G. T. SNYDER.
Tubular Boilers.

No. 212,062. Patented Feb. 4, 1879.

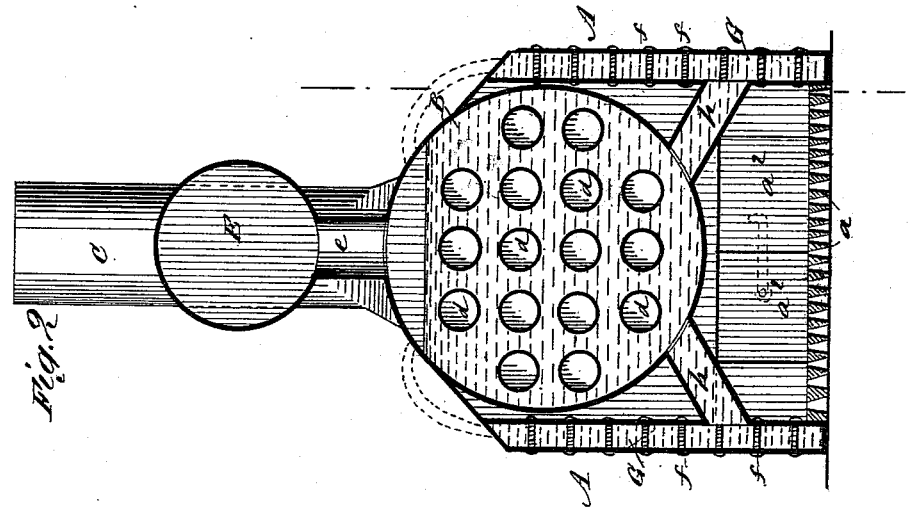

Fig. 2

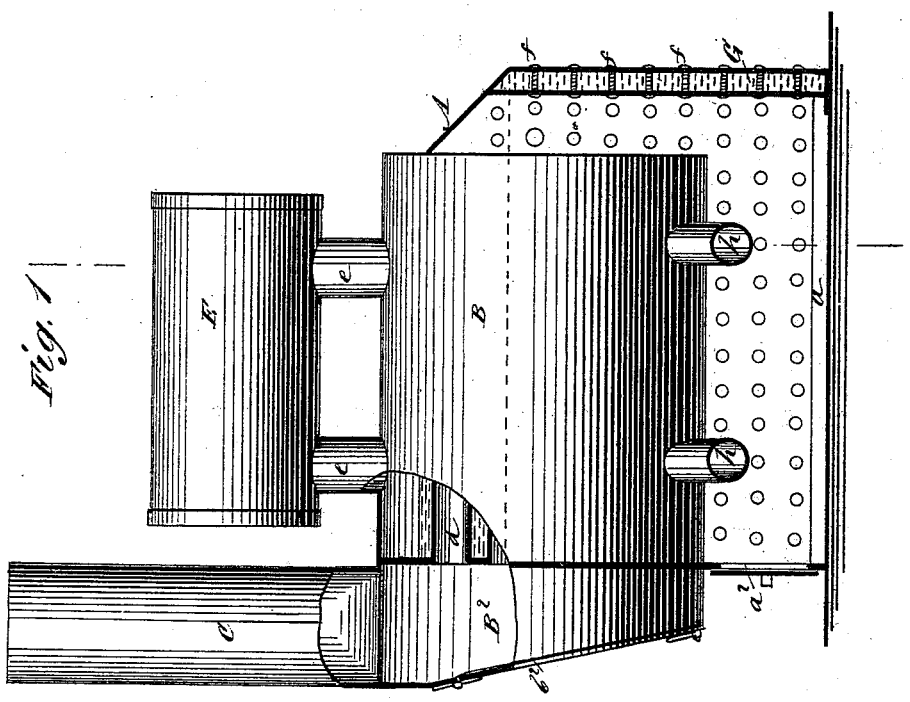

Fig. 1

WITNESSES:
C. Neveux
C. Sedgwick

INVENTOR:
G. T. Snyder
BY Munn & Co
ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE T. SNYDER, OF NATRONA, PENNSYLVANIA.

IMPROVEMENT IN TUBULAR BOILERS.

Specification forming part of Letters Patent No. **212,062**, dated February 4, 1879; application filed May 22, 1878.

To all whom it may concern:

Be it known that I, GEORGE T. SNYDER, of Natrona, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Tubular Boilers, of which the following is a specification:

The invention will first be described in connection with the drawings, and then pointed out in the claim.

In carrying out my invention, I construct the furnace and fire-box with double walls, braced by bolts extending from the outer to the inner plates, the space between said plates constituting a jacket and water-chamber. The boiler is cylindrical in form, provided with horizontal flues, and is arranged in the fire-box directly over the grate-bars. The length and width of the furnace and fire-box exceed the dimensions of the boiler, and the arrangement of the boiler is such that the products of combustion from the fire-box pass under the boiler to the rear end, and return through the flues to the front end, and thence to the smoke-stack.

The boiler and the water-jacket communicate with each other by means of tubes or water-legs, and the upper portion of said jacket is provided with pipes leading to the steam-dome or to the steam-space in the boiler.

The accompanying drawings illustrate the manner of carrying out my invention.

Figure 1 is a longitudinal vertical section of an apparatus embodying my improvements, and Fig. 2 is a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts.

The furnace and fire-box A are of rectangular form at its sides, bottom, and ends, and its top is inclined upward, and vanishes into the upper portion of the horizontal cylindrical boiler B, which is arranged directly over the fire-grate *a*. The lower portion of the furnace constitutes the fire-box, and is provided with doors a^2 at the front end.

A casing, B^2, (which may be a continuation of the boiler-casing,) extends beyond the front end of the furnace, above the doors a^2, and constitutes a smoke-chamber, and it may be provided with a door, b^2. From this chamber rises the smoke-stack C. As the tubes or flues *d* extend entirely through the boiler, and as the chamber B^2 extends beyond the front end of the furnace, and the rear end of the boiler does not reach the rear wall of the furnace, the result is, that the products of combustion pass under the entire length of the boiler to the rear end thereof, and thence return through the flues *d* to the front end, and through the smoke-chamber to the smoke-stack.

On the top of the boiler rests the dome E, which may be of any suitable description. It is here shown as of cylindrical form, connecting with the steam-space of the boiler by means of tubes *e e*.

The rear end and two sides of the furnace and fire-box are provided with double walls, consisting of exterior and interior plates, connected and braced by bolts *f*. The space between these plates forms a jacket or water-chamber, G, extending around three sides of a rectangle. This water-jacket G communicates with the water-space of the boiler B by means of tubes or water-legs *h*, by which means a constant circulation of water is maintained. The top of the water-jacket may be provided with pipes, as shown in dotted lines, communicating with the steam-dome or the steam-space of the boiler, so that any steam which may be generated in the jacket will pass to the dome or the boiler.

Among other advantages resulting from the construction above described, I avoid the ordinary crown-sheet, and the troublesome work of connecting the fire-box and tubular section, and also the complicated fastenings between the fire-box and cylinders.

I economize space by constructing the apparatus in a compact form, and I obtain a large extent of heating-surface, and thereby economize fuel.

By omitting the complicated features referred to I lessen the cost of construction.

The water jacket or chamber G not only cooperates with the boiler in heating water for the generation of steam, but it serves as a protection to the boiler and a preventive of condensation when the apparatus is exposed in cold weather.

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

The combination, with a steam-boiler, of the surrounding water-leg or casing G, provided with pipes *h*, connected to the bottom of boiler and to the lower part of said water-leg at an angle, whereby a better circulation of the water is produced, and also pipes for connecting the top of the water-leg with the steam-space of the boiler, for the better liberation of the steam, substantially as described.

GEORGE T. SNYDER.

Witnesses:
JULIUS G. GNERRY,
CHRIST. CONROY.