

(No Model.)

W. BRAND.
BOILER FURNACE.

No. 546,772.

Patented Sept. 24, 1895.

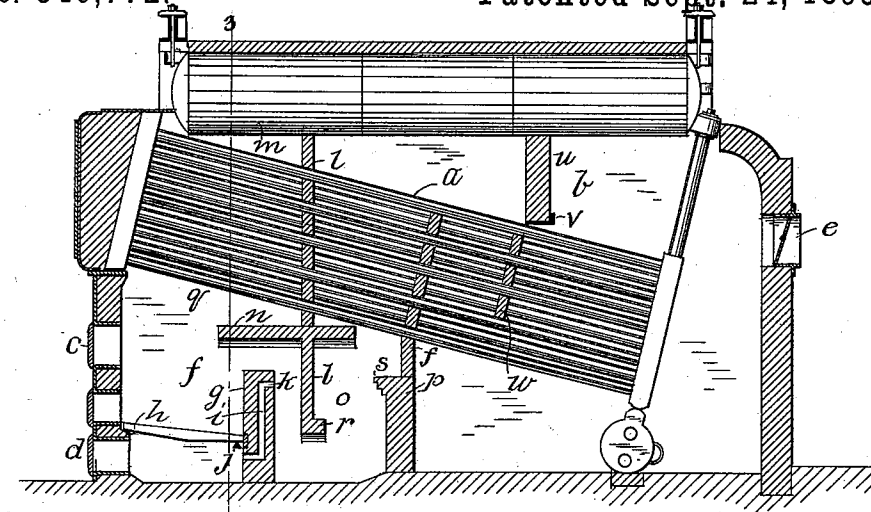


Fig. 1

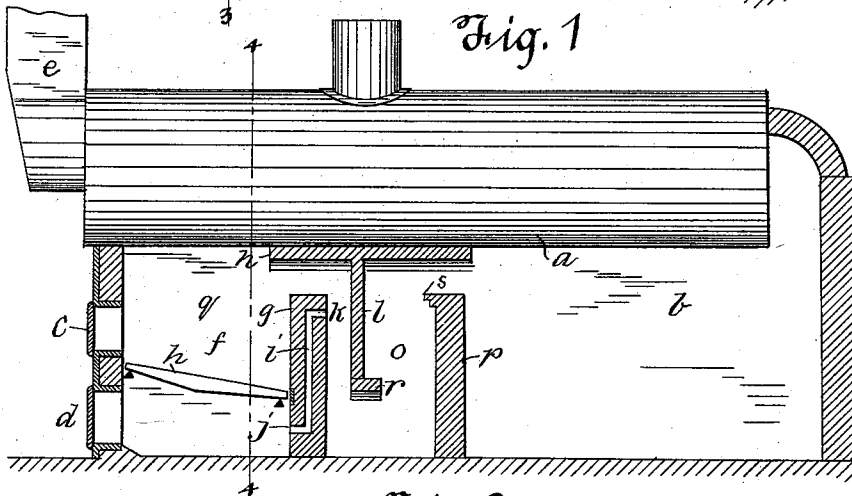


Fig. 2

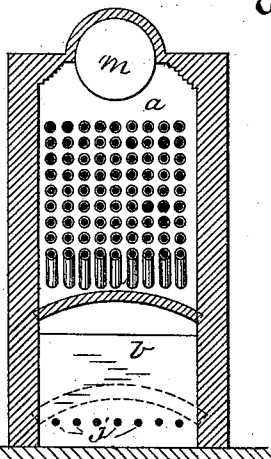


Fig. 3

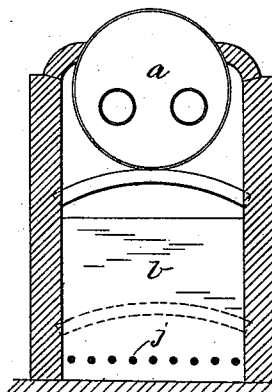


Fig. 4

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM BRAND, OF PITTSBURG, PENNSYLVANIA.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 546,772, dated September 24, 1895.

Application filed June 9, 1894. Serial No. 514,108. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BRAND, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Boiler-Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to steam-boiler furnaces.

To enable others skilled in the art to make and use my invention, I will describe the same with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a water-tube boiler-furnace embodying my invention. Fig. 2 is a like view of a smoke-flue boiler-furnace. Fig. 3 is a cross-section on the line 3 3, Fig. 1. Fig. 4 is a cross-section on the line 4 4, Fig. 2.

Like letters indicate like parts in each of the figures.

I will first describe my invention as applied to a water-tube boiler *a* of any ordinary construction and provided with the customary parts, which it is not deemed necessary to describe. This boiler *a* is contained within the walls of the furnace *b*, said furnace being provided with fuel-doors *c*, ash-door *d*, and the chimney-flue *e*. At the forward end of said furnace is the fuel-chamber *f*, which is formed by the front wall of the furnace and the bridge-wall *g*, and which is provided with the grate-bars *h*. These grate-bars *h* are downwardly inclined toward the bridge-wall *g* in order to expose a greater portion of said wall to the action of the heated mass of fuel on said grate-bars. The particular advantages of such an arrangement of the grate-bars will appear in the further description of my invention. The bridge-wall *g* has formed therein the flue *i*, with the openings *j* leading thereto and the openings *k* leading therefrom. These openings are arranged at suitable intervals. Beyond the bridge-wall *g* is the depending wall *l*. This wall *l* extends from the drum *m* to the arch *n*, which supports it, and below said arch into the combustion-chamber *o*, formed between the front bridge-wall *g* and the rear bridge-wall *p*. The upper portion of the depending wall *l* closes up the spaces between the water-tubes and, with the front end

of the arch *n*, forms a heating-chamber *q*. The arch *n* projects on both sides of the depending wall *l*. The depending wall *l* is provided with a short arch *r*, extending into the combustion-chamber *o*.

The rear bridge-wall *p* is provided with a rearwardly-projecting ledge *s*. Said bridge-wall has also the extension *f'*, which is preferably slightly inclined toward the rear of the furnace and fills up the spaces between the water-tubes. A second depending wall *u* extends down from the drum *m*, said wall being supported on the beam *v*. Below said depending wall *u* is another deflecting wall *w*, interposed between the water-tubes.

In Figs. 3 and 4 I have illustrated my invention as applied to a smoke-flue boiler. When the boiler is in use, the heated products rise into the heating-chamber *q*, (where a water-tube boiler is employed.) The front portion of the arch *n* holds the heated products within the heating-chamber *q* and prevents their escaping to the combustion-chamber *o* too rapidly. As the water in the tubes of the boiler has a tendency to chill the products of combustion, it is necessary to hold the products of combustion within the heating-chamber *q* until this chilling effect of the water-tubes has been overcome. The heated products finally escape from the heating-chamber *q* into the space between the bridge-wall *h* and depending wall *l*, where they are met by the air escaping from the openings *j*. This air, coming, as it does, from the ash-pit through the flue *i* of the highly-heated bridge-wall *h*, is itself highly heated. The inclination of the grate-bars *h* causes the fuel to pile up against said wall, whereby the greater portion of said wall above the grate-bars is exposed to the heated mass of fuel, and consequently the air passing through the flue *i* is raised to a high degree. The heated products and air then pass into the combustion-chamber *o*, uniting with each other to form a very high heat within said combustion-chamber. The short arch *r* acts to throw the intermingled heated products and air toward the rear bridge-wall *p*, while the projecting ledge of said bridge-wall tends to throw the heated product toward the depending wall *l*, thus acting to retard the progress of same. The products of combustion then pass up through the intervening

spaces of the water-tubes, over the extension-wall *f*, and, coming into contact with the depending wall *u* and deflecting-wall *w*, proceed directly to the chimney.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a boiler furnace, the combination with the boiler, of a fuel chamber at the forward end thereof having a bridge wall, a combustion chamber back of said bridge wall and having a rear bridge wall, a depending wall between said bridge walls within said combustion chamber, and an arch or roof extending forwardly from the depending wall just beyond the front bridge wall, whereby an air space is left between the bottom of the boiler and the upper face of said arch or roof, substantially as set forth.

2. In a boiler furnace, the combination with the boiler, of a fuel chamber at the forward end thereof having a bridge wall, a combustion chamber back of said bridge wall having a rear bridge wall, a depending wall between said bridge walls within said combustion chamber, said depending wall having an arch or projecting ledge at the lower end thereof extending into said combustion chamber, and said rear bridge wall having a ledge at the upper end thereof projecting into said combustion chamber, substantially as set forth.

In testimony whereof I, the said WILLIAM BRAND, have hereunto set my hand.

WILLIAM BRAND.

Witnesses:

ROBT. D. TOTTEN,
JAMES I. KAY.