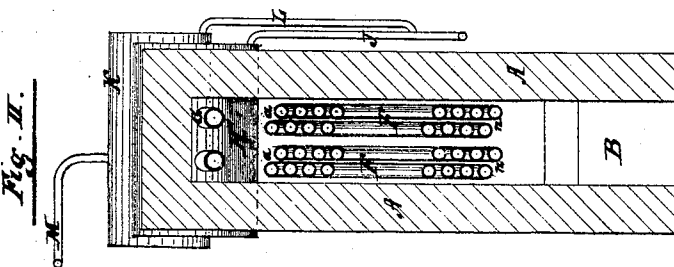
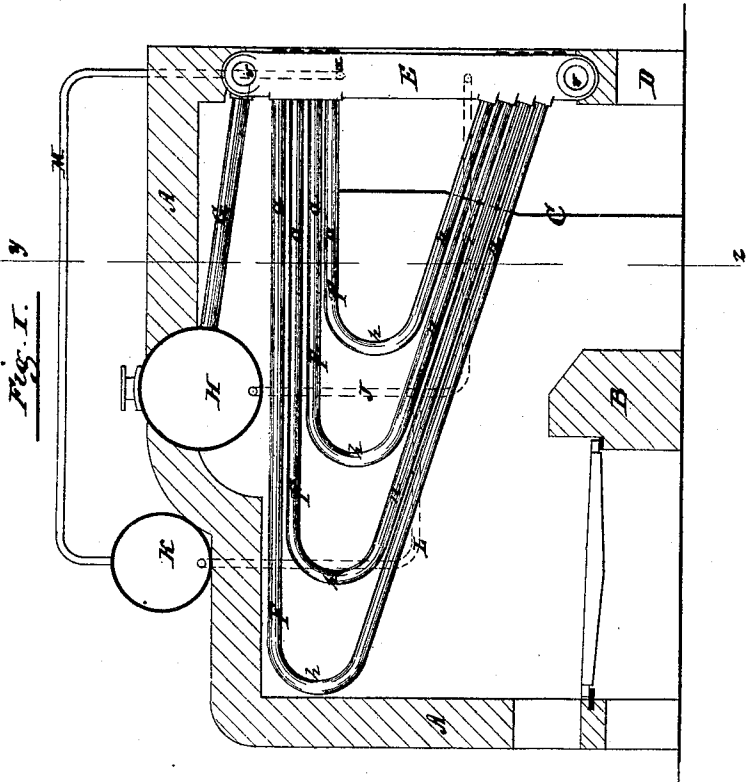
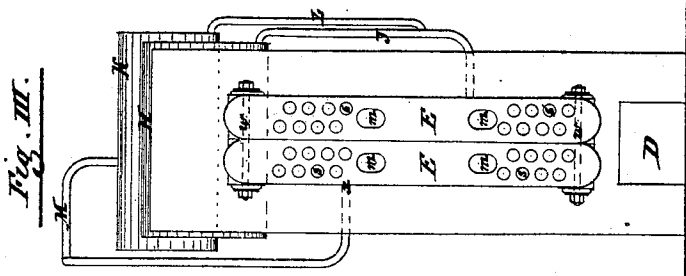


J. F. ALLEN.
Improvement in Steam-Generators.
 No. 132,041. Patented Oct. 8, 1872.



Witnesses
 Henry S. Roeder
 Leon N. Loeb

Inventor
 John F. Allen

UNITED STATES PATENT OFFICE.

JOHN F. ALLEN, OF MOTT HAVEN, NEW YORK.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. 132,041, dated October 8, 1872.

To all whom it may concern:

Be it known that I, JOHN F. ALLEN, of Mott Haven, Westchester county, in the State of New York, have invented a new and Improved Steam-Generator, of which the following is a specification:

My invention relates to the combination, with an upright pipe or chamber, of a series of pipes, each pipe running inclined upward from the lower part of the chamber and returning horizontally to the upper part of said chamber, from which it starts, by means of a large curved bend, the several pipes connected with the same chamber being placed one within the space left by the other, all having curves of nearly the same radius; the object of my improvement being to reduce the number of joints usual in sectional boilers, and to insure perfect circulation, and, at the same time, to place the pipes in such a manner that in the inclined part of each pipe which is nearest to the fire the circulation will be more violent, and therefore capable of carrying sufficient water to and through its higher horizontal part to absorb the heat of the fire and protect that part of the pipe from the excessive heat. It will be readily seen that the circulation in each pipe further from the fire will be less violent, but they will have less height to throw their water to and through their horizontal part.

Figure I is a longitudinal section of a steam-generator embodying my invention. Fig. II is a cross-section of the same at the line yz in Fig. I. Fig. III is an end view of the back of the boiler.

E are upright-standing pipes or chambers, built partly into the back wall of the boiler, and F are bent or doubled pipes. The upper legs a of these doubled pipes F run horizontal, and are attached to the upper end or steam-room of the pipe E, while the lower legs n of said doubled pipes F run diagonally downward and are attached to the lower end or water-space of the pipe E. The bent part h of the pipes F should be made of as easy a curve as the nature of the boiler will allow. The mean water-line will be at the line x or just below the lowest pipe of the series of the upper horizontal legs a of the pipes F. To the top of the pipe E a pipe, G, is attached, slanting upward and connected to the

steam-drum H situated above the pipes F. The lower part of this steam-drum H is connected through the pipe J with the lower part of the pipe E to allow any water which may be carried over with the steam into this steam-drum to flow back again. The pipes F, the pipe G, part of the pipe or pipes E, and part of the drum H are inclosed by the walls A A, forming the fire and combustion chamber. A plate, C, is arranged behind the bridge-wall B to give the desired direction for the flame and gases, which escape through an opening, D, in the back wall below the pipes E. In the back of the pipe E holes s are provided to give access to the inside of the pipes F to facilitate the cleaning of said pipes. These holes s are situated in a line with the inside of both legs of the pipes F, and are closed by means of suitable plugs screwed into the same from the inside of the pipes E, for which purpose suitable hand-holes, m , are provided near those holes s to screw in or unscrew said plugs. Above and outside of the boiler a reservoir or water-chamber, K, is arranged, into which the feed-water to supply the boiler is forced by means of the feed-pump, or in any other desired way. The lower part of this reservoir K is connected through the pipe L with the lower part or water-space of the pipe E; or the same may be connected with the pipe J, connecting the steam-drum H with the lower part of the pipe E, as here represented. To the top of this reservoir K a pipe, M, is attached, the other end of which is connected to the pipe E at the line x or at that point intended to be the water-line in the steam-generator. When two or more of the pipes E are attached and arranged side by side holes $v v$ are made at top and bottom in the sides of these pipes E to form a communication between them, and through the center of which holes bolts w pass to fasten the same together.

The steam generated in the inclined legs n and bent parts h of the pipes F passes through the horizontal legs a of said pipes F into the upper part of the pipe E and through the pipe G into the steam-drum H. These horizontal legs a of the pipes F, as well as the pipe G, being exposed to the heat of the flame and gases, any water which may be carried up with the steam will be readily converted therein into steam, and the steam at the same time be

superheated. Any excess of water will, after entering the upper part of the pipe E, fall back again into the body of water in said pipe; or if passed into the steam-drum H will return through the pipe J.

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

1. The combination, with an upright pipe or chamber, E, of a series of pipes, F, with a single curved bend in each pipe, one being placed within the space left by the other, the upper legs *a* of said pipes F running horizontally

and their lower legs *n* inclining downward, substantially as and for the purpose herein described.

2. The combination of the doubled pipes F attached to an upright pipe, E, the inclined pipe G, steam-drum H, and pipe J, substantially in the manner and for the purpose set forth.

JOHN F. ALLEN.

Witnesses:

HENRY E. ROEDER,
LEON H. LOEB.