CHARLES H. FOX.

Improvement in Steam Boiler Furnaces.

No. 123,882. Patented Feb. 20, 1872.

Fig. 1.

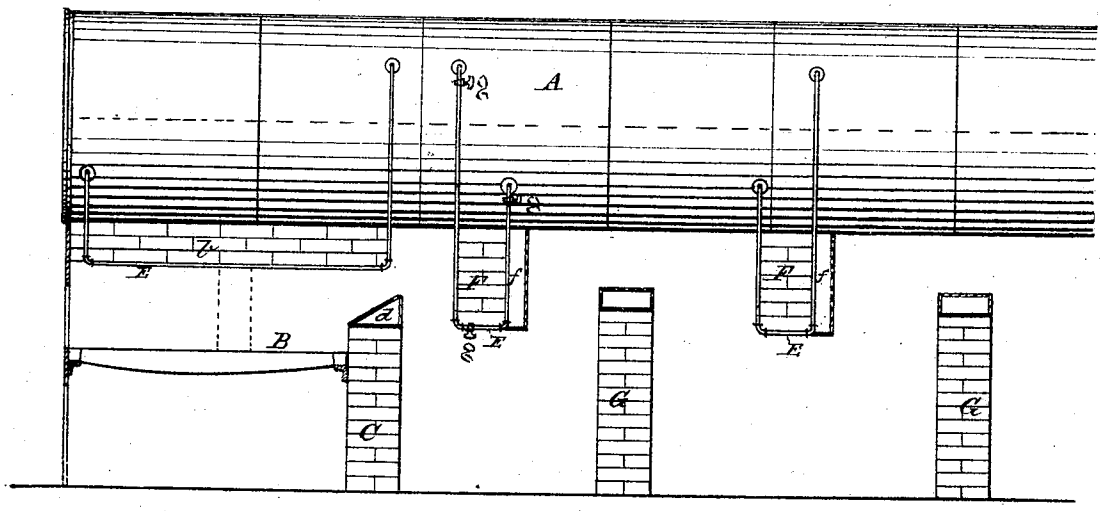
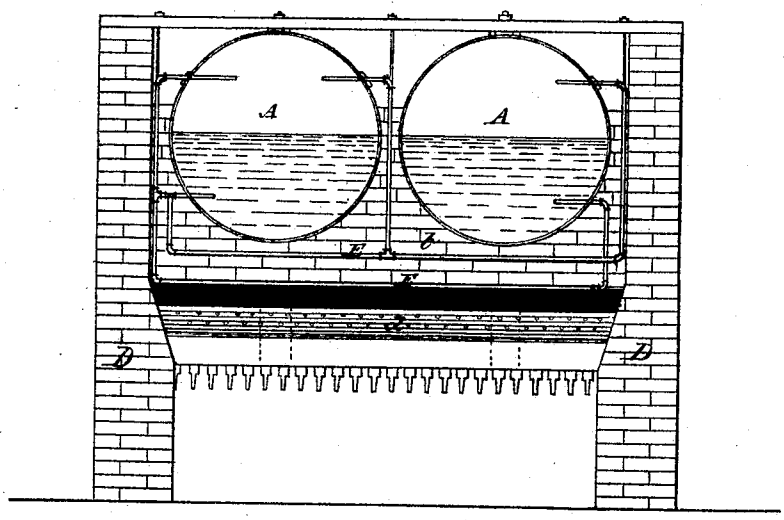


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES H. FOX, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. 123,882, dated February 20, 1872.

To all whom it may concern:

Be it known that I, CHARLES H. FOX, of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Furnaces for the Prevention of Smoke, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing and the letters of reference marked thereon making part of this specification, in which—

Figure 1 is a side view. Fig. 2 is an end view, the front plate being removed.

The first part of my invention relates to deflectors suspended from the boiler by water and steam tubes or pipes supporting fire-brick walls. The second part of my invention consists in a suspended crown-wall or arch made of fire-brick, and having a heated surface, against which the flames and gases impinge, instead of against the boiler with its low temperature. This crown-wall or arch is also supported by water-pipes connected to the boiler. The object of my invention is to furnish furnaces with deflectors that will, as is well known of fire-brick, retain and constantly radiate the heat developed by the fire, and also to provide a means of supporting them that will not burn out as easily as the common iron rods now in use. This I accomplish by wrought-iron pipes or tubes—such as gas-pipes—which are connected at one end with the steam-space in the boiler and the other end with the water-space, by which means a constant and continuous circulation of water is created, thereby preventing the said pipes or tubes from being burned, and also assisting in creating a better circulation of the water in the boiler and a more rapid generation of steam. The water in the tubes or pipes, being directly exposed to the heat, of course assists in heating the main body of water in the boiler. If at any time it is desirable to clean the pipes, small valves are provided to close the communication with the water, and then the steam may be allowed to blow all sediment and dirt out of said pipes. Immediately behind the deflectors I arrange perforated air-tubes, made of fire-brick or tiles, by which air is admitted to the spaces between the bridge-walls and the deflectors, thereby assisting in the consumption of the gases, smoke, and sparks, as from actual experiment it has been proved that a great saving in fuel is obtained, and no sparks whatever leave the chimney. The bridge-walls are also provided with air-tubes or air-spaces, which assist in the consumption of the gases, smoke, and sparks.

The construction and operation of my invention is as follows: A represents the boilers, under the front part of which is arranged the fire-grate B, of the usual construction. Immediately in the rear of the grate B is a bridge-wall, C, extending from side to side of the walls D. Upon the top of said bridge-wall I arrange an air-tube or space, *d*, preferably made of fire-brick or tiles, as these not only last better, but also retain and give out more heat than any other material. Any other suitable material may, however, be used, if preferred. Directly over the grate I arrange a ceiling or flat crown-wall, *b*, as it might be termed, that is supported by water-pipes E, which are connected together, and run both lengthwise and crosswise, thus forming a complete bed, upon which the fire-brick lies. The object of placing these fire-brick here is that the gases and flames impinge against them, which are of a higher temperature, instead of against the boiler, which has a much lower temperature, and thereby assists in consuming the gases and communicating their heat to the boiler. A short distance to the rear of the bridge-wall C I suspend a deflector, F, made of fire-brick, which is also supported by water-pipes, and in the rear of and connected to this deflector is an air-tube or space, *f*, made of fire-bricks or tiles, with perforations or small spaces between them. In the rear of the deflector I construct another bridge-wall, G, provided with air-tubes, and so on, alternately, a suspended deflector and a bridge-wall, as many as may be desired. I arrange small valves or cocks *g* in the pipes, so that all communication with the boiler may be shut off to prevent freezing, and when the boilers are not in use. If it is desirable to clean the pipes, the cock communicating with the water may be shut off and the cock communicating with the steam opened, by which all sediment and dirt is then blown out of said pipes by the steam. It will be readily understood and seen by this arrangement that the flames, heated gases, and sparks are retarded in their travel toward the chimney, and all the smoke, gases, and sparks consumed; that the entire heat developed is employed for the gen-

eration of steam, and that there can be no danger from sparks setting anything on fire; the sparks that are consumed being also that much fuel burned and saved, as this amounts to a large percentage when there is a strong draught, as is well known in locomotives and steamboats, where my improvements may be employed with the same advantage as in the boiler shown. By arranging the water-pipes in connection with the steam-space and water-space of the boiler, a continuous circulation of the water is obtained, and the pipes are, of course, prevented from being burned. If preferred, small fire-brick pillars, as shown in dotted lines, may be arranged under the front crown-wall, and also under the suspended deflectors. The boilers are supported in the usual way.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. One or more deflectors suspended by water-pipes, substantially in the manner shown and described.

2. Deflectors suspended as described, and provided with air spaces or tubes, as shown, and for the purpose set forth.

3. The water-pipes connected to the steam-space as a support, and in combination with fire-brick lining or deflectors, as shown, and for the purpose herein set forth.

4. The arrangement of the grate B, suspended crown *b*, deflectors F, and bridge-walls G, when constructed substantially as shown, and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES H. FOX.

Witnesses:

GEO. OENAS,

E. M. HUNT.