

(No Model.)

P. HOLTZMANN & R. MAYER.

VERTICAL TUBE BOILER.

No. 333,012.

Patented Dec. 22, 1885.

Fig. 1.

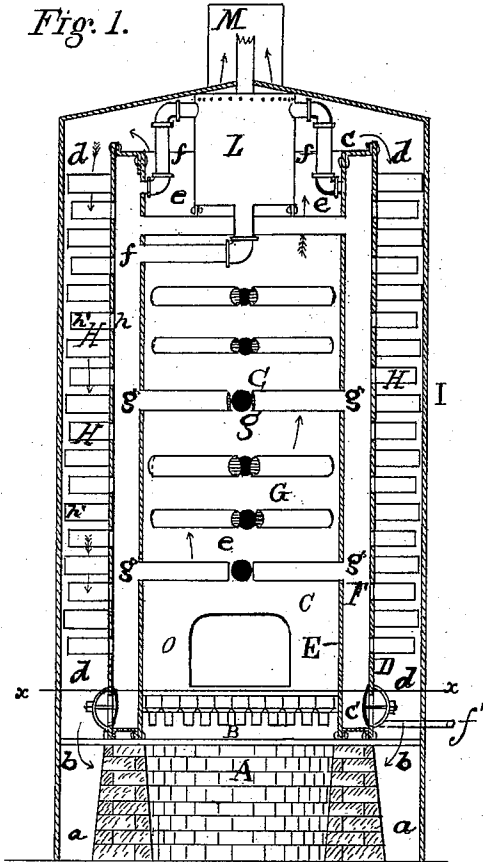


Fig. 2.

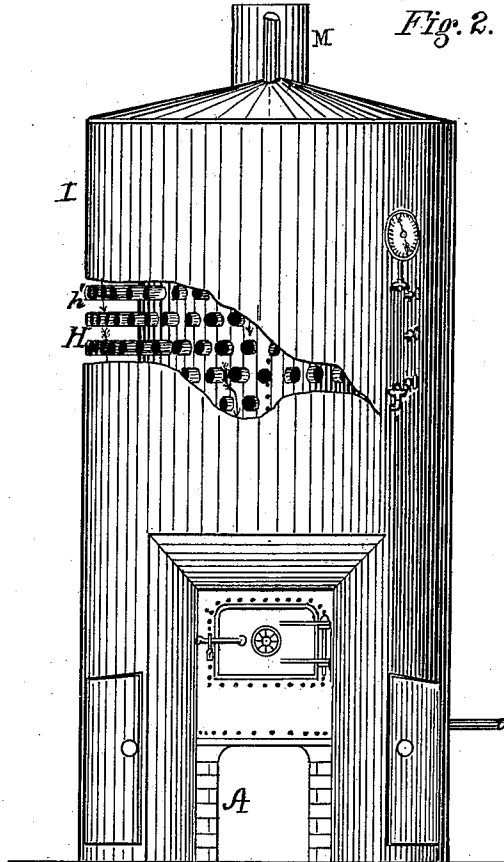


Fig. 3.

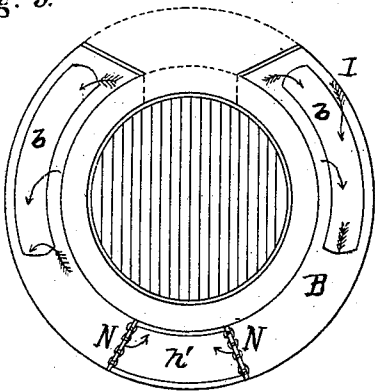
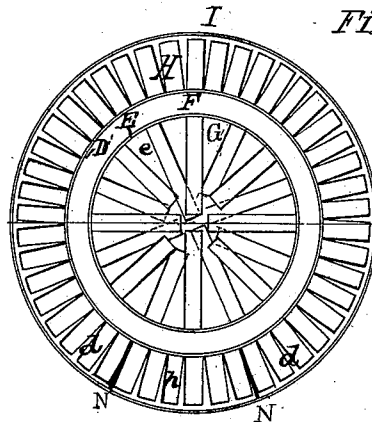


Fig. 4.



Witnesses

A. A. Thomas
A. S. Lindsey

Inventors

Phillip Holtzmann
Rudolph Mayer,
per M. Singleton
att.

UNITED STATES PATENT OFFICE.

PHILLIP HOLTZMANN AND RUDOLPH MAYER, OF NEW YORK, N. Y.

VERTICAL TUBE-BOILER.

SPECIFICATION forming part of Letters Patent No. 333,012, dated December 22, 1885.

Application filed April 17, 1885. Serial No. 162,539. (No model.)

To all whom it may concern:

Be it known that we, PHILLIP HOLTZMANN and RUDOLPH MAYER, citizens of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Vertical Water-Tube Steam-Boilers; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a vertical section of the boiler; Fig. 2, a side view, partly broken away; Fig. 3, a section on line *x x*, Fig. 1, looking down on the grate-bars; Fig. 4, a top view, cover removed, Fig. 1, showing arrangement of the tubes, the steam-dome being omitted.

This invention relates to improvements in boilers, being designed more particularly for vertical boilers.

The object of the invention is to furnish an enlarged heating-surface, and to so utilize the heat as to obtain with a minimum consumption of fuel a maximum result.

The invention consists in the peculiarities of construction hereinafter pointed out.

In the annexed drawings, the letter A indicates the brick or masonry base for supporting the boiler. On this base are placed the flue-plates B, on which rests the boiler C. This boiler consists of two concentric shells, D and E, fastened together at *c c'*, top and bottom, by connecting brace-rings, with the water-space F between. Extending in from the shell E, and radially crossing the space *e*, are a number of short tubes, G, arranged in circles, or in any manner desired, their inner ends approaching near the central line of the space *e*. The outer ends, *g*, of these tubes G are open, permitting free communication with the water-space F. Their inner ends, *g'*, are closed. Extending radially out from the shell D are a number of similar short tubes, H, arranged as shown, and having open inner ends, *h*, and closed outer ends, *h'*. Some of these tubes H may be of such a length as to touch the outer shell or casing, I, of the boiler. At the top the water-space F has the steam-connection *f* with the dome L, and the shell I is provided with the stack M. Connecting at one side the

shell D and casing I are two plates, N N, running vertically and cutting off a segmental space, *n*, wherein are located a number of the tubes H. This space *n* is connected at the top with the stack M, and is just over the opening *n'* in the flue-plate. In these plates are also openings *b b*, communicating with the residue of the space *d* between the shell D and casing I. Such openings *n' b b* communicate with the space *a* about the base A and within the casing I, and the space *e* within the shell E communicates at the top with the space outside of the shell D.

In use water is admitted into the water-space F through pipe *f'*, and fuel is placed in the fire-box O. A proper amount of water being supplied, the space F and the tubes G and H are properly filled. When the fire is made, the products of combustion rise through the space *c*, pass down the space *d* through the openings *b b* into the space *a*, up through opening *n'*, flue *n*, and out of the stack M. Now, this circuitous passage causes the heat to be fully utilized, and the water in the boiler, being spread out in attenuated portions and not in large bulk, quickly and thoroughly heats up, and is converted into steam with but little loss of energy.

Having described our invention, what we claim is—

1. In a boiler such as described, the two concentric shells E D, with the space F between them, the shell E having short radial tubes G extending within, and the shell D having the short radial tubes H extending without, said tubes G and H opening into the space F and closed at their other ends, as set forth, in combination with the inclosing-casing I, as described.

2. In a boiler such as described, the two concentric shells E D, having the space F between them, the shells having the tubes G and H leading into the space F and closed at their other ends, in combination with the casing I, the vertical plates N N between the shell D and casing, and the flue-plates B, having the openings *n' b b*, as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

PHILLIP HOLTZMANN.
RUDOLPH MAYER.

Witnesses:

GEO. W. PALMER,
JAMES B. BLEW.