

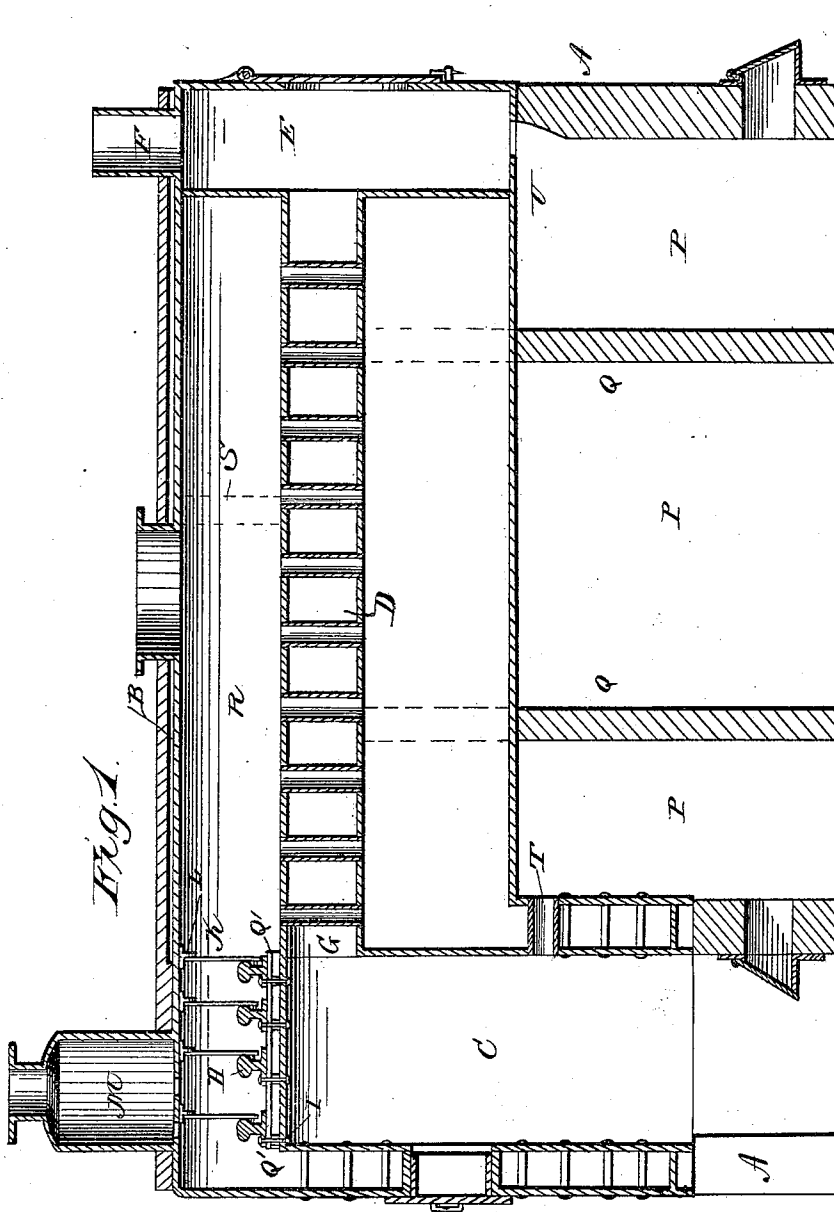
(Model.)

2 Sheets—Sheet 1.

T. CRITCHLOW.
STEAM BOILER.

No. 244,193.

Patented July 12, 1881.



Witnesses,
 P. L. Curaud
 H. Aubrey Tomlin

Inventor
 T. Critchlow
 By Alexander & Mason
 Attorneys

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Fig. 2.

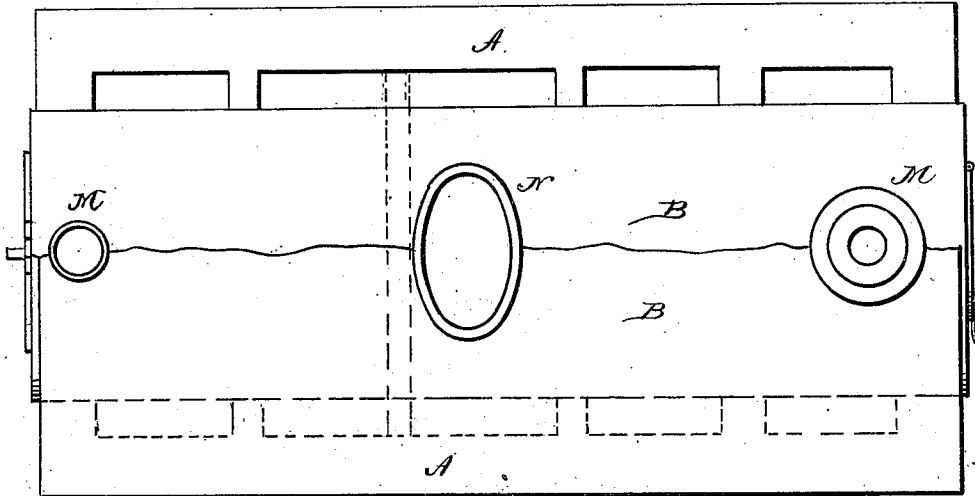
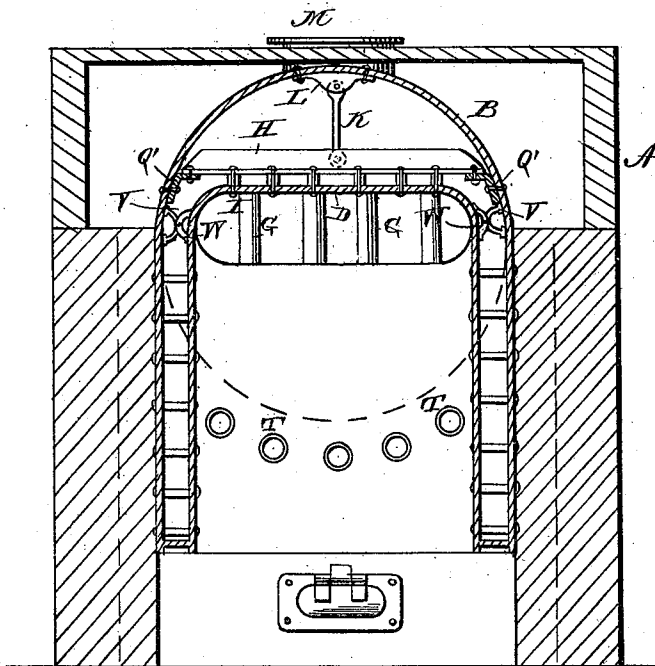


Fig. 3.



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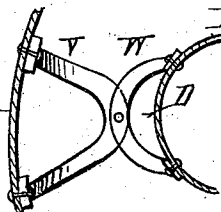


Fig. 4.

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UNITED STATES PATENT OFFICE.

THOMAS CRITCHLOW, OF STEELTON, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 244,193, dated July 12, 1881.

Application filed April 21, 1881. (Model.)

To all whom it may concern:

Be it known that I, THOMAS CRITCHLOW, of Steelton, in the county of Dauphin, and in the State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boilers and Furnaces therefor; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention relates to certain improvements in steam-boilers and boiler-furnaces, and it has for its objects to provide an improved arrangement of the tubes, whereby the heat passing through the flue of the boiler will be more effectually utilized than heretofore; to provide for more effectually connecting the crown-sheet with the outer casing of the boiler, and to secure a uniform temperature around the outer casing of the boiler to prevent loss of heat from radiation, as more fully hereinafter specified. These objects I attain by the apparatus illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of my improved boiler and furnace; Fig. 2, a top view of the boiler and furnace with the upper portion of the furnace removed, and Fig. 3 a transverse vertical section through the fire-box and the adjacent portions of the furnace. Fig. 4 is a detail view of the braces.

The letter A indicates the walls of the furnace, which may be constructed of brick-work or other suitable material.

The letter B indicates the boiler, which is mounted in the furnace in the usual or any convenient manner.

The letter C indicates the fire-box, and D a horizontal flue leading therefrom to the smoke box or chamber E, from the upper part of which the smoke-stack F extends. Through the horizontal flue extend vertically a series of vertical tubes, G, connecting the upper and lower portions of the boiler.

The letter H indicates a series of crown-bars, in the form of railroad-rails, extending transversely across the crown-sheet of the fire-box, and bolted thereto by means of the bolts I. The said crown-bars are centrally connected with the outer casing of the boiler by means

of the stays K, which are attached to the connections L bolted to the inside of the outer casing of the boiler. The outer ends of these crown-bars rest upon and are connected by bolts or rivets to the horizontal angle-irons Q, the latter being firmly secured to the inner walls of the outer casing of the boiler by means of suitable bolts. These crown-bars thus serve to prevent the lateral expansion of the outer sheeting of the boiler.

Located between the outer wall or sheet of the boiler and the horizontal flue D, on opposite sides of the said flue, are braces V W. The portion V of each of these braces terminates in flanged ends or heads v, which are connected by bolts or other suitable means to the outer sheeting of the boiler. The portion W also terminates at its ends in like heads, which are similarly connected to outer wall of the flue D. Where the elbows of these braces cross each other they are secured together by rivets or bolts or other convenient means. These braces are placed at suitable intervals along the sides of the boiler, and their function is to prevent the collapsing of the sides of the flue, and, further, to act as a strengthening-brace for the boiler-sheet. This flue displacing a considerable volume of water in the boiler, it is found in practice that it has a disposition to rise, and by the use of these braces V W, I effectually overcome this tendency.

The letter M indicates the steam-dome, and N the man-hole, of the boiler.

The space below the boiler is divided into a series of compartments, P, by means of the partitions Q, and the upper part over the boiler is divided into connecting compartments R, formed by the partition S.

Through the rear of the fire-box extend the flues T, which open into the first of the chambers or compartments P, and from the last of said compartments P leads an opening, U, to the smoke-box E.

The operation of my invention will be readily understood in connection with the above description and is as follows: The products of combustion pass through the flue D, imparting their heat to the water in the tubes G, heating the same and causing a thorough circulation. A portion of said products of com-

bustion passes through the flues T, and successively through the chambers P and R, and from thence through the opening U into the smoke-box E, thus uniformly heating the entire outside of the boiler and effectually preventing loss of heat by radiation.

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

10 1. In combination with the fire-box, the boiler having flame-aperture T and suitable flues at the rear thereof, the alternating chambers surrounding the boiler and communicating with the smoke-chamber, and the uptake,
15 substantially as and for the purposes specified.

2. In combination with the outer shell of the boiler and the horizontal flue, the curved braces connected together and to the shell and flue, as described, substantially as and for the purposes specified. 20

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of March, 1881.

THOS. CRITCHLOW.

Witnesses:

G. W. JACKSON,
ROBT. M. STURGEON.