J. W. BOOKWALTER.
Steam-Boiler Furnaces.

No. 209,218. Patented Oct. 22, 1878.

Fig. 1.

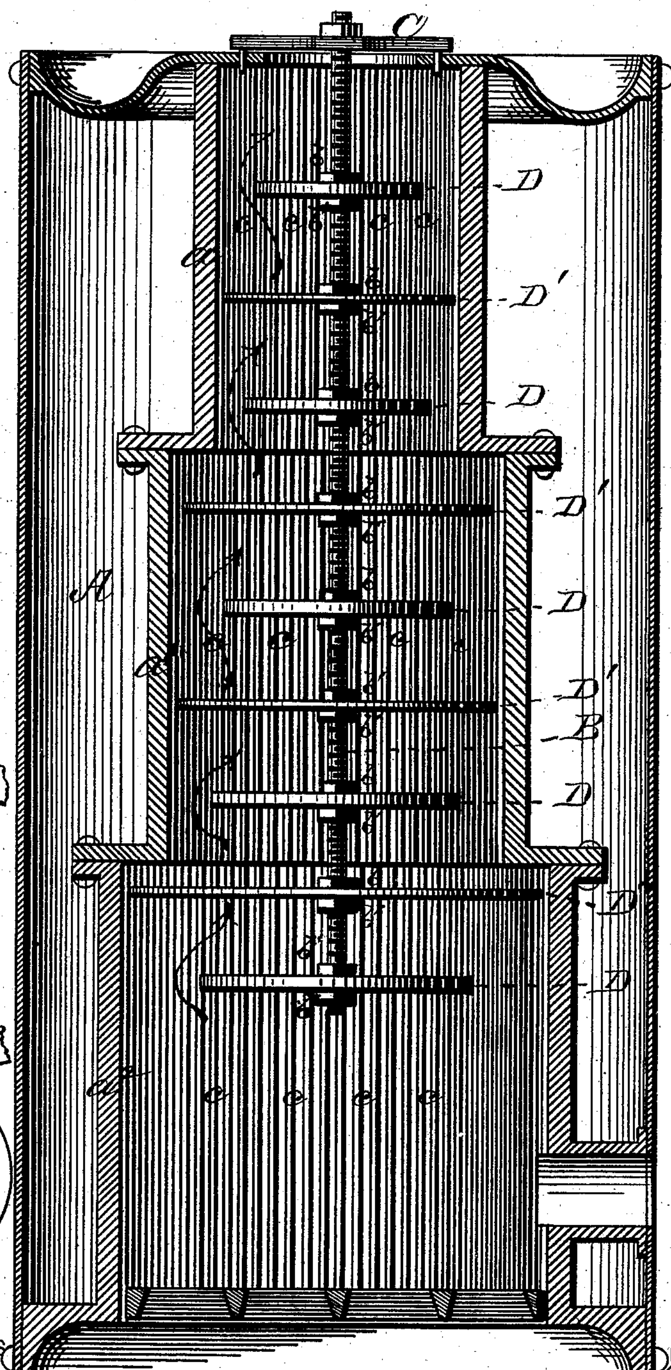
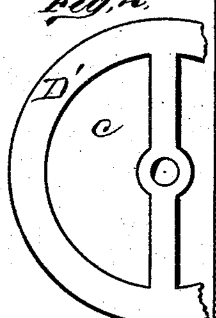


Fig. 2.



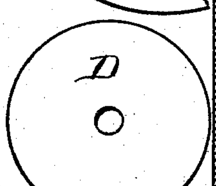


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN W. BOOKWALTER, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. **209,218**, dated October 22, 1878; application filed June 8, 1878.

To all whom it may concern:

Be it known that I, JOHN W. BOOKWALTER, of Springfield, in the county of Clarke and State of Ohio, have invented a new and valuable Improvement in Steam-Boiler Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a central vertical section of this invention. Fig. 2 is a detail view of the open-centered baffle-plate. Fig. 3 is a similar view of the alternate or solid baffle-plate.

This invention has relation to improvements in steam-boilers.

The object of the invention is to direct the flame and other products of combustion against the inner surface of the boiler, and to retard them in their passage through the same, thus greatly increasing the steaming qualities of the boiler.

The nature of the invention consists in diffusers or baffle-plates suspended within the fire-space of the boiler, a solid plate alternating with one, the central portion of which is cut away, whereby the products of combustion pass upward in a zigzag course, as will be hereinafter more fully set forth.

In the annexed drawings, the letter A indicates an upright boiler, the interior or fire-surface of which is formed by a series of metallic rings, a a^1 a^2, decreasing in diameter from below upward, and provided with vertical ribs or corrugations c. This construction forms the subject-matter of a previous application for a patent, and is not broadly claimed herein.

B indicates a screw-threaded metallic rod, depending from a bridge, C, extending across the fire-chamber at its upper end. This bridge is kept stationary, so as to maintain the rod B in the middle of the fire-chamber, by means of spurs that enter corresponding recesses in the crown-sheet or top of the boiler. Upon this rod are placed diffusers or baffle-plates D D′, that are adjusted on the said rod by means of the nuts b b', respectively, above and below them. The plates D are solid, and the plates D′ have their central portions cut away, as shown at c, Fig. 2. These plates are arranged upon the rod B at suitable distances apart, so as to alternate with each other, the lowest plate being solid and the next above open, and followed by a solid plate. These latter plates are of somewhat less diameter than the interior of the fire-chamber; but the open-centered plates D′ are of such diameters that their peripheries are in contact with the walls of said chamber, or nearly so. The lowest plate, D, is situated near the upper end of the ring-section a^2, so as to afford a sufficient space for the introduction of fuel.

Instead of the open disks above mentioned, I may use solid ones of the same size as the disks D; but I prefer to arrange them as above set forth, the solid alternating with the open plates, this construction being more effective, as the products of combustion are caused to impinge against the interior walls of the fire-chamber, instead of simply passing up along the sides of said chamber.

The course of the currents of heated air is in a zigzag upward. The products of combustion in their upward flow strike against the lowest solid plate D, and, being slightly retarded, are deflected outward and caused to impinge against the walls of the fire-chamber. They thence pass inward through the open center of the adjoining plate, D′, and, striking against the second solid plate, D, are directed outward thereby, and caused to impinge a second time against the fire-chamber walls. They continue in this zigzag course alternately outward and inward until they escape into the stack.

Plates D D′ may be made of metal, or of fire-brick, soap-stone, plumbago, or other material capable of resisting high temperatures without melting or burning out.

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

1. The solid disks D and open disks D′, suspended within the fire-chamber of a steam-boiler, and alternating with each other, as and for the purpose specified.

2. The combination, with a steam-boiler having a central fire-chamber decreasing in successive steps from below upward in diameter, of a bridge spanning the top of said chamber, a screw-threaded rod depending

from said bridge, and diffuser-plates adjusted on said rod and alternately solid and open, the open plates being of greater diameter than the solid ones, and extending out to the walls of said chamber, substantially as specified.

3. A steam-boiler having diffuser-plates alternately solid and open suspended in its fire-chamber, the open plates being of greater diameter than the solid ones, and extending completely across the said chamber, whereby the products of combustion are directed upward in a zigzag course and caused to impinge against the walls of the said chamber, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN W. BOOKWALTER.

Witnesses:
WILLIAM JAYNE,
FRANZ OESTERREICH.