

G. H. Reynolds.

Steam Generator.

Nº 86,321.

Patented Jan. 26, 1869.

Fig: 1.

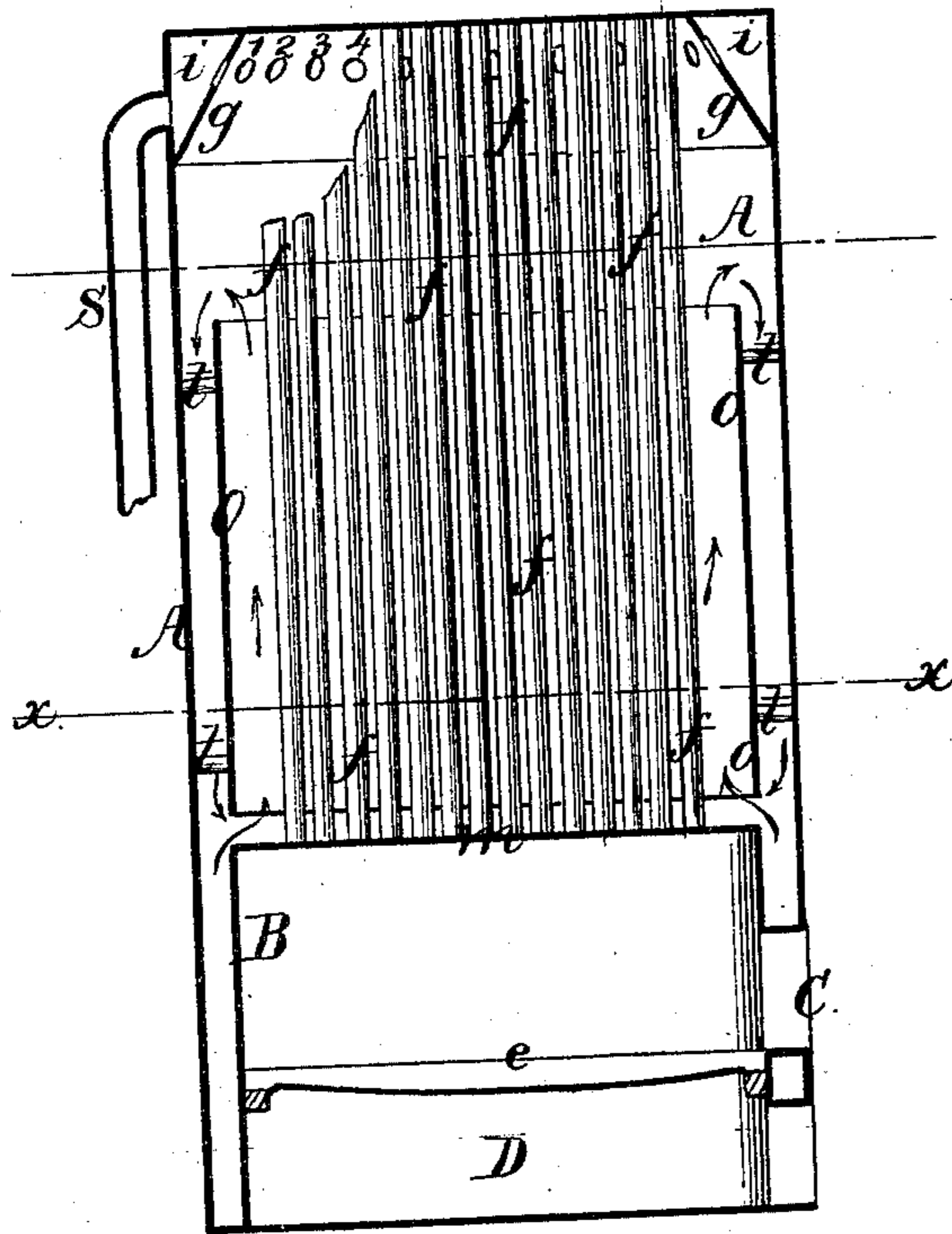
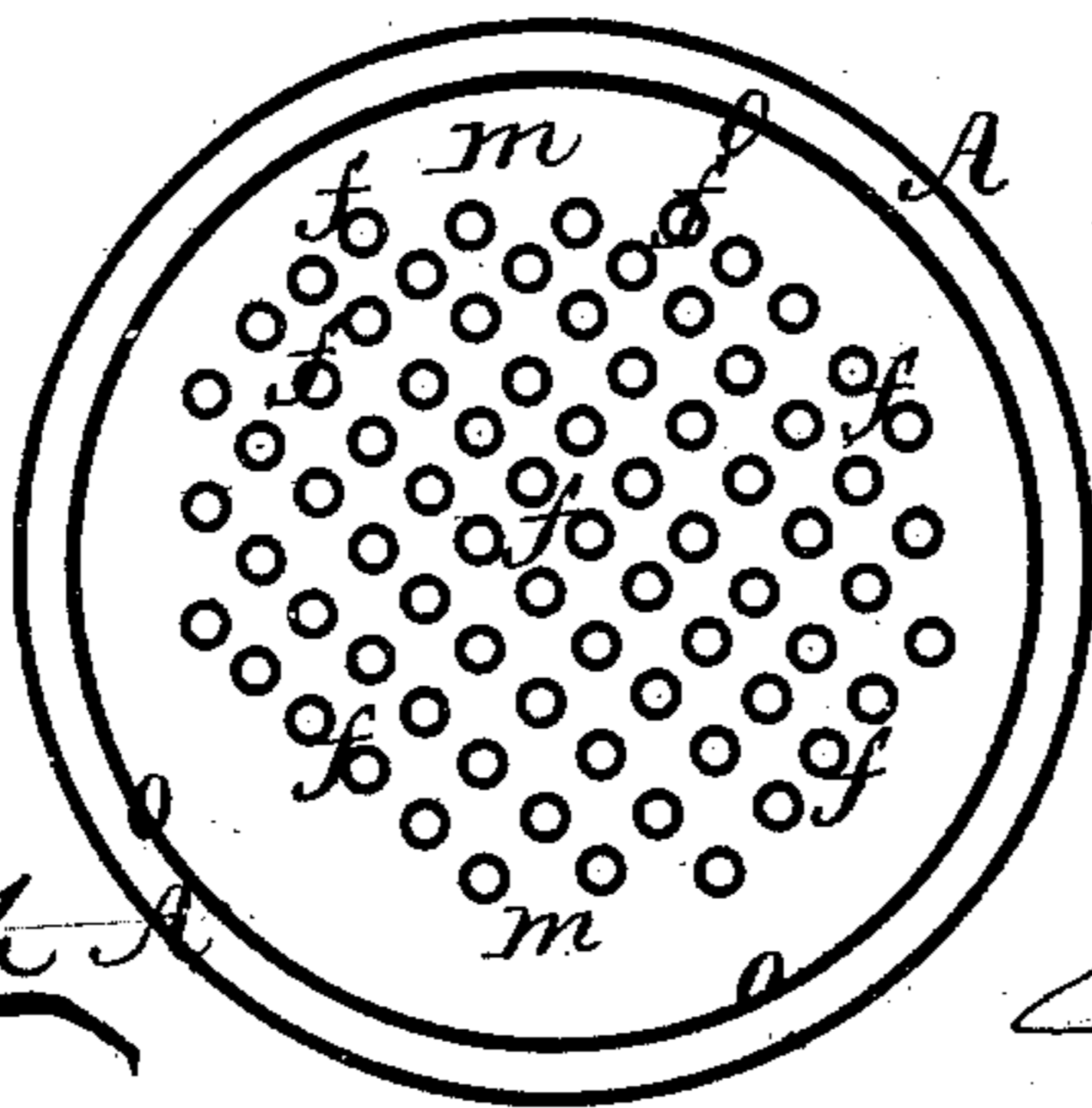


Fig: 2.



Witnesses;

Chas. Scott

J. B. Whop

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Atty



GEORGE H. REYNOLDS, OF NEW YORK, N. Y.*

Letters Patent No. 86,321, dated January 26, 1869.

IMPROVEMENT IN STEAM-GENERATORS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, GEORGE H. REYNOLDS, of New York, of New York county, in the State of New York, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to certain improvements in steam-boilers, and has for its main objects to increase the efficiency of the boiler, by inducing a better circulation of the water around and in contact with the flues, to prevent collection of sediment in the tube-sheet, and to effect the drying of the steam generated, previous to its egress from the boiler; and to these ends,

My invention consists in the employment of an annular thimble or tube placed around the flue or tubes, and so arranged relatively to the tube-sheet and water-line (or space) as to induce a circulation of the water upward within the said thimble, and down outside of it, and over the tube-sheet, as will be hereinafter more fully explained; and

My invention also consists in forming a drying-chamber, or superheater, above the water-space, by means of an annular partition, as will be presently more fully explained.

To enable those skilled in the art to make and use my invention, I will proceed to describe the construction and operation of one of my improved boilers, referring by letters to the accompanying drawings, in which—

Figure 1 is a vertical section of an upright boiler, embracing my invention.

Figure 2 is a horizontal section of the same, at the line $x x$, fig. 1.

In the several figures the same parts are denoted by the same letters of reference.

A is the body of an upright boiler;

B, the fire-chamber;

e , the grate-bars;

D, ash-pit;

m , the tube-sheet;

C, fire-box door;

$f f$, the vertical flues or tubes; and

m , the tube-sheet.

All of these parts may be constructed and arranged in about the usual manner.

The blue line, at fig. 1, represents the water-line, (or level of the water in the boiler,) and that portion of the body of the boiler A, which is above this line, of course constitutes the steam-space of the boiler.

O is a cylindrical thimble or short tube, which is made of such a diameter as to surround all the tubes $f f$, as shown, and of a length sufficient to extend from a short distance above the tube-sheet m to a point a little below the water-line.

This tube, which I designate the circulation-thimble, may be sustained or suspended by braces $t t$, or in any desirable manner, and may be made of about the size shown, though its exact size and location are not essential, so long as it is large enough to surround the tubes, and is so located that its lower edge is not below the level of the tube-sheet, and its upper edge is below the water-level, at all times.

In the steam-space of the boiler, and at the top of the latter, I arrange an annular partition, g , which is made in the form of a frustum, and so arranged as to partition off an annular chamber, i , which serves as a drying-chamber, or superheater, and into which the steam passes through numerous perforations, 1, 2, 3, 4, &c., in the partition g .

The steam is taken from this chamber i through an ordinary eduction or steam-pipe, S.

The operation of my improved boiler will be readily understood to be as follows, viz:

The boiler being supplied with water and the fire made, steam is generated as usual, but the generation is rendered more rapid than usual by the employment of the circulation-thimble O, the function and operation of which are to induce a circulation of the water upward within said thimble, (and around the tubes $f f$), and downward outside of it, as illustrated by the arrows at fig. 1.

The tendency and effect of this circulation are to constantly bring the particles of water into fresh contact with the tubes, and thus increase the formation of globules and generation of steam.

It will be understood that by inducing this circulation or motion of the water in a circuit, as described and illustrated, the water is made to constantly wash over (to a certain extent) the upper surface of the tube-sheet m , and prevent the collection or deposit of sediment, which otherwise would occur, and that thus the heating-capacity of said tube-sheet, and consequently the generating-capacity of the boiler, is more or less increased.

By the employment of the perforated partition-plate g , the steam is allowed to escape around the entire circumference of the steam-space into the chamber i , and is not only afforded in a drier condition, but prevented from carrying off any water, as is apt to occur where the eduction-pipe takes the steam from the steam-space (over the water) directly.

Of course the details of construction, it is evident, may be varied, without losing the main features or advantages of my invention.

For instance, the partition g , in lieu of being perforated with numerous holes, 1, 2, 3, &c., might be made with an annular slot near its top edge, or it might be made solid, and extended up to within a short distance of the top or crown-sheet of the boiler; and, where the construction of the boiler may be such as to involve the use of a few large tubes or flues, in-

* Assor to James M. Hicks of the same place.

stead of numerous small ones, as shown, a series of circulation-thimbles may be employed, each one of sufficient diameter to surround one tube or flue, and all of about the length, and arranged relatively to the tube-sheet and water-line, as shown, of O in the present case.

I do not, therefore, wish to be understood as limiting myself to the precise form and adaptation of my invention shown.

Having explained the construction and operation of my invention, so that one skilled in the art can make and use it,

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

The employment of one or more circulation-thimbles or tubes, substantially in the manner and for the purposes set forth.

Also, in combination with the boiler-body, the employment of an annular partition, *g*, or its equivalent, arranged to operate substantially as described, for the purposes set forth.

In testimony whereof, I have hereunto set my hand and seal, this day of July, 1867.

GEO. H. REYNOLDS. [L. S.]

Witnesses:

WM. H. BISHOP,
CHAS. A. SCOTT.