

W. MOORHOUSE.

Improvement in Securing Steam Boiler Tubes
in Tube Sheets.

No. 125,321.

Patented April 2, 1872.

Fig. 3.

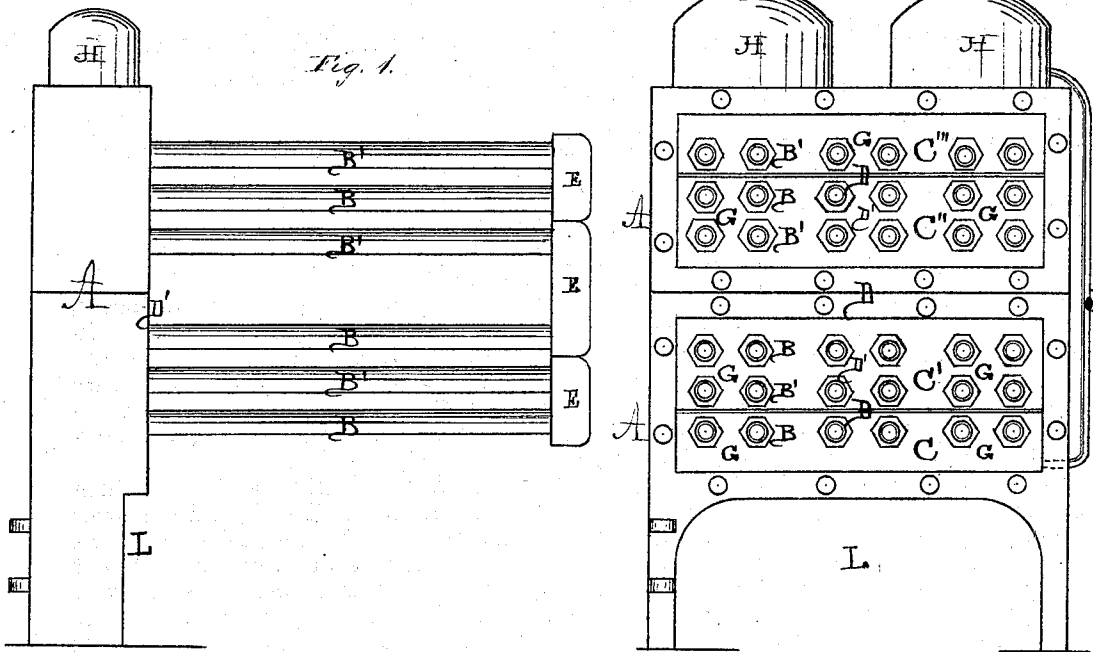


Fig. 1.

Fig. 4.

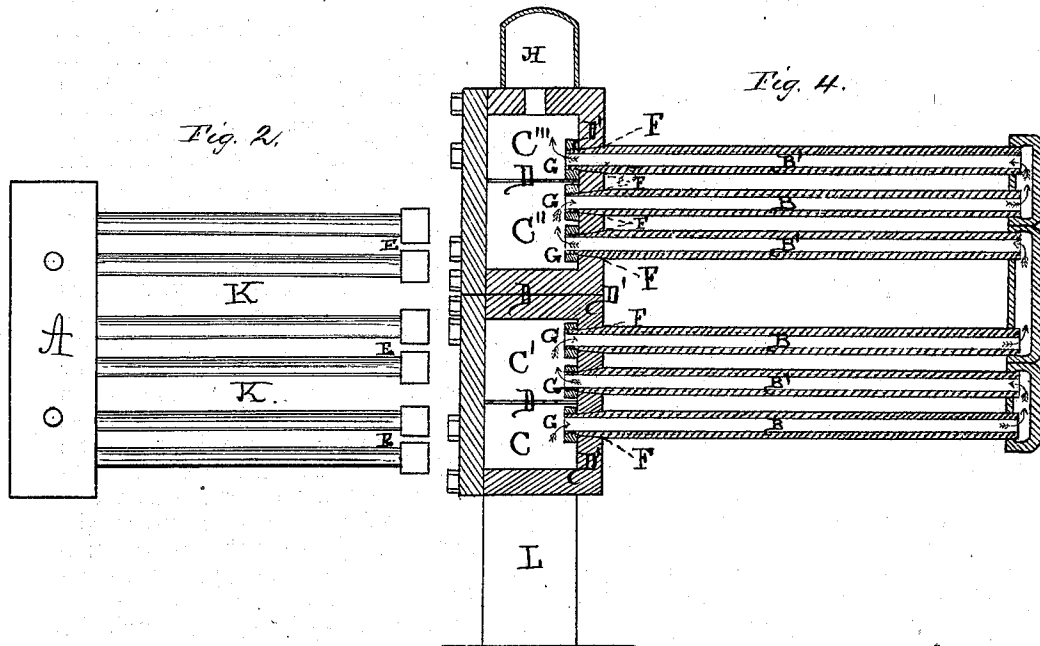


Fig. 2.

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UNITED STATES PATENT OFFICE.

WALTER MOORHOUSE, OF PHILADELPHIA, PA., ASSIGNOR TO HIMSELF,
WILLIAM MOORHOUSE, AND JOSEPH FIELD, OF SAME PLACE.

IMPROVEMENT IN SECURING STEAM-BOILER TUBES IN TUBE-SHEETS.

Specification forming part of Letters Patent No. 125,321, dated April 2, 1872.

To all whom it may concern:

Be it known that I, WALTER MOORHOUSE, of the city and county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Steam-Generators; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a side view of the device illustrating my invention. Fig. 2 is a top or plan view thereof. Fig. 3 is a front view, the face-plate being removed. Fig. 4 is a vertical longitudinal section thereof.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to improvements in steam-generators; and consists in the mode of securing the tubes to the tube-sheet.

Referring to the drawing, A represents the water-tank, with which communicate the tubes B B'. The tank A forms receptacles for water, which flows thereinto from one set of tubes, and flows therefrom through another set of tubes. The tank is divided transversely by partitions D D, so as to form a series of divisions or compartments, C C' C'' C''', which are arranged one above the other, or side by side. The back plate of the tank forms the tube-sheet D', and to this sheet are secured the tubes B B'. The tubes are arranged in pairs, and the pair is connected at one end by a cap, E, so that the tubes will communicate at that end. The tubes at the other end are connected to the tube-sheet D', as follows: A portion of the length of each tube is made tapering at the ends opposite to the caps, and enters tapering or conical openings F in the tube-sheet D'. Nuts G fit on threads cut or formed on said tapering ends of the tubes, and bear against the tube-sheet.

It will be seen that by tightening up the nuts the tapering ends of the tubes are drawn

into the conical openings of the tube-sheet, and thus the joint is snug and secure. In cases of leakage or loosening of the tubes the operation of tightening can be continued, there being no obstruction by shoulders, and consequently no weakening of the tubes by the latter appliances.

The tubes B B' constitute a pair, of which one end is connected to the cap and the other end to the tube-sheet. One tube, B, of the pair will communicate with one compartment of the tank A, and the other tube, B', with the adjacent compartment, so that, as the water is fed into the lower compartment C, it passes through the lower tubes B; then by the caps into the tubes B', and into the compartment C'; then continues through the next tubes B and B' into the compartment C'', and so on until it reaches the drums H, from whence it is conveyed to the feeding-tank C by means of a pipe, J. Thus there is a continuous circulation of water. The compartments or chambers will be filled with water, and the latter flows through the tubes with equal pressure, and without strain on the joints.

The arrangement of the tubes is such that a series of passages, K, are left between every two vertical rows of the tubes, so that in case it is desired to remove any pair of the tubes, the nuts being unscrewed, the tubes must be struck or forced from the tube-sheet so as to clear it, and they may then be lowered or let down by the right or left through one of the passages K into the fire-chamber, and withdrawn at the space L of the furnace-doors.

By this arrangement the other tubes will not be disturbed, and no portion of the masonry-work torn down or destroyed to accomplish the removal of the tubes.

By removing the face-plate of the tank the ends of the tubes are accessible, and the operation of tightening the latter is readily performed.

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

1. The tubes B B' having conical ends, as described, arranged in pairs, with the tubes constituting the pair communicating with different compartments of the tank A, all as set forth.

2. The tubes formed with conical ends, and entering conical openings in the tube-sheet, in connection with the tightening-nuts, substantially as described.

3. The conical-ended tubes projecting into

the water-compartments of the tank, in connection with the nuts and the tube-sheet, substantially as described.

The above signed by me this 28th day of February, 1872.

WALTER MOORHOUSE.

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THEO. E. WIEDERSHEIM.