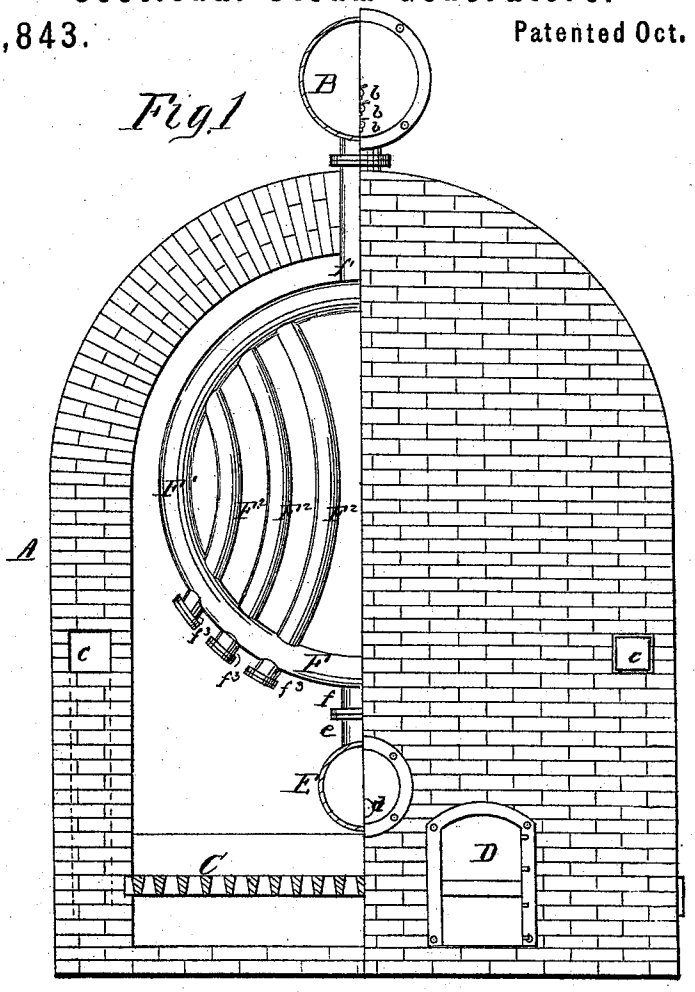
2 Sheets--Sheet 1.

D. RENSHAW.

Sectional Steam-Generators.

No. 143,843. Patented Oct. 21, 1873.

Fig. 1



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2 Sheets--Sheet 2.

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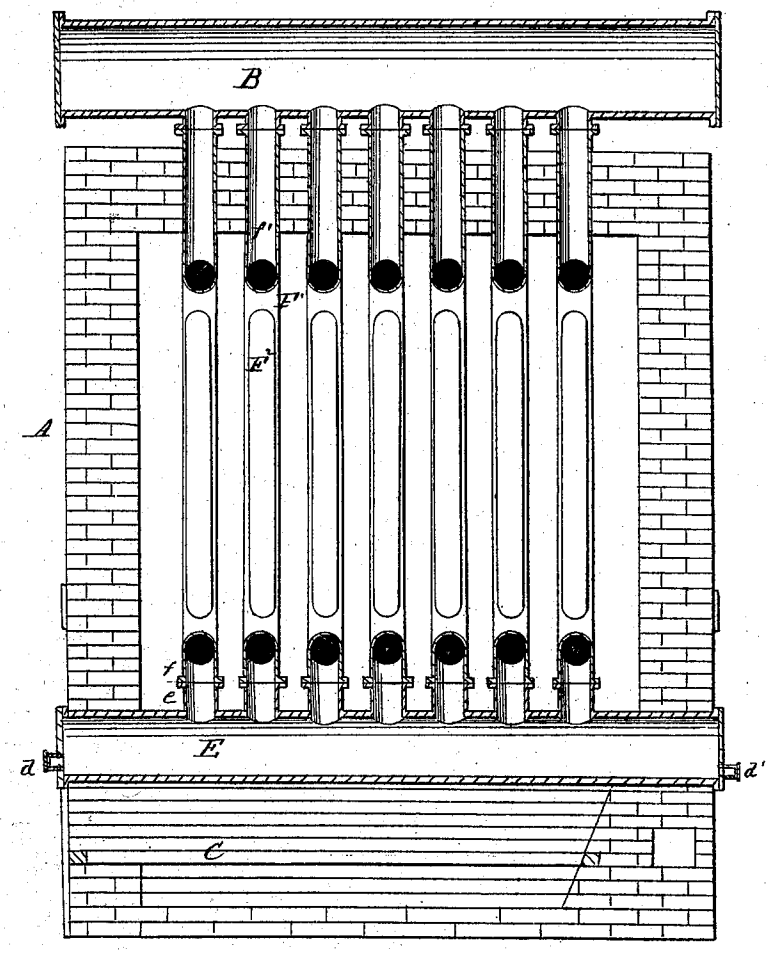
Fig. 2



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UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **143,843**, dated October 21, 1873; application filed February 4, 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-Generators; 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 the drawings, Figure 1 is a front elevation and partial transverse section of my invention. Fig. 2 is a vertical longitudinal section of the same. Figs. 3 and 4 are sectional views of modifications.

This invention relates to steam-generators formed in sections and used in connection with a reverberatory furnace, said furnace being made of brick or other similar substance possessing great capacity for the retention and return of heat, or of hollow cast-metal sections, designed not only to reverberate heat upon internal generators, but to contain water and generate steam. This invention consists mainly in the peculiar construction of the internal generators, consisting each of a continuous curved pipe, having, if desired, inner arches, and in the combination of said generators with a reverberatory furnace and a steam-drum connected therewith, as hereinafter fully described.

Referring to the drawing, A shows a reverberatory furnace, constructed as described, surmounted by a steam-drum, B. C is the grate, which is equal in area to the base of the furnace, and *c c* are flues extending from the front to the rear of the furnace. The doors are shown at D. E is a pipe or tubular water-chamber running longitudinally through the furnace, having supports in the front and rear walls thereof. The pipe E has flanged projections *e*, forming connections with the sections F, which have similar projections *f* and f^1, the latter communicating, as seen, with the drum B. The sections F consist of the outer continuous pipes F^1 and the inner arched pipes F^2, the inner and outer pipes being all cast at once and in a single piece. In order to facilitate the removal of the cores in casting, and to provide for easy access to the inside of the generators, they are formed with open projections at f^3, said projections being formed with suitable caps. For the purpose of obtaining a downward circulation in the outer pipe, and an upward circulation in the inner pipes, the former are made of greater diametrical dimensions than the latter, thus holding a greater amount of water to a proportionately less amount of fire surface, and thereby producing the result desired. *b b* are gage-cocks on the steam-drum. A feed-pipe is provided at *d*, and a blow-off pipe is seen at *d'*.

A steam-generator thus constructed possesses many important advantages. The castings are easily made, and, as the sections are all cast in one piece, economy is secured. The outer portions of the sections holding larger water bodies than the inner portions, the desired upward and downward circulation is secured. Due provision is also made for the equalization of the contraction and expansion of the metal, as it is obvious that, as both the inner and outer parts of the sections from point to point of their connections are arches of about the same length, the expansion and contraction will be nearly equal in both.

What I claim as my invention is—

1. The internal section E, formed of a continuous curved pipe with inner arches F^2, as described, said arches being of less diametrical dimensions than the pipe E, so as to produce circulation, as specified.

2. In a reverberatory furnace, the combination of the sections F, formed of a continuous curved pipe, made with the inner arches F^2, the tubular water-chamber E, and steam-drum B, substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of January, 1873.

DAVID RENSHAW.

Witnesses:
M. DANL. CONNOLLY,
THOS. A. CONNOLLY.