T. GREER.

STEAM BOILER.

No. 11,220. Patented July 4, 1854.

Fig. 6.

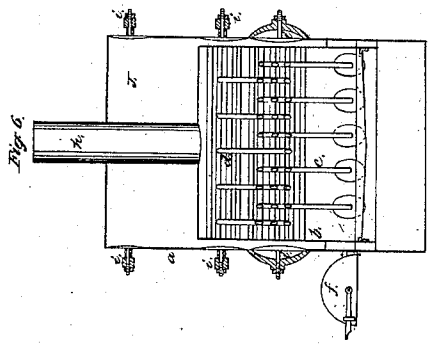


Fig. 3.

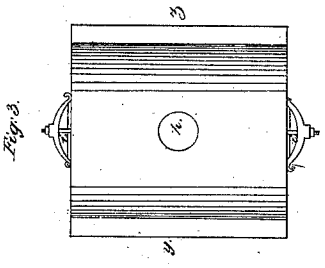


Fig. 5.

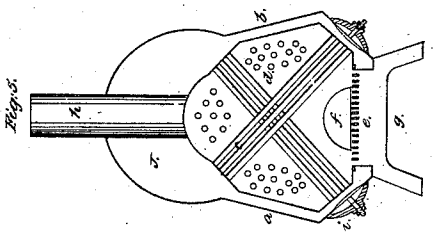


Fig. 2.

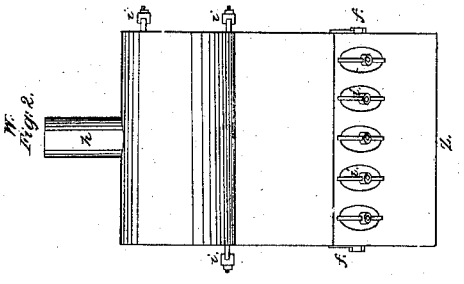


Fig. 4.

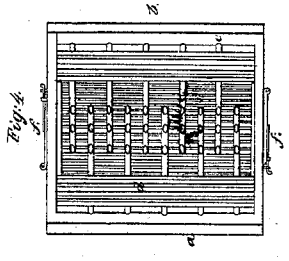
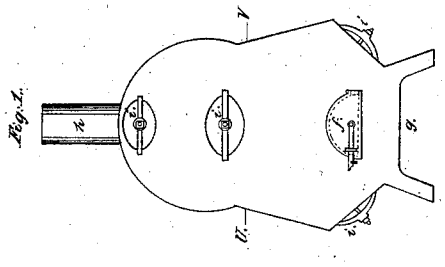


Fig. 1.



Witnesses,
Geo. W. Hollingsworth
John Dillenmond

Inventor:
Thomas Greer

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS GREER, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **11,220**, dated July 4, 1854.

To all whom it may concern:

Be it known that I, THOMAS GREER, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Tubular Fire-Box for Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon.

The same letters refer to like parts.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

I do not confine myself to any particular form of boiler, though I prefer the one here represented.

Figure 1 is a front view of the outside of the boiler. Fig. 2 is a side view of the same. Fig. 3 is a bird's-eye view. Fig. 4 is a sectional view through U V. Fig. 5 is a sectional view through W X. Fig. 6 is a sectional view through Y Z.

a is the outer shell.
b is the inner shell.
c is the angular tubes.
d is the horizontal tubes.
e is the grate-bars.
f is the fire-door.
g is the ash-pit.
h is the smoke-pipe.
i is the hand or man holes and caps.
j is the steam-chamber.

In constructing my boiler I first form the inner shell *b*. Through this shell from each side and near the top to the opposite sides and near the bottom I pass a series of tubes *c* at an angle of about forty-five degrees. This arrangement leaves a space between the tubes *c* and the top of the shell *b* and also on each side of the shell *b* and the upper end of one tier and the lower end of the other tier of tubes *c*. Through these spaces I pass a series of horizontal tubes *d* from front to rear, the said tubes all being secured to the shell in the usual way—that is to say, by ferrule and calking.

The outer shell *a*, though larger, is shaped similar to the inner shell *b*, except at the top, where the arch is thrown up to form the steam-chamber *j*. The two shells are united by flanges or any other preferred method a little below the grate-bars *e*, thus forming a water-space entirely around the shell *b*, except at the bottom or fire-space represented by the grate-bars *e*. Now by keeping the water above the top of the shell *b* the tubes *c* and *d* will also be kept full, thus allowing the fire to act directly upon every tube and also on the whole inner surface of the shell *b*. This arrangement gives a very large fire-surface in a comparatively small space, and the angular tubes *c* and water-space between the shells *a* and *b* allow a free and rapid circulation of the steam and water.

By removing the caps from the hand or man holes *i* the tubes *c* and *d* and the space between the shells *a* and *b* may be cleaned and the tubes repaired or replaced without difficulty.

I am aware that vertical, coiled, and horizontal tubes have been used in boilers, and I therefore do not claim them; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. A series of angular tubes arranged and for the purpose as herein specified.

2. The horizontal tubes, in combination with the angular tubes.

THOMAS GREER.

Witnesses:
GEO. W. HOLLINGSWORTH,
JOHN FITZSIMMONS.