(No Model.)

W. C. HIGGINS.

HOT WATER HEATER AND STEAM GENERATOR.

No. 590,063. Patented Sept. 14, 1897.

Fig. 1.

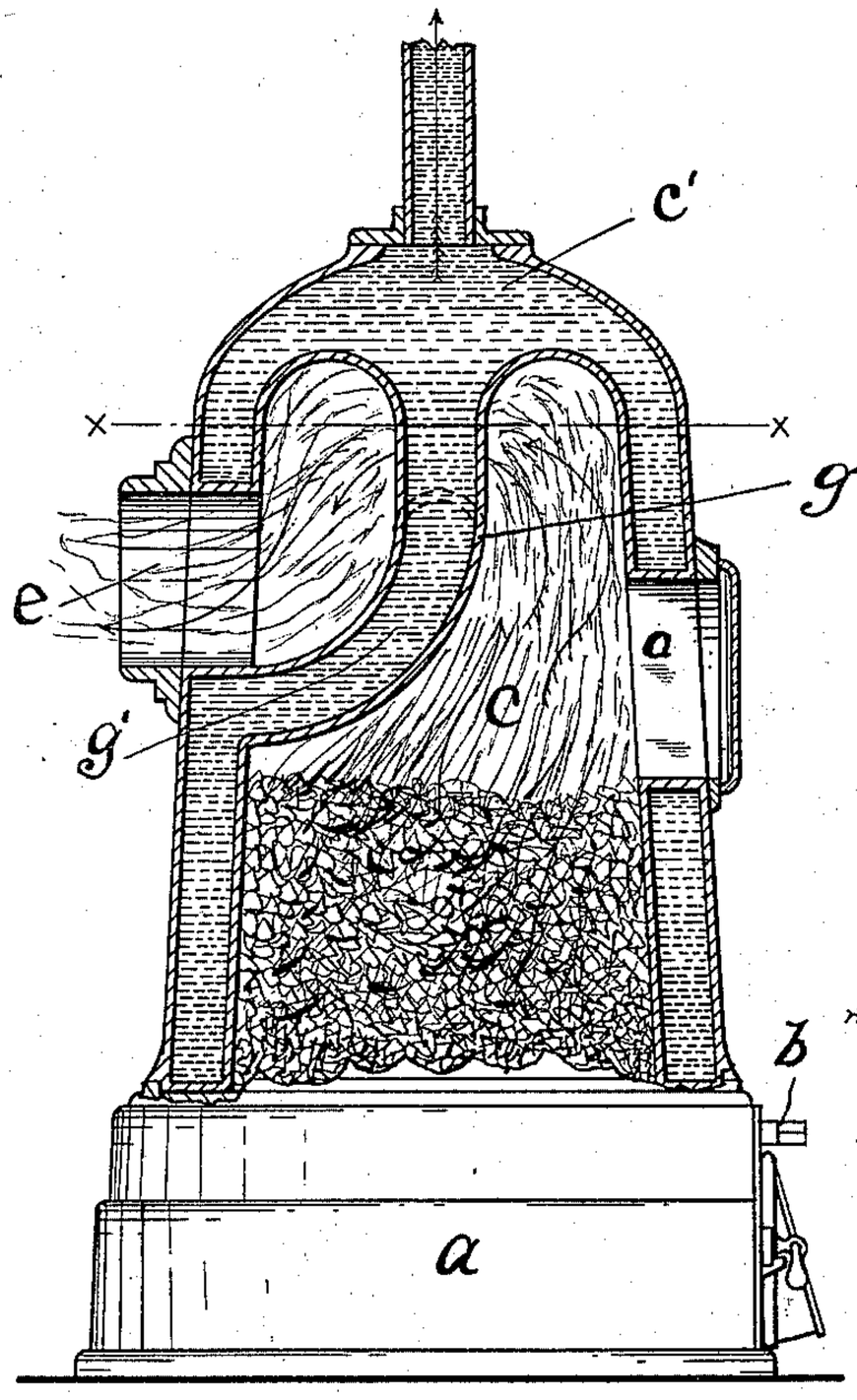


Fig. 2.

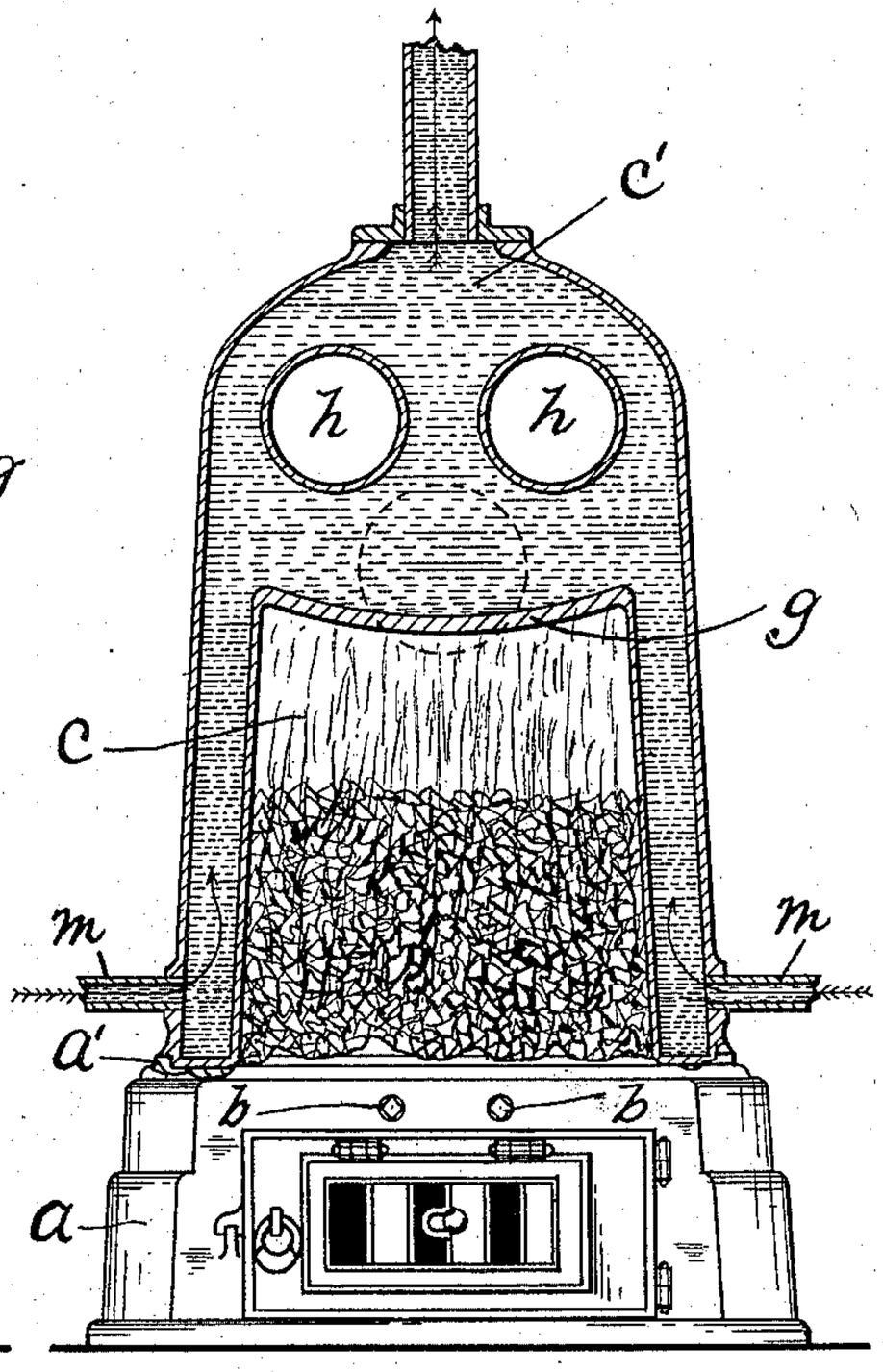


Fig. 3.

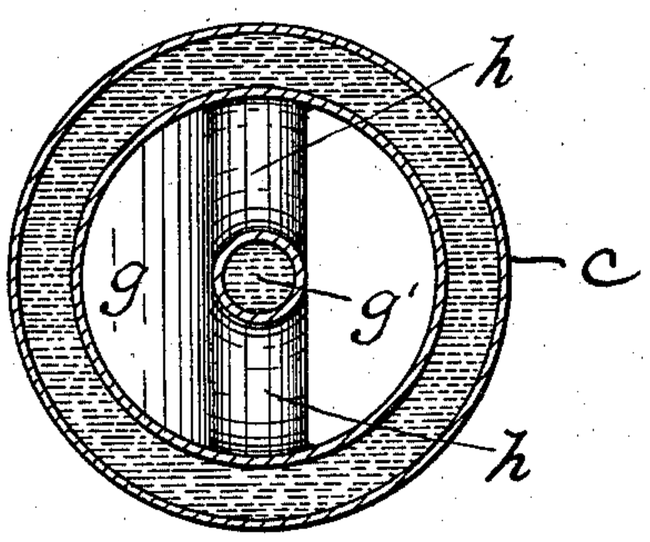
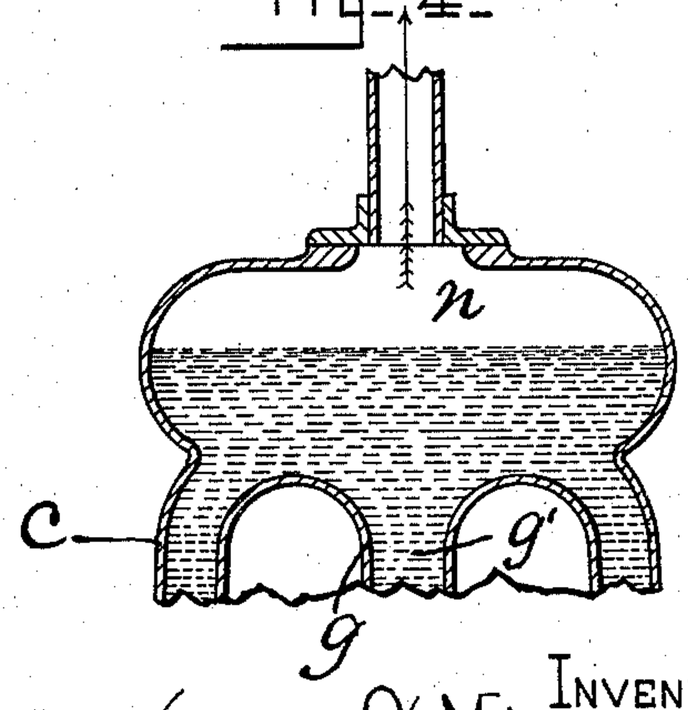


Fig. 4.



Witnesses
Alonzo M. Luther.
Edwin C. Johnson 2nd

Inventor,
Werter C. Higgins,
By Attorney
Frank H. Allen.

UNITED STATES PATENT OFFICE.

WERTER C. HIGGINS, OF NORWICH, CONNECTICUT.

HOT-WATER HEATER AND STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 590,063, dated September 14, 1897.

Application filed October 31, 1896. Serial No. 610,782. (No model.)

To all whom it may concern:

Be it known that I, WERTER C. HIGGINS, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Hot-Water Heaters and Steam-Generators, which improvements are fully set forth and described in the following specification, reference being had to the accompanying drawings.

The immediate purpose of this invention is to provide an exceedingly simple water-heater in which the boiler and steam-dome (if such a dome be used) may be conveniently and economically cast as a single piece and in which the water is presented to the action of the fire in comparatively thin sheets, being thus quickly influenced by the caloric products of the said fire.

The drawings which I have annexed hereto will aid in explaining my invention. Figure 1 is a central vertical sectional view of the boiler-section of a water-heater of my improved construction, taken on a line cutting through the feed-door and smoke-flue; and Fig. 2 is a similar view taken on a vertical line at right angles to that of Fig. 1. Fig. 3 is a cross-sectional view of Fig. 1 on line *x x;* and Fig. 4 is a central vertical sectional view of the upper portion of such a boiler having provision made for a steam-dome, as I shall refer to more particularly hereinafter.

In the drawings the letter *a* denotes a base-section adapted for use as the ash-pit of my heater, and mounted in said base-section is a grate *b* of any improved form. This base-section forms no part of my present invention.

The letter *c* indicates my improved boiler-section, the same being preferably seated within an annular ring *a'*, cast upon the base-section. Said boiler-section is substantially cylindrical in form and is constructed with an outer and inner shell, which shells are preferably concentric with each other and provide a thin water-chamber that completely surrounds the fire-pot and extends downward nearly or quite to the upper level of the grate. The upper portion of the said boiler-section is drawn inward, as at *c'*, and is provided centrally with a pipe connection through which hot water or steam (as the case may be) can be discharged.

In one side of the cylindrical double shell of the boiler-section is a feed-opening *d*, whose four walls are integral with the outer and inner shells of the boiler, and in the opposite wall of said boiler is an opening *e*, that serves as an exit for smoke and other unconsumed products of combustion.

Beginning at a point near the bottom of the smoke-opening *e* is a partition or "rear" wall *g*, that extends inward and upward to a point where it meets and unites with the inner wall of the dome-shaped top *c'*, as is best seen in Fig. 1 of the drawings. This partition *g* is formed with double walls that are united integrally with the said dome at the top and with the inner cylindrical shell of the body of the boiler at the sides and lower portion in such manner that it forms the crown-sheet of the boiler, and an unobstructed thin chamber or waterway *g'* is provided by it that connects the cylindrical water-chamber around the fire-pot with the dome-chamber of the boiler, thus providing for the free and natural upward circulation of the heated water through the hottest portions of the fire-pot and combustion-chamber.

In order to allow the products of combustion to pass to the exit-opening *e*, I provide one or more openings *h*, having curved walls in top of the described rear wall. As here illustrated, two such openings are provided and they are preferably located above the level of the smoke-opening *e* and between the upper end of the water-chamber *g'*, which extends through said partition, and the upper end of the water-chamber, which surrounds the fire-pot, so that a somewhat indirect course is prescribed for said products, as is indicated by the arrows in Fig. 1. These openings *h*, by reason of their location and the shape of their walls, also serve the most important function of causing the hotter and cooler waters to take such courses that they do not commingle one with the other in their passage from and to the bottom, respectively. The intense heat within the fire-pot impinges upon the lower inner wall of the partition *g*, the shape of said wall being such that the heat is guided upward along said wall until

the openings *h* are reached, when it escapes through said openings and finally passes outward through the smoke-exit *e*. Meanwhile the thin sheet of water in the lower part of the rear wall is raised to a high temperature, and seeking to rise passes upward through the chamber *g'* to the dome, while the cooler waters at the top pass downward between the outer and inner shells of the body of the boiler, thus inducing a constant circulation of the water in prescribed directions.

The reference-letters *m m*, in Fig. 2, denote "return-pipes" that are tapped into the boiler at or near its lower end.

When it is desired to use my invention with steam-boilers, a steam-dome *n* is provided by building up and enlarging the upper portion of the section C, as seen in Fig. 4. This change does not, however, in any way interfere with the perfect working of my improvement, which consists of the novel arrangement and location of the described partition or rear wall.

My invention makes it both possible and practicable to produce portable heaters very cheaply and of such simple construction that they cannot get out of order.

Having thus described my invention, I claim—

A boiler, consisting of a substantially cylindrical body, having a dome and formed with an outer and an inner shell, which shells provide a thin water-chamber surrounding the fire-pot, a smoke-exit leading outward through said shells, a hollow partition or rear wall for the ascending column of water, extending upward and inward within the fire-box from a place in said inner shell contiguous to the lower end of said smoke-exit and forming the crown-sheet of the boiler, the top of said partition being formed to provide an opening for the products of combustion, said opening having a curved wall and being located beneath the outer wall of the dome and between the upper end of the water-chamber through said partition and the upper end of the water-chamber which surrounds the fire-pot, substantially as described, whereby said curved wall guides the descending cooler water directly from the dome to the upper end of the chamber which surrounds the fire-pot and prevents said cooler water from commingling with the ascending hotter water flowing into the dome from the upper end of said hollow partition.

WERTER C. HIGGINS.

Witnesses:
ALONZO M. LUTHER,
HENRY S. HIGGINS.