(No Model.) 2 Sheets—Sheet 1.

H. C. STEINHOFF.

HEATING BOILER.

No. 528,401. Patented Oct. 30, 1894.

FIG. 1.

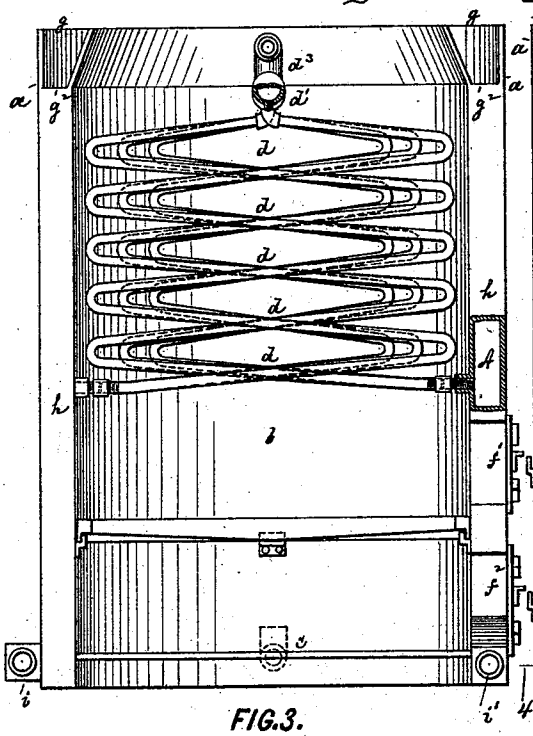


FIG. 2.

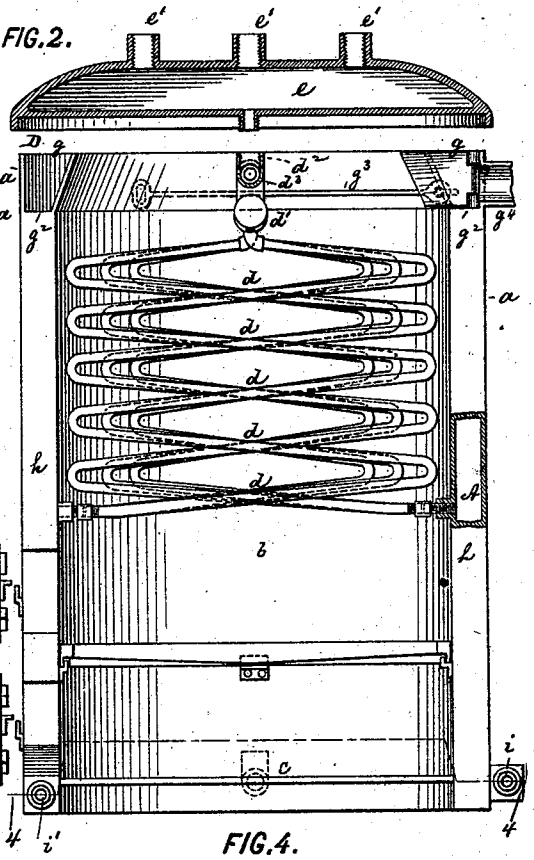


FIG. 3.

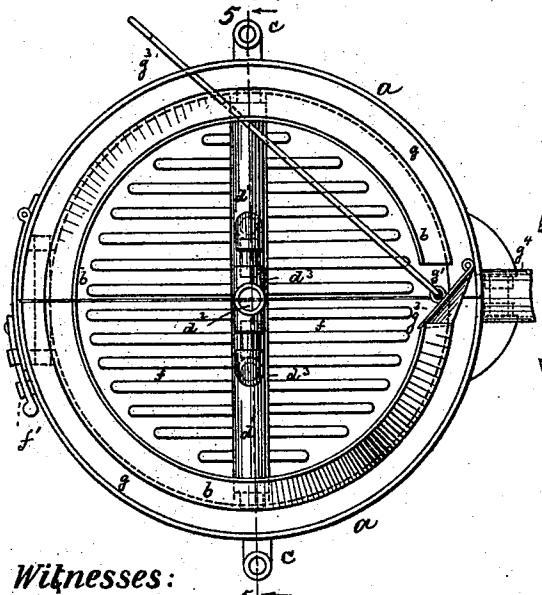
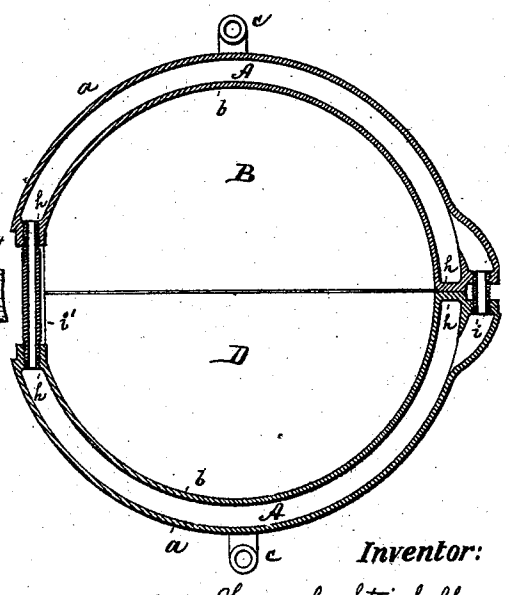


FIG. 4.



Witnesses:
Theodore Becker.
William Schulz.

Inventor:
Henry C. Steinhoff
by his attorneys
Roester & Briesen

(No Model.) 2 Sheets—Sheet 2.

H. C. STEINHOFF.

HEATING BOILER.

No. 528,401. Patented Oct. 30, 1894.

FIG. 5

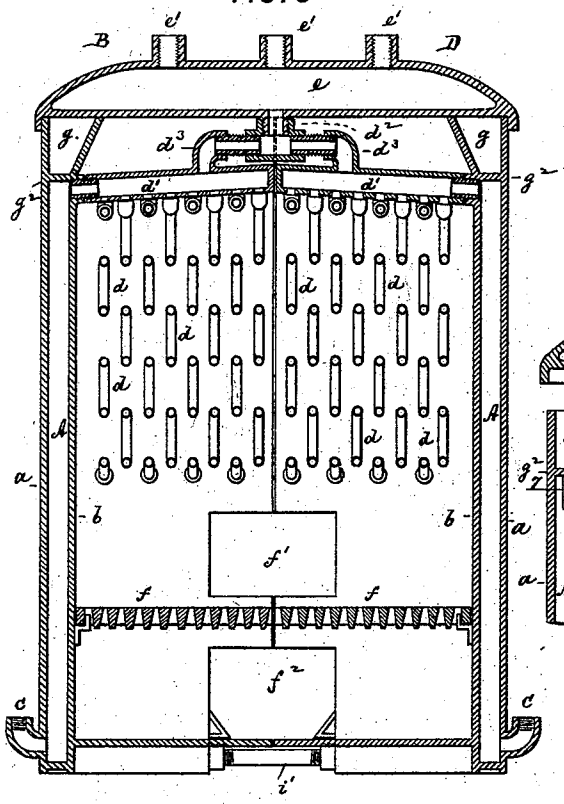


FIG. 6.

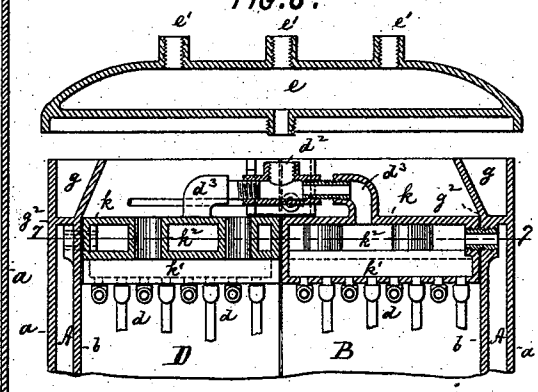
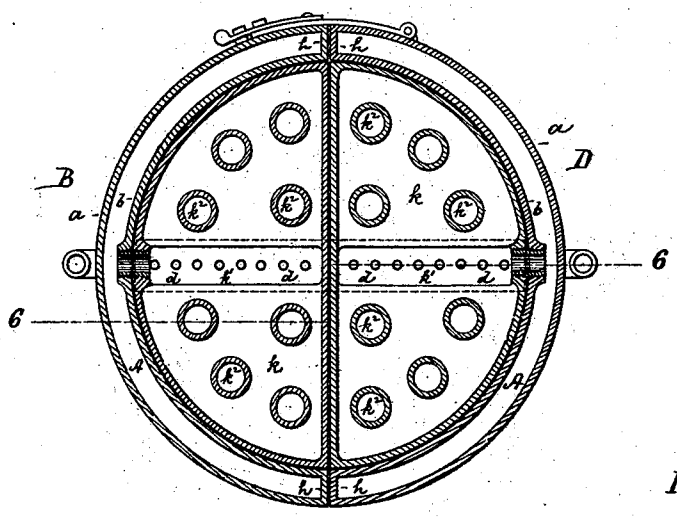


FIG. 7.



Witnesses:
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William Schulz.

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UNITED STATES PATENT OFFICE.

HENRY C. STEINHOFF, OF WEST HOBOKEN, NEW JERSEY.

HEATING-BOILER.

SPECIFICATION forming part of Letters Patent No. 528,401, dated October 30, 1894.

Application filed March 15, 1894. Serial No. 503,682. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. STEINHOFF, of West Hoboken, Hudson county, New Jersey, have invented an Improved Heating-Boiler, of which the following is a specification.

This invention relates to an improved boiler for generating hot water or steam, to be used for heating purposes.

The object of the invention is to thoroughly utilize the heat of the fuel, and to so construct the boiler that it may be readily taken apart, to be shipped and cleaned.

In the accompanying drawings: Figure 1 is an elevation of one section of my improved boiler, without the head or assembling chamber. Fig. 2 is an elevation of the other section with such head; Fig. 3, a top view of the boiler, showing the two sections connected; Fig. 4, a horizontal section on line 4, 4, Fig. 2; Fig. 5, a vertical central section on line 5, 5, Fig. 3; Fig. 6, a vertical central section through the upper part of a modification, on line 6, 6, Fig. 7, and Fig. 7, a horizontal section on line 7, 7, Fig. 6.

My improved boiler is provided with an annular water chamber A formed between the outer tubular shell *a*, and the inner concentric tubular shell *b*. The feed water openings *c*, are located at the bottom of chamber A and from these feed openings the water rises within chamber A and enters a series of heating coils or pipes *d*, that occupy the space inclosed by the inner shell *b*. The coils *d*, enter at their upper ends a diametrically arranged tube *d'*, extending across the shell *b*. To this tube there is connected by an upright branch d^2, a hollow head or accumulating chamber *e*, which, in effect, constitutes the cover of the boiler. The water enters this accumulating chamber and is through the outlet pipes *e'*, delivered to the circulating system of the heating apparatus.

f, is the grate of the boiler; *f'*, the fire door; f^2, the ash door. The grate is located within the circular space inclosed by shell *b*, and beneath the coils *d* so that the heat acts directly upon the water contained in such coils. The heat and products of combustion rise between coils *d* and enter through an opening *g'*, of shell *b*, into an annular chamber *g*, formed above the water chamber A, between shells *a*, *b*, by means of a horizontal partition g^2. This opening *g'*, is controlled by a damper g^3, which when open, permits the heat and products of combustion to pass directly out into the chimney by flue g^4; but if the damper is closed (Fig. 3), the heat and products of combustion must first traverse the entire length of chamber *g*, before they are discharged into the chimney. As the chamber *g* is located directly beneath the assembling chamber *e*, the heat given off by it, when the damper is closed, will thus be utilized to heat the water in the assembling chamber, besides heating the water in chamber A. In this way, the heat is thoroughly used up and the draft is readily controlled.

I prefer to construct the boiler in two separable sections B and D (Figs. 1 and 2) formed by splitting a tubular boiler vertically by means of a central section. This enables me first to pack the boiler more compactly for transportation purposes, and secondly to more readily gain access to its interior for cleaning purposes, besides facilitating the manufacture. The water chamber A in each of the sections B, D, is closed along its upright ends by the end plates *h*, (Fig. 7) that extend up to the partition g^2. To couple the sections B, D, I employ the threaded tubes *i*, *i'*, (Figs. 4 and 5,) engaging correspondingly threaded sockets. These tubes serve likewise to establish communication between the two divisions of the water chamber.

If the boiler is made sectional as described, the diametrically arranged tube *d'*, should of course also be divided at the center (Fig. 5). Its two ends are closed up and communication between its sections and exit pipe d^2, is established by means of a threaded tubular coupling d^3.

In Figs. 6 and 7, I have shown the boiler arranged more particularly for the generation of steam. Here the tube *d'*, is replaced by a hollow disk-shaped dome *k*, provided with a channel *k'*, into which the upper ends of the coils *d*, enter. The dome is perforated as at k^2, for the free passage of the products of combustion. The steam passes from the dome through the coupling d^3, and exit pipe

d^2, into the hollow accumulating chamber e, to be thence ejected through tubes e'. The dome k, is made in two sections, and the coupling d^3, between them, is of the construction already previously described.

It will be seen that my improved boiler has a large heating surface, may be easily regulated, and can be readily taken apart for transportation and cleaning purposes.

What I claim is—

1. A heating boiler provided with an annular water chamber, an inclosed coil and fire chamber, a communicating heating chamber g, above the annular water chamber and a damper controlling the inlet opening of the heating chamber, substantially as specified.

2. The combination of tubular shells a, b, inclosing the water chamber A, with a fire chamber and heating coil inclosed by shell b, a partition g^2 between the shells, a heating chamber g, above such partition, and a damper controlling the inlet opening of such heating chamber, substantially as specified.

3. The combination of tubular shells a, b, inclosing water chamber A, with a fire chamber and heating coil inclosed by shell b, a communicating heating chamber g, above the water chamber, a damper controlling the inlet opening of the heating chamber, and an accumulating chamber e, above the heating chamber, substantially as specified.

4. The combination of tubular shells a, b, inclosing the water chamber, with a fire chamber and heating coil inclosed by shell b, a heating chamber above the water chamber, a damper g^3, controlling the inlet opening of the heating chamber, a pipe d', that connects the heating coils and an accumulating chamber e, communicating with such pipe, substantially as specified.

5. The combination of sections B D of a heating boiler, each composed of the concentric shells a, b, and end plates h, that inclose the water chambers with coupling tubes that enter the water chambers and connect the boiler sections, substantially as specified.

6. A tubular boiler composed of a pair of detachable semi-tubular sections, and consisting of a pair of concentric shells, a central fire chamber, heating coils, a water chamber and heating chamber between the shells, and an accumulating chamber above the heating chamber, substantially as specified.

HENRY C. STEINHOFF.

Witnesses:
F. v. BRIESEN,
JOHN E. M. BECKER.