G. P. SALISBURY & H. C. SMITH.
Steam-Boiler.

No. 207,133. Patented Aug. 20, 1878.

Fig. 1.

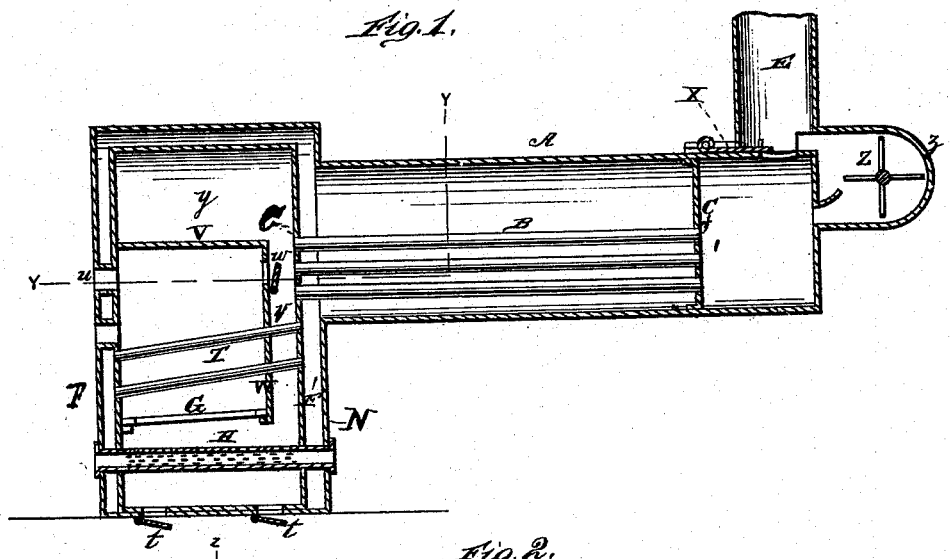


Fig. 2.

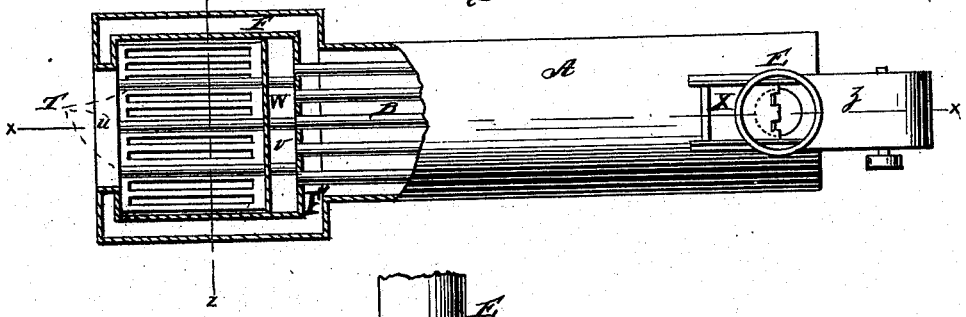
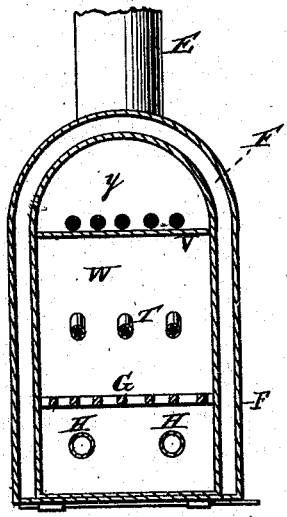


Fig. 3.



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UNITED STATES PATENT OFFICE

GEORGE P. SALISBURY AND HENRY C. SMITH, OF NEW HAVEN, CONN.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **207,133**, dated August 20, 1878; application filed April 5, 1878.

To all whom it may concern:

Be it known that we, GEORGE P. SALISBURY and HENRY C. SMITH, of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Steam-Boilers; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to steam-boilers; and consists in the construction, combination, and arrangement of the devices hereinafter described.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of a steam-boiler embodying our invention, taken through the line *x x* of Fig. 2. Fig. 2 represents a plan view of the same, taken partly in section, on the line *y y* of Fig. 1; and Fig. 3 represents a transverse vertical section through the line *z z* of Fig. 2.

A designates the cylindrical body of the boiler; B, the fire-tubes, extending longitudinally through the same; C, the plates to which the ends of said tubes are attached; D, the smoke-box; E, the smoke-stack; F, the front water-leg, and N the rear water-leg.

To provide the requisite strong draft we employ an exhaust-fan, Z, which is inclosed in a chamber or curved independent passage, *z*, which opens at one end into the said smoke-stack, and at the other end into the said smoke-box. It is inclosed in a protecting-casing, which prevents all communication with the outer air. This fan may be operated by any convenient mechanism. It acts wholly as an exhaust, drawing the air through the furnace and fire-tubes, and delivering it to the smoke-stack.

Damper X regulates the draft by closing the base of smoke-stack E more or less, as desired. When said stack is closed at the bottom by said damper the draft is strongest; but in proportion to the size of the opening will be the downward pressure of the air tending to neutralize the draft.

W designates a vertical diaphragm in the back part of the furnace, and separated from its rear wall by a space, *r*. The lower edge of said diaphragm supports the inner ends of grate-bars G, which may be tubular in form.

The fire-box is completed by a horizontal partition or top plate, V, which extends from the inner face of the front of the furnace to the top of said vertical diaphragm, forming close connections at both ends. This horizontal partition protects the crown-plate from being injured by sudden changes of temperature when cold air rushes in on opening the door.

The chief use of diaphragm W is to allow a downward draft to be used, thus avoiding waste of light particles of fuel and effecting other desirable results. To start the fire an upward draft is, however, desirable. This is effected by opening dampers *t t* in the bottom of the furnace and damper *w* in the upper part of diaphragm W. When these dampers are closed the draft is downward.

T designates a series of water-tubes extending across the furnace, slightly inclined, and arranged so as to be wholly embedded in the fuel. They extend from water-leg F to water-leg N, and serve for the generation of steam, and to produce a circulation of water therein. Their inclined arrangement facilitates the escape of steam, and by embedding them in the fuel we insure the application of a greater degree of heat than they could receive if merely subjected to the blaze below the fuel.

H designates two or more perforated air-pipes extending across the furnace horizontally below the grate, and supplying air for combustion.

The outer air for the draft enters the furnace through draft-door *u*.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a smoke-stack, smoke-box, and device for regulating the draft with an exhaust-fan operating in connection with the independent passage leading from the

smoke-box to the smoke-stack, to produce a draft through the furnace-flues, smoke-box, and up the stack, as shown and set forth.

2. The exhaust-fan Z, operating in connection with the independent passage leading from the smoke-box to the smoke-stack, to produce a draft through the furnace-flues, smoke-box, and up the stack, as shown and set forth.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

GEORGE P. SALISBURY.
HENRY C. SMITH.

Witnesses:
GEORGE TERRY,
ROGER M. SHERMAN.