DAVID RENSHAW.

Improvement in Steam Generators.

No. 124,513. Patented March 12, 1872.

Fig. 1.

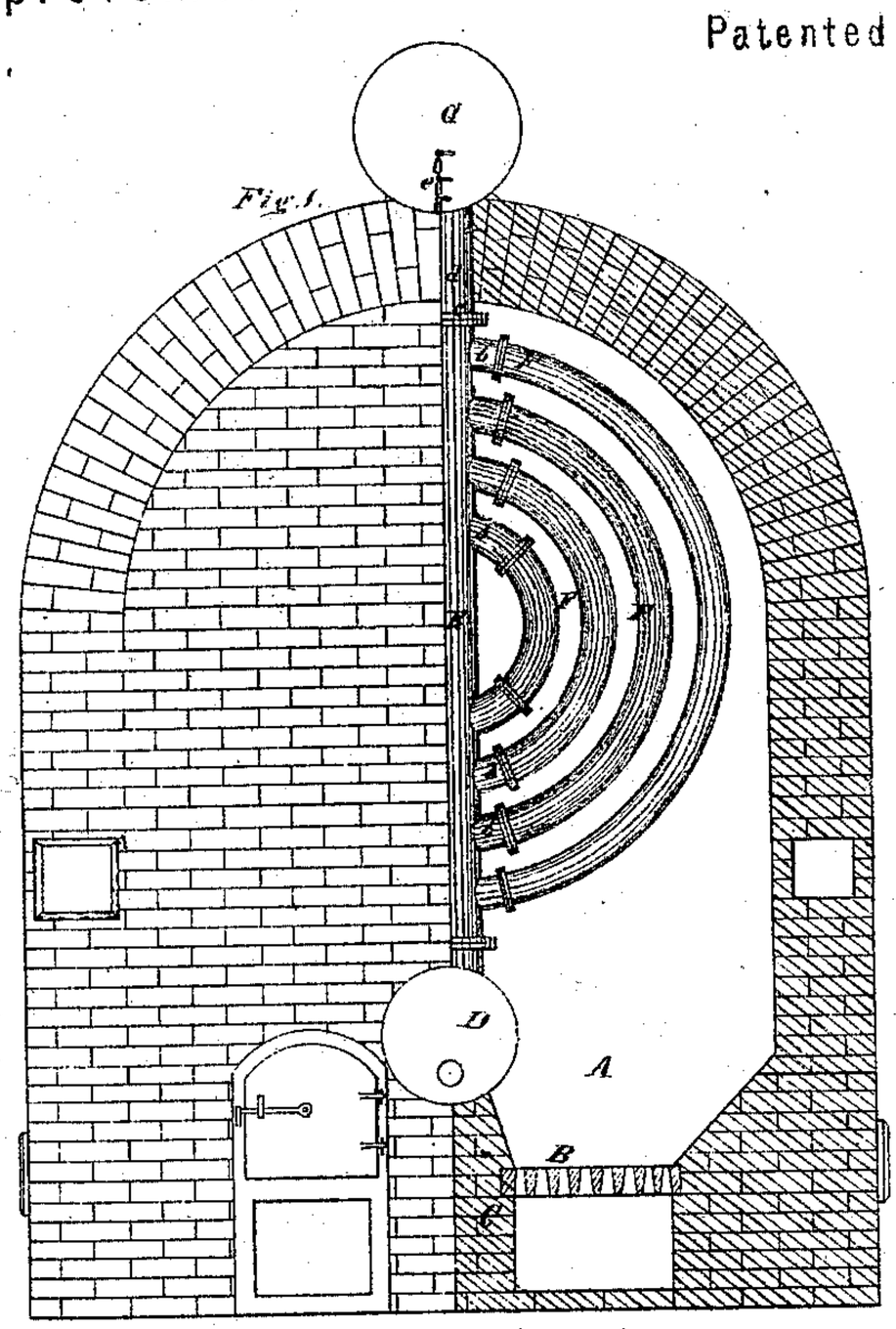
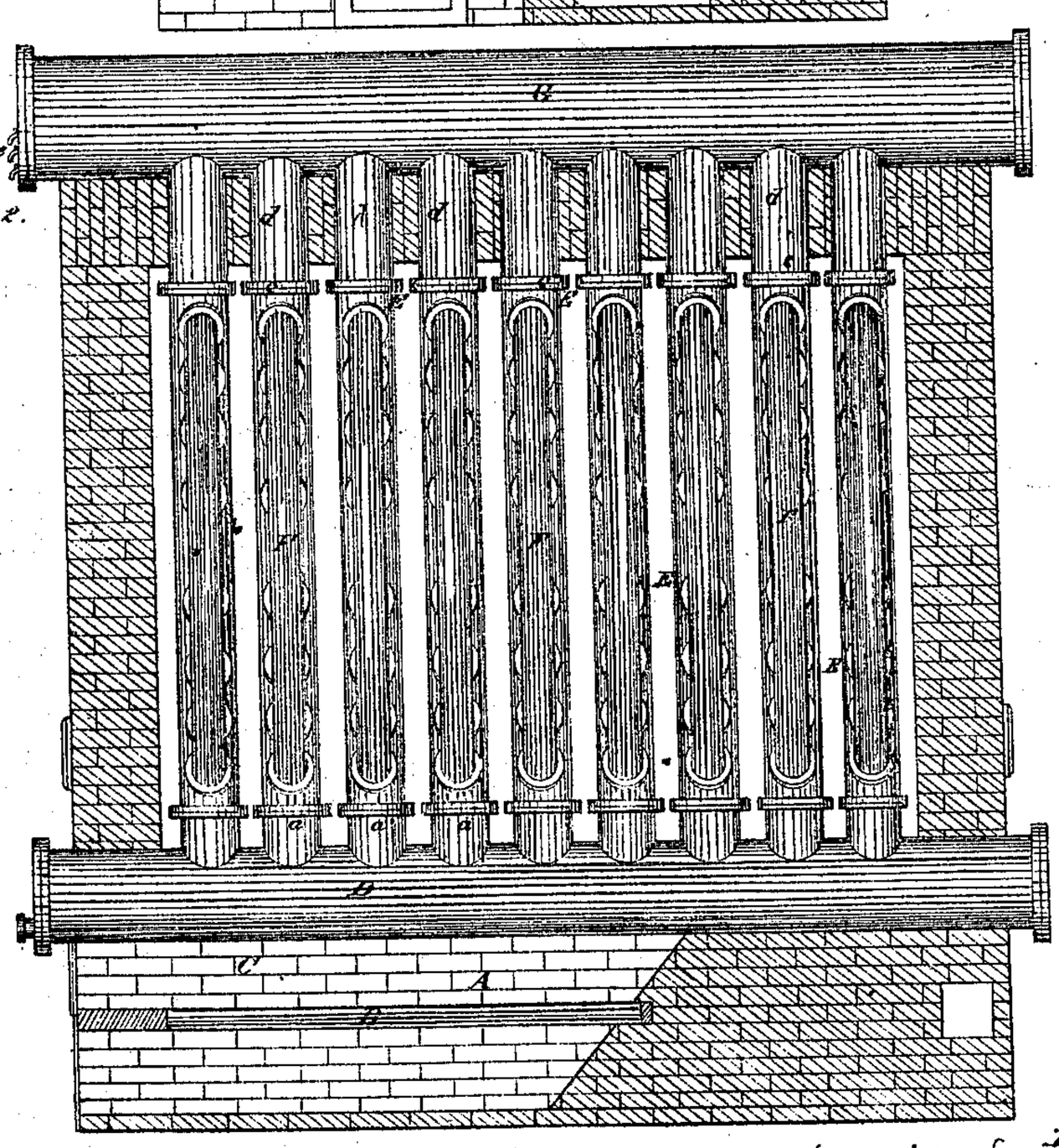


Fig. 2.



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124,513

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 124,513, dated March 12, 1872.

SPECIFICATION

Of certain Improvements in Steam-Generators, invented by DAVID RENSHAW, of Syracuse, in the county of Onondaga and State of New York.

Nature and Object of the Invention.

This invention is designed to reduce the expense of construction of steam-generators, secure economy of space occupied by a boiler of a given power, and produce more efficient and economical generation of steam. Said invention consists in the combination, with a reverberatory furnace and a steam-drum or steam-chest, of the horizontal pipes, vertical pipes, and curved pipes, hereinafter described, as hereinafter more fully set forth.

Description of the Accompanying Drawing.

Figure 1 is a front view of my improved steam-generator, the front of the furnace at the right hand of the center being removed to give a clear view of the internal parts. Fig. 2 is a side elevation of the internal parts and a section of the furnace.

General Description.

A is a reverberatory furnace, provided with two grates, B B, and the other necessary appliances common to steam-boiler furnaces. It is also provided with a bridge or bridges, C, to support the tube, pipe, or cylinder D. This pipe D I prefer to cast in a single piece, with upwardly projecting portions *a a*, to receive the vertical pipes E, of which these projections *a a* really form a part. These pipes E I also prefer to cast in a single piece each, with the projections *b b* which connect with the semicircular pipes F, which last I also prefer to cast in a single piece each. The pipes E are constructed to form joints inside of the furnace at *c*, with downward projections *d* from the steam-drum G; or these joints may be made above the crown of the furnace, if in any case desired. In constructing the joints above mentioned, I prefer to make them surface joints, secured by bolts in the usual manner. The steam-drum G may be made of either cast or wrought iron. If cast, I prefer to cast the projections *d* in a single piece with it, as represented in the drawing; and if the steam-drum G is made of wrought-iron, the projections *d* may be cast and bolted to it by means of the flanges, in the usual way practiced in such constructions. *e e e* are gauge-cocks, to regulate the height of the water in the boiler. The feed-water should be supplied through one of the ends of the pipe D, and this pipe should be provided with a removable head at one or both ends, for the purpose of cleaning the boiler, and these heads should be located outside of the furnace, so as to be conveniently accessible. For stationary boilers, the furnace A may be constructed of brick, in the form shown in the drawing; or if desired, it may be made up of hollow iron sections, adapted to contain and evaporate water, and connected with the steam-drum G, and with the feed-pipe by which water is supplied to the boiler. The grates B B are located one each side of the bridge C, as shown, so as to allow this bridge to be built up directly from the foundation, in the manner represented.

Remarks.

The construction and combination of parts herein described furnishes a strong and reliable steam-generator, with a very large evaporating and fire surface within a small compass, while at the same time the fire is brought to act in the most efficient manner in the generation of steam. This combination of parts also insures perfect circulation in the boiler, and a proper delivery of the steam generated to the steam-drum. The vertical pipes E being located in the middle of the furnace, and the curved pipes F branching out from the said pipes E on both sides thereof and returning to them, in the manner described and in substantially the form represented in the drawing, it will be seen that the said pipes F are thereby adapted to the arch of the furnace in such a manner as to utilize the heat to the best advantage, and at the same time to produce a thorough and complete circulation of the water and a rapid generation of steam, while at the same time the boiler is made very compact, and yet full and ample space for complete combustion is left between the grates and the lower portions of the pipes F. As the tendency of any sediment in water will be to descend into the pipe D, it is obvious that this boiler can also be cleaned with very great facility. This may generally be done to efficient

purpose under ordinary circumstances by simply opening the blow-off cock, and allowing it to remain open for a short time while the feed-pumps are working at their full capacity, so as to keep up the supply of water in the boiler; and this, it is obvious, can be done in this boiler without stopping the working of the engine, though the pressure of steam will be somewhat reduced, but not so much so as to prevent the performance of ordinary or light work, owing to the fact that in this boiler all the sediment is delivered into the single tube or pipe D, where the mode of removing it, just above described, can be made available with the greatest possible facility by opening only one blow-off cock, there being no diversion of currents to interfere with the direct tendency of the sediment to the blow-off cock. In this combination of the pipe D, and vertical pipes E rising therefrom, and the curved pipes F branching out from the pipes E and returning thereto, the sediment which forms in all the pipes is all delivered in the single horizontal pipe D, from which it can be removed with the utmost facility, as already stated, while at the same time the combination of the pipes above mentioned in the manner described secures a perfect circulation in the boiler, (pipe D being exposed to the direct heat of the fire,) which would not be realized from water legs extending upward from connections below the fire, even if provided with branch-pipes. The pipes E being all placed upon a single central pipe, D, they can be placed very compactly together and still receive the efficient action of the heat of the fire upon all sides, while the pipes F, branching out therefrom toward the sides and crown of the furnace and returning to the said pipes E, are subjected to intense heat, causing very rapid and complete upward circulation through them, while at the same time this combination of parts makes the whole structure very compact, so that a boiler of any given horse-power can be contained in a furnace of comparatively very small dimensions.

This combination, while affording the advantages above described, also at the same time involves the further advantages that its several parts can be cast without any serious danger of fracture by contraction in cooling, and the structure is perfectly free from danger of fracture from unequal expansion and contraction while in use; and also, that it affords unusual facilities for repairs in case any should become necessary. The combination of the generating-tubes with a steam-drum placed above the action of the fire is also important, as it affords security from explosions caused by superheating of the steam, which danger is always present when steam is superheated in the same chamber in which it is formed.

Claim.

I claim as my invention—

The combination of the reverberatory furnace A, the pipe D, the pipes E, the pipes F branching out from the pipes E and returning thereto, and the steam-drum G, substantially as hereinbefore set forth.

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