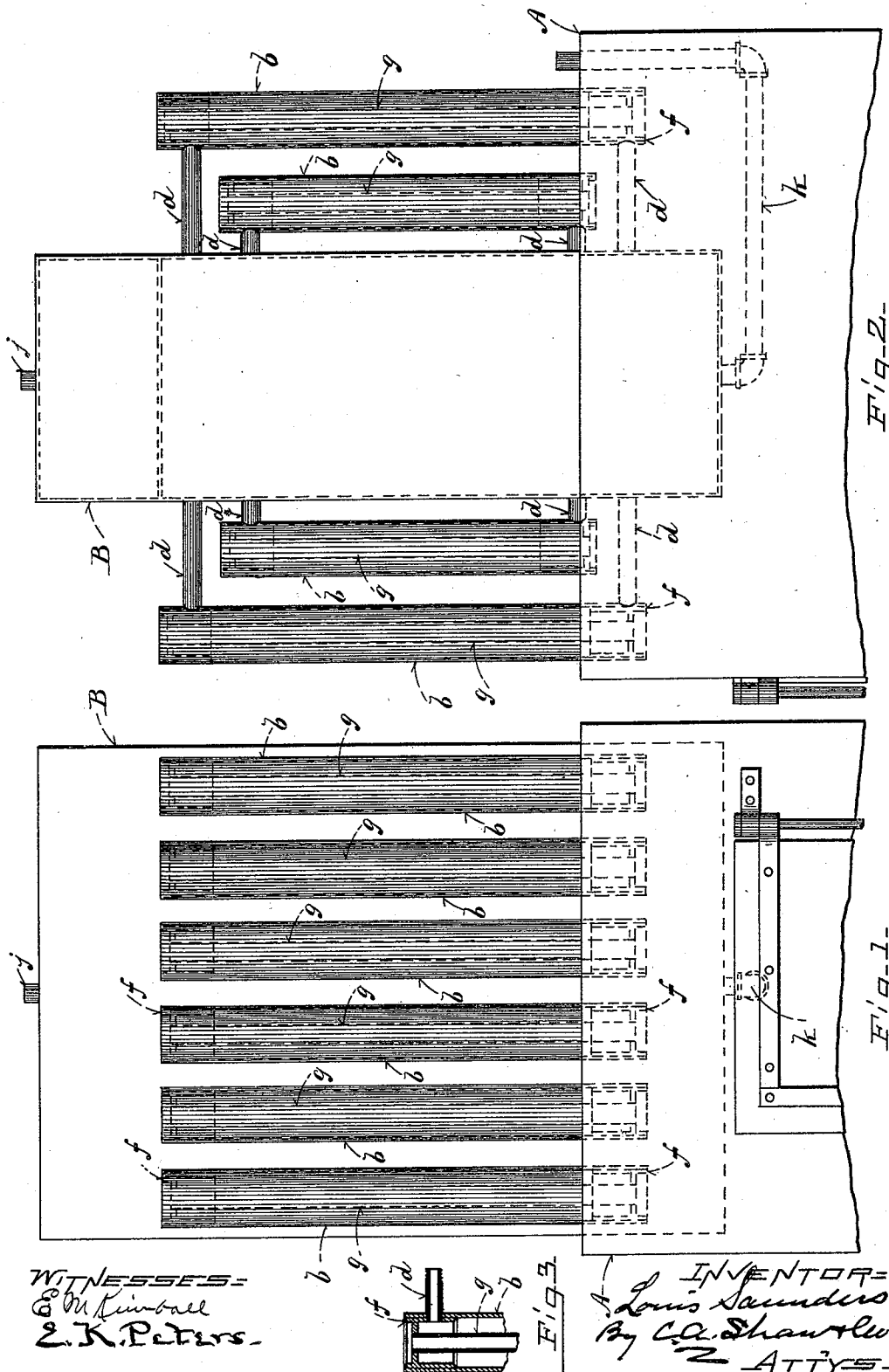


(No Model.)

L. SAUNDERS.
BOILER.

No. 562,199.

Patented June 16, 1896.



WITNESSES=
E. M. Kimball
E. K. Peters.

INVENTOR=
Louis Saunders,
By C. C. Shawlee,
ATTY-S.

UNITED STATES PATENT OFFICE.

LEWIS SAUNDERS, OF LAWRENCE, MASSACHUSETTS.

BOILER.

SPECIFICATION forming part of Letters Patent No. 562,199, dated June 16, 1896.

Application filed January 11, 1894. Serial No. 496,467. (No model.)

To all whom it may concern:

Be it known that I, LEWIS SAUNDERS, of Lawrence, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Boilers, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved boiler, the casing being removed; Fig. 2, a front elevation of the same, and Fig. 3 a sectional view of one of the circulation-tubes.

Like letters of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to a square, vertical boiler particularly adapted for heating purposes, the object being to obtain extended water-space with rapid heating capacity.

In the drawings, A represents the fire-box centrally in which there is a rectangular tank B, disposed over the grate. On the front and back of said box a series of circulation-tubes *b* are arranged vertically. These tubes are shown in detail in Fig. 3, and are closed by inwardly-depressed heads *f*, connected centrally by flues *g*.

The tank B is tapped by horizontal ducts *d*, which pass through the sides of the circulation-tubes *b*, flush with their heads *f*. As many of these circulation-tubes may be employed as desired and they may be of any suitable length, or their lengths may vary. Above the upper ducts *d* the space within the tank B forms the steam-dome. A nipple *j* taps the top of the tank, to which a steam-pipe may be attached.

Water is conveyed to the boiler by a pipe *k*, passing centrally over the fire-box and into the bottom of the tank.

As many rows of circulation-tubes *b* may be connected with the tank B as are desired, those of each row being preferably in parallelism and by lengthening their ducts *d* can be set out so that the rows will overlap. Each tube is connected independently with the tank and has an independent circulation therewith.

The tank B is narrower from the front to the rear of the fire-box than in the opposite direction, and for this reason I apply the circulation-tubes to the longest sides, but they may be also applied to the ends. By this construction square boilers of any length may be formed with a very large water-space, dry steam being generated in the top of the central box or tank, which acts as the steam-dome, and a constant circulation maintained through the tubes *d*. This construction is particularly adapted for hot-water heating and is exceedingly cheap and simple.

The tank B may be extended downward into the fire-box for gas-heating, if desired.

Having thus explained my invention, what I claim is—

In a boiler of the class described the fire-box in combination with the rectangular tank having the water-inlet, *k*, through the fire-box into its bottom and the steam-outlet in its top, two rows of vertical circulation-tubes, *b*, arranged in parallelism and having their ends closed by heads, *f*, connected by flues, the inner row of tubes being the shorter and said tubes being each independently connected with the tank by ducts, *d*, entering the side walls of said tank and the tubes adjacent their heads, said tank projecting above the upper ends of the tubes to form a steam-space substantially as shown and specified.

LEWIS SAUNDERS.

Witnesses:

GEORGE J. JOHNSON,
ALVA COAKLEY.