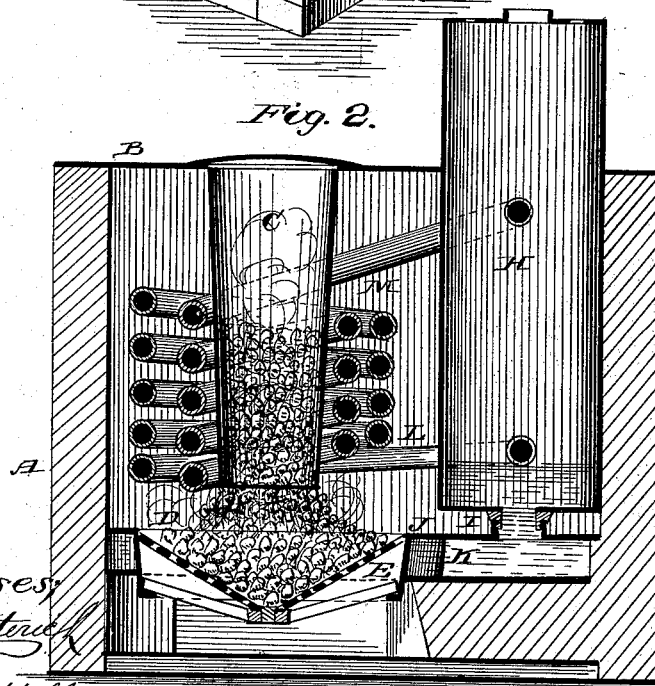
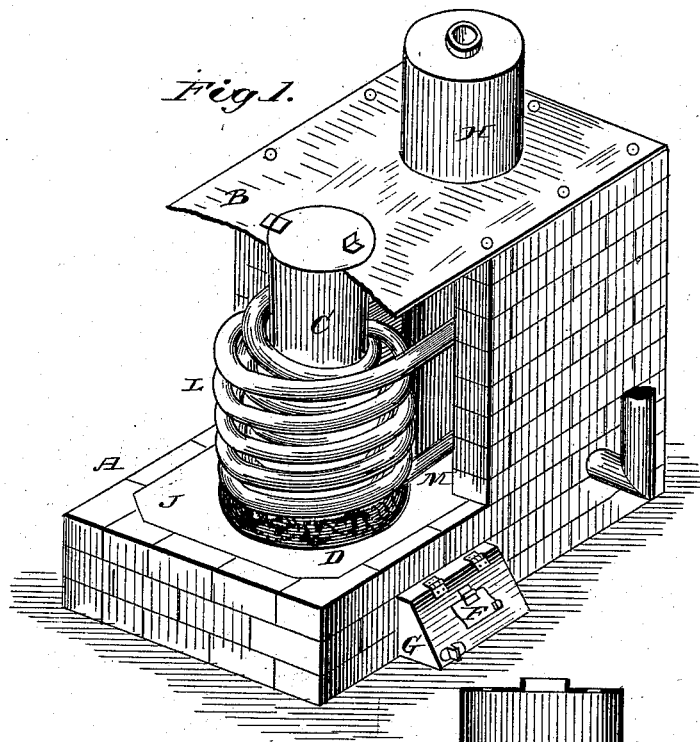


N. COOMBS.
Water-Tube Steam-Generator.

No. 219,072.

Patented Sept. 2, 1879.



Witnesses:
A. G. Dietrich
J. R. Little

Inventor,
Nelson Combs,
by
C. A. Snow & Co.,
Attys.

UNITED STATES PATENT OFFICE

NELSON COOMBS, OF TITUSVILLE, PENNSYLVANIA.

IMPROVEMENT IN WATER-TUBE STEAM-GENERATORS.

Specification forming part of Letters Patent No. **219,072**, dated September 2, 1879; application filed January 31, 1879.

To all whom it may concern:

Be it known that I, NELSON COOMBS, of Titusville, in the county of Crawford and State of Pennsylvania, have invented certain new and useful Improvements in Water-Tube Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view, parts being broken away to show the construction; and Fig. 2 is a longitudinal sectional view.

Corresponding parts are denoted by like letters of reference.

This invention relates to steam-generators; and it consists in certain improvements in the construction of the same, which will be hereinafter more fully described, and particularly pointed out in the claim.

In the drawings, A represents the arch or casing, from the top of which, B, a removable cylindrical coal or fuel magazine, C, projects downwardly nearly to the fire-pot D, at the bottom of which is an inverted cone-shaped shaking or tilting grate, E, which may be operated through door F of the ash-box G.

H is the water and steam reservoir, which is arranged vertically parallel to the coal-magazine, and is connected at its base by a tube-nipple, I, to the plate or section J, in which the fire-pot is located, under which plate or section, and connected to it, extending along under it to and around the fire-pot, is a water cell or heater, K, in which all the cold water is first forced to supply the reservoir, and in circulating around the fire-pot protects it from burning out, the inside of the cell being the fire-pot.

L M are spiral water-coil-tube steam-gener-

ators. The coils are arranged directly over the fire-pot. The lower ends extend along on the top of the plate or section J to near the bottom of the reservoir, and are connected to it, or may be connected to the plate or section on which they rest. In like manner the upper ends extend to the reservoir, and are connected to it at or above the water-line, near the top of the reservoir. Additional coils may be similarly arranged to increase the capacity of the device for generating steam, each additional one being arranged around the inner coils.

In operation the water passes from the cell or heater K, up through the nipple, into the reservoir and lower ends of the coils L M, in which it circulates rapidly upward. While traversing the coils it is heated and converted into steam, which discharges from the upper ends into the upper part of the reservoir, from which, by suitably-connected pipes, it is taken and applied to any desired use.

The heating-surface of the coils being very large, and their position such that all the heat from the fire on the grate acts upon them, steam is generated very rapidly and at a small expense for fuel.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

The combination of the chamber K, forming a water-cell around the fire-pot, reservoir H, spiral coils L M, fuel-reservoir C, and the inverted conical tilting grate E, all arranged and operating substantially as described, for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

NELSON COOMBS.

Witnesses:

HENRY WHITE,
J. J. HOLDEN.