

D. RENSHAW.

Steam-Generators and Smoke-Consuming Furnaces.

No. 149,062.

Patented March 31, 1874.

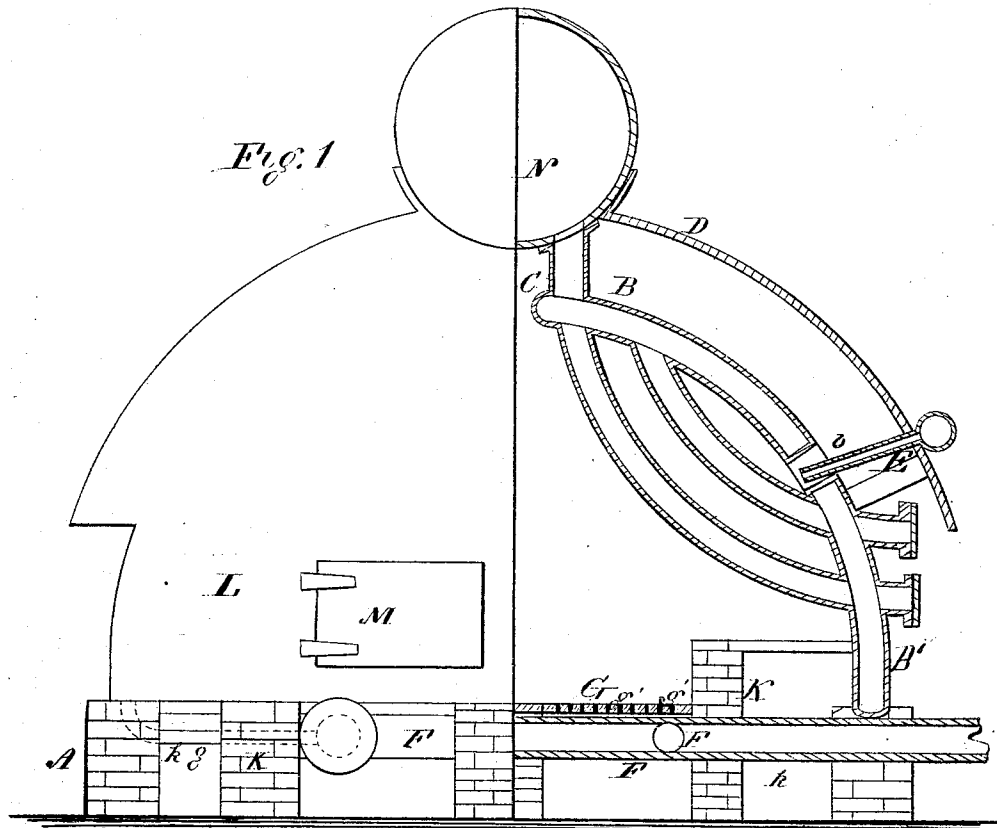
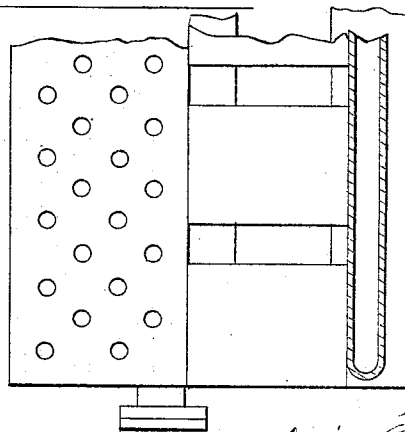


Fig. 2



Witnesses.
Anthony Connolly
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UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO LYDIE F. RENSHAW, OF HINGHAM, MASSACHUSETTS.

IMPROVEMENT IN STEAM-GENERATORS AND SMOKE-CONSUMING FURNACES.

Specification forming part of Letters Patent No. **149,062**, dated March 31, 1874; application filed October 30, 1873.

To all whom it may concern:

Be it known that I, DAVID RENSHAW, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Generator and Smoke-Consuming Furnace; and I do hereby declare the following to be a full, clear, and exact description of the invention, 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 part of this specification, in which—

Figure 1 is a front elevation and part sectional view. Fig. 2 is a horizontal sectional view of part of the base.

My invention has for its object to produce a combined furnace and steam-generator, in which the smoke from the former, or usual waste products of combustion, will be wholly or in great measure consumed. The nature of my invention consists in the peculiar construction, combination, and arrangement of parts, having reference, first, to the construction and arrangement of the water-walls of the furnace or generator, which are made and arranged so that the smoke and waste products of combustion will pass through an opening in the apex of said walls, descending outside of them for some distance, and then re-enter the furnace over the fire through suitable openings; secondly, to the provision of a pipe from which steam is discharged into and through the openings by which the smoke and waste products of combustion are conducted back to the fire, which steam is thereby decomposed, forming, with the smoke, an inflammable gas, by the burning of which the heat of the furnace is greatly increased.

Referring to the accompanying drawing, A is the base of the furnace, which is surmounted by the metallic sectional generators B' B', which form an arch, B, open at the apex C. Outside the arch B is a wall or casing, D, made of cast metal, and designed to be covered with plaster-of-paris or other non-conducting material.

The smoke and waste products of combustion pass through the opening C in the apex,

descending in the space between the arch B and the casing D, and returning to the combustion-chamber through the openings *b* in the sections B'.

E represents a pipe which conveys steam to the openings *b b*, where it is discharged in such quantities as to utilize fully the smoke or waste carbon of the furnace, at the same time creating a positive current through the upper flue.

The steam, being thus decomposed, forms, with the smoke and waste carbon, a valuable inflammable and heating gas, which is consumed over the grate, thereby effecting a very economical result.

F F are a series of feed-water pipes located beneath the grate G, which they support, said pipes being supplied at any suitable point, and communicating with the sections B' by means of pipes *g g*, which enter the sides of the pipes F F, and are screwed into holes in the bottom or lower part of the sections B'. The feed-water in the pipes F F will be heated by the waste heat of the furnace, receiving, as it will be seen, the caloric thereof on their upper surfaces. The sediment descending from the sections B' will be carried by the pipes *g* into the feed-water pipes F F, and deposited on the bottom of the latter, remote from the fire, whereby all danger of burning said sediment on the feed-water heater is avoided. G is the grate, which I prefer to make of a thin slab of plumbago, provided with suitable draft-orifices *g'*, the advantage of this material consisting in the fact that clinkers will not adhere to it, and that it will not be cracked by differences of temperature. K is a wall on each side of the furnace, forming, with the base A, a flue, *k*, through which the heavy and unconsumed gases are carried to the chimney, the top of the flue consisting of tiles, with suitable apertures between them for the passage of the gases. L is the front of the furnace, having doors M for admission to the grate, and N is a steam-drum surmounting the furnace.

What I claim as my invention is—

1. In combination with a casing or exterior wall, D, the interior wall or arch B, having an opening, C, at its apex, and orifices *b b*, for the return of the smoke and waste products of

combustion to the fire, substantially as set forth.

2. In combination with the casing D and wall or arch B, having the opening C and orifices *b*, the pipe E, for discharging steam in and through said orifices, as set forth.

In testimony that I claim the foregoing I

have hereunto set my hand this 16th day of October, 1873.

DAVID RENSHAW.

Witnesses:

GEO. C. SHELMERDINE,
M. DANL. CONNOLLY.