(No Model.)

L. N. TONNS.

STEAM GENERATOR.

No. 452,502. Patented May 19, 1891.

Fig. 1

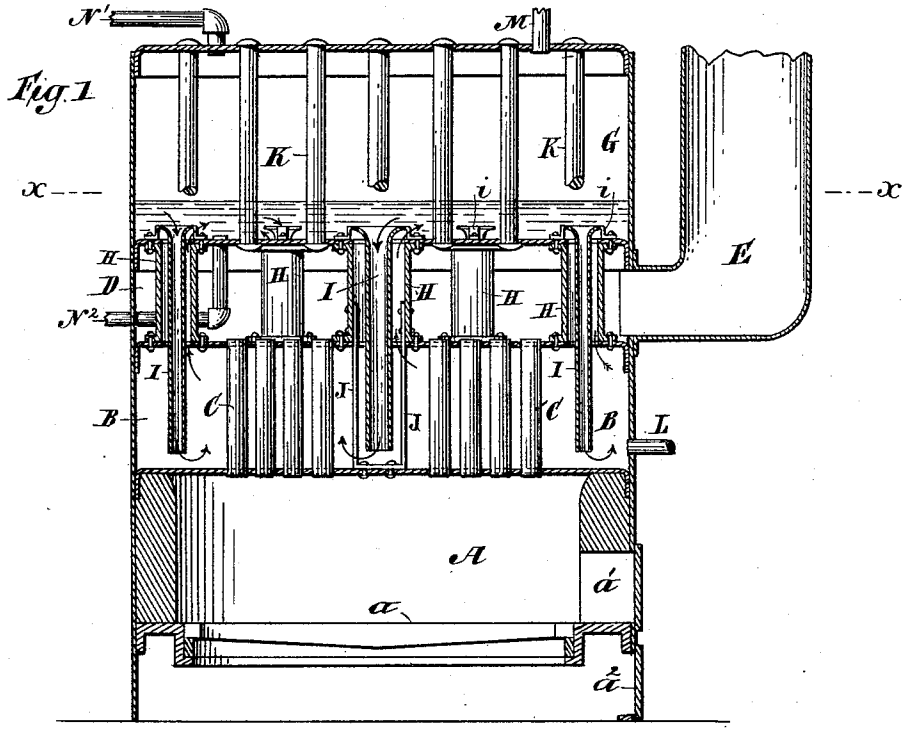
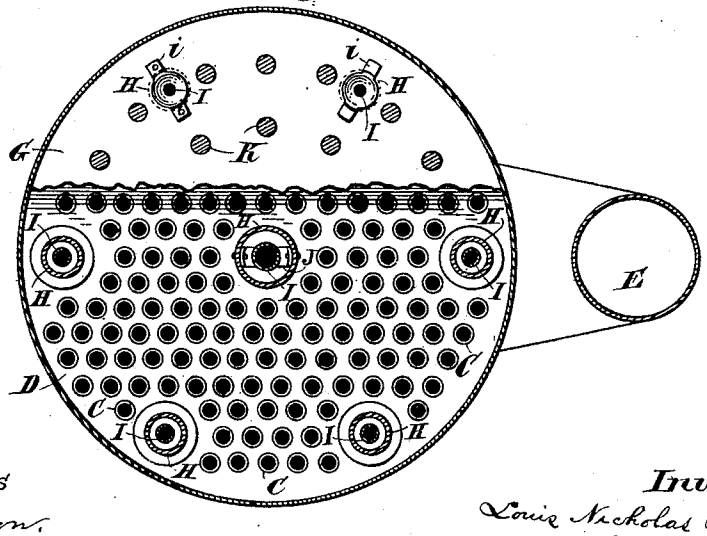


Fig. 2



Witnesses
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UNITED STATES PATENT OFFICE.

LOUIS N. TONNS, OF BRIGHTON, ASSIGNOR OF TWO-THIRDS TO EDWARD H. HALL, OF BROOKLYN, AND GEORGE H. ALLEN, OF NEW YORK, N. Y.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 452,502, dated May 19, 1891.

Application filed January 30, 1889. Serial No. 298,088. (No model.)

To all whom it may concern:

Be it known that I, LOUIS NICHOLAS TONNS, of New Brighton, in the county of Richmond and State of New York, have invented a certain new and useful Improvement in Steam-Generators, of which the following is a specification.

My improvement consists in the combination, in a steam-generator, of a furnace, a water-chamber arranged above the furnace, a combustion-chamber located above the water-chamber, pipes extending from the furnace through the said water-chamber to the combustion-chamber, a water and steam chamber above the combustion-chamber, large pipes extending from the said water-chamber to the water and steam chamber, smaller pipes, having funnel-shaped upper ends, extending from the lower part of the water and steam chamber down through the large pipes that extend from this chamber to the water-chamber and also down through these large pipes into the water-chamber nearly to the bottom thereof, and bolts or rivets extending from the bottom of the steam and water chamber to the top or crown of the latter. The inner pipes, having the funnel-shaped ends, are supported at the upper ends by brackets. By this combination of parts I produce a very simple, compact, and cheap boiler, in which there will be a thorough circulation of water and practically no opportunity for the collection of scale and sediment.

In the accompanying drawings, Figure 1 is a central vertical section of a steam-generator embodying my improvement. Fig. 2 is a horizontal section on the plane of the dotted line *x x*, Fig. 1, but with a portion of the bottom of the steam and water chamber removed to show the bottom of the combustion-chamber.

Similar letters of reference designate corresponding parts in both figures.

A designates the furnace. It is fitted with a grate *a* and provided with a door *a'* for the introduction of fuel, and an ash-pit door a^2.

B designates the water-chamber. It is located immediately above the furnace. Through this water-chamber a number of short pipes C extend. Above the water-chamber a combustion-chamber D is located. The pipes C receive the products of combustion and conduct the same through the water-chamber and thence into the combustion-chamber. The combustion-chamber is provided with a chimney or flue E, which may be connected to a chimney in a building, and receives the products of combustion from the combustion-chamber. It will be seen that the contents of the water-chamber will be heated not only by reason of the location of the furnace, which extends entirely across and beneath the same, but also by the passage of the products of combustion through the pipes C.

G designates a steam and water chamber located above the combustion-chamber. Large pipes H, having outwardly-extending flanges at the top and bottom, are secured by rivets or like devices to the top of the water-chamber B and bottom of the steam and water chamber G. They communicate through holes with the interior of the water-chamber B and steam and water chamber G. The pipes H, having the flanges secured as shown, materially strengthen and brace the bottom of the chamber G and the top of the chamber B.

I designates pipes having funnel-shaped upper ends. They extend through the pipes H, and, as they are much smaller than the pipes H, do not prevent the latter from maintaining communication between the water-chamber and the steam and water chamber. The funnel-shaped upper ends of the pipes I are within the lower portion of the steam and water chamber. They are suspended from and supported by brackets *i*, formed integral therewith and secured to the bottom of the steam and water chamber. In the present instance they are secured to the bottom of the steam and water chamber by the same rivets which secure thereto the upper ends of the pipes H. These pipes I extend down through the pipes H into and nearly to the bottom of the water-chamber B.

Water heated in the chamber B will rise through the pipes H in the lower portion of the steam and water chamber G. The funnel-shaped or flaring upper ends of the pipes I will deflect it sidewise as it enters the chamber G. The cooler water in the chamber G will flow into the funnel-shaped upper ends of the pipes I and descend through these pipes

I into the water-chamber B. A vigorous circulation will be kept up in this manner.

It will be observed that the central pipe H is larger than the others and that the others are arranged around it in the form of a circle. The central pipe has secured to its interior braces J, which extend down to the bottom of the water-chamber B and are there fastened. Rivets or stay-bolts K extend from the combustion-chamber D up through the steam and water chamber. These stay-bolts also act as breakers for the current of water.

The whole generator is shown as of cylindric form. It will be seen that it is very compact, simple, and efficient.

Water may be introduced through a pipe L. Steam may be taken off through a pipe M.

N′ N^2 designate pipes, which may connect with a gage.

I have especially adapted this boiler for using salt-water without first subjecting it to the action of a condenser. It will be observed that the several chambers are quite narrow vertically, and that the water and combustion pipes are correspondingly short. By making the combustion-pipes C short, an intense heat is maintained throughout their entire length, and by making the pipes H short water is quickly and thoroughly agitated. The great number of bolts K act as breakers for the salt-water in the steam-chamber. By this means there is no sediment or deposit of salt.

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

In a steam-generator, the combination, with a furnace, of a water-chamber above and extending entirely across the furnace, a combustion-chamber arranged above the water-chamber, pipes extending from the furnace through the water-chamber to the combustion-chamber, a water and steam chamber above the combustion-chamber, large pipes having outwardly-extending flanges at top and bottom, secured to the top of the chamber B and to the bottom of the chamber G, and smaller pipes within the larger pipes, having funnel-shaped upper ends and brackets integral with said funnel ends, secured to the bottom of the chamber G, substantially as specified.

LOUIS N. TONNS.

Witnesses:
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WM. H. ROBINSON.