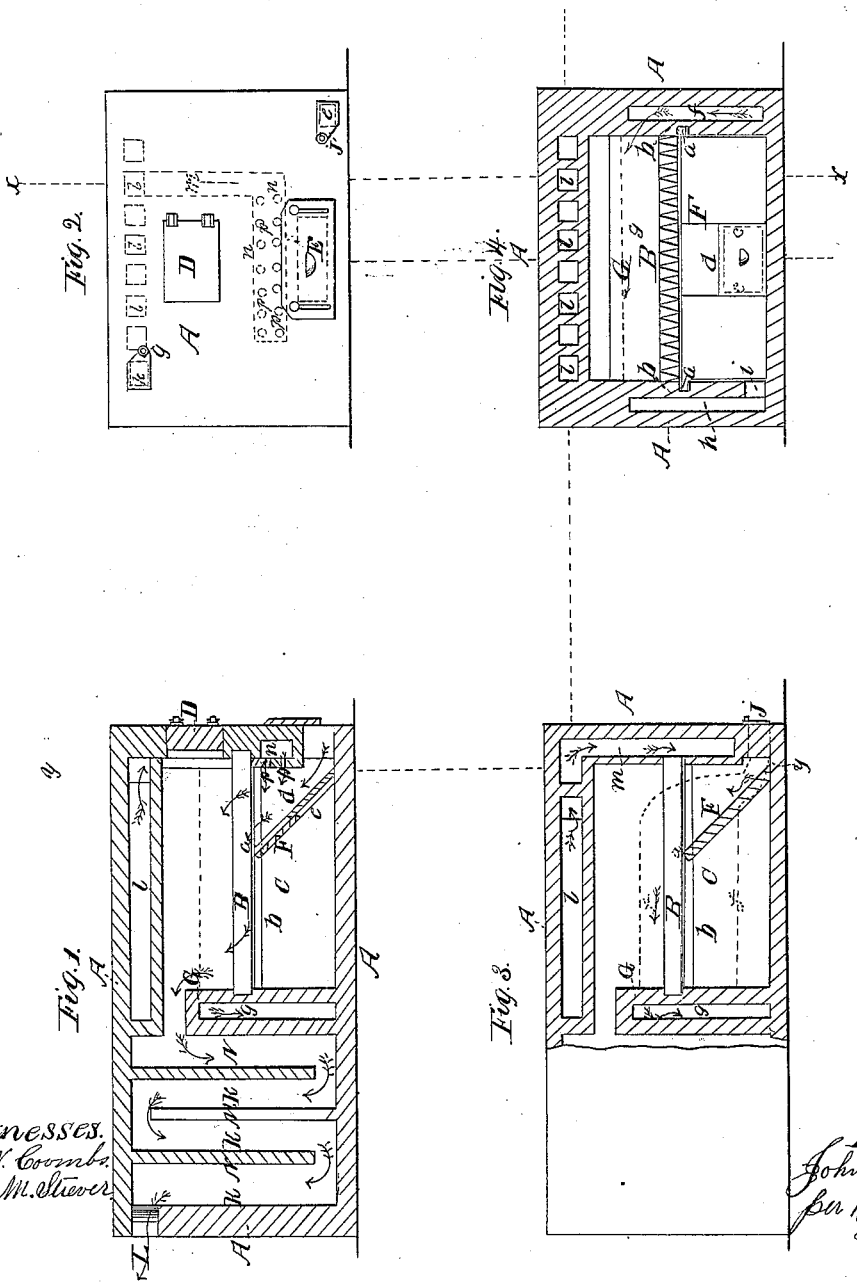
Sheet 1 - 2 Sheets.

J. Chilcott,

Steam-Boiler Furnace,

No. 51,923, Patented Jan. 9, 1866.



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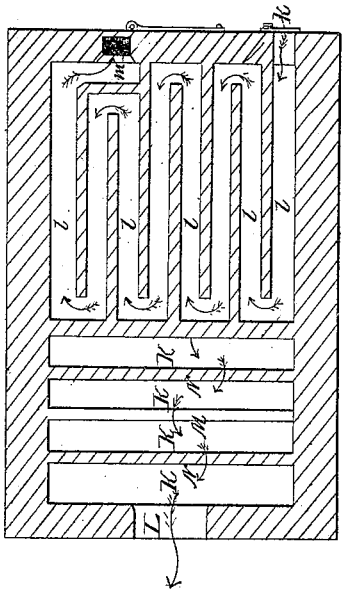

Fig. 5.

Witnesses.
F. W. Coombs.
H. M. Stuver.

Inventor
John Chilcott
per Brown Coombs & Co
Att'ys

UNITED STATES PATENT OFFICE.

JOHN CHILCOTT, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **51,923**, dated January 9, 1866; antedated December 28, 1865.

To all whom it may concern:

Be it known that I, JOHN CHILCOTT, of No. 74 Fulton street, in the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Furnaces for Steam-Generators and other Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal vertical section of a furnace with my improvements. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical section of the same in the plane indicated by the line *x x* in Figs. 2 and 4. Fig. 4 is a transverse vertical section in the plane indicated by the line *y y* in Figs. 1 and 3. Fig. 5 is a horizontal section in the plane indicated by the line *z z* in Figs. 3 and 4.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in certain novel means of conducting and directing to a furnace a properly-regulated supply of cold or heated air, or both, to produce a very perfect combustion of the fuel.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The furnace is entirely inclosed and covered with a shell, A, of brick-work or other suitable material, and the boiler or other apparatus to be heated by it may be arranged directly over or in rear of it. The fire-grate B is arranged in about the usual position in front, with an ash-pit, C, below and a bridge-wall, G, behind it. Under the fire-door D there is an opening to the ash-pit with a sliding door, E.

Under the grate and extending all across and the whole depth of the ash-pit there is an inclined slab, F, of cast-iron or fire-brick, the lower edge of which rests upon the bottom of the ash-pit, and the upper parts of which are supported by two tenons, *a a*, at its ends, fitting easily to horizontal grooves *b b*, in the side walls of the ash-pit, to enable the said slab to be moved back and forth and arranged at any distance from the front of the ash-pit. This slab prevents the air, which enters the front of the ash-pit through the open door E or other means, from passing into the back part of the ash-pit, and causes the said air to pass through the front part of the grate and the fuel thereon, or to pass between the grate-bars and be heated before passing through the fuel on the part of the grate behind the upper edge of the said slab, thereby enabling the said air to mix more intimately with the gases rising from the fuel and producing more perfect combustion. In the lower part of the said slab F, at the middle of its length, there is an opening, *c*, of suitable width for raking out the ashes from the part of the ash-pit behind the said slab, the said opening being fitted with a sliding shutter, *d*, by which to close it at other times than when raking out the ashes, though this shutter may be kept open any distance that may be desired, to admit a limited quantity of air to pass through the opening *c* and through that portion of the grate behind the slab F.

At the right-hand side of the front of the furnace, near the bottom thereof, there is an opening, *e*, (shown in dotted outline in Figs. 2 and 3,) for the admission of air into a passage, *f*, in the corresponding side wall of the furnace, the said passage communicating with a passage, *g*, in the bridge-wall G, and this passage communicating with a passage, *h*, in the other side wall of the furnace, from which there is an opening, *i*, Fig. 4, leading into the front part of the ash-pit. The opening *e* is furnished with a shutter, *j*, which, when open, admits air through the said opening *e*, passages *f g h*, and opening *i* to the ash-pit, the air so admitted being heated in the said passages *f g h* and admitted in a heated state to the part of the ash-pit in front of the slab F before passing thence through the grate to mix with and inflame the gases eliminated from the fuel.

At the left-hand side of the upper part of the furnace there is an opening, *k*, which communicates with one end of a continuous series of passages, *l l*, in the roof of the furnace. The arrangement of these passages is best shown in Fig. 5, but the said passages are also shown in all the other figures. The other end of the said series of passages communicates with the upper end of a vertical passage, *m*, in the front wall of the furnace, and this passage communicates with a horizontal passage, *n*, constructed in the front wall, the latter passage having

numerous orifices, *p p*, for the admission into the front part of the ash-pit of the air which passes through the opening *k*, passages *l*, *l*, *m*, and *n*, and which is heated in its circulation through said passages, and before being admitted through the fuel on the front part of the grate. The opening *k* is furnished with a shoulder, *q*, by which it may be closed when sired, or opened to any desirable degree.

The whole of the air passing into the furnace may be admitted through the door E or through either of the openings *e k* by closing all but one of them, or portions of it may be admitted through any two or all three of the openings, according to the condition of the fuel on the grate, or as the judgment of the engineer or fireman may direct.

In rear of the bridge-wall G of the furnace are represented a series of alternating upright and hanging bridge-walls, M and N, Figs. 1 and 5, forming gas-mixing chambers K K, in which the mixture of the combustible gaseous products of combustion and unmixed air that may escape from the furnace is effected, and their combustion completed before the gaseous products pass off by the exit-opening L to the boiler or other apparatus to be heated.

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

1. The slab F, arranged across the ash-pit C, below the grate B, substantially as and for the purpose herein specified.

2. The arrangement of the opening *e*, passages *f g h*, and opening *i*, in combination with each other and with the furnace and slab F, substantially as and for the purpose herein described.

3. The arrangement of the opening *k*, passages *l l m n*, and orifices *p p*, in combination with each other and with the furnace and ash-pit, substantially as and for the purpose herein specified.

JOHN CHILCOTT.

Witnesses:

HIPPOLYTE MALI,

CHAS. E. FROST.