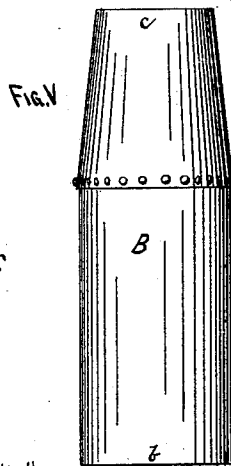
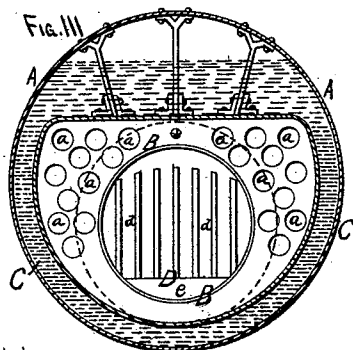
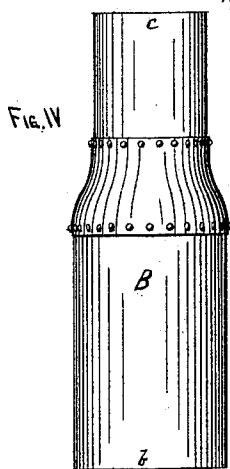
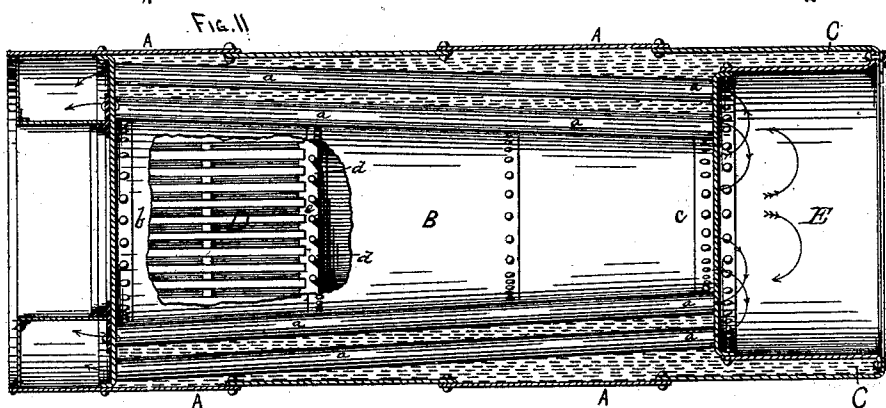
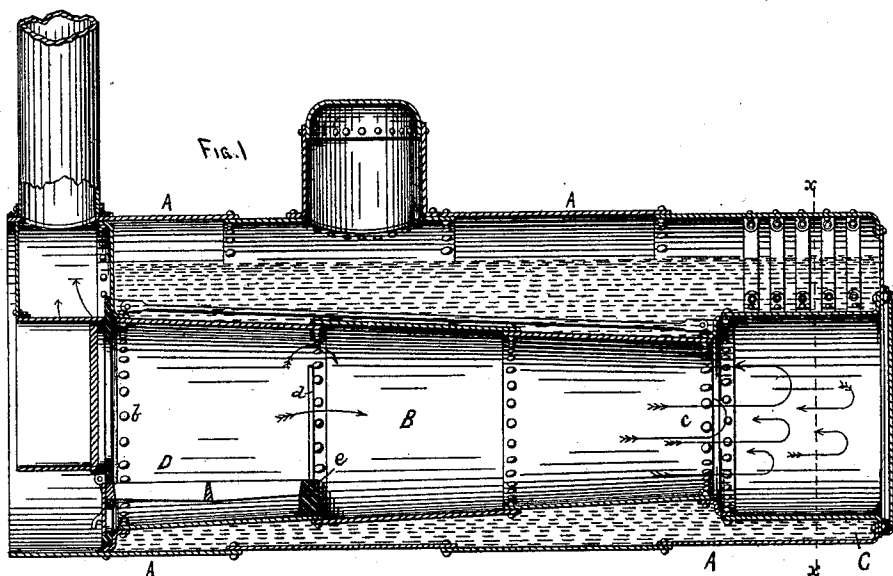


L. RIVET. Steam-Boiler.

No. 225,722.

Patented Mar. 23, 1880.



WITNESSES
J. T. Orcutt.
Edw. Robert.

Louis Rivet,
INVENTOR, BY
Louis Fisher & Chas. H. Woodward,
Attys.

UNITED STATES PATENT OFFICE.

LOUIS RIVET, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF TWO-THIRDS OF HIS RIGHT TO NEWTON HARLOW BOLTON, OF SAME PLACE, AND SAMUEL WORKS SKINNER, OF ILION, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 225,722, dated March 23, 1880.

Application filed November 8, 1879.

To all whom it may concern :

Be it known that I, LOUIS RIVET, of Minneapolis, in the county of Hennepin and State of Minnesota, have made certain new and useful Improvements in Steam-Boilers, which improvements are fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a sectional elevation. Fig. 2 is a plan view, partially in section. Fig. 3 is a cross-section on the line *xx* of Fig. 1. Figs. 4 and 5 are views, reduced, of the large tube detached, showing variations in the methods of its construction.

This invention relates particularly to that class of horizontal steam-boilers adapted to burn straw or other light fuel; and it consists in the employment of a horizontal tapering continuous flue provided with a grate at its larger end, having grids or fingers at the rear end of the grate, in combination with converging return-flues and a rear combustion-chamber, so that a water-jacket may be formed around the main flue and rear combustion-chamber without enlarging the shell of the boiler or reducing the grate-surface, as hereinafter set forth.

In the ordinary return-flue boiler a large percentage of the effect of the heat is lost in the combustion-chamber or smoke-jacket, owing to the thinness of its walls.

Many attempts have been made to utilize this heat by forming auxiliary water-jackets, non-conducting coverings, &c., around the combustion-chamber; but these have proved cumbersome and impracticable on portable boilers, as they add materially to the weight and expense.

To utilize this heretofore waste heat without adding materially to the expense or weight, or to reduce the grate-surface, is the object of my invention, which consists of the usual outer shell, A, inner large flue, B, rear combustion-chamber, E, and small return-flues *a a*.

The large flue B is made of the usual size at the front end, *b*, but contracted toward the rear end, *c*, so that sufficient space may be

left for a water-jacket, C, and the return-flues *a a* without enlarging the outer shell, A, or reducing the size of the grate D.

The rear combustion-chamber, E, is formed by the rear flue-sheet on one side and a straight cylindrical shell of less diameter than the outer shell, by which a water-space is formed between them, thus forming a water-jacket around the same.

The tapering form of the main flue, the smaller end of which terminates in the rear combustion-chamber, allows a greater area for the insertion of the return-tubes, and also a greater heating-surface for the heat to impinge upon as it enters said return-tubes, thus producing a double advantage by its peculiar construction, as specified.

By this means I am enabled to materially increase the heating and water surface of the boiler without altering the shape or size of the outer shell or the grate.

The large flue B may be tapered its entire length, as shown in Figs. 1 and 2, or only a portion of its length, as shown in Figs. 4 and 5.

The grate D will be arranged in the usual manner in the forward end of the large flue B, and provided with fingers or bars *d*, extending upward nearly to the top of the flue, to serve as retarders to the fuel and prevent it being drawn bodily through the flues before the fire has had time to consume it. By this means the total combustion of the fuel is insured and all danger from sparks and cinders averted.

The bars *d* may be set loosely in holes in the grate-bridge *e*, or secured rigidly to or form part of the grate-bars themselves. They may be made in any suitable manner to accomplish the desired result.

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

The combination, in a horizontal steam-boiler adapted to burn straw or other light fuel, of the main flue B, tapering from its front to its rear flue-sheet, and provided at its front end with a grate having upwardly-

projecting fingers or grid, with the outer shell, A, extending beyond the said rear flue-sheet, and with the inner shell of the rear combustion-chamber forming a water-jacket around the same, and with the return-tubes *a*, all arranged to operate in the manner set forth.

In testimony whereof I have hereunto set

my hand in the presence of two subscribing witnesses.

LOUIS RIVET.

Witnesses:

H. M. CURTIS,

C. N. WOODWARD.