(No Model.) 2 Sheets—Sheet 1.

A. CALHOUN.

STEAM BOILER.

No. 341,220. Patented May 4, 1886.

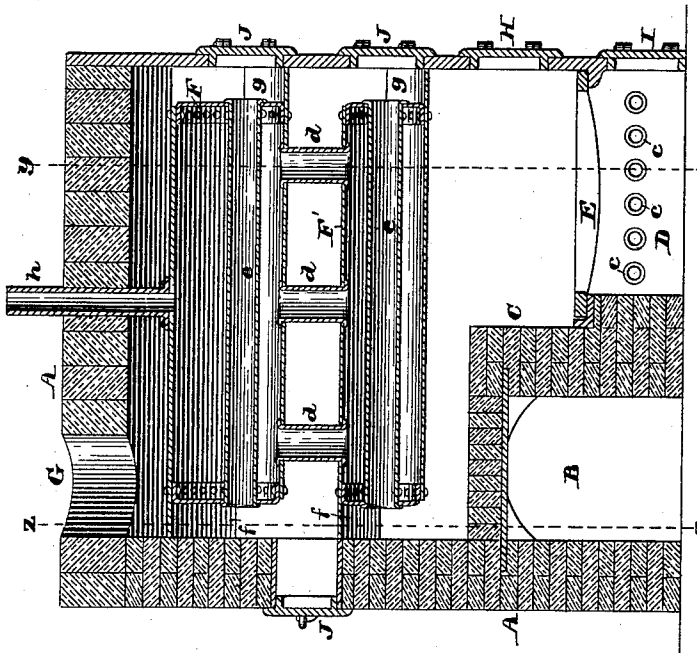

Fig. 1.

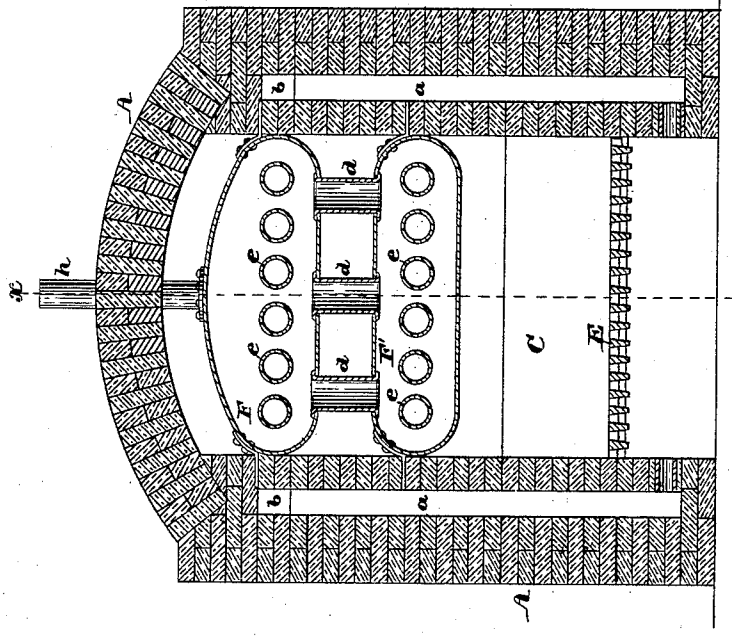

Fig. 2.

Witnesses:
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John McGrath.

Inventor:
Allan Calhoun,
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Attorney.

(No Model.) 2 Sheets—Sheet 2.

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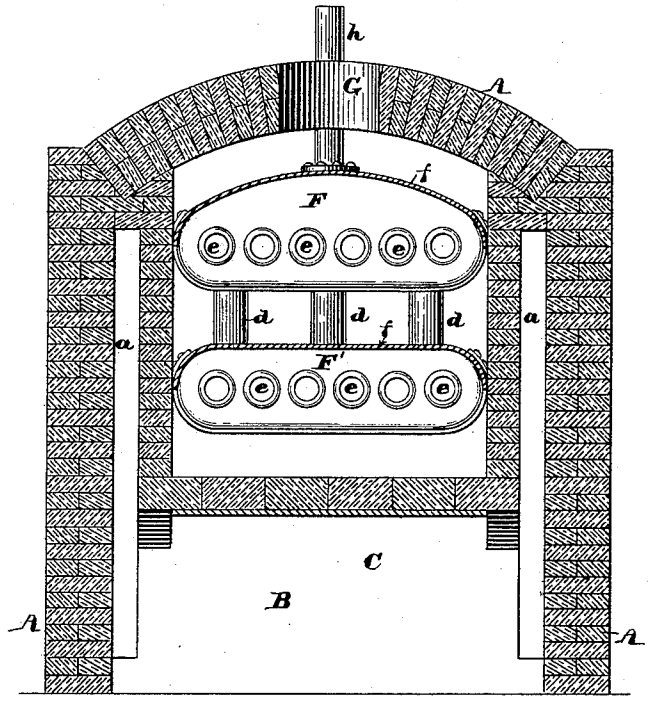

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

ALLAN CALHOUN, OF MIDDLEBURY, VERMONT.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 341,220, dated May 4, 1886.

Application filed February 25, 1886. Serial No. 193,105. (No model.)

To all whom it may concern:

Be it known that I, ALLAN CALHOUN, of Middlebury, in the county of Addison and State of Vermont, have invented certain new and useful Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the construction of steam-boilers for heating and other purposes, and has for its object simplicity of construction, compactness, with increased heating-surface, and a ready means of heating the air to be supplied to the combustion-chamber; and it consists in certain novel features of construction, which will be readily understood by reference to the description of the drawings, and to the claims to be hereinafter given.

Figure 1 of the drawings is a longitudinal section on line *x x* on Fig. 2. Fig. 2 is a transverse vertical section on line *y y* on Fig. 1, and Fig. 3 is a transverse vertical section on line *z z* on Fig. 1.

In the drawings, A is the inclosing-casing, which may be of brick, as shown, or of metal, as may be desired; but in either case the side walls will be made double, so as to form between them the air-chambers *a*, to which air is supplied through the openings *b b* in the rear wall of the setting, either by the natural draft created by the heat of the furnace or a forced draft of a blower, as may be desired. The chambers *a a* communicate with the chamber B at the rear of the bridge-wall C, as shown in Fig. 3, and said chambers *a a* also communicate through the openings *c c* with the ash-pit D, just below the grate E, as shown in Fig. 2.

F and F′ are two water and steam chambers, made oval or oblong in transverse section and of a width equal to the distance between the inner surfaces of the inner side walls of the casing, and of a length considerably less than the distance between the inner faces of the rear and front walls of said casing, said chambers being located one above the other and having direct communication with each other through a series of vertical water-tubes, *d d d*, as shown in Figs. 1 and 2.

The water-chambers F and F′ are each provided with a single row of horizontal smoke or fire tubes, *e e*, which extend from end to end thereof and through each head or tube-sheet, as shown in Fig. 1.

The spaces between the ends of the chambers F and F′ and the inner faces of the rear and front walls of the casing or setting are divided by partitions *f f* and *g g*, the former located above the tubes *e e* and the latter below the same, as shown in Fig. 1, so as to compel the hot gases and other products of combustion, after passing to the rear of the boiler over the bridge-wall C, to return to the front of the boiler through the series of tubes *e e* in the chamber F′, pass to the rear again between the two chambers F and F′, return to the front again through the tubes *e e* in the chamber F′, and then pass to the rear again over the top of said chamber F, and to the chimney at G.

The partitions *f f* and *g g* may be formed by extending the upper sheets of the chambers F and F′ beyond the ends of said chambers in one direction, and the lower sheets beyond the opposite end, as shown in Fig. 1, or independent sheets may be riveted to the heads of said chambers just above and below the tubes *e e*, as may be desired.

H is the fire-door; I, the ash-pit door, and J J J are doors through which the tubes *e e* and the space between the chambers F and F′ may be cleaned. The water-chamber F′ has flat upper and lower sides, and the chamber F has its lower side flat and its upper side crowned or curved in cross-section, as shown, and said chambers are filled with water to a line just above the tubes *e* in the chamber F, the remaining space being reserved for steam, which may be drawn therefrom through the steam-pipe *h*. By this construction a very effective steam-producing boiler is obtained at comparatively small cost and occupying but little space, and which is particularly well adapted to the purpose of heating buildings by steam.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A steam-boiler having the following elements, viz: an outer shell or casing, two water-chambers of a width equal to the distance between the side walls of said casing, and a length considerably less than the distance between the front and rear walls of said casing,

said chambers being arranged horizontally, one above the other and equidistant from said front and rear walls, a series of vertical water-tubes connecting said chambers, a series of fire-tubes extending longitudinally through each of said chambers from front to rear, and partitions extending from one end of each of said chambers to the wall of said casing below the fire-tubes, and from the other end of each of said chambers to the casing above the fire-tubes, substantially as described.

2. In a steam-boiler, the combination of two water-chambers located within an outer shell, and connected together by a series of water-tubes, a series of fire-tubes extending from end to end of each of said chambers, and a series of partitions betweeen the ends of said chambers and the front and rear walls of said casing, whereby the products of combustion are caused to pass in succession along the lower surface of a chamber and through the fire-tubes of said chamber, along the upper surface of one chamber and the lower surface of the other chamber, through the fire-tubes of the upper chamber and along the upper surface of said upper chamber, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 18th day of February, A. D. 1886.

ALLAN CALHOUN.

Witnesses:
N. C. LOMBARD,
WALTER E. LOMBARD.