

W. S. SALISBURY.
Coil Steam Generator.

No. 200,482.

Patented Feb. 19, 1878.

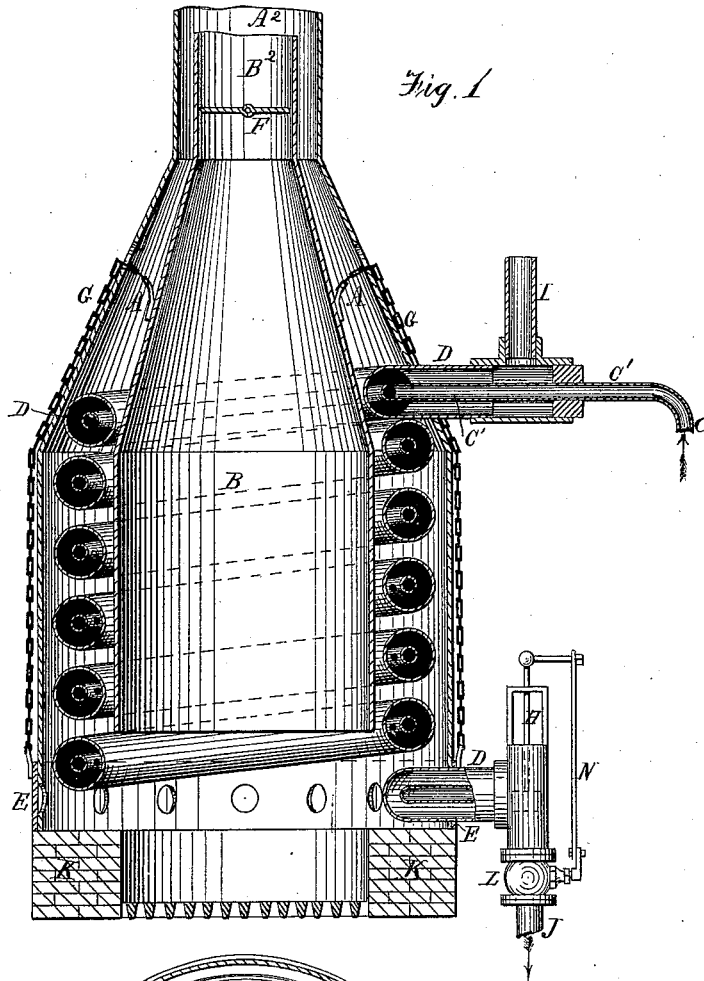


Fig. 1

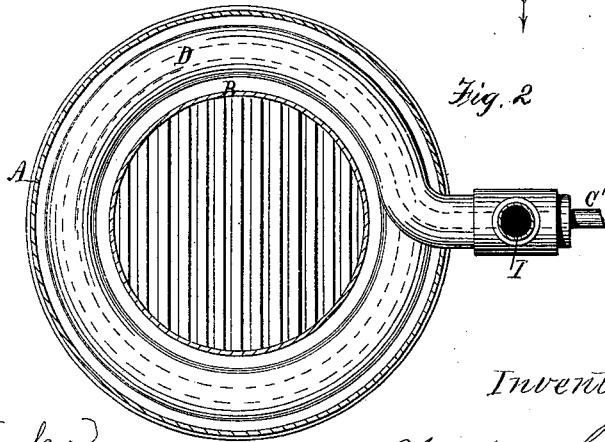


Fig. 2

Witnesses

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Inventor

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UNITED STATES PATENT OFFICE.

WILBER S. SALISBURY, OF BATTLE CREEK, MICHIGAN, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY J. BRIMMER, OF ADAMS, NEW YORK.

IMPROVEMENT IN COIL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **200,482**, dated February 19, 1878; application filed February 10, 1877.

To all whom it may concern:

Be it known that I, WILBER S. SALISBURY, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, and, with the accompanying detailed description, set forth what I consider the best means of carrying out my invention.

Figure 1 is a central vertical section, and Fig. 2 is a plan view with the top parts removed.

Similar letters of reference indicate like parts in both the figures.

D is a continuous coil of lap-welded iron or other pipe, supplied with a T at each end, and inside of which and throughout its length is a coil, C', of pipe, considerably less in diameter, having small holes drilled through at various distances apart in the lower coils, and supplied with water through an end, C. In the passage of water through coil C' it is sprayed through the small holes into the larger coil D, and becomes instantly converted into steam, which, being separated from the water, passes upward and out of steam-pipe I, and in its ascent it heats the feed-water in coil C'. The T on the lower end of coil D is provided with a piston, H, and connecting-rod N. When the water rises above the lower coil it will lift the piston H, which, by the means of the connecting-rod N, opens valve L, allowing the water to escape at J, thereby automatically controlling the flow of water, so that all water not converted into steam before it reaches the end of coil C' may pass out through valve L. Below the bottom of the coils is a circle of fire-brick, K, held in an ordinary cast-iron frame, and which need differ in no respect from the ordinary fire-brick work around a circular grate, only to give a greater diameter than the coil D. The coils should have suitable supports to raise them above the fire-brick, for

free passage of combustion under the lower coil.

A cylindrical casing, A, of stout sheet-iron, incloses the coils, which is provided with a conical extension thereof at the top, and a chimney, A², also a circular valve, E, covering holes that are made through the lower part for draft of air. In the interior of coil D is a cylindrical casing, B, provided with a conical extension thereof at the top, and provided with a chimney, B², and with a turning valve, F, attached to which are three chains, G, that pass through the outer casing and down the outside of same to connect on the circular valve E, thus suspending the casing B, and when the circular valve E is raised the casing B is lowered down so as to rest upon the fire-brick K. At the same time valve F is thrown open by suitable connection, (not represented,) thus effectually shutting off the fire from the coils, which ascends up through casing B and chimney B², while the coils become cooled off from the draft of air rushing in through the holes in the lower part of casing A, and passing out through the chimney A².

When the casing B is elevated and the valve F is closed, the hot products of combustion rising from the fire on the grate are imprisoned and prevented from any egress through the chimney B², and are compelled to dive under the lower edge of casing B, and pass upward among the convolutions of pipe D and out through the chimney A².

The spaces between the convolutions should be ample for free egress of all gases rising from combustion. The valve F should be shaped to close as tight as possible, so as to effectually prevent any gases from ascending when closed, and may be so arranged as to work automatically with the raising and lowering of the casing B and valve F.

The pipes D and C' may contain as many coils as are required for more or less power of boiler. An outer casing (not represented) of thin metal, exterior to casing A, may be used to protect persons from heat.

The water should be nearly all evaporated in being driven through the coils. In using very pure water it may be taken into the feed-

pump, (not represented,) and compelled to repeat its rounds several times. With hard or muddy water, it should be allowed to escape and waste.

Many modifications may be made in the details of the apparatus, and some of the features of the invention may be used without the whole. I attach importance to the arrangement of the pipe D, in having the pipe C' coiled inside, as a means of separating the water from the steam; also, in providing a steam-chamber, so as to more effectually dry the steam. I also attach importance to the steam heating the feed-water in its passage through pipe C'; also, to the open end of pipe C', and in connection with valve L, as a means of freeing the pipe from any sediment; also, to the piston H and connecting-rod N, as a means of automatically operating valve L, thereby preventing too much water being pumped in when running the engine at a high rate of speed; also, to the automatic arrangement of the interior casing B and circular valve E, as a means of protecting the coils from too intense heat, which might be destructive, especially when the engine is stopped and the fire is in full glow.

I claim as my invention—

1. The inner casing B, chimney B², connecting-chains G, and turning valve F, in connection with casing A and circle-valve E, all in combination with a coil-boiler, as herein specified.

2. A coil-boiler consisting of a double coil, one coil of less diameter than, and located within the interior of, the other, said inner coil or pipe being partially perforated, as described and shown.

3. A coil-boiler with a double coil, one located within the interior of the other, said inner coil conducting and heating the feed-water, in combination with branches or T-pieces, the lower one of said branches being provided with piston H and valve L, by means of which the water in the coil is kept at a proper height, all constructed and arranged substantially as shown and described.

WILBER S. SALISBURY.

Witnesses:

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JAS. ADAMS.