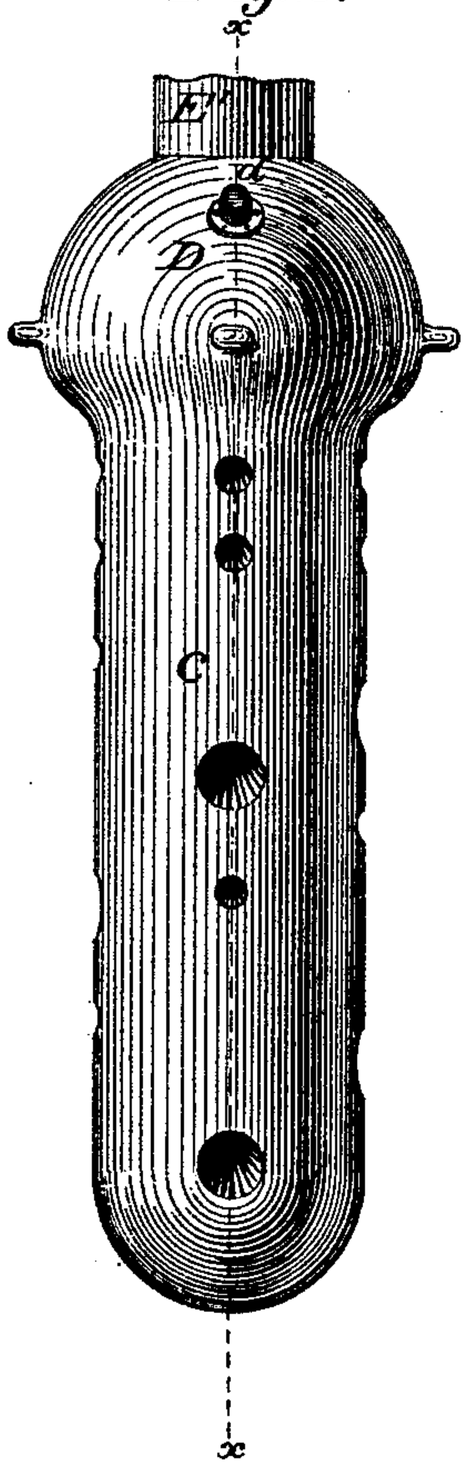
S. CADDICK.

CHIMNEY-BOILER.

No. 183,127. Patented Oct. 10, 1876.

Fig. 2.



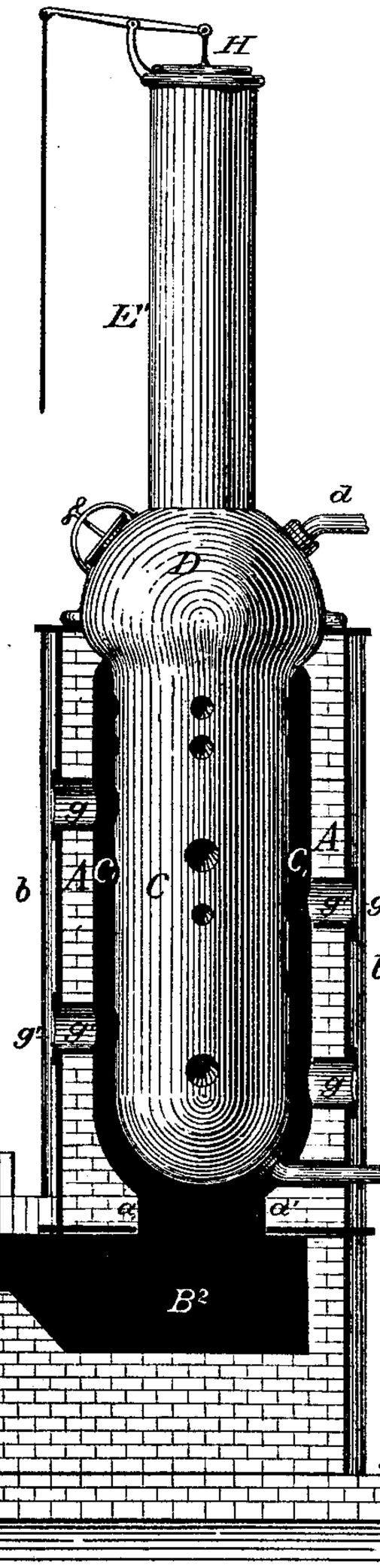
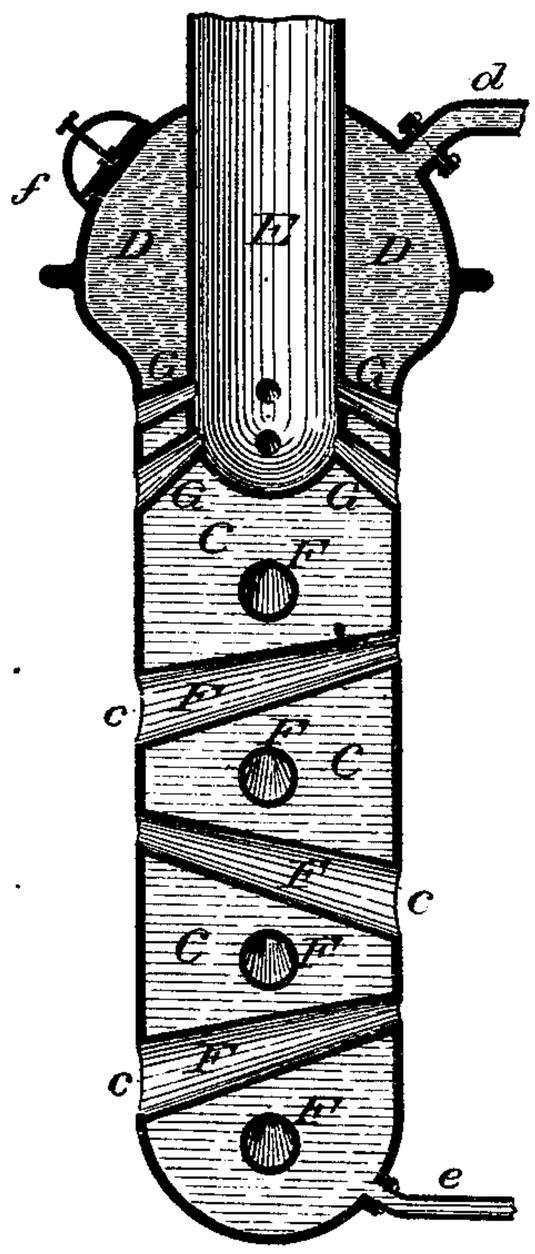


Fig. 1.

Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL CADDICK, OF PEMBROKE, MAINE.

IMPROVEMENT IN CHIMNEY-BOILERS.

Specification forming part of Letters Patent No. **183,127**, dated October 10, 1876; application filed May 23, 1876.

To all whom it may concern:

Be it known that I, SAMUEL CADDICK, of Pembroke, in the county of Washington and State of Maine, have invented a new and useful Improvement in Boilers; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of my invention is the utilization of the products of combustion in a puddling, reheating, or other furnace in their passage to the open air, for the purpose of making steam to furnish the necessary power required for running the machinery in such a manufactory.

My invention therein consists, principally, in attaching to a puddling, reheating, or other metal-working furnace a steam-boiler, hereinafter described, adapted to be heated by the products of combustion after passing through the said furnace on their way to the open air; further, in the novel construction of the boiler, and in the arrangement and combination of the several principal operative parts, all as more fully hereinafter explained.

To enable others skilled in the art to manufacture my boiler, I now describe the same in connection with the drawings, in which—

Figure 1 is a central section of the stack and the body of a puddling-furnace and my boiler as attached and used in combination therewith; Fig. 2, a side elevation of the boiler detached from the furnace, and Fig. 3 a vertical section on the line *x x* in Fig. 2.

Like letters denote corresponding parts in each figure.

A represents the casing of the boiler, which is, in this instance, the stack of a puddling-furnace. The stack may be of any desired exterior form, and is built up, in the ordinary manner, of brick, and may be incased by a wrought-iron shell, or strapped with iron bands, if desired. It is, preferably, supported upon a base, *a*, by four or more columns, *b*. B is the body of a puddling, reheating, or other furnace, which connects, by the usual throat B^1, with the chamber B^2 at the lower end of the stack. The stack A has a cylindrical hollow interior, the lower end of which is contracted, as shown by *a'*, where it enters the chamber B^2. In the stack or casing A is suspended the boiler proper C, which extends downwardly nearly to the chamber B^2, leaving a free open space, C', between the shell of the boiler proper and the said casing. The top of the boiler proper is enlarged, globe-shaped, forming a steam-chamber, D, which enlarged portion rests upon the top of the casing A. A flue, E, with a closed lower end, depends within the steam-chamber D, and projects centrally above the same, where it is connected with the exit-flue E'. F represents inclined flues, which pass, preferably, at right angles to each other through the lower part of the boiler, and connect, at both ends, with the space C'. These flues are intended to be quite large, and are tapering in form, having their lower ends *c* of larger diameter than their upper ends, which allows the upper inside flange of flues to be readily adjusted at any time. G are other flues, near the upper end of the lower part of the boiler, which pass at an incline from the shell of the boiler into the sides of the flue E, connecting the said flue E with the space C'. These flues are, preferably, tapering in form. A valve, H, is placed on top of the exit-flue E', and operated in any ordinary manner. The steam-pipe *d* opens out of the steam-chamber D, and the feed-water pipe *e* enters near the bottom of the boiler. The chamber D is provided with a man-hole, *f*. In the casing A, opposite the lower end *c* of the flues F, are holes *g*, through which the flues are cleaned, having stoppers *g'*.

My boiler being constructed as above described, its operation and advantages are as follows: A fire being built in the grate of the puddling or other furnace, the products of combustion pass through the body B of the furnace into the chamber B^2, and thence into casing A, and, circulating entirely around the lower part of the boiler proper and through the flues F, pass into the flues G and out the exit.

Heretofore the products of combustion in such furnaces, in a highly-heated state, have been conveyed directly to the stack and passed off into the open air without further utilization of the heat. It will then be seen that by placing my boiler in the stack of such furnaces the necessary steam for running the

machinery—as, for instance, the rolling-mills and forges usually connected with such a manufactory—is furnished without additional cost of fuel, as heretofore, and with less expense in the first construction of the boiler.

The particular construction of my boiler is also advantageous. The inclined flues, by being taper in form, retain and compress the products of combustion, which are drawn into them by the exhaust caused by the rapidly-passing products at the opposite end of the flues. The form of the flues, and their inclination also, to a great extent, keep the flues clear, and permit them to be readily cleaned through the holes in casing. The casing of the boiler, by being wholly constructed of or lined with brick, retains better the heat and consumes more thoroughly the products of combustion. The construction of the flues of my boiler, by passing through the same, strengthens the shell of the boiler more than ordinarily against the dangers attending a high pressure of steam.

If it is desired to apply the particular construction of my boiler separate from a furnace, a fire-box and grate can be placed in the position of the chamber B^2, and the construction of the other parts retained.

Having thus fully described my invention and explained some of its advantages, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a puddling, reheating, or other metal-working furnace, the combination, with the stack thereof, of a steam-boiler, C D, suspended within the said stack, substantially as and for the purposes set forth.

2. The combination, with the casing A, of the vertical cylindrical boiler C, suspended within the same, so as to leave a space, C′, entirely around the boiler, and inclined flues F, passing through the said boiler and connecting the said space, substantially as described and shown.

3. The combination, with the boiler C and the space C′, of the depending flue E and the flues G, substantially as described and shown.

4. The combination, with the boiler C and space C′, of the inclined flues F and G and the flue E, substantially as described and shown.

This specification signed and witnessed this 16th day of May, 1876.

SAMUEL CADDICK.

Witnesses:
W. K. CAMERON,
E. L. PATTANGALL.