

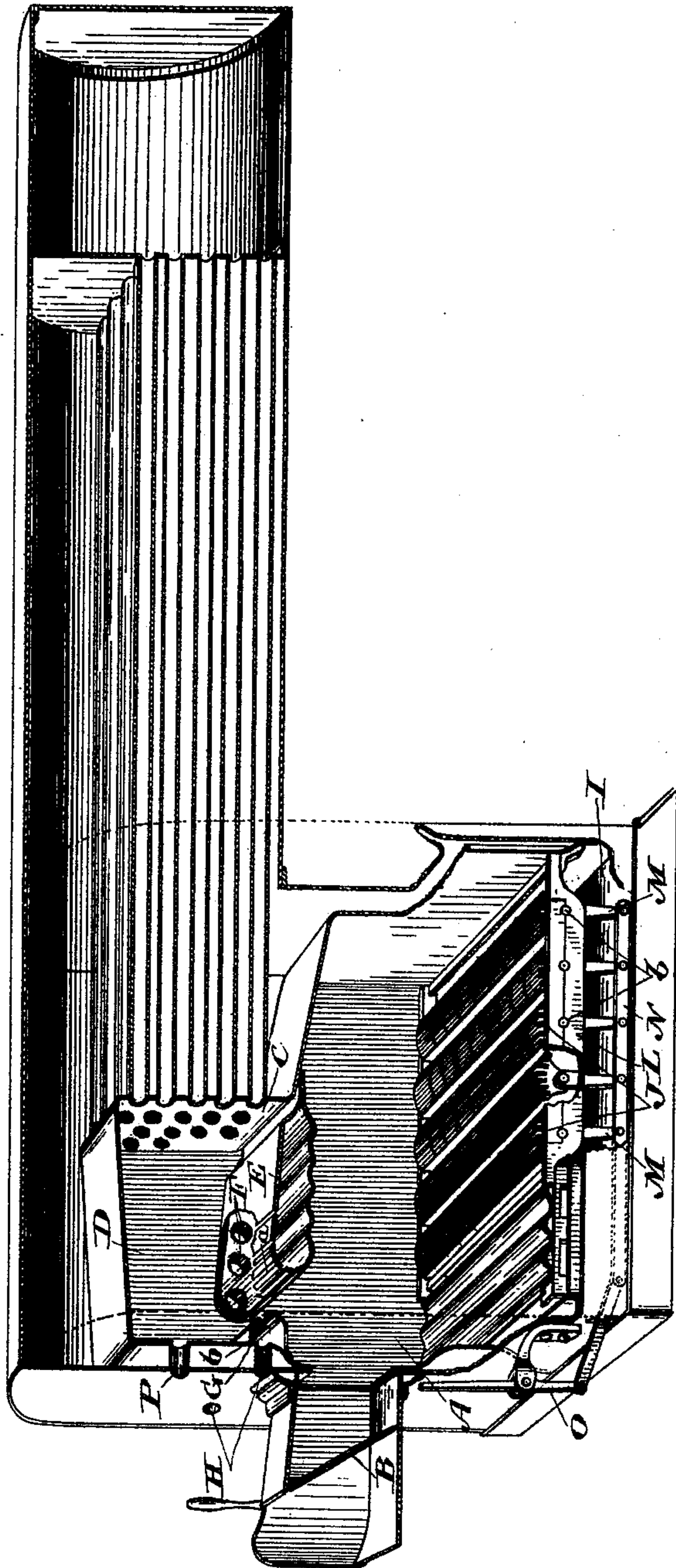
(No Model.)

J. ABELL.

STEAM BOILER FIRE BOX.

No. 413,997.

Patented Oct. 29, 1889.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN ABELL, OF TORONTO, ONTARIO, CANADA.

STEAM-BOILER FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 413,997, dated October 29, 1889.

Application filed March 28, 1889. Serial No. 305,083. (No model.)

To all whom it may concern:

Be it known that I, JOHN ABELL, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, manufacturer, have invented a certain new and Improved Steam-Boiler Fire-Box for Consuming Straw, of which the following is a specification.

The object of the invention is to construct a fire-box in which straw may be consumed without producing dust to fill up or clog the tubes of the boiler; and it consists, essentially, of a fire-box having its upper portion, where the flues enter, partially separated from its lower portion by a hollow chamber extending from the tube-sheet to a point near the opposite side of the fire-box, and provided with openings leading to the outside of the boiler to admit air, which is heated in the chamber and enters the fire-box through perforations in the chamber at the point where the heated gases pass on their way to the tubes, the whole being constructed substantially as hereinafter more particularly explained, and then definitely claimed.

The drawing represents a perspective sectional elevation of a steam-boiler provided with my improved fire-box.

A is the portion of the fire-box into which fuel is fed through the door B. This portion of the fire-box I prefer to shape as shown in the drawing—that is to say, to extend it forward of the tube-sheet C. The upper portion of the fire-box (marked D) I term the “combustion-chamber,” which combustion-chamber is separated from the fire-box proper A by a hollow chamber E, which extends longitudinally from the tube-sheet C to a point near the opposite side of the fire-box and laterally entirely across the fire-box, through the sides of which holes F are made for the purpose of admitting cold air into the chamber E. Slats or perforations *a* are made through the wall of the chamber E, so that the air admitted and heated in the chamber E will escape into the fire-box at the point where the smoke and heated gases pass from the lower portion of the fire-box A into the upper portion or combustion-chamber D. The oxygen thus admitted intensifies the combustion and completely consumes all particles of carbon escaping from the lower portion of the fire-box A,

and consequently the tubes remain perfectly clean. In addition to the chamber D, I prefer to use a chamber G, into which fresh air is admitted through the holes H and passes through slots or perforations *b* into the fire-box A at a point opposite to the chamber E.

I is a chamber at the lower portion of the front of the fire-box for admitting air below the grates J of the fire-box. The air thus admitted creates a draft toward the back of the fire-box, thence up between the chambers E and G, and thence back toward the tubes. The draft thus created, in connection with the supply of fresh air through the perforated chambers E and G, causes a thorough combustion within the fire-box, no matter how fine the material may be which is being consumed.

The grates K consist of a series of bars arranged in groups, each group being pivoted at *b* in a frame L. An arm M is connected to each of the pivots *d*, and the series of arms are connected together by the bar N, which extends back through the wall of the ash-pit and is connected, as indicated, to the pivoted lever O, the adjustment of which will cause the groups of grates K to rock on their pivots and upset for the purpose of dumping any unconsumed portion of the straw which may accumulate upon the grates.

With the view of enabling the engineer to see whether the combustion-chamber D is as perfect as it should be, I form a hole P in the wall of the boiler, which hole may be protected by mica or any other transparent material which will withstand the heat.

What I claim as my invention is—

1. A fire-box having its lower portion extending beyond the tube-sheet and having its upper portion, where the flues enter, partially separated from its lower portion by a hollow chamber arranged adjacent to the flues and extending from the tube-sheet to a point near the opposite side of the fire-box, and provided with openings leading to the outside of the boiler to admit air, which is heated and escapes into the fire-box at the point where the smoke and heated gases pass the hollow chamber, substantially as and for the purpose specified.

2. The fire-box A, having its lower portion

projecting beyond the tube-sheet C and its upper portion D separated by a hollow perforated chamber E, having holes F to connect it with the outside of the boiler, substantially
5 as and for the purpose specified.

3. A fire-box having a hollow perforated air-chamber E located below the tubes, so as to separate the combustion-chamber D from the lower portion of the fire-box, and a per-

forated air-chamber G, located substantially opposite to the perforated air-chamber E, substantially as and for the purpose specified.

Toronto, March 7, 1889.

JOHN ABELL.

In presence of—

CHARLES C. BALDWIN,
W. G. McMILLAN.