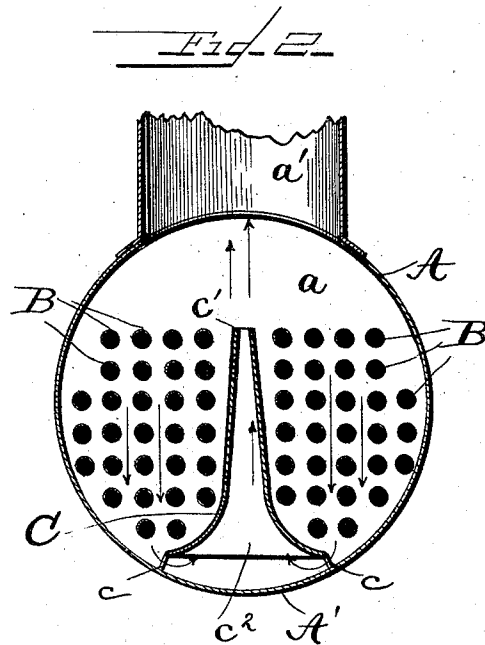
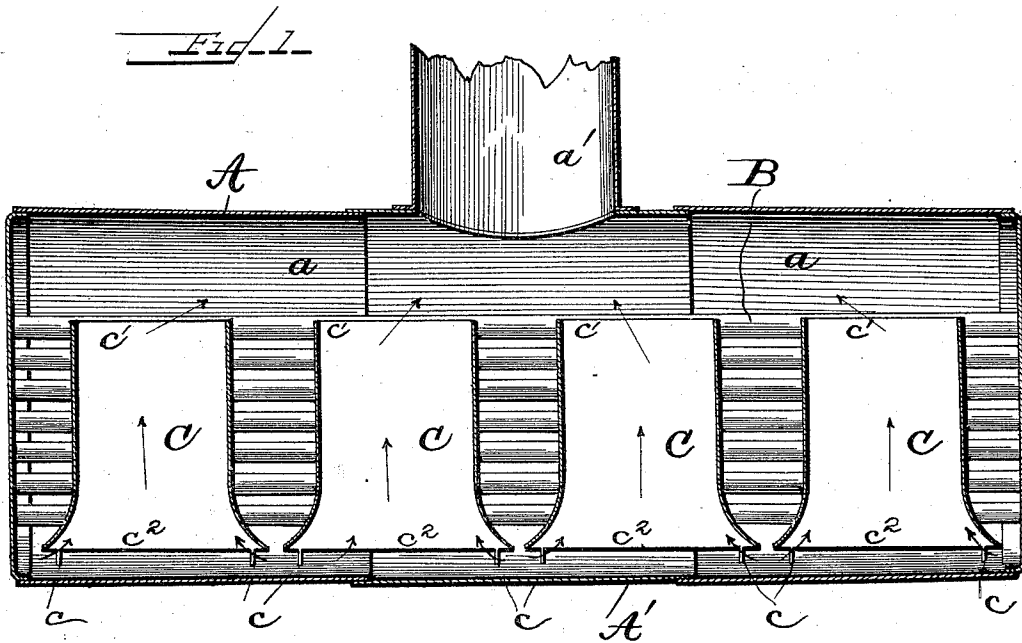


(No Model.)

O. C. DAVIS.
BOILER.

No. 541,839.

Patented July 2, 1895.



Witnesses
G. A. Pauberschmidt
J. D. Kingsbury.

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UNITED STATES PATENT OFFICE.

OSSIAN C. DAVIS, OF RACINE, WISCONSIN.

BOILER.

SPECIFICATION forming part of Letters Patent No. 541,839, dated July 2, 1895.

Application filed October 19, 1894. Serial No. 526,354. (No model.)

To all whom it may concern:

Be it known that I, OSSIAN C. DAVIS, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Boilers; and I do hereby 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.

My invention is an improvement in boilers and consists in the novel features hereinafter described reference being had to the accompanying drawings which illustrate one form in which I have contemplated embodying my invention and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a longitudinal central section of a fire-tube boiler constructed in accordance with my invention. Fig. 2 represents a transverse sectional view of said boiler.

A represents the shell of the boiler provided with a series of fire tubes B which are preferably arranged as shown in the transverse sectional view Fig. 2, so as to leave a space adjacent to the central part of the boiler. In this central space I locate preferably a series of conducting tubes or passages C having tapering side walls and flaring openings at the bottom. These conducting tubes or passages are supported preferably by means of feet or projections *c* which rest upon the shell A in any desired way and support said tubes with their flaring lower ends a short distance from the bottom of the boiler so as to allow the water to circulate beneath the said tubes. The tubes C are preferably of greater diameter longitudinally of the boiler than transversely and I may employ one or more as may be found most efficient. The side walls of the tubes C preferably taper from bottom to top so that the opening *c'* at the top which is the discharge opening is very considerably smaller than the opening *c''* at the bottom which is the inlet opening.

When a fire is started in the furnace beneath my improved boiler, the water above the bottom plate of the boiler will rise as soon as it is acted upon by the heat and ascend through one of the conducting passages, thus producing currents which draw downward

other portions of the water, to take the place of the descending currents, and thus exposing the water uniformly to the heating surfaces of the boiler. The products of combustion passing through the fire tubes will of course heat the water to a considerable extent and as it is drawn downward over the bottom plate it will receive its greatest heat and pass upward through the conducting passages together with the steam which is generated, the latter passing directly to the steam space. This construction therefore produces a series of rapidly circulating currents each operating continuously in the same direction and not conflicting with the other currents and hence the water will be uniformly and quickly heated.

The hottest portion of the boiler or heating surface will be the bottom plate and it will be seen that the water and steam after passing over said bottom plate and receiving its greatest heat will be immediately conducted in a body upward to a point adjacent to the steam space, without chilling the steam by allowing it to pass through other portions of water less highly heated.

I prefer to taper the side walls of the conducting passages for a portion of, or throughout their length, so as to draw the heated water and steam into a compact column and allow it to discharge at the top with more force than it would otherwise have, thus facilitating the production of the currents. As the conducting tubes have metallic feet resting directly on the bottom plate of the boiler, the heat from the bottom plate will be directly communicated to said tubes and thus add to the effectiveness of the tubes.

By employing my improved construction of boiler the water will be uniformly, quickly and economically heated, the water being caused to circulate constantly in the same general direction over the heating surface from the less highly heated portions to the most highly heated portions and will then be immediately conducted to a point adjacent to the steam space, through the conducting passages or tubes.

What I claim, and desire to secure by Letters Patent, is—

1. In a steam boiler the combination with the outer shell, of the return flues arranged

on either side of the central part of the boiler, and the conducting passages located directly in the central portion of the boiler having wide flaring bottom portions above the bottom plate of the boiler and narrow conducting portions extending vertically in a straight line to the steam space between and out of engagement with said flues, whereby the water is conducted from the point of greatest heat, directly to the steam space without coming into contact with the said return flues, substantially as described.

2. In a steam boiler the combination with the outer shell, of the return flues arranged on either side of the central part of the boiler and the conducting passages located directly in the central portion of the boiler having

wide flaring bottom portions extending over substantially the whole of the bottom of said boiler, said passages having vertical conducting portions extending vertically in a straight line from the said flaring portions to the steam space, located between and out of contact with the return flues and tapering toward their upper ends, whereby the water is conducted from the point of greatest heat directly to the steam space without coming in contact with said return flues, substantially as described.

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

OSSIAN C. DAVIS.

Witnesses:

JOHN H. HARR,
B. R. JONES.