

W. TAYLOR.  
Boilers for Water-Heaters.

No. 158,755.

Patented Jan. 12, 1875.

FIG. 2.

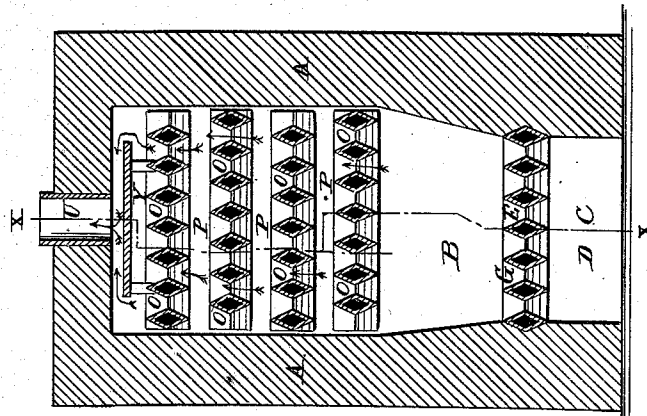
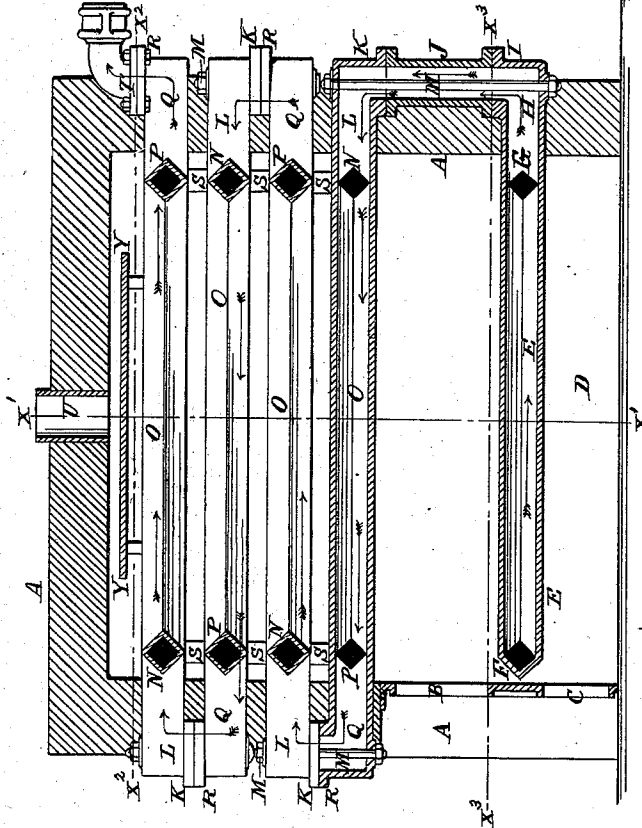


FIG. 1.



ATTEST:

*Robert Burns.*  
*Henry Tarnier.*

INVENTOR:

*William Taylor*  
*By Haight & Bro.*

**W. TAYLOR.**  
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FIG. 4.

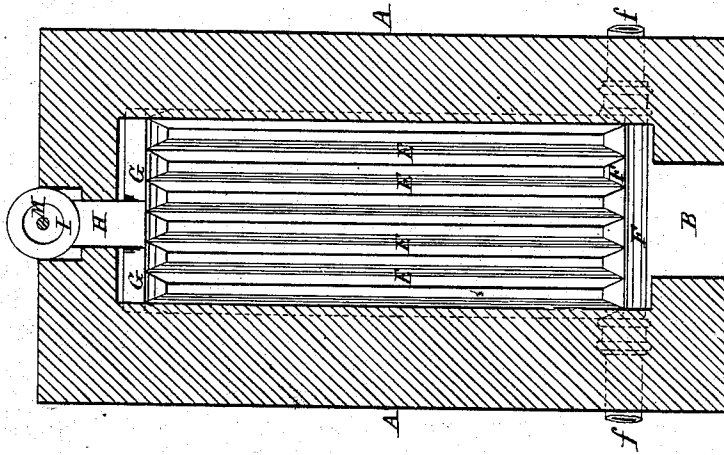
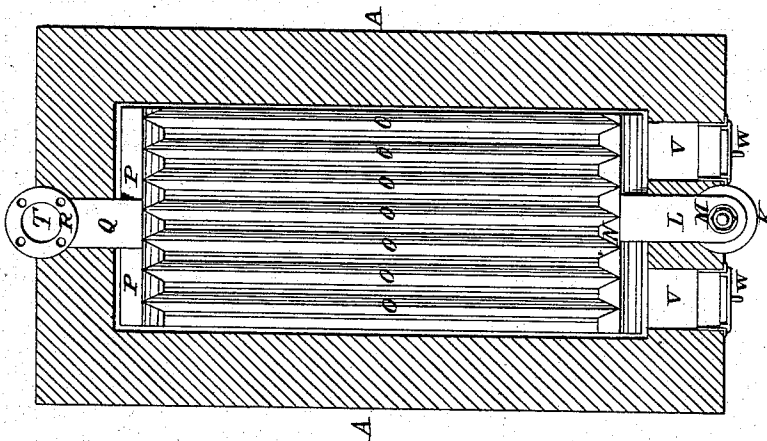


FIG. 3.



ATTEST:

*Robert Burns.*  
*Henry Tanner.*

INVENTOR:

*William Taylor*  
*By Knight Bros.*  
*Atty.*

# UNITED STATES PATENT OFFICE.

WILLIAM TAYLOR, OF ST. LOUIS, MISSOURI.

## IMPROVEMENT IN BOILERS FOR WATER-HEATERS.

Specification forming part of Letters Patent No. **158,755**, dated January 12, 1875; application filed November 16, 1874.

*To all whom it may concern:*

Be it known that I, WILLIAM TAYLOR, of St. Louis, St. Louis county, State of Missouri, have invented a certain new and useful Improvement in Boilers for Water-Heaters and other purposes, of which the following is a specification:

My boiler consists of a number, more or less, of horizontal, or nearly horizontal, cast-iron sections placed one above another. Each section has a number of parallel longitudinal tubes or pipes, of angular cross-section, connected at the ends by transverse pipes of similar form. The sections have intercommunication alternately at the front and rear, so that the water in its ascent from the lower section, which constitutes the furnace-grate, to the upper section, which is directly connected with the discharge-pipe from the boiler, flows alternately backward and forward in the alternate sections, as indicated by arrows. Each section may be inclined somewhat upward toward the discharging end, so as to aid the described circulation of the water.

Figure 1 is a longitudinal section at  $x x$ , Fig. 2. Fig. 2 is a transverse section at  $x^1 x^1$ , Fig. 1. Fig. 3 is a horizontal section at  $x^2 x^2$ , Fig. 1. Fig. 4 is a horizontal section at  $x^3 x^3$ , Fig. 1.

A is the casing of the boiler. This may be of any non-combustible material, as brick or metal, the former preferred. B is the furnace-doorway, and C the ash-pit doorway. D is the ash-pit. The furnace-grate consists of a number of horizontal longitudinal tubes or pipes, E, of angular cross-section, preferably of diamond section, as shown, with the acute corners up and down. These pipes are connected, and communicate at the front and rear ends, by transverse pipes F and G. The tube F has extensions  $f f$  passing through the case A, to receive the return-water from the warming-stands in the building, where the boiler is used in connection with heating apparatus. The pipe G has upon its rear side a neck, H, turning upward at the rear end, and provided with a horizontal flange, I, by which it is jointed to a vertical pipe, J, with flanges at each end, the lower flange being jointed with flange I, and the upper one with a similar flange, K, on the neck L. The flange-joints may be made

water-tight by red lead or by a gasket, and are secured by a vertical stay-bolt, M, passing axially through the pipe J, and having a head and nut bearing, respectively, against the top of neck L and the bottom of neck H, the bolt passing through the said necks, as shown. The neck L extends backward from the rear side of the transverse pipe N, from whose front side extend a number of longitudinal pipes, O, which, at the front end, are connected and communicate by a transverse pipe, P, similar to those N, F, and G. The pipes N, F, and G I prefer to make rectangular in section, and the grate-pipes E, and also the other longitudinal pipes O I prefer to make of diamond-shaped cross-section, as shown, with the acute corners upward and downward, so as in the grate-pipes to allow free exit to the ashes between the pipes, and with the pipes O to allow the easy upward passage of the products of combustion. At the front side of the transverse pipe P is a horizontal neck, Q, opening at top through a horizontal flange, R, with which and the flange K of the next section is made a joint, secured like the others by a stay-bolt, M. Each section is cast in one piece, and consists of longitudinal pipes connected at their ends by transverse pipes, one of which connects with the section above, and the other with that below, so that the circulation of water through the sections is alternately backward and forward, as indicated by arrows in Fig. 1. The sections are so placed in relation to each other that the longitudinal pipes O in one section are vertically over the spaces between the pipes in the section next below, so that the products of combustion as they rise through the spaces shall impinge against the pipes of the next section. The transverse pipes F, G, N, and P extend into the walls of the case A, so as to give support to the sections, and the sections may also have support upon each other by blocks S, placed between them at the necks, or by other means.

Four of the sections are shown in addition to the fire-grate section; but the number may vary, as required. In all cases the upper section has communication with the discharge-pipe leading to the heat-radiators by a neck, T, when the boiler is used in this connection.

When the boiler is used to supply steam it would be necessary to supply a steam-chamber and a safety-valve.

U is the smoke-discharge orifice. V V are apertures to allow the introduction of an instrument to clean the soot from the pipes, in case any such deposit should take place. These apertures are stopped by caps W W. Y is a deflecting-plate beneath the orifice U.

I claim herein as of my invention—

In a boiler, the combination of sections com-

posed each of longitudinal pipes O, having smaller horizontal than vertical diameter, and transverse supporting-pipes N P of angular cross-section, with alternate rear and front connection between contiguous sections, substantially as and for the purposes set forth.

WILLIAM TAYLOR.

Witnesses:

SAML. KNIGHT,  
ROBERT BURNS.