(No Model.)

M. S. FOOTE.

BOILER FURNACE.

No. 264,871. Patented Sept. 26, 1882.

Fig. 1.

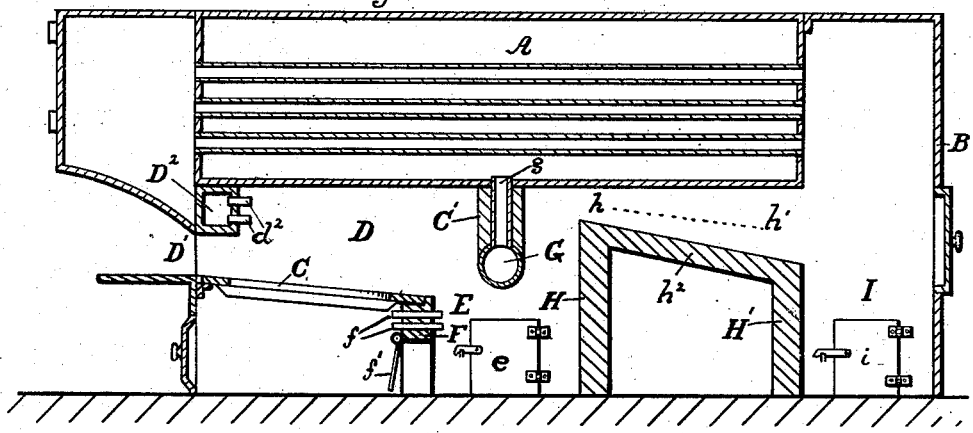


Fig. 2.

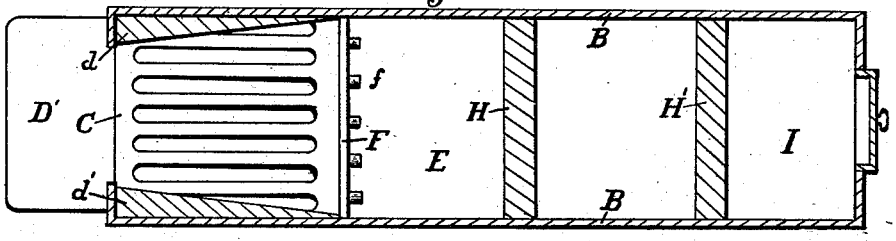
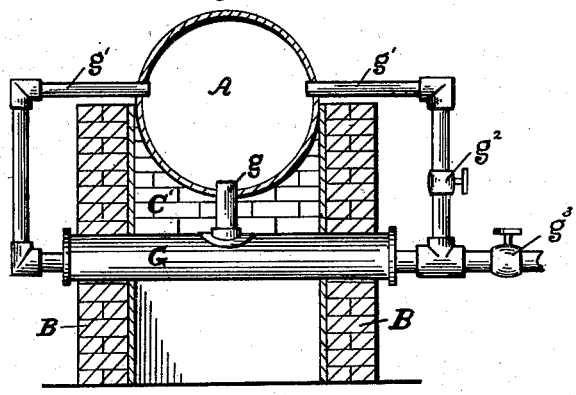


Fig. 3.



WITNESSES

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BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 264,871, dated September 26, 1882.

Application filed August 8, 1882. (No model.)

To all whom it may concern:

Be it known that I, MARK S. FOOTE, of Burlington, county of Des Moines, State of Iowa, 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 of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal section of an apparatus embodying my invention. Fig. 2 is a plan view of the grate, showing parts in section. Fig. 3 is a cross section at the rear of the grate.

The object of my invention is to provide an improved boiler-furnace calculated to economize fuel, adapted to burn screenings, to consume the smoke, and also to direct the heat evenly under the whole boiler.

In carrying out my invention, A is any suitable boiler.

B represents the walls supporting the boiler.

C is the grate. I desire to have the grate slope downward to the rear, and I find that by placing the front end of the grate-bars about twelve inches and the rear end about twenty-two inches below the boiler a very suitable location is obtained, though I do not confine myself to any particular distances.

D is the combustion-chamber of the furnace. Its interior side walls, *d* and *d'*, are so constructed that the chamber broadens or flares toward the rear, as shown in Fig. 2. The side walls thus diverging toward the rear, while the grate slopes downward in that direction also, it will be seen that an expanded form is given to the combustion-chamber perpendicularly and horizontally from the front to the back throughout, giving an expanding fuel-space, while the inclination of the grate also tends to precipitate the clinkers back into the clinker-pit E, back of the wall F, located under the rear ends of the grate-bars. Said wall F is provided with one or more air-pipes, *f*. By means of this wall cold air is prevented from passing behind the grate-bars, while air in jets is introduced through the pipes *f*. The clinker-pit is located between the wall F and the front bridge-wall, H.

e represents suitable doors leading from the sides of the supporting-walls B for the removal of the clinkers. Should an inside boiler be used, a suitable door may be provided in the wall F under the inside grate, whereby the clinkers may be removed from the front, as shown at *f'*. By removing the clinkers in this way a saving of time and labor is secured.

D' is the entrance to the combustion-chamber, through which fuel is fed.

D^2 is a cap or fire-lining, so constructed as to form a hot-air chamber, through which the air passes in a heated state into the furnace in jets through the pipes d^2.

G is a suitable water-collar, connected by one or more pipes, *g*, to the bottom of the boiler, and projecting downwardly therefrom. Said collar is further provided with pipe-connections *g'* from the upper ends to the sides of the boiler below the water-line. One of said pipes is also provided with a valve, g^2, which may be closed, and the water thereby forced around through the other pipe and the water-collar, and out through the blow-off cock g^3, thereby keeping the mud or sediment out of the collar and pipes. I prefer to locate this collar over the clinker-pit in such a manner as not to unduly interfere with the combustion-chamber, while at the same time, with the wall G' between it and the boiler, it shall act as a check to the passage of the smoke and hold it upon the fire, in order that it may be consumed, the heat, however, being turned down under the collar and up along the under surface of the boiler on the other side of the collar.

H is the front-bridge wall, closed in the upper part against the sides of the boiler, and having a suitable flue, *h*, underneath the boiler, so that the heat may pass back under the boiler to heat its rear end.

H' is the rear bridge-wall, closed entirely on the sides of the boiler, so as to prevent the flame from getting into the tubes at the sides, but leaving a suitable flue, *h'*, underneath the boiler, through which the flame and heat may be drawn under the boiler and up into the tubes. Said flue is provided with a suitable paving, h^2, preferably sloping downward to the

rear. By thus closing up the rear bridge-wall on the sides of the boiler and enlarging the opening under the boiler the flame is more effectually drawn under the boiler and directed underneath it to the rear.

I is an ash-pit at the rear of the rear bridge-wall, provided with a door, *i*, through which the ashes can be removed.

It is evident that in a furnace thus constructed the heat strikes the boiler well forward, and is directed under the whole surface through the flues to the rear.

What I claim is—

1. In a boiler-furnace, the combination, substantially as hereinbefore described, of a fuel-supporting grate, inclined in a downward direction from the front to the rear, with a combustion-chamber formed horizontally above the grate, with its side walls diverging from the front to the rear of the grate, whereby such combustion is caused to expand both horizontally and perpendicularly toward its rear, as specified.

2. In a boiler-furnace, the combination, with an inclined grate supported at its rear by a wall provided with air-jets, of the horizontally-arranged combustion-chamber, having side walls diverging from the front to the rear of the grate, and a hot-air chamber located in the forward part of the combustion-chamber above the grate for introducing heated air into the said combustion-chamber, substantially as described.

3. In a boiler-furnace, the combination, with a fuel-supporting grate, a combustion-chamber over the same, and a wall at the rear of the grate, of a clinker-pit arranged in rear of said wall, a water-collar, G, connected with the boiler and extending transversely over the clinker-pit in rear of the fuel-supporting grate, and end connections between the water-collar and the boiler, provided with the valve g^2 and blow-off cock g^3, substantially as described.

4. A boiler-furnace consisting of the combination, with the expanding combustion-chamber D, constructed in the manner herein set forth, of the clinker-pit E, the wall F, water-collar G, front and rear bridge-walls, H and H′, with the paving h^2 and flue $h\ h'$, and the ash-pit I, all constructed and arranged substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MARK S. FOOTE.

Witnesses:
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