J. C. STEAD.

Feed-Water Heater.

No. 205,813. Patented July 9, 1878.

Figure 1.

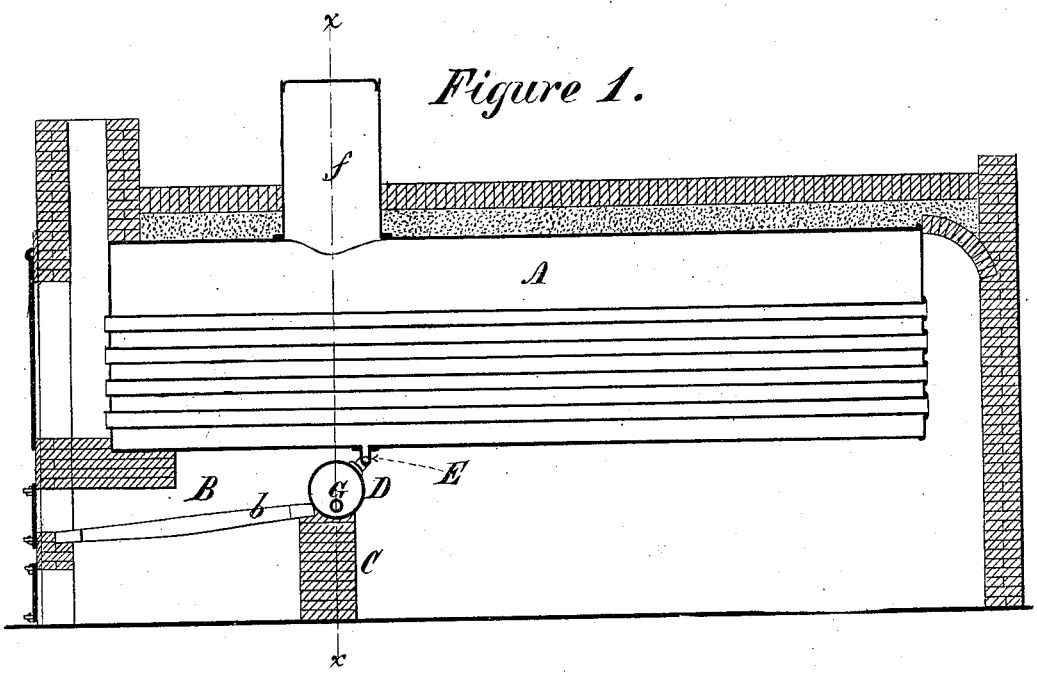
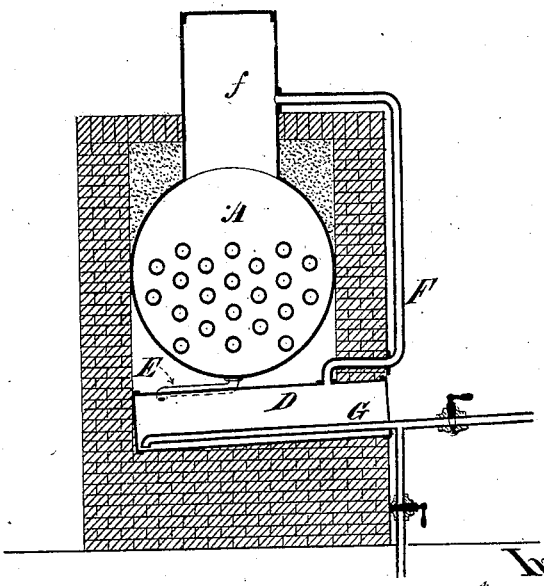


Figure 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES C. STEAD, OF GREEN POINT, NEW YORK.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **205,813**, dated July 9, 1878; application filed June 12, 1878.

To all whom it may concern:

Be it known that I, JAMES C. STEAD, of Green Point, New York, have invented a certain Improvement in Feed-Water Heaters and Circulators for Steam-Boilers, of which the following is a specification:

My improvement relates to that class of feed-water heaters or circulators in which the feed-water is heated in a drum placed longitudinally upon the bridge-wall, and having one connection with the water-body in the bottom of the boiler and another with the steam-space in the boiler, or in which the drum having these connections is used as a supplementary steam-generator, and to promote the circulation of water from the bottom of the boiler into the drum, and thence into the steam-space in the boiler, substantially as shown and described in the Letters Patent of the United States No. 198,428, granted to me December 18, 1877.

My present invention consists in connecting the pipe leading to the steam-space in the boiler with the highest part of a drum set upon the bridge-wall in an inclined position.

In the class of feed-water heaters to which my invention belongs there is a vigorous circulation of water from the bottom of the boiler into and through the drum when feeding is intermitted; and the object of connecting the highest part of the drum with the steam-space in the boiler is to prevent any collection of steam in the drum between the body of water it contains and any portion of its upper surface. When the drum is set upon a level, or, what is the same thing, when the upper portion of the shell of the drum is level, the direct impingement of the flames of the furnace upon its exterior drives the water away from the upper part of the shell, and creates a steam-space in the drum, which is therefore exposed to be rapidly burned out at that point. If the connection with the steam-space is made with the lower end of an inclined drum, this difficulty is still more serious. In such case the water stands on, or nearly on, a level with the opening at the lower end of the drum, and there is a steam-space between the surface of the water and the higher part of the drum. By so constructing or setting the drum that the upper part of its shell is inclined, and by connecting the highest part of it with the steam-space in the boiler, I am enabled to keep the drum full of water and accomplish the two purposes of preventing the rapid burning out of the upper part of the drum, and also of increasing the vigor of the circulation of water through the drum.

The accompanying drawings, illustrating my invention, are as follows: Figure 1 is a longitudinal vertical section of a stationary boiler and furnace provided with a drum placed across the top of the bridge-wall. Fig. 2 is a transverse section through the line *x x* on Fig. 1, showing the connections of the drum with the bottom of the boiler and with the steam-dome, also showing the blow-off pipe, which may, if desired, be connected with the service-pipe for the supply of feed-water through the drum to the boiler.

The drawings represent a stationary cylinder-boiler, A, set in brick-work, and provided with a furnace, B, at the front end. The bridge-wall C terminates nearly on a level with the grate-bars *b*, and is surmounted with a drum, D, set in an inclined position. The lower end of the drum is connected by the pipe E with the lower part of the boiler, and the highest part of the portion of the drum exposed to the flames of the furnace is connected by the pipe F with the top of the boiler, or, as shown, with the steam-dome *f*. The drum is provided with the pipe G, which may, if desired, be connected with a service-pipe for the introduction of feed-water into the drum, or it may be used as a blow-off pipe. In the latter case the pipe G is either connected with the lower end of the drum, or, if inserted in the upper end, as shown in the drawing, is prolonged so that its mouth extends nearly to the lower end of the drum.

When my apparatus is used as a feed-water heater the feed-water is introduced directly into the drum, and, being therein heated, makes its way therefrom into the boiler. I prefer, however, to use separate feed-water-heating apparatus, and use my bridge-wall drum solely as a steam generator and circulator.

In operation, the water from the bottom o, the boiler falls into the drum through the pipe E, and being therein heated by the action of the flames, which impinge upon the exterior

surface of the drum, makes its way through the pipe F into the upper part of the boiler, or into the dome, as shown.

It will of course be understood that the form of the supplementary steam generator or drum may be varied without departing from my invention, the material characteristic of which is that the upper part of the shell of the drum upon the bridge-wall is inclined, so that the connection with the steam-space of the boiler may be made from a part of the drum which is higher than any other part of it, or higher than any other part exposed to the flames of the furnace.

I claim as my invention—

The supplementary steam generator or drum D, set on the bridge-wall of a furnace in an inclined position, or having the upper portion of its shell inclined, in combination with a pipe connecting the highest exposed part of the drum with the steam-space in the boiler, and another pipe connecting the lower end of the drum with the lower part of the boiler, substantially as and for the purposes set forth.

JAMES C. STEAD.

Witnesses:

EDWD. PAYSON,

M. L. ADAMS.