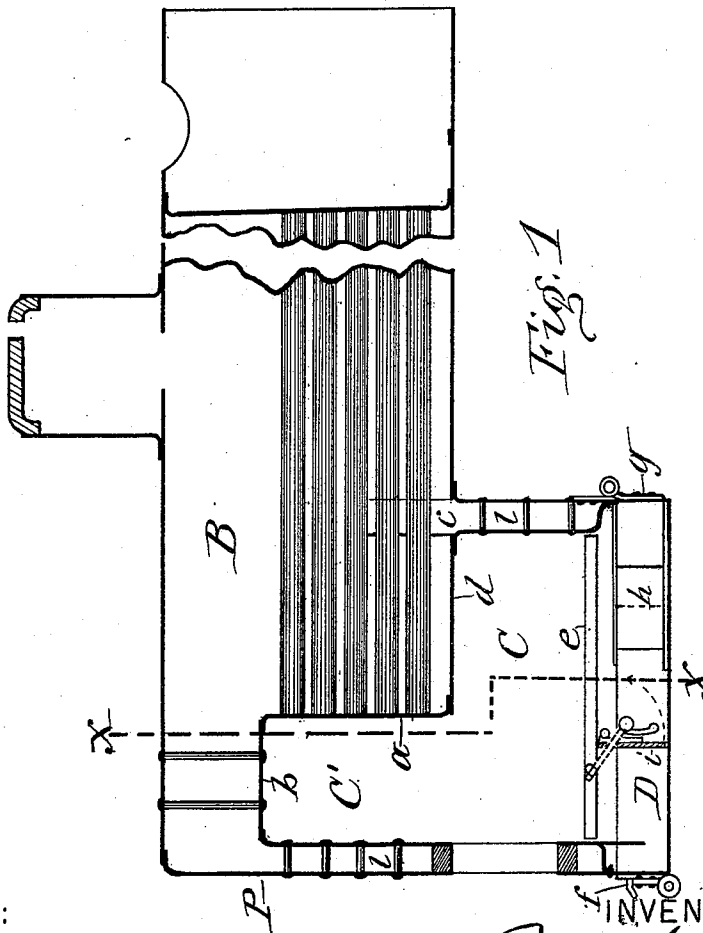
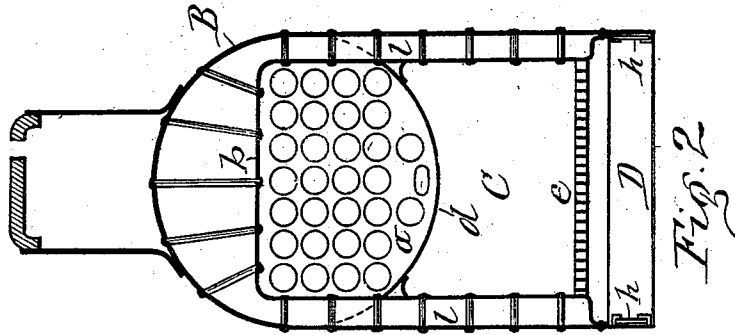


(No Model.)

R. JOY.
STEAM BOILER.

No. 507,735.

Patented Oct. 31, 1893.



WITNESSES:

G. W. White,
C. L. Bendixson

INVENTOR:

Robert Joy
By Hull, Haass & Smith
his ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT JOY, OF OSWEGO, NEW YORK, ASSIGNOR TO THOMSON KINGSFORD,
OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 507,735, dated October 31, 1893.

Application filed February 10, 1893. Serial No. 461,721. (No model.)

To all whom it may concern:

Be it known that I, ROBERT JOY, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention has more particularly reference to the class of steam boilers which have the boiler shell extending partway into the fire-box. In such boilers the bottom of that portion of the boiler shell which extends into the fire-box has heretofore been made flat to form over the rear portion of the fire-box a straight crown-sheet similar to that which is over the front portion of the fire-box. Such a construction necessitated the employment of a number of stay bolts to tie the rear crown-sheet to the top portion of the boiler shell and thus brace said crown sheet so as to prevent its warping or sagging.

The object of this invention is to render the aforesaid rear crown sheet simpler and cheaper in construction and self bracing so as to dispense with the stay-bolts for sustaining said crown sheet.

The object of the invention is also to provide simple and conveniently controlled means for excluding the draft through the front portion of the grate when desired, and thus guard against the too rapid escape of the products of combustion to the vertical extension of the fire box in front of the flue sheet, and cause the bottom portion of the boiler over the rear portion of the fire box to be more effectually heated; and to that end the invention consists in the improved construction and combination of parts hereinafter described and specifically set forth in the claim.

In the annexed drawings, Figure 1 is a vertical longitudinal section of a boiler embodying my improvements and Fig. 2 is a vertical transverse section on line *x, x*, in Fig. 1.

Similar letters of reference indicate corresponding parts.

B— represents the boiler shell which is formed cylindrical throughout with the exception of a portion at its front end which has its lower half removed, and is joined to the

front plate —P— and outer wall of the water leg —*l*— which surrounds the fire-box —C. The front end portion of the cylindrical body of the boiler shell extends into the top portion of the fire-box and has affixed to it the flue sheet —*a*— which is joined to the crown-sheet —*b*— attached to the inner walls of the water-leg. The rear portions of the side-walls of said water leg are preferably curved inward and riveted to the lower portion of the cylindrical boiler shell as shown in Fig. 2 of the drawings. The water leg at the rear end of the fire-box communicates with the interior of the boiler shell through an opening —*c*— cut transversely through the lower portion of the boiler shell. The aforesaid extension of the cylindrical boiler shell into the fire-box, forms a combustion chamber —*C'*— in front of the said extension and also forms over the rear portion of the fire-box a self-bracing inverted arch-shaped crown sheet —*d*— which dispenses with the use of the extra stay-bolts heretofore required to sustain the flat crown sheet and also serves to distribute the products of combustion toward the sides of the fire-box and more uniformly in their passages through the direct flues.

e— represents the grate, and —D— the sub-jacent ash-pit, the front of which is provided with the usual door —*f*— to permit the removal of the ashes thereat from the ash-pit. The rear end of the ash-pit is provided with the draft-door —*g*— to admit the requisite air for the combustion of the fuel deposited upon the grate. In order to obtain a more thorough circulation of the air under the grate and a more uniform distribution of said air in its ascent through the grate, I provide the rear end portion of the ash-pit with draft-doors —*h*— in opposite sides. The incoming current of air meeting in the ash-pit causes the air to be diffused therein. In order to allow the draft to be confined to the rear portion of the ash-pit and grate when desired to maintain the main body of the fire under the inverted arch-shaped crown sheet in the rear portion of the fire-box, and guard against too rapid passage of the products of combustion to the combustion-chamber —*C'*— and through the direct flues of the boiler, I extend a suit-

able damper, *i*, across the ash-pit near the front end thereof as shown in Fig. 1 of the drawings. By closing this damper the draft is excluded from the front portion of the grate.

5 Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

10 In a direct flue-boiler, the combination, with the fire-box —C— and boiler shell —B— extending partway into said fire box and forming the combustion chamber —C'— in front of the direct flues, of a draft-door in the rear

end of the ash-pit, and a damper extending across the ash-pit near the front end thereof and adapted to exclude the draft from the 15 front portion of the grate, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name this 28th day of January, 1893.

ROBERT JOY. [L. S.]

Witnesses:

EPHRAIM M. WILKINSON,
B. W. BURLEIGH.