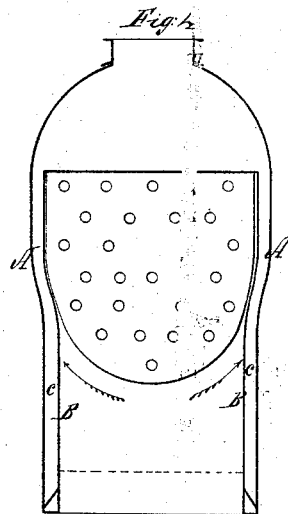
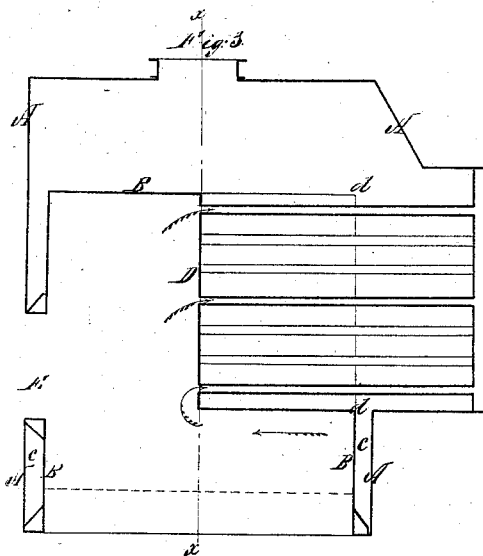
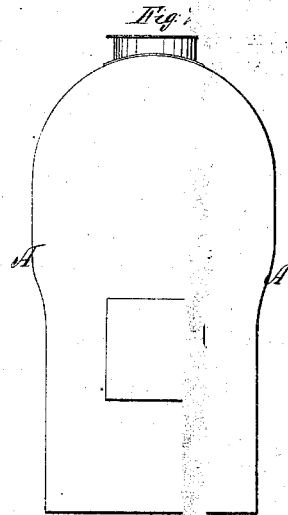
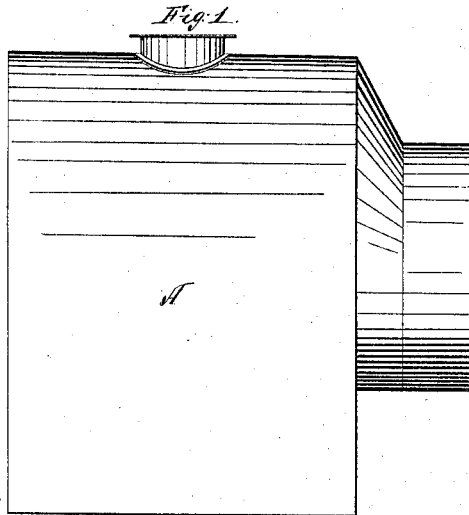


*W. Zellner,*  
*Steam-Boiler Fire-Tube.*

*N<sup>o</sup> 54,654.*

*Patented May 8, 1866.*



*Witnesses:*  
*John W. Symmes*  
*H. A. Kline*

*Inventor:*  
*W. Zellner*  
*By* *John E. Carl*

# UNITED STATES PATENT OFFICE.

WILLIAM ZELLNER, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND  
M. M. ROUNDS, OF NEW HAVEN, CONNECTICUT, AND J. E. JEROLD,  
OF JERSEY CITY, NEW JERSEY.

## IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 54,654, dated May 8, 1866.

*To all whom it may concern:*

Be it known that I, WILLIAM ZELLNER, of New York, in the county of New York and State of New York, have invented a new Improvement in Steam-Boilers; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the fire-box end of the boiler, within which my improvement is made; Fig. 2, an end view of the same; Fig. 3, a longitudinal vertical central section, and in Fig. 4 a transverse section on line *xx*.

My invention relates to an improvement in that part of the boiler immediately adjoining the fire-box; and it consists in extending the water-chamber and tubes into the fire-box over the fire, whereby a greatly-increased amount and more effective use of fire-surface is produced.

To enable others skilled in the art to construct and use my improvements, I will proceed to describe the same as illustrated in the accompanying drawings.

The outer case, A, of the boiler is of the usual form and construction, with an inner case, B, which forms a water-space, C, entirely around the fire-box. The red line, Fig. 3, denotes the

line of grate-bars. Heretofore the tube-sheet has been placed on the line *d*, the upper plate of the fire-box extending back to the tube-sheet.

In my improvement the tube-sheet D is brought farther into the fire-box, as seen in Fig. 3, and the under side of that part of the water-chamber which is thus extended into the fire-box is made convex, as seen in Fig. 4. By this construction the fire-surface is increased by so much as the area of that part of the boiler and tubes thus extended into the fire-box, the under surface of the boiler tending to spread the heat to throw it more to the outer surfaces, thereby increasing the effective force of the fire. In this construction the fire-opening E should be placed down sufficiently low to enable the fireman to properly tend the fire therein.

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

A steam-generator having a portion of the boiler extended into the fire-box for the purpose of increasing the heating-surface thereof and distributing the heat therein, substantially as and for the purpose described.

WILLIAM ZELLNER.

Witnesses:

JOHN E. EARLE,  
M. A. HINE.