

G. H. BABCOCK & S. WILCOX.

Steam Generators.

No. 136,691.

Patented March 11, 1873.

Fig. 1.

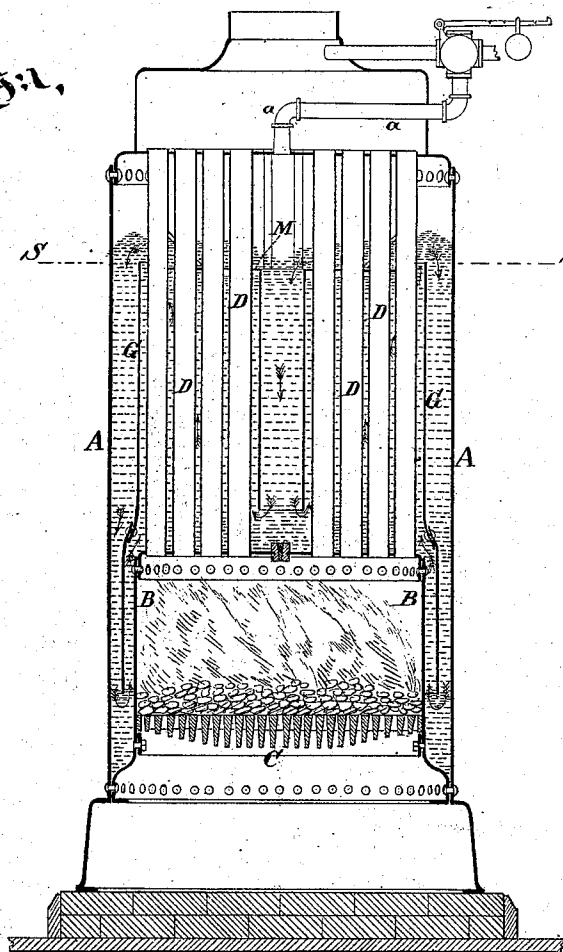
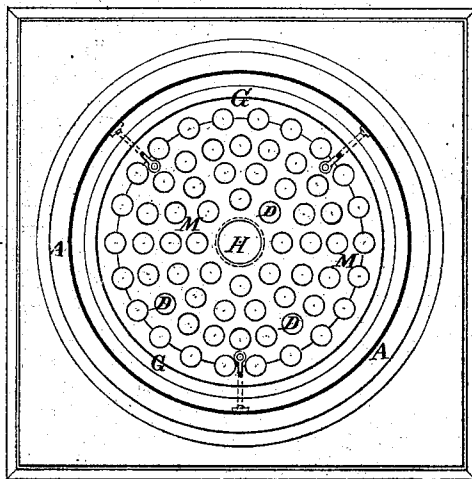


Fig. 2.



Witnesses:
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Stephen Wilcox,
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UNITED STATES PATENT OFFICE.

GEORGE H. BABCOCK, OF PLAINFIELD, NEW JERSEY, AND STEPHEN WILCOX, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 136,691, dated March 11, 1873.

To all whom it may concern:

Be it known that we, GEORGE H. BABCOCK, of Plainfield, Union county, New Jersey, and STEPHEN WILCOX, of Brooklyn, Kings county, State of New York, have invented certain Improvements in Steam-Generators, of which the following is a specification:

This invention is applicable to that form of steam-boilers known as the upright or vertical "tubular;" and its object is to prevent the evils due to foaming or priming, enabling the boiler to furnish dry steam or superheated steam, if desired; also to improve the circulation with its well-known advantages.

It consists in the introduction of a horizontal partition or baffle plate, placed at about the point it is desired to carry the water level, through suitable perforations in which the flue-tubes pass. (Baffle-plates for directing the course of the draft in boiler-flues are common, and, as we use our plate to direct the current of steam and water, the term seems appropriate.) In combination with our baffle-plate we use a circulator, which is a thin cylinder extending around the tubes and descending down a portion of the depth of the furnace, leaving an annular space between it and the shell of the boiler for the descending current. From a lower aperture in the center of the baffle-plate a tube descends nearly to the crown-sheet of the boiler to allow a free descent at that point.

The following is a description of what we consider the best means of carrying out the invention:

The accompanying drawing forms a part of this specification.

Figure 1 is a vertical section through the boiler and its appurtenances. Fig. 2 is a horizontal section on the line *s s*, Fig. 1.

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

A is the boiler-shell; B, the internal shell or furnace; C, the grate; D, the tubes; and E, the smoke-bonnet. M is the horizontal partition or baffle plate; G, the circulator; H, the descending-tube, fixed in the center of the baffle-plate, leaving sufficient space between it and the crown-sheet of the furnace for all the water that may flow down H to pass freely under its lower edge and rise among the tubes.

The baffle-plate extends from H nearly to the center of the outer row of tubes, but may be varied considerably in diameter without seriously affecting its efficiency, care being taken that there is sufficient space between it and the upper edge of circulator G for the free escape of the upward stream of steam and water generated by the heating-surface. The baffle-plate M and circulator G are connected to the boiler-shell A by light stays, not shown.

The benefit of some portions of our invention may be realized, to some extent, without the others; but we prefer the whole in combination, as shown.

Operation.

Upon building a fire in the furnace the mass of water surrounding the furnace and tubes and filling the space within circulator G becomes mingled with steam and tends to shoot up between the tubes, but, meeting the baffle-plate M, is compelled to flow off laterally and escape through the space between baffle M and circulator G. The steam separates rapidly after rising past this point, and the water flows outward over the upper edge of G, resuming its proper specific gravity, and descends, passing inward under the lower edge of G and in contact with the heating-surface, again to be made light by having steam mingled with it and to continue its circuit as long as the fire is maintained.

Most of the water, as described, flows over the top of circulator G, but a portion moves inward across the baffle-plate, and flows down through the tube H in its center, thus keeping up a current over the center of the crown-sheet and among the tubes.

It will be observed that steam is taken off from the center of the boiler through pipe *a*, and as the steam rises at the outer edge of the baffle-plate it must flow inward between and around the upper ends of the tubes on its way to the exit and become thoroughly dried.

In ordinary upright boilers, worked up to their rated power, it is necessary to carry the water low, whereby a large percentage of the tube-surface is above the water-line and relatively inefficient.

When the invention is used the baffle-plate can be placed near the top of the tubes, and,

as the water will be carried up against the baffle-plate, almost the entire tube-surface will be efficient steam-generating surface.

We claim as our invention—

1. The baffle-plate M, arranged relatively to the upright tubes D and boiler-shell A, as and for the purpose herein set forth.

2. The circulator G and baffle-plate M, in combination with the boiler-shell A, furnace

B, and tubes D, all arranged for joint operation, as and for the purposes herein set forth.

In testimony whereof we have hereunto set our hands this 7th day of January, 1873, in the presence of two subscribing witnesses.

GEO. H. BABCOCK.

Witnesses:

STEPHEN WILCOX.

WM. C. DEY,

ARNOLD HÖRMANN.