(No Model.)

J. J. BOHNER.

BOILER.

No. 530,006. Patented Nov. 27, 1894.

Fig. 1,

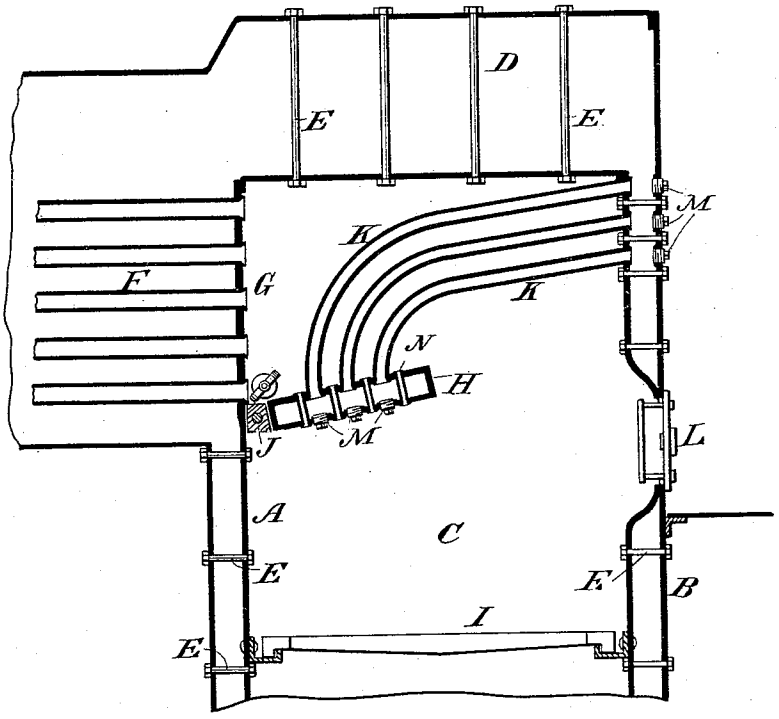


Fig. 2,

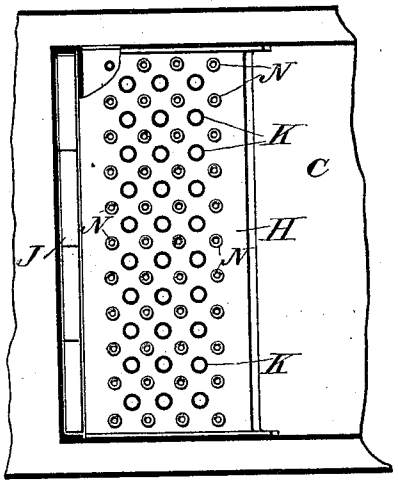
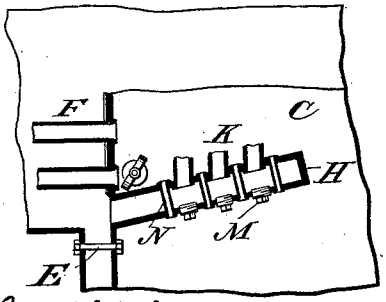


Fig. 3,



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UNITED STATES PATENT OFFICE.

JOSEPH J. BOHNER, OF BROOKLYN, NEW YORK.

BOILER.

SPECIFICATION forming part of Letters Patent No. 530,006, dated November 27, 1894.

Application filed April 28, 1894. Serial No. 509,315. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. BOHNER, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates to locomotive and other boilers of the class in which a transverse water-table connecting the water-legs is arranged at the back of the fire-box over the grate and below the flue-sheet to accelerate the heating and the circulation.

The object of my invention is to further improve this class of boilers by facilitating the circulation from the water-table and at the same time utilizing the upper part of the fire-box to accommodate additional water-tubes, and to this end my invention consists mainly in arranging in the upper portion of the fire box a gang of water-tubes leading from the top of the water-table upward and forward into the water-front above the furnace door, substantially in the manner hereinafter described.

In order that my invention may be fully ascertained, I shall first describe in detail the mode in which I practice the same and then point out the invention in a claim.

Reference is to be had to the accompanying drawings, forming part of this specification, in the various figures of which the same parts are designated by the same letters.

Figure 1 is a longitudinal sectional view of part of an ordinary locomotive boiler provided with my improvement. Fig. 2 is a detail sectional plan view on the line 2—2, Fig. 1. Fig. 3 is a longitudinal sectional view illustrating a modified arrangement of water-table.

The boiler thus represented in part is of ordinary construction having the water-back A, water-front B, water-legs C and crown D, tied by stay-bolts E, the horizontal flues F leading forward from the flue-sheet G, and the transverse longitudinally inclined water-table H connecting the water-legs C, and extending across the back of the fire-box I immediately below the gang of flues F, to receive the first onset of the fire and start the circulation laterally from the ends of the water-table C into the water-legs and upward therein into the crown and dome.

In Fig. 1, the back of the water-table H is shown separated from the water-back, the space left thereby being filled by removable fire-brick J, to facilitate the removal of waste accumulations from the top of the water-table. Hand-holes and plugs K are also shown extending through the water-legs C to give access to the top of the water-table for this purpose.

In Fig. 3, the back of the water-table H is shown communicating with the water-back A; a less desirable arrangement.

To improve the upward circulation from the water-table H and at the same time utilize the upper part of the fire-box I for an additional heating surface, I extend a gang of water-tubes K from the top of the water-table H, upward, and then by arching them, longitudinally forward on an incline under the crown-sheet into the water-front B above the furnace door L, through which tubes K the hot water and steam will readily ascend from the water-table into the water-front B, and thence into the crown and dome, which circulation will be further accelerated by the direct exposure of the tubes K to the heated gases rising from the fire and diverted by the water-table H past its front. The tubes K are preferably expanded in the top of the water-table H and in the tube sheet of the water-front B, by inserting the expanding tool through opposite apertures, afterward closing said apertures with plugs M.

To suitably strengthen the water-table H and also to form passages therethrough for the ascending gases, which will thereby tend to keep the top of the water-table clear of accumulations, I tie the top and bottom of the water-table together by tubular tie-bolts N arranged among the tubes K.

I am aware that boilers have hitherto been provided with tubular water-tables or bridges leading from the water-back forward and upward to the water-front of the furnace; but I believe I am the first to provide a practical method of providing any boiler having an ordinary water-table, connecting the side water-legs and projecting forward substantially from the water-back part-way only to the water-front, with a supplementary gang of water-tubes rising from the top of the said water-table to or near the crown sheet, and

then extending forward into the water-front or crown, so as to increase the heating surface and improve the circulation without interfering with the fire, as herein set forth and described.

I claim as my invention—

The combination, with a boiler, having a transverse water-heating and circulating water-table, opening into the water legs, projecting forward from the water-back over the grate and terminating a distance from the water-front, of a supplementary gang of water-heating and circulating tubes having their ends in circulating connection with the top of said water-table, and rising therefrom substantially parallel with the flue sheet, to or near the crown sheet, and bent and extending thence forward into circulating communication with the upper part of the water-front, substantially as shown and described.

In testimony whereof I have hereunto set my hand this 21st day of March, 1894.

JOSEPH J. BOHNER.

In presence of—

CLARENCE BURGER,

J. CULBERT PALMER.