

(No Model.)

2 Sheets—Sheet 1.

B. J. COLLIER.
BOILER.

No. 545,269.

Patented Aug. 27, 1895.

Fig. 1.

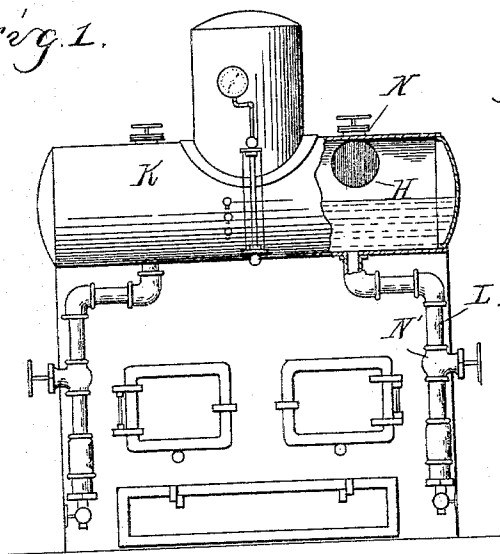


Fig. 3.

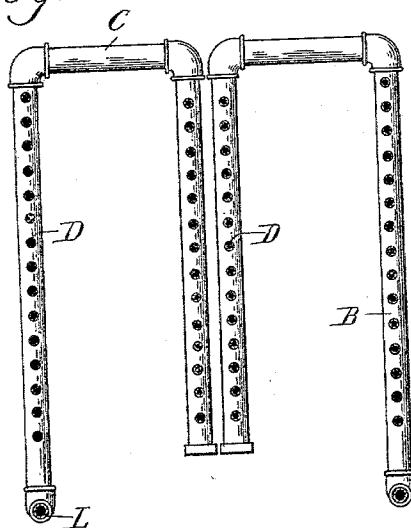
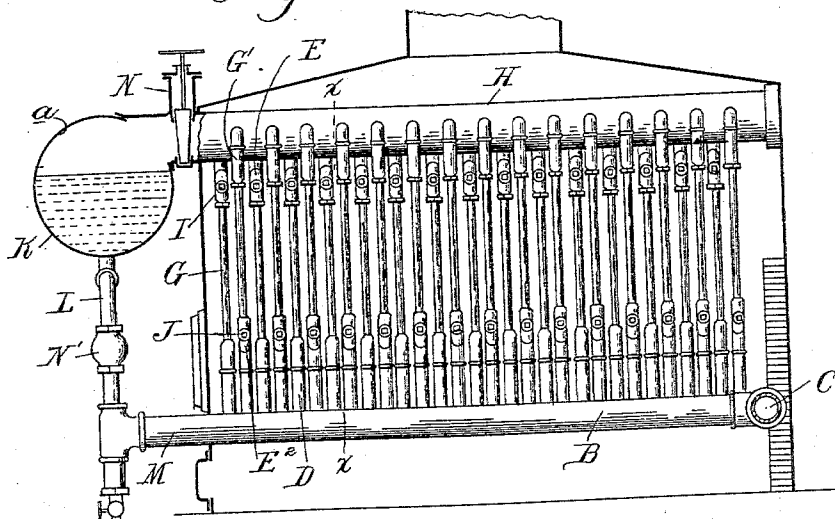


Fig. 2.



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By *W. E. Magnien* Atty's.

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Fig. 1.

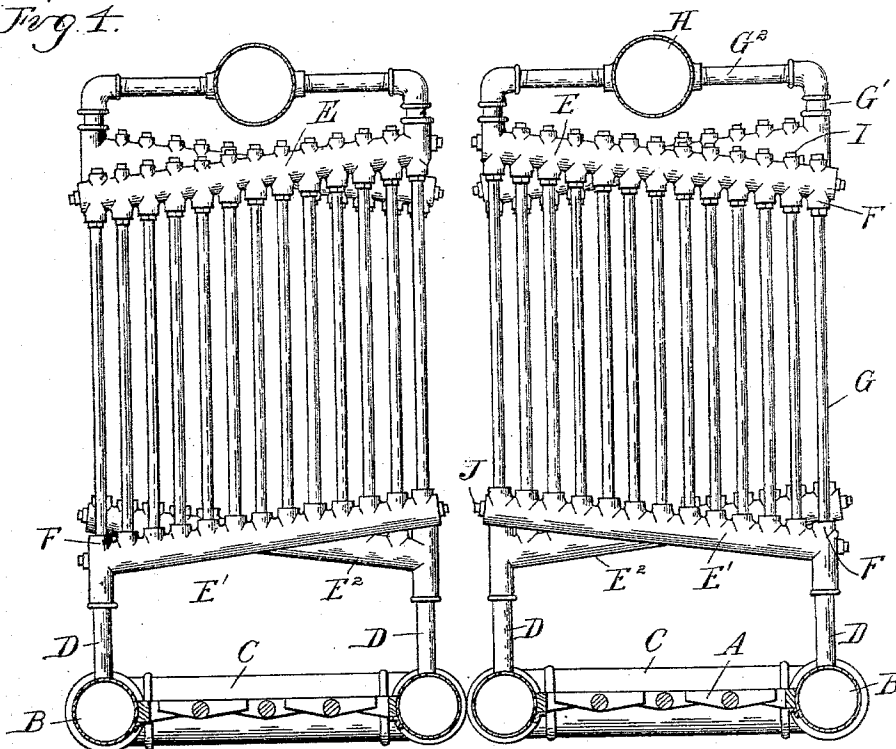
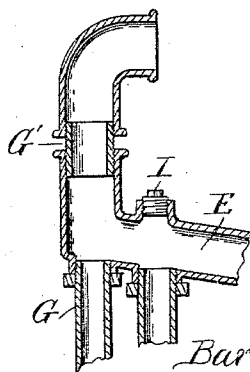


Fig. 5.



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UNITED STATES PATENT OFFICE.

BARZILLIA J. COLLIER, OF DETROIT, MICHIGAN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 545,269, dated August 27, 1895.

Application filed December 26, 1894. Serial No. 532,929. (No model.)

To all whom it may concern:

Be it known that I, BARZILLIA J. COLLIER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the peculiar construction, arrangement, and combination of the various parts of a boiler for use as a steam-generator or a water-heater, and particularly in the construction of the heating and circulating tubes, whereby I accomplish a rapid circulation and obtain a maximum efficiency from the heat of the fire; also whereby the boiler is made in like sections, whereby the expense of manufacture is lessened, and whereby the size or capacity of the boiler can readily be changed by adding or removing the desired number of sections of the heating-coils, and, further, whereby the water-circulating coils and headers may be thoroughly cleaned without dismantling the boiler, all as more fully hereinafter described.

In the drawings, Figure 1 is a sectional elevation of a boiler embodying my invention. Fig. 2 is a side elevation thereof, showing the casing in section. Fig. 3 is a plan view of the horizontal headers. Fig. 4 is a vertical section on line *x x* of Fig. 2. Fig. 5 is an enlarged detail section of the end of one of the inclined manifolds.

The boiler is provided with suitable setting and inclosing casing and grates of any known and usual construction.

In the drawings I have shown my construction applied to a steam-generator having two furnaces, each furnace having an independent boiler connected into a common steam-dome, with provision for cutting off either of the boilers in case it is desired to use but one.

It is evident that one boiler may be used alone or that a battery of one or more may be used.

A are the grates, which extend between the horizontal headers B, which headers are connected at their rear ends by means of the connecting-pipes C. These headers are tapped on their upper face to receive the lower end of the risers or nipples D, one for each sec-

tion of the heating-coils. Each heating-coil comprises the parallel manifolds E and E' at top and bottom, which manifolds are inclined from the riser D upward toward the other end. These manifolds on their inner faces are provided with two threaded nipples F, which are connected by the vertical circulating-pipes G, the whole section being substantially the shape of a rhomb or rhomboid, or what I shall hereinafter call the "rhombic sections." From the corner diagonally opposite that at which the riser D connects I form the outlet-pipe G', which connects, by means of the horizontal section G², into the universal header H. The next rhombic section has its riser D connected to the left-hand header B and its manifolds E'' inclined in the opposite directions from the manifolds E', while its outlet-pipe and connecting-pipes G' and G² connect into the opposite side of the universal header H. These sections are thus arranged alternately the whole length of the horizontal headers B, or so many of them are arranged thereon as may be desired to make a boiler of the necessary capacity. The water circulation, therefore, will be from the two horizontal headers upward through the risers D into the manifolds E' E², distributed across the fire in an upwardly-inclined direction through these manifolds and vertically through the pipes G to the upper manifolds, and thence through the connections G' G² through the universal manifold H. The upper manifolds E are provided on their upper surfaces with plugs I, opposite each of the pipes G, so that by removing the plugs these pipes may be thoroughly cleaned. The inclined headers E' E² are also provided with plugs J, which may be removed for the same purpose. In using this construction of boiler for a steam-generator I extend the universal headers H out through the front of the boiler, casing and connected into the top of the steam-drum K at one side thereof, as shown in Figs. 1 and 2, and the lower end of this drum I connect by the pipes L with extensions M of the horizontal headers B. In the connections between the headers H and the drum and the extensions M and the drum I place valves N N', so that if it is desired to use but a single boiler of a battery the other boilers

may be disconnected therefrom by shutting these valves without in any way affecting the operation of those remaining.

I deem it especially advantageous to connect the universal headers into the steam-drum at the top and side, as shown, for the water flowing off from those headers into the drum will strike the opposite downwardly-inclined face *a* of the drum and be deflected downward into the water in the drum, preventing its splashing upwardly into the steam and thereby increasing the moisture in the steam. I find that with this construction I maintain the steam much drier, whereas heretofore these pipes have been connected into the steam dome in such a manner as to strike a vertical side and be deflected in all directions.

What I claim as my invention is—

1. In a boiler, the combination of horizontal headers a series of rhombic sections connected thereto at one corner each comprising a lower inclined manifold extending over the grates, a series of vertical pipes extending from the upper face thereof, the series extending across the boiler and an upper manifold parallel to the lower manifold and into which the vertical pipes lead, substantially as described.

2. In a boiler, the combination of horizontal headers on each side of the fire, a series of rhombic sections connected thereto at one corner, alternately to the opposite headers, and each section comprising a lower inclined manifold extending over the fire space, a series

of vertical pipes extending from the upper face thereof, an upper manifold parallel to the lower manifold into which the vertical pipes lead, outlet pipes from the upper end of the upper manifold, and a universal header into which said outlet pipes connect.

3. The combination of a multiple of furnaces, independent water circulating pipes, or boilers for each furnace universal headers at the top of each boiler, a common steam drum into which the headers connect, return connections from the drum to the bottom of each boiler, and valves in the universal header connections and in the return connections substantially as described.

4. The combination with the boiler comprising the side headers, the universal header at the top and connecting circulating pipes between, of a steam drum having the downwardly inclined portion *a* and located at the front of the boiler, a return connection from the steam drum to the side headers, and a connection from the universal header to the steam drum entering at the top on the plane of and opposite the downwardly inclined portion *a* of said drum, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

BARZILLIA J. COLLIER.

Witnesses:

M. B. O'DOHERTY,

L. J. WHITEMORE.