(No Model.)

D. RENSHAW.

STEAM GENERATOR.

No. 260,321. Patented June 27, 1882.

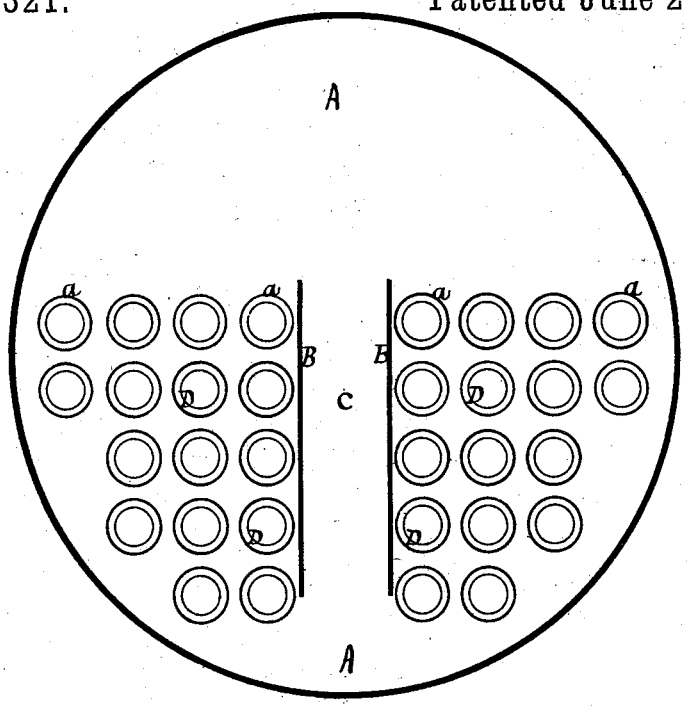

Fig. 1.

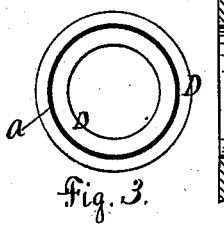

Fig. 3.

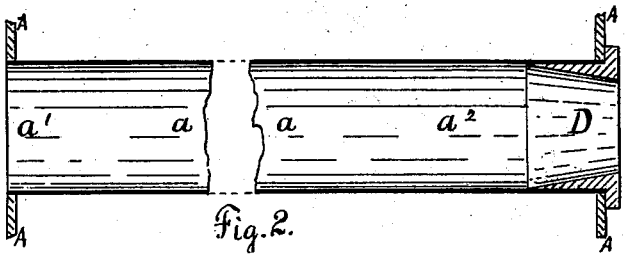

Fig. 2.

Witnesses.
Wm. A. Macleod.
Wm. A. Copeland.

Inventor.
David Renshaw
by Chas. F. Sleeper, Atty.

UNITED STATES PATENT OFFICE.

DAVID RENSHAW, OF COHASSET, MASSACHUSETTS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 260,321, dated June 27, 1882.

Application filed April 22, 1881. (No model.)

To all whom it may concern:

Be it known that I, DAVID RENSHAW, a citizen of the United States, residing at Cohasset, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention has for its object an improvement in steam-generators, by means of which I get out of the fuel the greatest amount of heat proportionately to the quantity used by retarding and retaining the heat generated and keeping it longer in contact with the heating-surface than has heretofore been done. Attempts have been made to accomplish this result in a manner resembling mine; but the nearest that has heretofore been reached, the thimble or retarding-plug, has been made of fire-clay, which may at any time crumble to pieces, and, furthermore, it has a straight opening through it, leaving large recesses for the accumulation of soot and ashes. I do not, therefore, claim any such construction.

My invention consists in fitting to the ends of the tubes and flues a thimble or hollow plug having an inwardly-tapering and enlarging opening, and having outside parallel sides to fit the flue or tube, the taper running to a knife-edge. Thus while contracting the main area of the flue I avoid obstructing the outlet of dust and ashes; and, in combination with the foregoing-mentioned plug, I utilize in the vertical center of the boiler a space formed by two parallel plates running from the top row of tubes nearly to the bottom row.

It may be deemed essential to describe the combined action of the circulating-plates and the tapering thimbles or plugs. When the flame is retained in the tubes or flues by retarding its exit it gives up more of its heat to the heating-surface than when it is permitted to pass off unobstructed, its conduction through the boiler-plate is greater, and thus generates steam so fast that if the downward circulation is not provided for the mixed steam and water passes up to the drum, and thus priming or foaming takes place, and the surface of the tubes becomes so hot that the steam cannot, without some means, relieve itself; and without these means it forms into bulk and volume, and at intervals explodes into the steam-space, with sometimes danger to the boiler by overstraining. The water at once rushes to take the place of the vacated or liberated steam, and, by the difference in temperature, damage is also done to the tubes. Thus it will be readily seen that with my circulating-plates located in the center of the boiler, forming a space without tubes, I have a free and constant circulation, avoiding the dangers pointed out, as well as having the benefit of the well-known results from a perfect circulation.

I claim nothing new for the circulatory plates alone, for I know they are old; but I do claim that by their co-operation with my improved thimble I produce a new and useful result.

I will now refer to the drawings, and point out the parts by figures and letters of reference.

Figure 1 shows a cross-section of a tubular boiler, showing the circulating-plates in position and the ends of the thimbles in the tubes. Fig. 2 shows an enlarged sectional view of a tube with one of the improved thimbles in section; Fig. 3, an end view of the same.

A is the boiler, B the circulating-plates, and C the central circulating-space.

D represents the plug or thimble, constructed with a tapering opening.

a, *a'*, and a^2 are portions of the tube, *a'* being the end where the products of combustion enter, and a^2 the exit end.

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

As an improvement in steam-boilers, the combination, with the circulating-plates forming the central water-space, of the plugs or thimbles having tapering openings for retarding and retaining the heat within the tubes, said circulating-plates serving to relieve the accumulated steam from said tubes by a constant circulation of water, in the manner set forth and shown.

DAVID RENSHAW.

Witnesses:
CHAS. F. SLEEPER,
H. T. LITCHFIELD.