D. RENSHAW.

Sectional Steam-Generators.

No. 143,845. Patented Oct. 21, 1873.

Fig 1

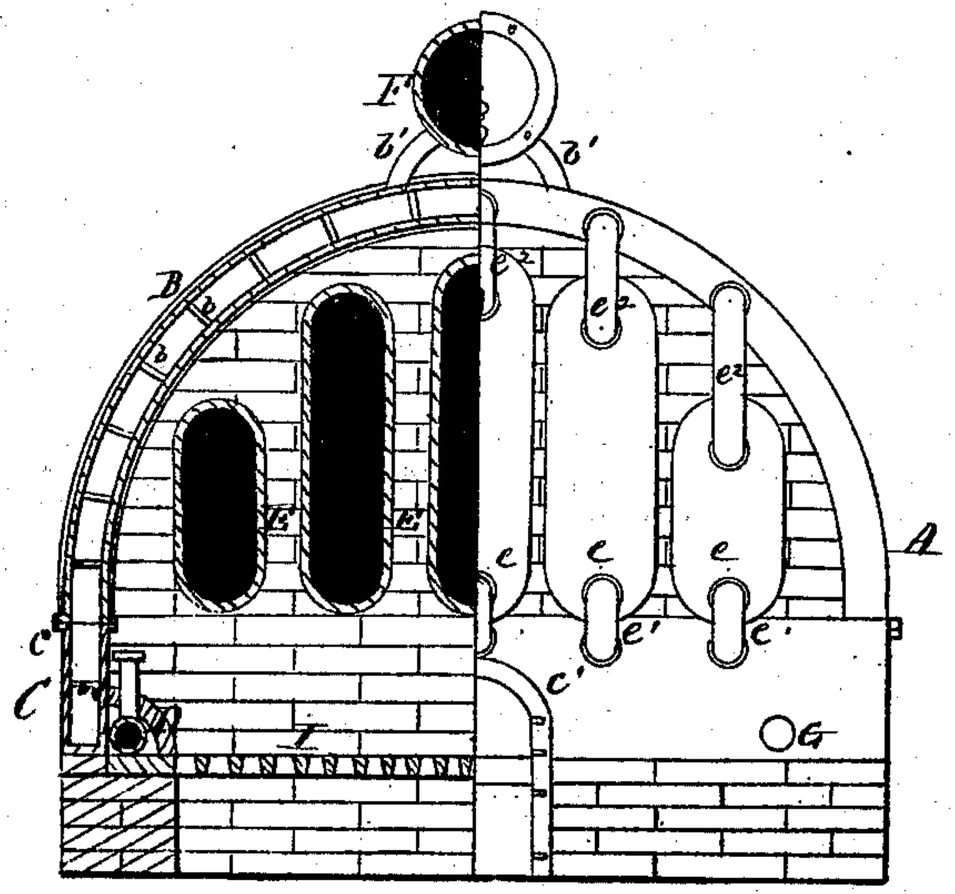

Fig 2.

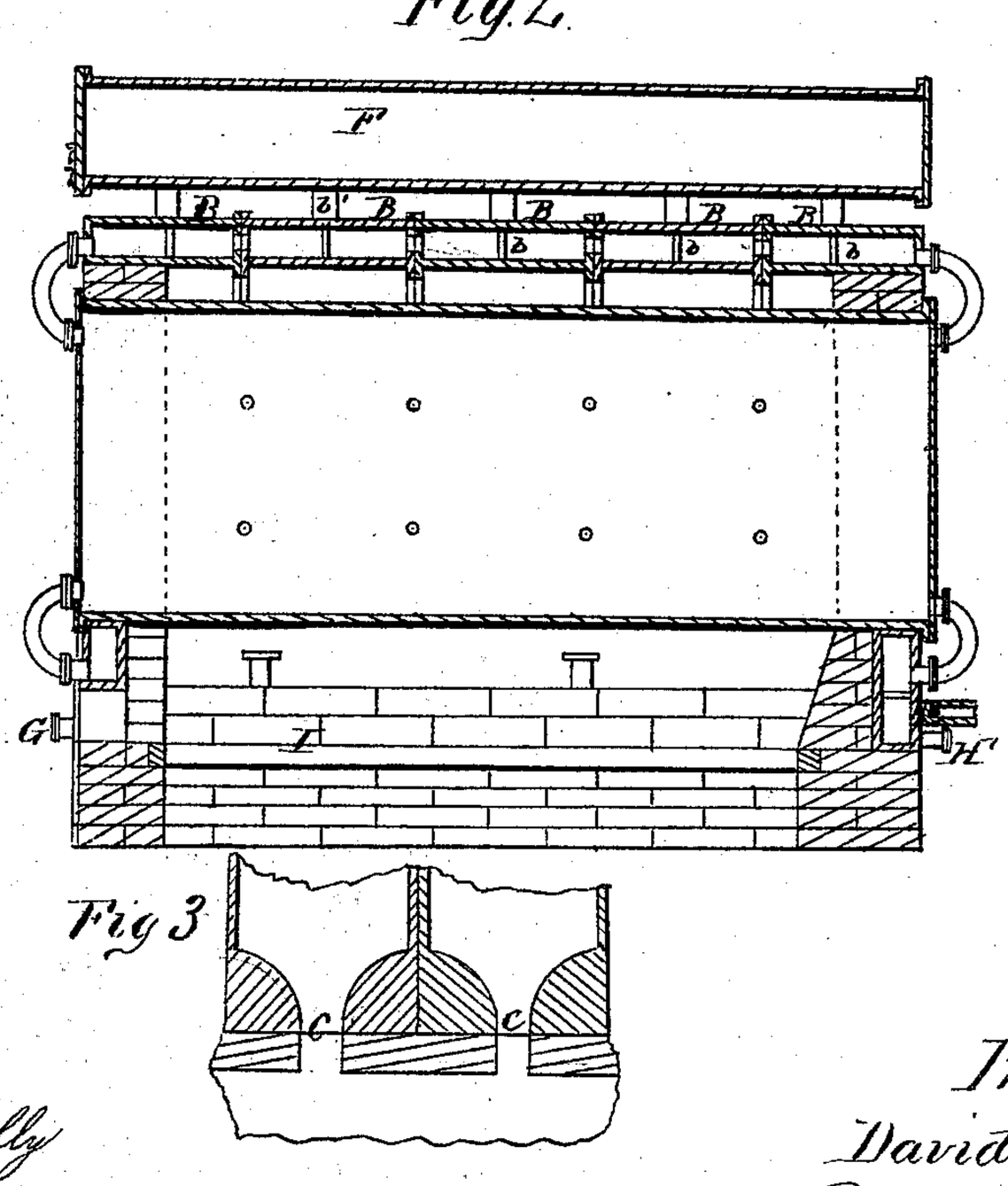

Fig 3

Witnesses
J. B. Connolly
E. Connolly.

Inventor
David Renshaw
by
Connolly Bros.
Atty's

AM. PHOTO-LITHOGRAPHIC Co. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **143,845**, 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 Sectional 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.

Referring to the drawings, Figure 1 is a front elevation and partial transverse sectional view of my invention. Fig. 2 is a vertical longitudinal section; and Fig. 3 is a detail view.

My invention relates to sectional steam-generators; and consists in the construction and arrangement of parts, as hereinafter described.

The furnace employed is constructed, generally, according to my patent of February 20, 1872—that is to say, it is a reverberatory furnace with an arched or rounded top or crown; it is made in sections which are cast hollow, so as to serve as receptacles for water, and to generate steam, and secured by stay-bolts cast with the sections, these sections being bolted to each other and communicating with a steam-drum located above the furnace. In the patent referred to these sections thus formed rise from a base or water chamber made of cast metal, said base being considerably wider than the sections which it supports.

In the present case I substitute for the broad base a flat section or sections, of the same width as those which form the crown of the furnace, and communicating therewith by flanged open projections, as shown in my patent of December 24, 1872, No. 134,165. These base-sections are cast with stay-bolts, in the same manner as the upper sections, and are arranged around the four sides of the furnace, having suitable bends at the corners, and being curved or arched at the front to form the door-frame. This construction of the furnace-base constitutes part of my invention, which consists further in the construction of internal generators, and in their combination with a reverberatory furnace and with a steam-drum surmounting the same.

Referring to the drawing, A shows a reverberatory furnace, constructed according to my invention. B B are the sections forming the upper part of said furnace, being made hollow and strengthened by stay-bolts *b*, as shown. The base of the furnace is shown at C, and is formed of flat sections, stay-bolted, as already described, and of the same width as the upper sections. The base and upper sections communicate by means of open connections, as shown at *c*, consisting of flanged projections, formed with thick walls, so that said upper and lower sections, at their point of junction, will be flush with each other. The base extends around the four sides of the furnace, as suggested, and the sections are bolted together by means of flanges cast upon them, the front being arched at *c'* for the furnace-door. D D are flues, running parallel with the sides of the furnace, having short upward extensions for carrying off the gases and products of combustion. These flues pass out at the rear of the furnace, where they turn and unite, forming a single flue, which enters the chimney at a suitable point. E E are cast-metal sections, of the form shown, extending from the front to the rear wall of the furnace, and cast with stay-bolts, similar to the sections forming the sides. The ends of these sections pass through the front and rear walls of the furnace, and are provided, as shown, with flanges or caps *e*, by which they are closed. They also communicate with the base by means of the curved pipes e^1, through which they are fed, and with the crown by means of similar pipes e^2, through which they discharge their steam. The sections B B communicate with the steam-drum F by means of the projections *b'* cast on said sections. G is a supply-pipe communicating with the base C; and H is a blow-off pipe connected with said base. The grate is shown at I, being of the same length and width as the inside of the furnace, thereby giving a large fire-surface. The side walls of the furnace are hollow, as shown, but the front and rear are of hollow sections at the base only, the upper portion being brick, surrounding the ends of the internal sections E, the ends whereof come through the front and rear, as already suggested.

The advantages of a furnace thus constructed are as follows: The base being made in sec-

tions of the same width as the upper part or crown, the area of the grate is considerably extended, and a large increase made to the fire-surface. It also decreases the amount of water carried to a given amount of grate-surface, and hence gives a proportionately increased economy in generation. The base-sections are made of the same width as the upper sections, with another important object in view, viz., to allow them to be cast with stay-bolts, in the same manner as said upper sections, and to thus render the furnace water-walls of uniform strength throughout.

The construction and arrangement of the internal sections E are such as to fill the interior of the furnace, as far as may be consistent with a due regard to the passage of the flames between them and the reception of the reverberated heat, thereby utilizing all the available room. These sections are also formed without a single joint exposed to the action of the fire, which is a point of great importance, and are so arranged that they may be taken separately from the furnace with little difficulty or delay.

If desired, each of the crown and base sections may be cast in a single piece, having side and bottom flanges, by which they are secured together. When thus constructed the sections will communicate by suitable openings near their lower ends.

What I claim is—

1. The base C, constructed of flat sections, stay-bolted, as set forth, being of the same width as the upper part of the furnace, and connected therewith by means of flanged projections, substantially as set forth.

2. The horizontal internal sections E, constructed as shown, each section extending from the front to the rear of the furnace, and communicating with the base and upper sections by means of the curved pipes e e^1, as described.

3. The combination of the base C, upper sections B, inner sections E, and drum F, substantially as specified, said base C and section B being of the same width and stay-bolted, and each of the sections E extending from the front to the rear of the furnace, as specified.

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.