(No Model.)

L. HOPPE.

STEAM BOILER.

No. 287,832. Patented Nov. 6, 1883.

Fig. 1.

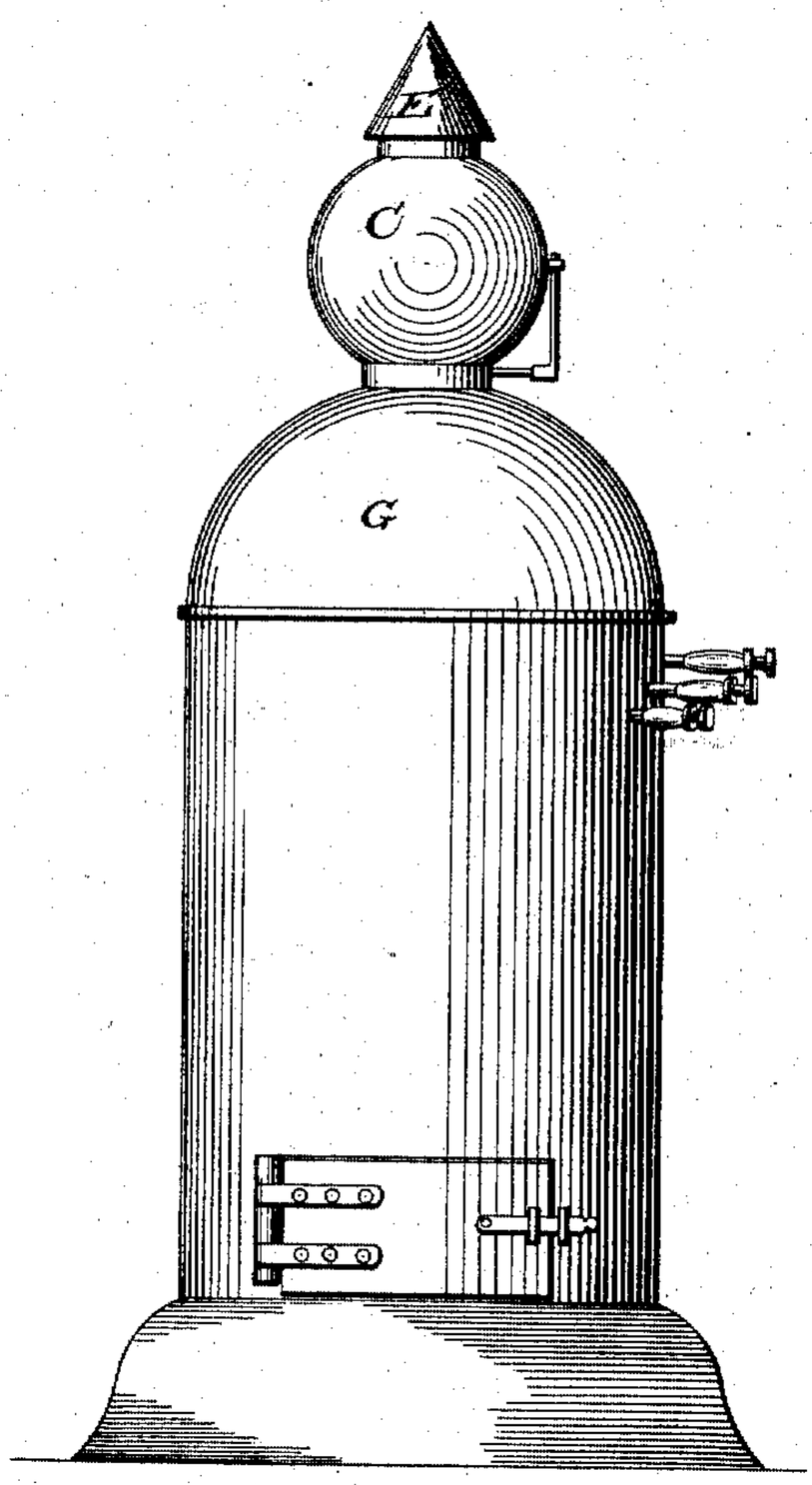


Fig. 2.

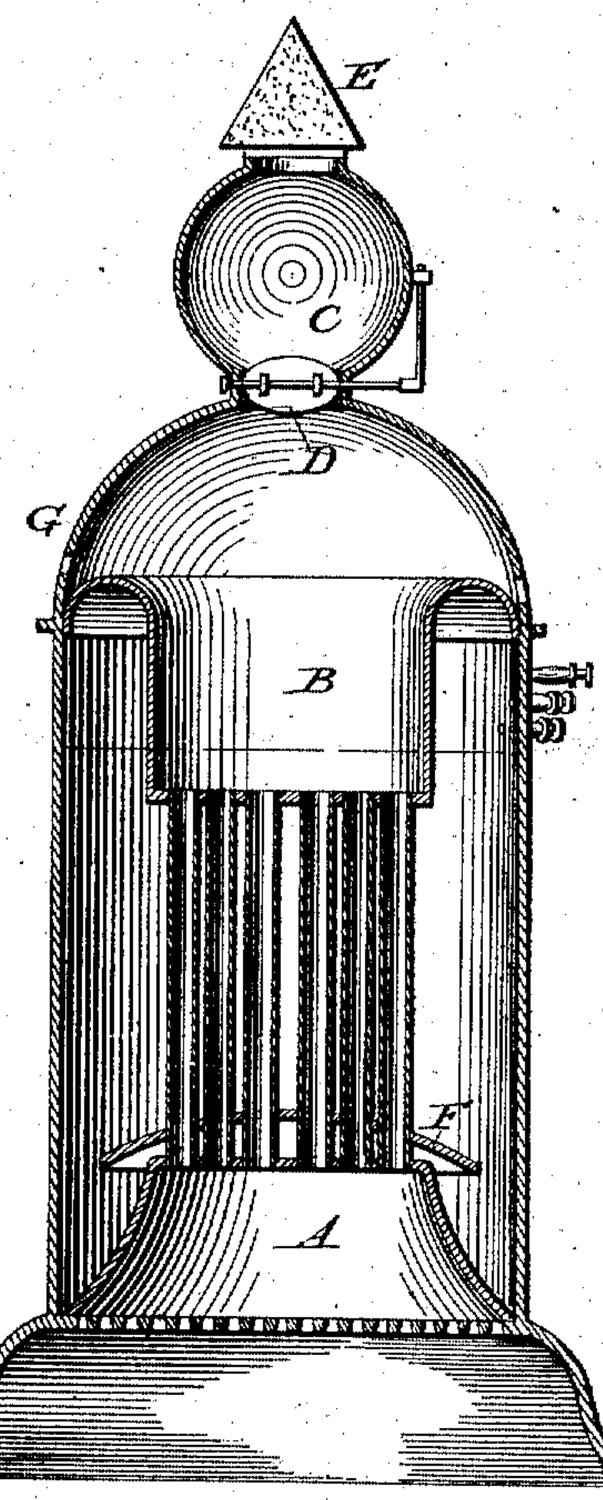


Fig. 3.

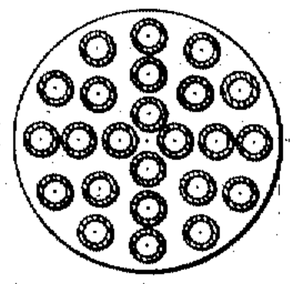
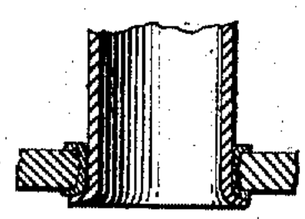


Fig. 4.



Attest.

Sidney P. Hollingsworth

Newton Wyckoff.

Inventor.

Louis Hoppe.

By his Attorney

Philip T. Dodge.

UNITED STATES PATENT OFFICE.

LOUIS HOPPE, OF PRINCETON, MINNESOTA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 287,832, dated November 6, 1883.

Application filed July 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, LOUIS HOPPE, of Princeton, county of Mille Lacs, and State of Minnesota, have invented a new and Improved Steam-Boiler; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the accompanying drawings, and to letters of reference marked thereon.

My invention relates to improvements in steam-boilers; and it refers particularly to that class of boilers known as "tubular upright;" and it has for its object the production of a boiler which shall be in a great measure free from objections so common to ordinary boilers, arising from leaking tubes and lime deposits, at the same time capable of being run in the most economical manner, and with the smallest amount of care and attention. I accomplish these results by means of the apparatus illustrated in the accompanying drawings, in which—

Figure 1 represents the complete boiler ready for use; Fig. 2, a longitudinal section of the same through the center, and showing the arrangement of the tubes, smoke-drum, spark-arrester, &c. Fig. 3 is a view of the bottom plate, showing the openings for the insertion of the tubes; Fig. 4, the method of packing the ends of the tubes for the purpose of guarding against the bad effects of expansion and contraction from heat and cold.

A, Fig. 2, is a fire-box constructed in the ordinary manner, the top of which may be arched, if desired, the better to resist the downward pressure of steam. Inserted in the top of the fire-box are a suitable number of flues or tubes, for the purpose of carrying off the smoke and unconsumed gases. The upper ends of these tubes are inserted in the bottom of a chamber, B, for the reception of the smoke, which ascends from thence through a drum, *c*, provided with a damper, D; thence through a spark-arrester, E; thence to smoke-funnel and the open air. F is a copper plate through which the tubes pass. This plate is intended to receive the greater part of the lime and other calcareous deposits from the water, to which they only slightly adhere, and from which they may be removed by the use of a bar or hammer operated through a suitable man-hole. (Not shown in the drawings.)

On one side of the smoke chamber or drum B is an opening, G, for the insertion of the exhaust-pipe of the engine, if deemed necessary for the extinguishment of sparks, or to aid in the draft of the furnace. On the opposite side of said drum, and at the bottom of the curve, is another opening, H, for the insertion of a suitable cock or valve for the removal of any condensed water that may collect within the drum when used as an exhaust for the escaping steam.

In Fig. 4 is given an enlarged view of the method adopted for brushing the holes in the plates for the reception of the flues or tubes, by which a lining of copper is placed between the tube and the iron of the boiler-plates. This is simply the insertion in opening of the plates for the reception of the tubes of an eyelet of copper, the flanges of which are closed down upon the plates on both sides, as shown in the drawings. Through the copper eyelets or brushings the flues or tubes are inserted and plunged down upon the copper faces of the eyelets, so as to form close joints. If necessary, by reason of leaks, the copper flange between the boiler-plates and the flange on the end of the tubes may be swaged or calked up, so as to insure perfectly tight joints—a matter often of the utmost importance.

It will be readily seen by inspecting Fig. 2 that the low-water line in the boiler is several inches above the tops of the flues—an arrangement not in use in any boiler known to me, but one of great importance, as by keeping the ends always covered with water they will neither burn nor rust out. The life of the boiler is consequently prolonged and leakage prevented.

Attached to the outer arm of the chamber is an arrangement (not clearly shown in the drawings) for regulating the draft by opening or closing damper, and fastening it at point required.

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

1. The tubular upright steam-boiler having the smoke-chamber B extended downward, as

shown, for the protection of the upper ends of the flues or tubes, and provided with a lime-catcher, F, arranged substantially as shown, and for the purpose named.

2. An upright tubular steam-boiler so constructed as to have the upper ends of the tubes or flues always below the water-line of the boiler, and properly fitted with a lime-catcher or plate of copper or metal, F, substantially as shown, and for the purpose stated.

This specification signed and witnessed this 19th day of June, 1882.

LOUIS HOPPE.

Witnesses:
J. S. BRADY,
HERMAN NEUMAN.

Correction in Letters Patent No. 287,832.

It is hereby certified that in Letters Patent No. 287,832, granted November 6, 1883, upon the application of Louis Hoppe, of Princeton, Minnesota, for an improvement in "Steam Boilers," errors appear in the printed specification requiring correction as follows: In line 65, page 1, the word "brushing" should read *bushing;* and in line 74, same page, the word "brushings" should read *bushings;* and that the proper corrections have been made in the files and records pertaining to the case in the Patent Office, and should be read in the patent to make it conform thereto.

Signed, countersigned, and sealed this 22d day of January, A. D. 1884.

[SEAL.]

M. L. JOSLYN,
Acting Secretary of the Interior.

Countersigned:

BENJ. BUTTERWORTH,
Commissioner of Patents.