C. SMITH.

Heating and Circulating Devices for Steam-Boilers.

No. 211,802. Patented Jan. 28, 1879.

Fig. 1.

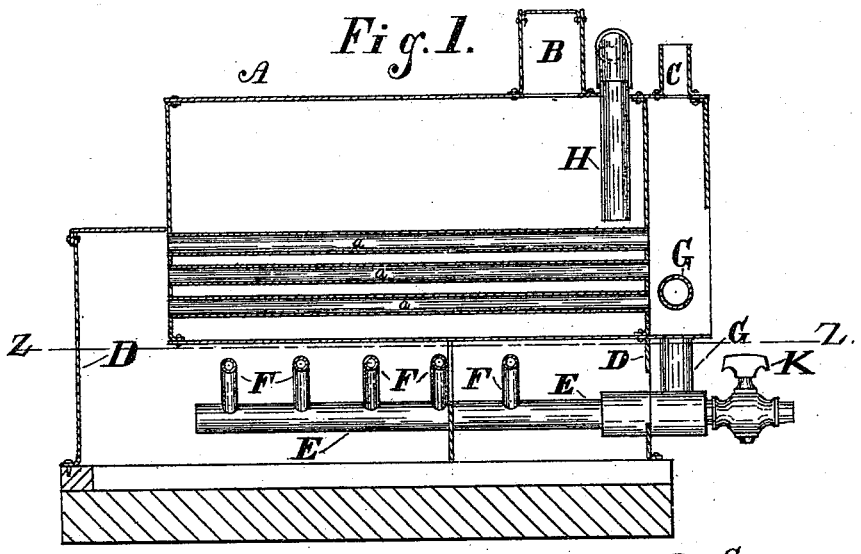


Fig. 2.

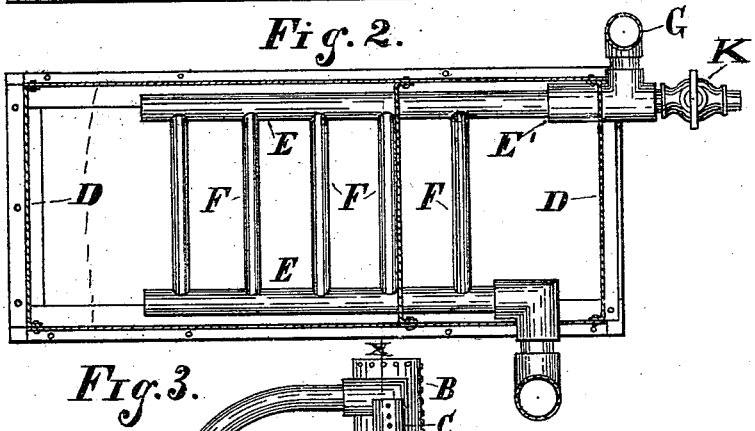
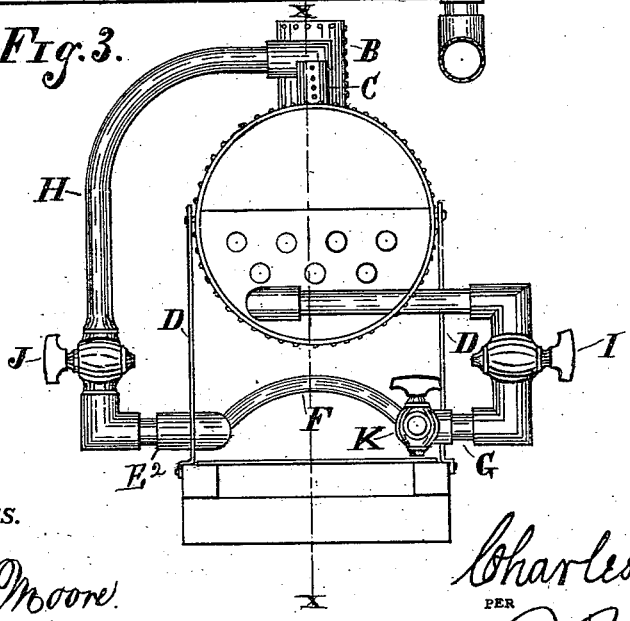


Fig. 3.



WITNESSES.

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CHARLES SMITH, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HEATING AND CIRCULATING DEVICES FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **211,802**, dated January 28, 1879; application filed November 23, 1878.

To all whom it may concern:

Be it known that I, CHARLES SMITH, of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Heating and Circulating Devices for Steam-Boilers, of which the following is a specification:

Reference is had to the accompanying drawings, which are made part hereof, and on which similar letters of reference indicate similar parts.

Figure 1 is a longitudinal vertical section, on the dotted line *x x* in Fig. 3, of a steam-boiler provided with my improvements. Fig. 2 is a plan view of the arrangement of pipes underneath the boiler, looking downward from the dotted line *z z* in Fig. 1. Fig. 3 is an end elevation.

In said drawings, the portion marked A is the shell of an ordinary boiler. *a a* are the ordinary tubes or flues therein. B is the dome thereon. C is the smoke-stack thereto. D D are the inclosing-walls. All the above-mentioned parts may be constructed in the ordinary or any approved manner.

Underneath, and in connection with said boiler, is arranged a series of pipes, with which the flame shall come in direct contact, and which constitute the steam-generator, which is the subject-matter of this invention. Of these pipes, those marked E E are of considerable size, and lie in a horizontal position on each side of the fire-box. Those marked F F run across the fire-box, through the flame, and are connected at their ends with the pipes E E. They are also preferably arched, as shown in Fig. 3, so that no sediment can remain in them, but will run into the pipes E E, whence it can be blown off.

G is a pipe connecting the bottom of the boiler with the pipe E^1. H is a pipe connecting the pipe E^2 with the top of the boiler. In each of these pipes is a stop-cock, by means of which the connection between the boiler and the system of pipes E E F F can be severed.

From the end of the pipe E^1 projects a cock, K, which can be used in blowing off the sediment collected in the pipe, or for drawing off the water.

In operation, the boiler is filled with water, in the usual manner, which is then admitted, through the pipes G, to the pipes underneath the boiler, where it is generated into steam, which returns to the boiler by way of the pipe H. This pipe H, after being carried to the top or upper part of the boiler, returns downward, and extends into the water in the boiler, or may, instead, enter the boiler at a point below the top of the water therein, the return being formed in all cases. This construction prevents the water in the pipes from returning into the boiler before it is converted into steam, which is a very important feature of my invention.

Instead of having a single water-pipe, G, between the boiler and the generator-pipes, a similar pipe may extend down from each side of the boiler, and thus form a double connection; or the pipe E may extend entirely around the boiler, instead of along the sides, and the pipe G may connect with it in the center in front. In either of these cases the steam-pipe H would be located at or near the rear end of the boiler.

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

1. In combination with a steam-boiler, a steam-generator located in the fire-box underneath said boiler, and consisting of the horizontal pipes E E, running the entire length of the furnace, and the arched pipes F F, substantially as herein shown and specified.

2. In combination with a steam-boiler, A, and steam-generator E E F F, arranged as specified, the steam-conducting pipe H, having its top end extending far enough inside the boiler to enter the water therein, substantially as herein shown and specified.

3. The combination of the boiler A, pipes E, F, G, and H, and cocks I and J, all substantially as herein shown and described, and for the purpose herein specified.

In witness whereof I have hereunto set my hand and seal at, Chicago, Illinois, this 5th day of December, A. D. 1878.

CHARLES SMITH. [L. S.]

In presence of—
FRANZ GONDELES,
J. T. MCCORMICK.