(No Model.)

J. M. SIMPSON.

STEAM BOILER.

No. 260,425. Patented July 4, 1882.

Fig. 2

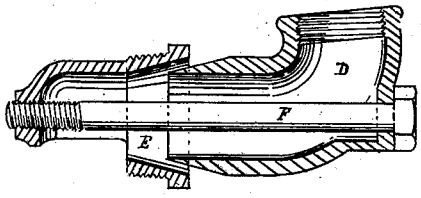


Fig. 1

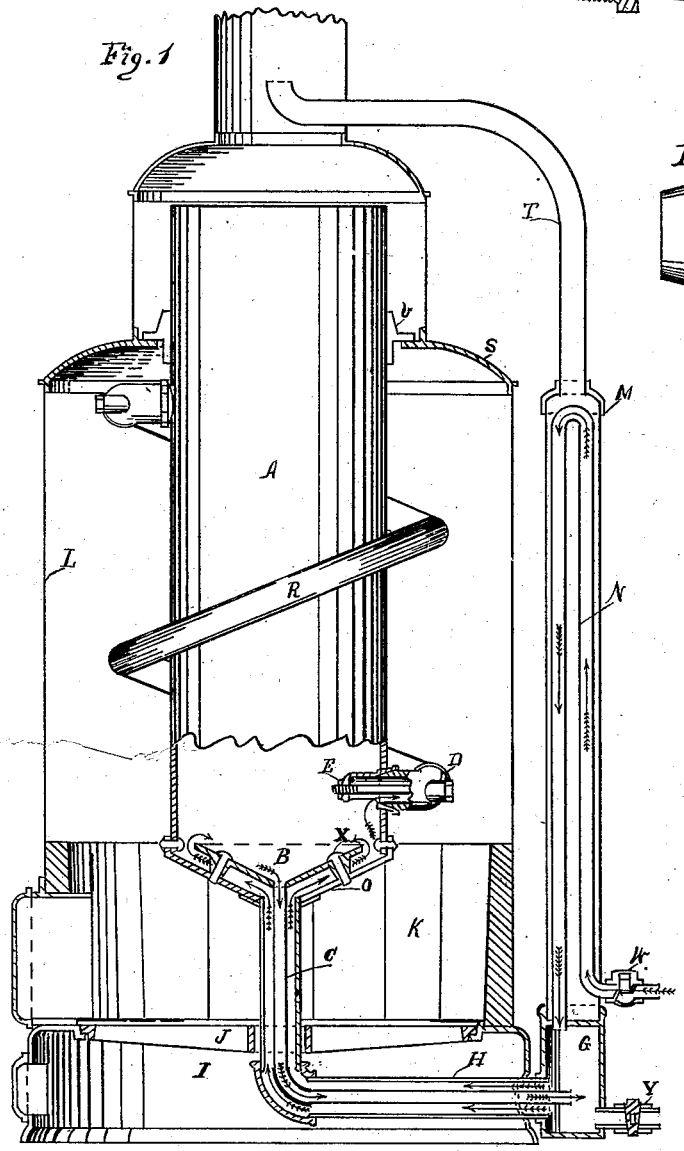


Fig. 3

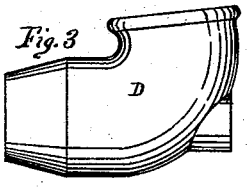


Fig. 4

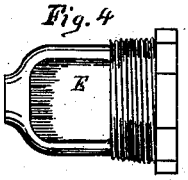
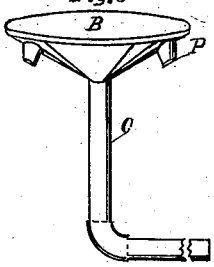


Fig. 5



Witnesses;
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UNITED STATES PATENT OFFICE.

JOSIAH M. SIMPSON, OF CHICAGO, ILLINOIS.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 260,425, dated July 4, 1882.

Application filed January 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH M. SIMPSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to improvements in what are known as "water-tube boilers"—boilers in which the main feature consists of a stand-pipe or central reservoir surrounded by right or left hand coils, or both, of pipe or tubing, the whole inclosed and supported by a suitable casing over a fire-box.

The objects of my improvement are, first, to provide a simple and efficient manner of connecting the water-tube coils with the stand-pipe or central water-reservoir; second, to secure a thorough circulation of the water. I attain these objects by the devices illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of such parts of the boiler as are necessary to show my improvement. Fig. 2 is a sectional view of the elbow and bushing I use to make the connection between the stand-pipe and coils. Fig. 2 also shows the bolt used to secure the elbow in the bushing. Figs. 3 and 4 are elevations of the elbow and bushing, the bushing turned upon its side to show its water-opening. Fig. 5 is a perspective view of the funnel or conical diaphragm with its return water-pipe used in connection with the bottom of the stand-pipe to insure circulation of the water.

Similar letters of reference refer to similar parts throughout the several views.

In the drawings, Fig. 1, I have shown but one coil of pipe surrounding the stand-pipe, that being sufficient to show my improved method of attaching the coils to the stand-pipe. In manufacturing these boilers quite a number of coils are generally used.

To prepare the stand-pipe A for the reception of the coils at proper intervals, holes are punctured in it and threaded. Into these holes the bushing E is screwed. The opening in that part of the bushing that now extends inside of the stand-pipe A is left facing downward for the purpose of more readily conducting the water from the stand-pipe A into the elbow D, (the course of the water being shown by the arrow projecting into the elbow, Fig. 1,) thence up through the coil R, also turning the current of water downward at the upper end of the coil at the point the water is again discharged into the stand-pipe. The hooded or inner end of this bushing E is threaded to fit the screw-bolt F. The opening in the outer end is beveled outwardly, furnishing a concave socket for the reception of the convexed end of the elbow D. The elbows are screwed upon each end of the coil R, the coil placed in position around the stand-pipe, the convex end of the elbows being inserted in the concaved outer end of bushing and drawn tight by the screw-bolt F, as shown in Fig. 1.

It will be observed that the elbow D is made of such shape that the bend of it conforms to the circle described by the coil, the bend of the elbow being more than an ordinary or right-angle elbow.

As shown in Figs. 2 and 3, the elbow is also furnished with an offset or shoulder, furnishing a flat seat for the head of the bolt, admitting of making a tight joint under the bolt-head.

To improve the circulation of the water in the lower end of the stand-pipe A, immediately over the fire, giving it at the same time an impetus into the opening in the bushing E, (the course of the water into the bushing-elbow and coil being indicated by the arrow projecting into the elbow, Fig. 1,) I have provided the conical-bottomed stand-pipe A with a large feed or supply pipe, H. This supply-pipe connects with and opens into the lowest extremity of the conical bottom O. From that point it extends down through the fire-box K, passing through an opening prepared in the fire-grates J into the ash-box I. At this point it turns a right angle, passing out through an opening through the side of the ash-box connecting with an opening into the mud-drum G.

I have also provided the upper or inner side of the conical bottom O of stand-pipe with a conical diaphragm. This diaphragm is supported a short distance above the conical bottom O by lugs P, and is secured to the bottom O by the rivets X, which pass entirely through the diaphragm B, the lugs P, and the bottom O, thus thoroughly securing them together and providing an annular chamber or passage-

way for water between the diaphragm B and the bottom O.

Connecting with and opening into the lowest extremity of the diaphragm B is a circulation-pipe, C. The exterior diameter of this pipe is much smaller than the interior diameter of the large feed-pipe, through the center and entire length of which it passes, emerging out into about the center of the chamber of the mud-drum G, where it abruptly terminates.

This device promotes the circulation of the water as follows: Heat being applied in the fire-box K, the water in the pipe H and between the diaphragm B and bottom O will be heated first, causing it to circulate in the direction denoted by the arrows, as shown in Fig. 1. Water being pumped into the mud-drum through heater-pipes N in heater M will also pass up into the body of the boiler through the annular space between the interior surface of pipe H and exterior surface of pipe C, thoroughly heating it, thus preventing the unequal expansion of the body of the boiler that would be caused by pumping in water of a lower degree of heat than that contained in the boiler.

The circulation between the diaphragm B and the bottom O is sufficient to keep the interior surface of the bottom O free from sediment, the return current of water through the pipe C depositing the sediment in the bottom of the mud-drum, where it may be blown off at will through the blow-off cock Y.

I am aware that prior to my invention boilers have been constructed with stand-pipes surrounded by coils. Therefore I do not claim such a combination, broadly; but

What I do claim as my invention, and wish to secure by Letters Patent, is—

1. The combination, in a steam-boiler, of a conical-bottomed stand-pipe provided with a conical diaphragm and surrounded by coils of pipe, said pipes having a hooded concave end bushing and convex end elbow with draw-bolt, all substantially as described and shown.

2. In a steam-boiler, the combination of a conical-bottomed stand-pipe with a conical diaphragm supplied with supporting-lugs and also a circulating-pipe and coil, said pipe being inclosed in the feed-pipe and extending into the mud-drum, all substantially as set forth.

JOSIAH M. SIMPSON.

Witnesses:
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