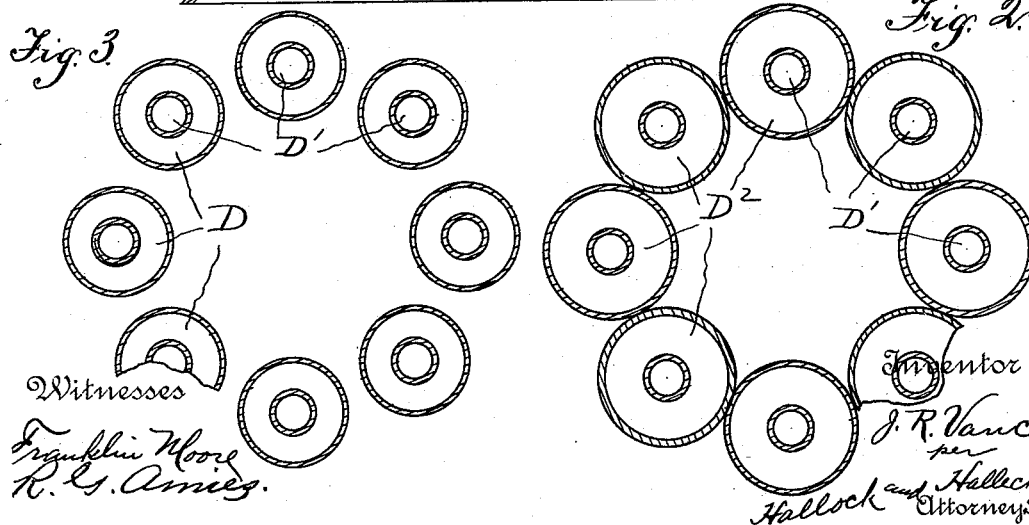
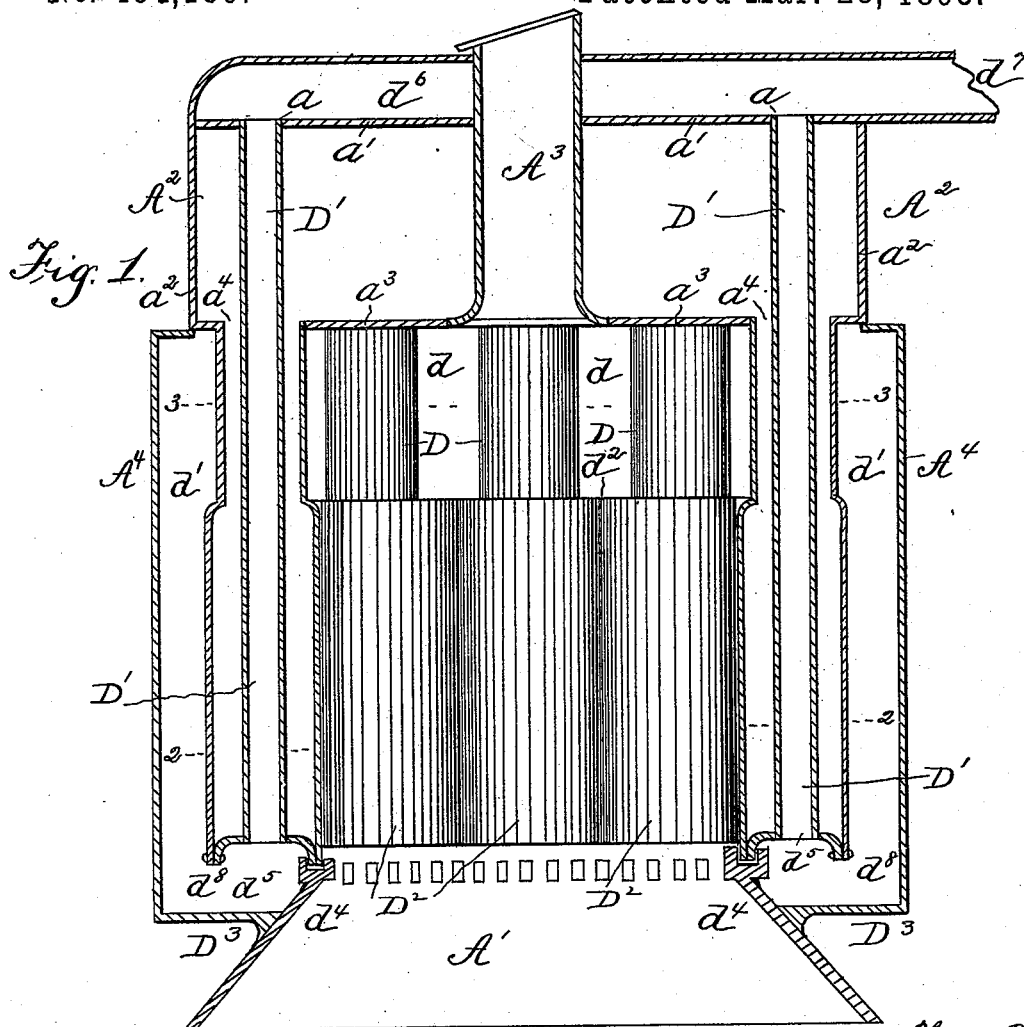


(No Model.)

J. R. VANCE.  
STEAM GENERATOR.

No. 494,180.

Patented Mar. 28, 1893.



# UNITED STATES PATENT OFFICE.

JAMES R. VANCE, OF GENEVA, NEW YORK.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 494,180, dated March 28, 1893.

Application filed June 27, 1892. Serial No. 438,161. (No model.)

### *To all whom it may concern:*

Be it known that I, JAMES R. VANCE, a citizen of the United States, residing at Geneva, in the county of Ontario and State of New York, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of boilers, in which the flues are made of wrought iron or other metallic pipes.

The object of the invention is to so arrange the pipes that increased heating surface will be obtained without increasing the cost or size of, or impairing the efficiency of, the boiler.

To that end, the invention consists of constructions, and are as will herein be described in the specification and pointed out in the claim, reference being had to the accompanying drawings, in which

Figure 1 represents a vertical section; Fig. 2 a section on line 2—2 in Fig. 1; Fig. 3 a section on line 3—3 Fig. 1.

A represents the fire-box; A', the ash-pit; A<sup>2</sup>, the steam drum; A<sup>3</sup> the fuel magazine; and A<sup>4</sup>, the outer casing, extending upward from the base of the fire-box to the under side of the steam drum. The steam drum A<sup>2</sup> is preferably made of a ring or cylinder of metal a<sup>2</sup> and top and bottom plates marked respectively a' and a<sup>3</sup>. Plate a' is provided with a series of openings, a, formed near its outer edge or rim. Plate a<sup>3</sup> is also provided with a series of openings a<sup>4</sup>, which are of greater diameter than the openings, a, and have the same vertical center as the latter. The drum is supported above the fire-box A by a series of pipes, D, the upper ends of which are screwed into openings, a<sup>4</sup>, of the plate a<sup>3</sup>. Owing to the fact that the openings, a<sup>4</sup>, are some distance apart, the pipes, D, have a space, d, between them, forming lateral flues between the fire-box and the down flue d'. The lower end of the pipes, D, are secured to, or formed integral, with the top or rim d<sup>2</sup> of the fire-box. In practice, I prefer to make the fire-box of a

vertical series of pipes, arranged in the form of a cylinder and D<sup>2</sup> having the approximating peripheries abutting against each other. When such a construction is used, the connecting pipes, D, are screwed into the upper part of the pipes, D<sup>2</sup>, the opening, d<sup>3</sup>, thereof being reduced, or formed to receive the latter. The lower ends of pipes D<sup>2</sup> are secured in a casting, D<sup>3</sup>, located upon the walls of the ash pit. This casting is provided with a series of thimbles, d<sup>4</sup>, the center of the openings, d<sup>5</sup>, of which are on the same vertical plane as the center of the openings a and a<sup>4</sup>, in the steam drum A<sup>2</sup>. Every thimble is provided with a pipe, D', that extends upward through pipe D<sup>2</sup>, pipe D and the steam drum A<sup>2</sup> and its upper end is screwed into one of the openings a in the top of the plate a' of the drum. These pipes serve as flues to connect the down flues d' with the collecting flue d<sup>6</sup>, formed by means of a cap D<sup>4</sup> over the steam drum. This cap has a central opening for the fuel reservoir, A<sup>3</sup>, and an opening, d<sup>7</sup>, for the pipe leading to the chimney. By leaving out one or more of the lateral tubes, a side feeder or magazine may be constructed. The casting D<sup>3</sup> is formed with a horizontal passage d<sup>8</sup>, which connects the down flue d' with the pipes D'. The down flue is formed by means of a cylinder, which rests upon the outer edge of the casting D<sup>3</sup>. Its upper end is secured to the lower part of the drum in such manner as to prevent leakage of the gas from the furnace.

It will be seen from the foregoing that the water is confined in tubular spaces of no great thickness and that both of the outer walls of the tubular spaces are subjected to the active action of the products of combustion as the latter pass from the fire-pot to the spaces or horizontal flues, d, thence into the down flue, d', thence through the casting, D<sup>3</sup>, into the up flue D', thence into the collecting flue d<sup>6</sup> and out into the chimney.

What I claim as new is—

A boiler, having a steam dome, a water fire-box composed of pipes arranged vertically with approximating sides abutting against

each other, pipes connecting the pipes of the  
water fire-box and steam drum and having  
spaces between said pipes to form lateral flues,  
a casing inclosing the said fire-box and pipes  
5 to form a down flue, pipes passing through  
said connecting pipes, the water fire-box and  
the steam drum, forming up flues and con-  
nected with said down flue and a cap over

the steam dome, forming a collecting flue for  
the up flues, substantially as described. 10

In testimony whereof I affix my signature in  
presence of two witnesses.

JAMES R. VANCE.

Witnesses:

GEO. F. DITMARS,

ALBERT B. GUILBERT.