J. CARROLL.

STEAM GENERATOR.

No. 105,642. Patented July 26, 1870.

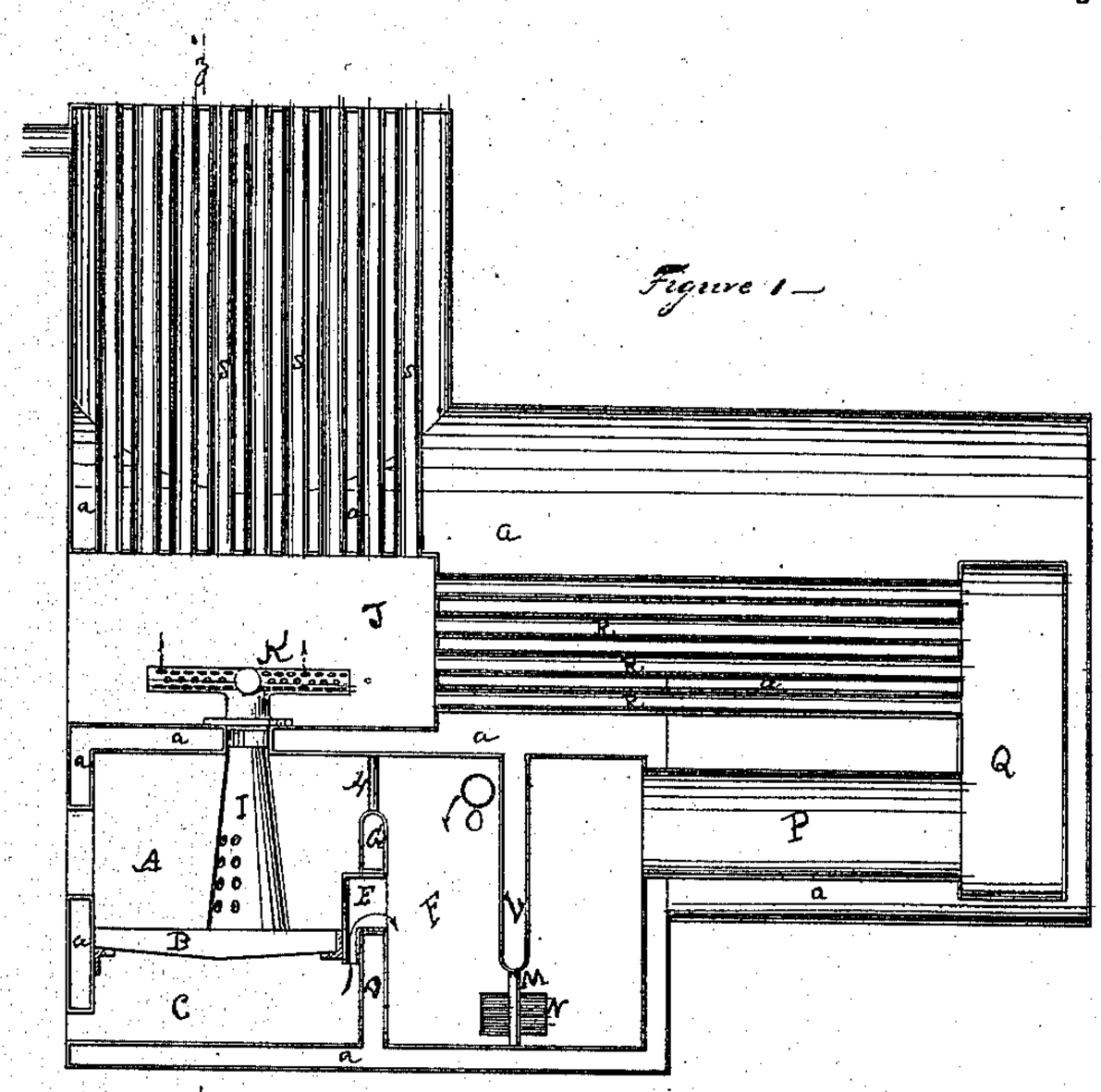

Figure 1.

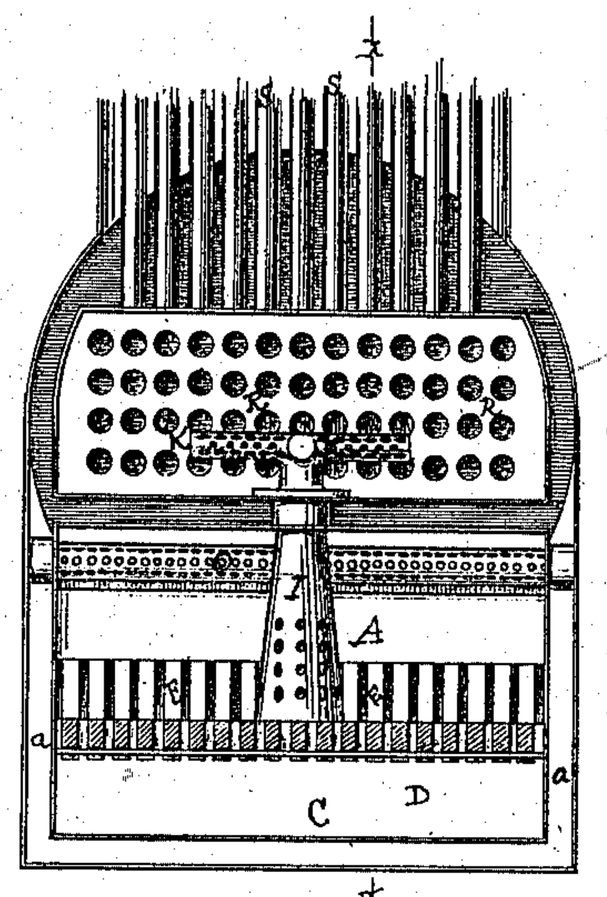

Figure 2.

ATTEST:

James Thierry

Sam. J. Spray.

INVENTOR:

John Carroll

United States Patent Office.

JOHN CARROLL, OF DETROIT, MICHIGAN.

Letters Patent No. 105,642, *dated July* 26, 1870.

IMPROVEMENT IN STEAM-GENERATORS.

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

To whom it may concern:

Be it known that I, JOHN CARROLL, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Steam-Generators; and do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, and being a part of this specification, in which—

Figure 1 is a longitudinal vertical section on the line *x x* in fig. 2.

Figure 2 is a transverse vertical section on the line *y y* in fig.

Like letters indicate like parts in each figure.

The nature of this invention relates to an improved construction of steam-generators, and consists in so constructing the same that all, or very nearly all, the products of combustion of the fuel used in generating steam are consumed; that a very large and increased heating-surface is obtained; and in a new, ingenious, and novel arrangement of its various parts.

In the accompanying drawing, I represent what is ordinarily termed a "locomotive-boiler," with horizontal flues, and vertical flues in the smoke-stack.

A represents a fire-box, provided with usual fire-grates, B, and ash-pit C and bridge-wall D.

E is a series of flues, with spaces between the same, which rest upon the bridge-wall D, and are closed at their front ends, with an opening in the bottom, affording a communication or air-passage from the ash-pit, immediately under the grates, to the combustion-chamber F, as indicated by the arrow in fig. 1.

G is a deflector, resting upon the top of the rectangular flues E, and is hollow, as shown, and connected with the water-space of the boiler by the pipe H.

I is a conical cylinder, whose base is open, and rests upon the grates B, and whose top enters the smoke-chamber J, where it terminates in the perforated tubes K. The sides of the conical cylinder within the fire-box are perforated, as shown, for the purpose hereinafter explained.

L is a suspended bridge-wall, also hollow, and connected, by means of the pipe M, with the water-space of the boiler.

N is a door or trap, opening from the outside into the combustion-chamber F, through which ashes or dirt may be withdrawn.

O is a perforated pipe, secured at its ends to the sides of the combustion-chamber, through which it passes directly in front of the upper part of the suspended bridge-wall L, and allows a passage for air from the outside of the boiler into the said combustion-chamber.

P is a large flue leading from said combustion-chamber to the smoke-box Q.

R is a series of flues leading from said smoke-box to the smoke-chamber J.

S is another series of flues leading from said smoke-chamber upward into the smoke-stack.

a are water-spaces in the boiler.

The flues P, R, and S are secured to and through suitable tube-sheets in the usual manner.

Fire being kindled in the fire-box, the flame is broken up, in its passage into the combustion-chamber F, by passing through the spaces between the rectangular flues E, and, upon their entrance to said combustion-chamber, are mingled with the currents of heated air which pass through said flues E from beneath the grates, while the heat arising from said flames is deflected over the top of the deflector G, and against the current of air which is admitted through the perforated pipe O, whence all the products of combustion, being thoroughly mingled with the air admitted, as described, are carried, being partially consumed, through the flue P, to the smoke-box Q, and thence, through the flues R, to the smoke-chamber J, where they are again brought into contact with flames and heat, which are carried into said chamber through the conical perforated cylinder I, and distributed through the perforated pipes K, such contact producing a thorough combustion of the remaining smoke and gases, while the heat and the remaining smoke, should there be any, will pass upward through the flues S to the smoke-stack.

I do not pretend to be the original and first inventor of an igniting communication between the fire-box and the chamber above it, but only of the specific construction and arrangement shown and described, wherein the base of the cylinder I rests upon the grates B, and the perforated tube K is connected with the cylinder I, and arranged within the smoke-chamber J, as shown and described.

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

1. The cylinder I, resting upon the grates B, and having connected therewith the perforated tube K, placed within the smoke-chamber J, when the several parts are constructed and arranged as described and shown, and as and for the purposes set forth.

2. The deflector G, hollow, and connected with the water-space of the boiler by the pipe H, and resting above the flues E and bridge-wall D, substantially as herein designated.

3. The construction of a steam-generator, wherein the grate-bars B, ash-pit C, bridge-wall D, retangular flues E, combustion-chamber F, deflector G, pipes H M, cylinder I, perforated pipes K, smoke-chambers J Q, suspended bridge-wall L, door or trap N, perforated pipe O, and flues P R S are arranged, relatively to each other and the water-spaces *a* of the boiler, substantially as and for the purposes herein shown, set forth, and described.

JOHN CARROLL.

Witnesses:

H. FREDERICK EBERTS,

SAM. J. SPRAY.