

A. STEINWAY.

Improvement in Steam-Boiler Furnaces.

No. 130,326.

Patented Aug. 6, 1872.

Fig. 1.

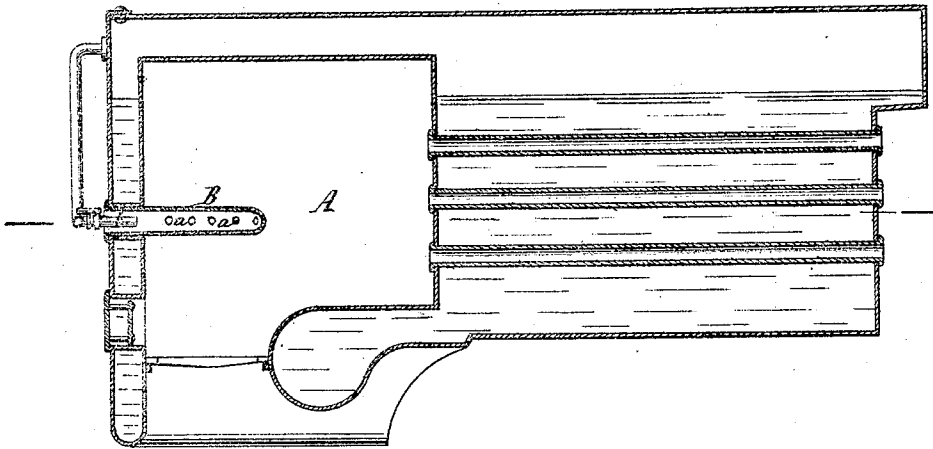


Fig. 2.

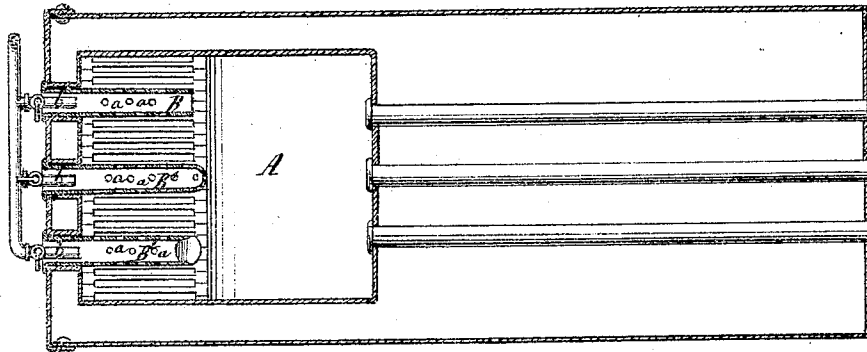


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. 130,326, dated August 6, 1872.

To all whom it may concern:

Be it known that I, ALBERT STEINWAY, of the city, county, and State of New York, have invented a new and useful Improvement in Smoke-Burning Attachment to Steam-Boilers, of which the following is a specification:

This invention consists of a mixing-tube, of cast-iron, fire-clay, or other refractory material, which enters the combustion-chamber of a steam-boiler or other furnace, and which is perforated with a large number of holes, in combination with a nozzle for steam or compressed air entering into the outer open end of said tube in such a manner that, by injecting through the nozzle a jet of steam or compressed air into and through the tube, a large quantity of atmospheric air is carried into the combustion-chamber and brought in contact with the gases rising from the fire, and by the action of the steam and air combined, or of the air above, the combustible gases contained in the combustion-chamber are ignited and the escape of unconsumed gases from the furnace is effectually prevented.

In the drawing, Figure 1 represents a vertical longitudinal section of a steam-boiler provided with a smoke-burning attachment. Fig. 2 is a horizontal section of the same in the plane *xx* of Fig. 1. Fig. 3 is a detached side view of one form of my attachment.

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

A designates the combustion-chamber of a steam-boiler or other furnace. Through the front of this combustion-chamber extends a mixing-tube, B, one or more, which is open at its outer end, while its inner end may either be open, as shown by the example marked B in Fig. 2, or it may be closed, as shown by the example marked B¹ in Fig. 2, or it may be partially closed and provided with a flat narrow opening, as shown by the example marked B² in Fig. 2. The body of the tube B is perforated with a large number of small holes, *a*, and it is made of cast-iron, fire-clay, or other refractory material capable of withstanding the heat to which it is exposed when the fire in the furnace is started. Opposite to the outer end of the tube B¹ is placed a nozzle, *b*, which extends a short distance into said tube,

and which can be supplied with steam from the boiler or with compressed air from any suitable reservoir. If steam or compressed air is admitted to the nozzle *b*, the jet issuing from it rushes through the tube B, and, by these means, a current of atmospheric air is induced through the tube into the combustion-chamber A. At the same time a quantity of the gases of combustion are sucked in through some of the perforations in the tube B and intimately mixed with the steam or air ignited through the nozzle *b*, and the gases rising from the fire are brought in contact with a large quantity of atmospheric air, whereby a complete combustion of the gases is effected. When a jet of steam is injected through the tube B the steam, on being heated to a high temperature in contact with the combustible gases rising from the fire, is decomposed into carbonic oxide and hydrogen, and by the combustion of these gases the heat in the furnace is increased. If the combustion-chamber is short and narrow a single tube may be used, which is closed at its inner end, such as shown at B in Fig. 2; but in a large furnace the tube is left open at inner end, as shown at B¹ in Fig. 2; and if the furnace is short and wide a tube may be used, such as shown at B² in Fig. 2; or, if desired, two or more tubes of either kind may be inserted in one or more sides of the same furnace.

By the use of my invention I am enabled to effect a considerable saving of fuel.

I do not claim arranging the tubes in line with the boiler-flues for the purpose of increasing the draft of the fire or for cleansing the tubes of ashes, for such is not new; but

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of one or more mixing-chambers or retorts, B, and nozzles *b*, with the combustion-chamber of a steam-boiler or other furnace, substantially as herein shown and described.

ALBERT STEINWAY.

Witnesses:

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