

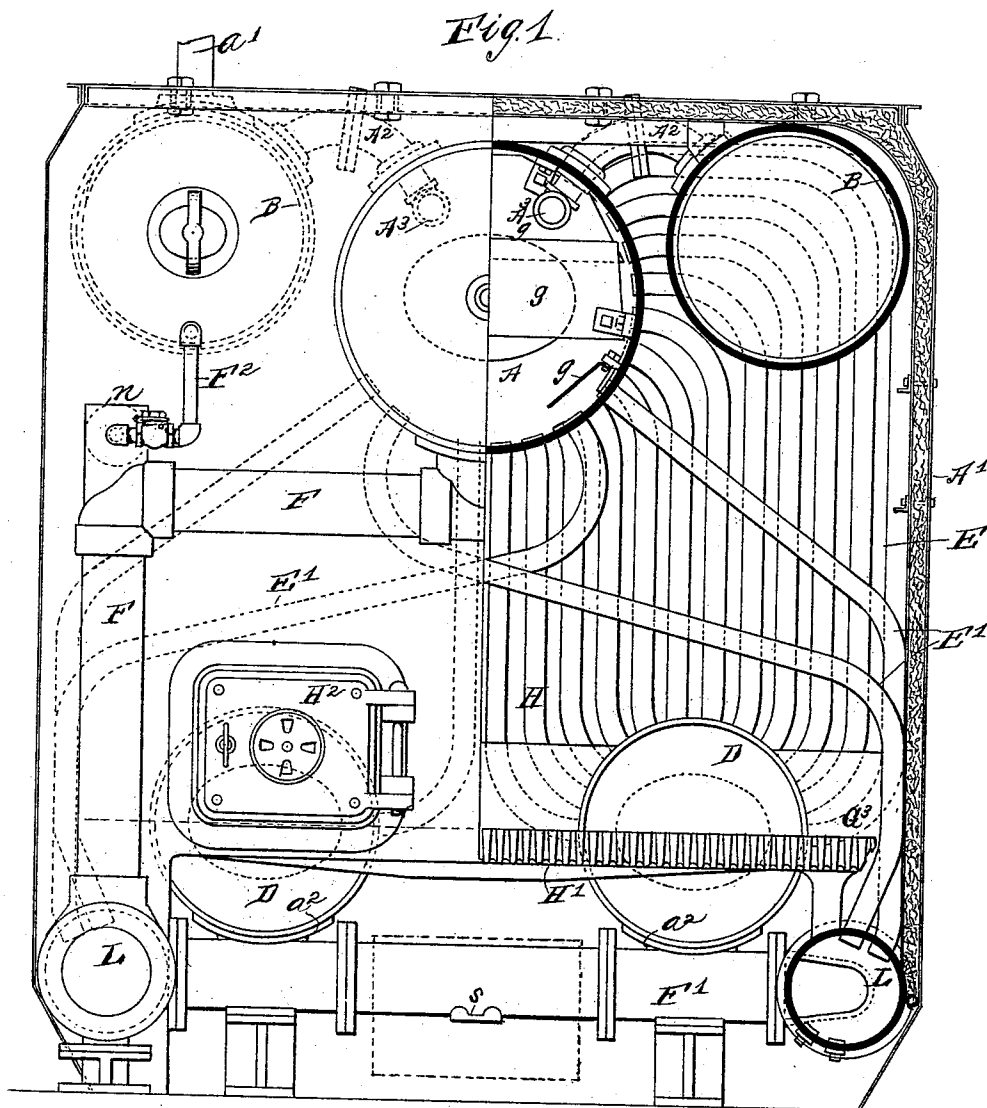
(No Model.)

2 Sheets—Sheet 1.

W. COWLES.
WATER TUBE BOILER.

No. 508,410.

Patented Nov. 14, 1893.



WITNESSES:

Chas. H. Brown
Wm. M. Shiff

INVENTOR

William Cowles

BY

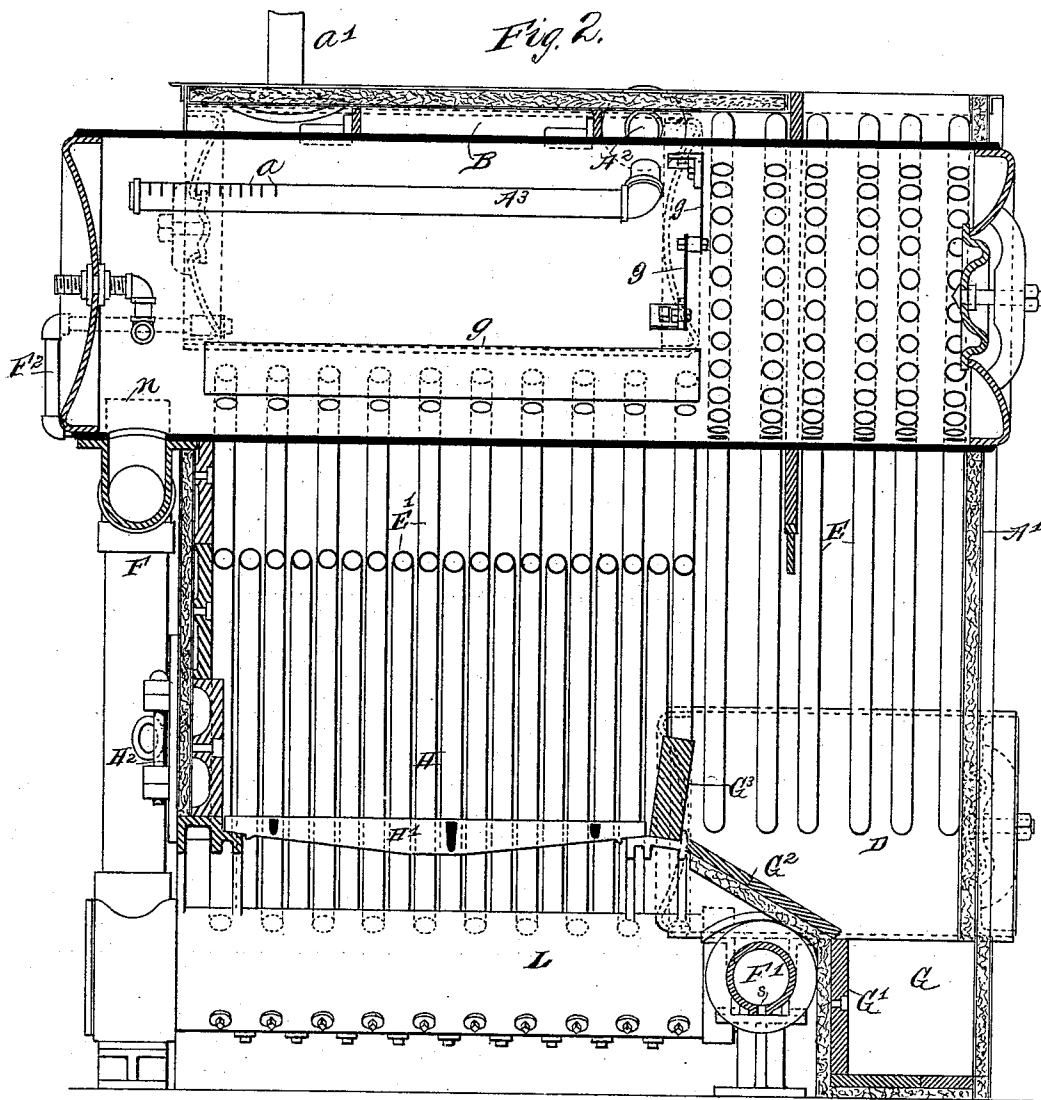
Edwin H. Brown

HIS ATTORNEY

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WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM COWLES, OF BROOKLYN, NEW YORK, ASSIGNOR TO JOHN I. EASTMAN, OF PHILADELPHIA, PENNSYLVANIA.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 508,410, dated November 14, 1893.

Application filed December 28, 1892. Serial No. 436,525. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM COWLES, of Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Water-Tube Boilers, of which the following is a specification.

This invention relates to steam boilers, more especially to that class of steam boilers in which the water is caused to circulate through tubes and water drums or manifolds, at the lower portion of the structure, and a steam drum or drums, located at the upper portion of the structure.

The object of this invention is to improve the general construction of the boilers of this type disclosed in my Patents No. 369,545 of January 22, 1889; No. 465,163 of December 15, 1891, and No. 465,164 of December 15, 1891.

The invention consists more especially of the arrangement of two side drums connected with a main steam drum, in which provision is made for separating the steam from the water as it passes from the main drum to the side drums, and whereby the dry steam is taken from the front end of the steam drum to the rear end of each side drum, and escapes at the top front ends of the side drums, thus causing the steam to flow horizontally throughout the full length of the steam and side drums; and it further consists in the arrangement of a casing between the ash pit and soot pit, so that the cross over or equalizing pipe arranged between the two water drums, is removed from the direct heat of the soot pit; and it further consists in the drains for the side drums to downcast pipes direct.

I will describe a boiler embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a front view partly in section, of a steam boiler, embodying my improvement, and Fig. 2 is a longitudinal vertical section thereof taken through the center of Fig. 1.

Referring by letter to the drawings, A designates the main steam drum, extending the full length of the structure, and supported by the tubes within the walls or casing A', in the usual manner. The steam drum A is provided with the usual man-hole for the purpose of cleaning.

B designates side drums for receiving dry steam from the drum A. As here shown, the connection between the drums B and the drum A, consists of pipes A², which extend, at one end, through the shell plate of the drum A, and have secured to them longitudinally extending dry steam pipes A³, closed at the free end, but having a series of slots or openings *a*, at said free end. Obviously, the steam from the drum A will pass through these pipes A³, in a substantially dry condition.

It will be seen that the side drums B extend only a portion of the length of the steam drum A and are located in the forward upper portion of the structure. They are connected one with the other by means of a suitable steam pipe, and both are provided with an exit *a'* for steam. The space H constitutes a furnace, located below the steam drums, above mentioned, and is provided with the usual grate bars H' and with doors H². Located within the furnace, at the rear lower portion thereof are water drums D, which extend longitudinally of the structure, one on each side thereof.

The water drums D are connected to the main steam drum A, by means of circulating tubes, or nest tubes E, which, in the main, extend vertically, but are suitably turned at the ends to connect with said drums, as shown. Other circulating tubes or "furnace" tubes E' extend from the lower portion of the steam drum A, to manifolds or side pipes L, extending horizontally within the ash pit below the grate bars H', and which are connected one with the other, by means of a cross-pipe F' having a sediment blow-off s.

Down-cast pipes F, form a connection between the steam drum A and the manifolds L, and smaller pipes F² lead from the forward ends of the side drums B into the down-cast pipes, thus providing drain pipes from the lower portion of the drums B, and each of these drain pipes may be provided with a check valve to prevent water from being drawn up by sudden opening of stop valve, or increase in generation and flow of steam. A feed pipe *n'* also leads into one of the down-cast pipes. The water drums D have a connection *a*² with the cross-over pipe F'. It will be seen, by this construction, that there is a complete and constant circulation of water

from the water drums D through pipes E to the drum A, and from the manifolds L through pipes E' to the drum A, and through the down-cast pipes F, and that the pipes E E' are
5 wholly exposed to the action of the heat in the furnace.

G is a soot pit arranged across the lower rear portion of the structure and having a wall G' between it and the ash pit, and an inclined
10 wall G² connecting the upper edge of the wall G' to the bridge wall G³. The cross pipe F' is arranged between the ash pit and soot pit, so that it is entirely removed from the fire and the heat of the soot pit.

15 Baffle plates g are placed in the steam drum A over the mouths of the circulating pipes E' and consist of metal plates secured in an inclined position so as to deflect the water downward and to allow the steam to escape
20 upward.

Having described my invention, what I claim is—

1. In a steam boiler, the combination with the circulating tubes, substantially such as
25 described, of the main steam drum, the drums arranged at the sides thereof, and the connections between said steam drum and the side drums comprising pipes arranged longitudinally in the steam drum and having slots or
30 similar openings near the end, substantially as specified.

2. In a steam boiler the combination with the circulating tubes, of the main steam drum, the drums arranged one on each side of said
35 steam drum, an exit for steam at the forward ends of said side drums, connections between the rear ends of said side drums and the steam drum and dry pipes extending from said connections longitudinally within the
40 steam drum to near its front end, and having slots or similar openings for steam near its free end, substantially as specified.

3. The combination with the steam drum and the two side drums having connection
45 therewith, of the water drums, a series of circulating tubes leading from each water

drum to the rear portion of the steam drum, the manifolds and the circulating tubes leading from said manifolds to the steam drum, substantially as specified. 50

4. The combination with a furnace, of the steam drum arranged horizontally in the upper portion thereof, the two drums arranged in the upper portion of the furnace at the sides of the steam drum, the two water drums
55 arranged in the rear lower portion of the furnace, the manifolds arranged within the ash pit and the sets of circulating tubes connecting said water drums and manifolds with the steam drum, substantially as specified. 6c

5. The combination with the manifolds, the steam drum, the side drums having the connections with the steam drum, and the circulating tubes all arranged substantially as described, of the down-cast pipes leading from
65 the steam drum, and the drain pipes leading from the side drums to the down-cast pipes, substantially as specified.

6. The combination with the manifolds, the steam drum, the side drums having the connections with the steam drum, and the circulating tubes, of the down-cast pipes leading from the steam drum, with drain pipes leading from the side drums to the down-cast pipes and the check valves in said drain pipes, sub-
75 stantially as specified.

7. The combination with the furnace having the grate bars and the ash pit, of the soot pit, the walls G', G², separating said two pits, the said wall G² being inclined and connecting with a bridge wall and the cross-over
80 pipe arranged adjacent to said wall G' below the wall G² in the ash pit, substantially as specified.

In testimony whereof I have signed my
85 name to this specification in the presence of two subscribing witnesses.

WILLIAM COWLES.

Witnesses:

CLARENCE R. FERGUSON,
NOEL GALE.