is held in spaced relation to the other wall, and sealing means covering the openings in the one wall and provided with openings through which said yielding means extend.

12. In a furnace wall, an outer wall, an inner wall spaced from the outer wall and provided with a plurality of grooved refractory members extending into the space between said walls, and means comprising bulb metallic members engaging the grooves in said refractory members for yieldingly holding the inner wall at a plurality of points in spaced relation to the outer wall.

13. In a furnace, an inner furnace wall, an outer wall spaced from said furnace wall to form an air passage, and yielding tie-pieces joining said walls at a plurality of points to permit relative movement of the two walls in a direction substantially at right angles to the planes of the two walls and constructed and arranged to permit relative motion between the two walls in a direction parallel to the planes of said walls.

14. In combination, a furnace wall, a fixed supporting structure, and yielding means normally holding said wall at a plurality of points against the supporting structure and constructed and arranged to permit movement of said wall in a direction substantially at right angles to the plane of the wall.

15. In combination, a furnace wall, a fixed supporting structure, and means comprising springs connected between said wall and said fixed structure and yieldingly holding said wall against said fixed structure at a plurality of points whereby said wall may move in a direction substantially at right-angles to the plane of the wall.

16. In combination, a furnace wall comprising a plurality of special refractory elements, a fixed supporting structure, and means comprising springs connected between said refractory elements and said fixed structure and yieldingly holding said wall against said fixed structure whereby movement of the furnace wall in a direction substantially at right angles to the plane of the wall is permitted.

17. In combination, a fixed supporting structure, a wall provided with a plurality of members projecting therefrom and adapted to engage said supporting structure, and means for yieldingly holding said projecting members against said supporting structure.

18. In combination, a fixed supporting structure, a wall provided with a plurality of refractory members projecting therefrom and adapted to engage said supporting structure, and means for yieldingly holding said projecting members against said supporting structure.

19. In combination, a fixed supporting structure, a wall comprising outer and inner spaced walls, the outer wall being adapted to seat against said fixed structure, and the inner wall having members projecting therefrom and adapted to seat against the outer wall, and yielding means connected between said fixed supporting structure and said projecting members for yieldingly holding said inner wall against the outer wall and the outer wall against said fixed structure.

20. In combination, a fixed structure, a wall comprising an outer wall and an inner wall, the outer wall being provided with openings and the inner wall being provided with members projecting in a direction of said openings, means passing through the openings in said outer wall and connected between said fixed supporting structure and said projecting members for yieldingly holding said inner wall in contact with the outer wall, plates being provided on the inside of the outer wall and surrounding said connecting means against which said projecting members are seated.

21. In combination, a furnace wall, a fixed supporting structure, yielding means normally holding said wall at a plurality of points against the supporting structure and constructed and arranged to permit movement of said wall in a direction substantially at right angles to the plane of the wall, and means permitting movement of said wall in its own plane relative to said fixed supporting structure.

JAMES C. HOBBS.