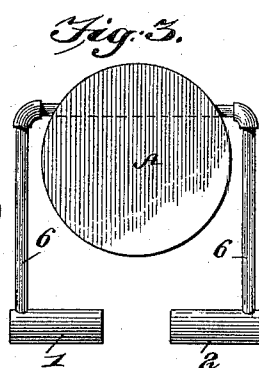
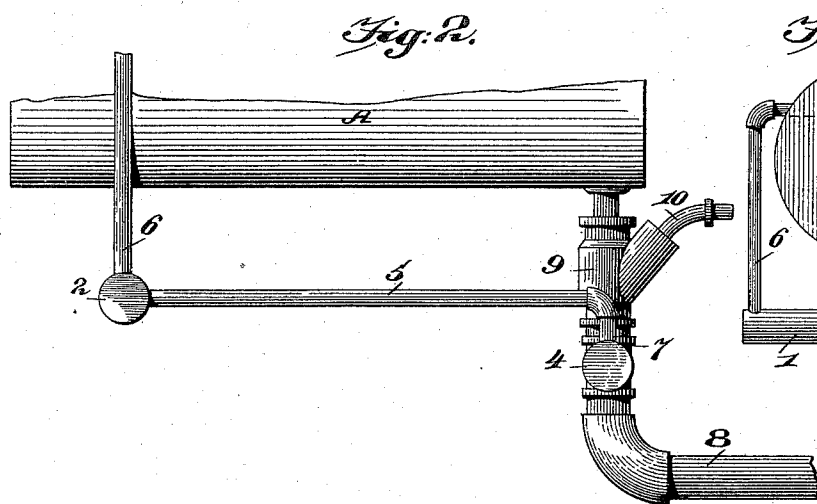
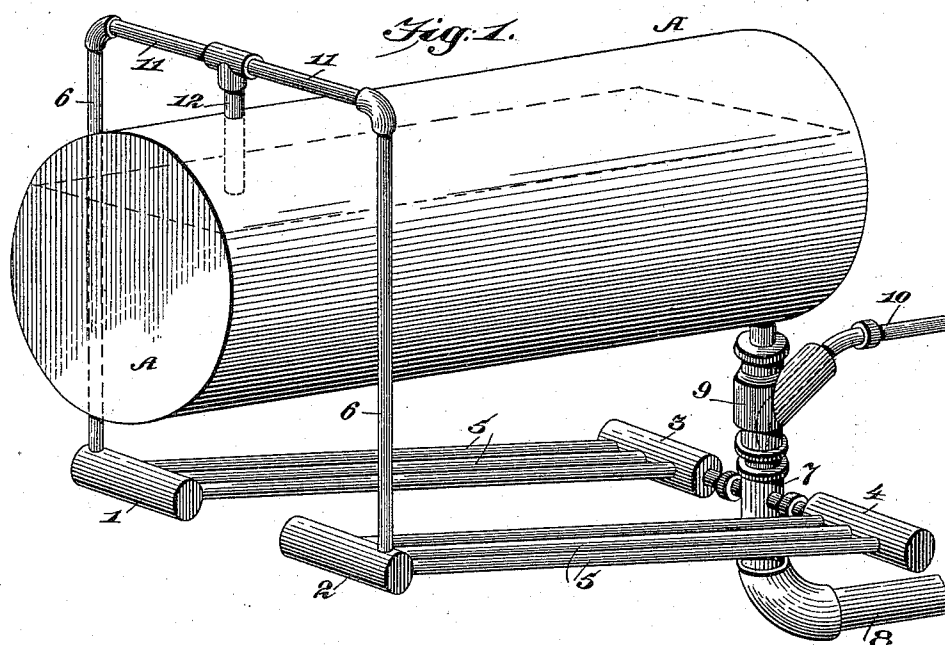


(No Model.)

H. L. FREEMAN.
STEAM BOILER.

No. 582,121.

Patented May 4, 1897.



Inventor

Witnesses

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UNITED STATES PATENT OFFICE.

HORACE L. FREEMAN, OF LEXINGTON, NORTH CAROLINA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 582,121, dated May 4, 1897.

Application filed December 28, 1896. Serial No. 617,231. (No model.)

To all whom it may concern:

Be it known that I, HORACE L. FREEMAN, a citizen of the United States, residing at Lexington, in the county of Davidson and State of North Carolina, have invented a new and useful Steam-Boiler, of which the following is a specification.

The primary object of the present invention is to prevent the incrustation of boilers and steam-generators and to secure a positive and rapid circulation of the water therethrough, as well as to obviate foaming and provide for the drawing off of sediment and all matter tending to foul the boiler and impede its action.

A further object of the improvement is to economize in the consumption of fuel and to utilize the feed-water as a means for precipitating the impurities from the water in its circulation, while at the same time the feed-water is heated to the boiling-point prior to its entrance into the boiler and commingles with the water previously heated during its circulation through the attachment which forms the vital feature of the invention.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a boiler or steam-generator, showing the invention applied. Fig. 2 is a side elevation showing a different arrangement of the pipes connecting the front and rear manifolds. Fig. 3 is a detail view showing the upright pipes leading from the front manifolds connected with the boiler in a different way from that shown in Fig. 1.

Corresponding and like parts are referred to in the following description and indicated in the several views of the drawings by the same reference-characters.

The boiler or steam-generator A is of the ordinary horizontal type and is representa-

tive of the class to which the invention is to be applied.

The attachment comprises a series of manifolds 1, 2, 3, and 4, arranged in pairs at opposite ends of the boiler and connected by a series of pipes 5. The manifolds 1 and 2 are located at the front end of the boiler and are separated a proper distance and have connection with the steam-space of the boiler by means of upright pipes 6. The rear manifolds 3 and 4 are disposed in a lower plane than the front manifolds and have connection at their inner ends with the horizontal branches of a T-coupling 7. A blow-off pipe 8 connects with the lower end of the coupling 7 and receives the sediment and other matter precipitated from the water during its circulation. A coupling 9 connects the upper end of the coupling 7 with the bottom side of the boiler A and is of less cross-sectional area than the blow-off pipe 8, so as to enable the clearing of the latter when opened for getting rid of the accumulations. The feed-pipe 10 communicates with a branch of the coupling 9, and its discharge end enters the coupling 9 and is deflected downwardly and terminates centrally thereof, whereby the incoming water is directed downwardly and has a tendency to supplement the downflow of the water from the boiler through the couplings 9 and 7.

The upright pipes 6 are connected at their upper ends by a horizontal pipe 11, from which extends a pipe 12, leading into the upper portion of the boiler and terminating at a point corresponding with the water-line, which is of advantage in removing the scum from the surface of the water when the blow-off is open. The upper ends of the pipes 6 may communicate directly with the sides of the boiler at a point corresponding with the water-level, as shown in Fig. 3, but it is preferred to have them unite and communicate with the boiler on a medial line.

The pipes 5 extend in parallel relation and connect corresponding front and rear manifolds and incline rearwardly and downwardly, but in some instances they may be arranged as shown in Fig. 2, their rear ends extending downwardly and communicating with the rear manifolds and the pipes running about parallel with the boiler.

When the boiler is in operation, the water gravitates through the couplings 9 and 7 and passes laterally into the manifolds 3 and 4 and forwardly through the pipes 5 into the front manifolds 1 and 2, thence in an upward direction through the pipes 6 back into the boiler, and is superheated in its travel through the various manifolds and their connecting-pipes. The feed-water entering through the pipe 10 mixes with the water in its passage through the couplings 9 and 7 and, being at a lower temperature, precipitates any sediment or impurity contained therein, thereby preventing the incrustation of the boiler.

As previously explained, the blow-off pipe 8 is of larger diameter or size than the coupling 9 or the connection between the coupling 7 and the boiler. Hence upon opening the blow-off 8 to its fullest extent a backflow of water through the various manifolds and pipes 5 and 6 will result, and the scum or other impurity floating upon the surface of the water in the boiler will be drawn through the pipes 6, the manifolds and their connecting-pipes, and pass out through the blow-off pipe 8, as will be readily comprehended. The blow-off pipe 8 acts in the capacity of a trap or mud-drum and may be replaced by the latter, if desired.

Having thus described the invention, what is claimed as new is—

The combination with a boiler or steam-generator, of a pair of manifolds located at or near the front end of the boiler, a second pair of manifolds located at the rear end of the boiler and in a lower plane than the first pair of manifolds, upright pipes connecting the front manifolds with the boiler and terminating at a point corresponding with the water-line, longitudinal pipes connecting corresponding front and rear manifolds, a T-coupling having lateral branches in communication with the rear manifolds, a coupling or connection between the rear end of the boiler and the T-coupling, and having a branch, a blow-off in communication with the lower end of the T-coupling and of larger cross-sectional area than the connection between the boiler and T-coupling, and a feed-pipe passing through the branch of the connection between the boiler and T-coupling and terminating about centrally thereof to assist in the circulation of the water and serving to precipitate any impurity therein, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HORACE L. FREEMAN.

Witnesses:

M. C. BIGGERS,
M. W. CONRAD.