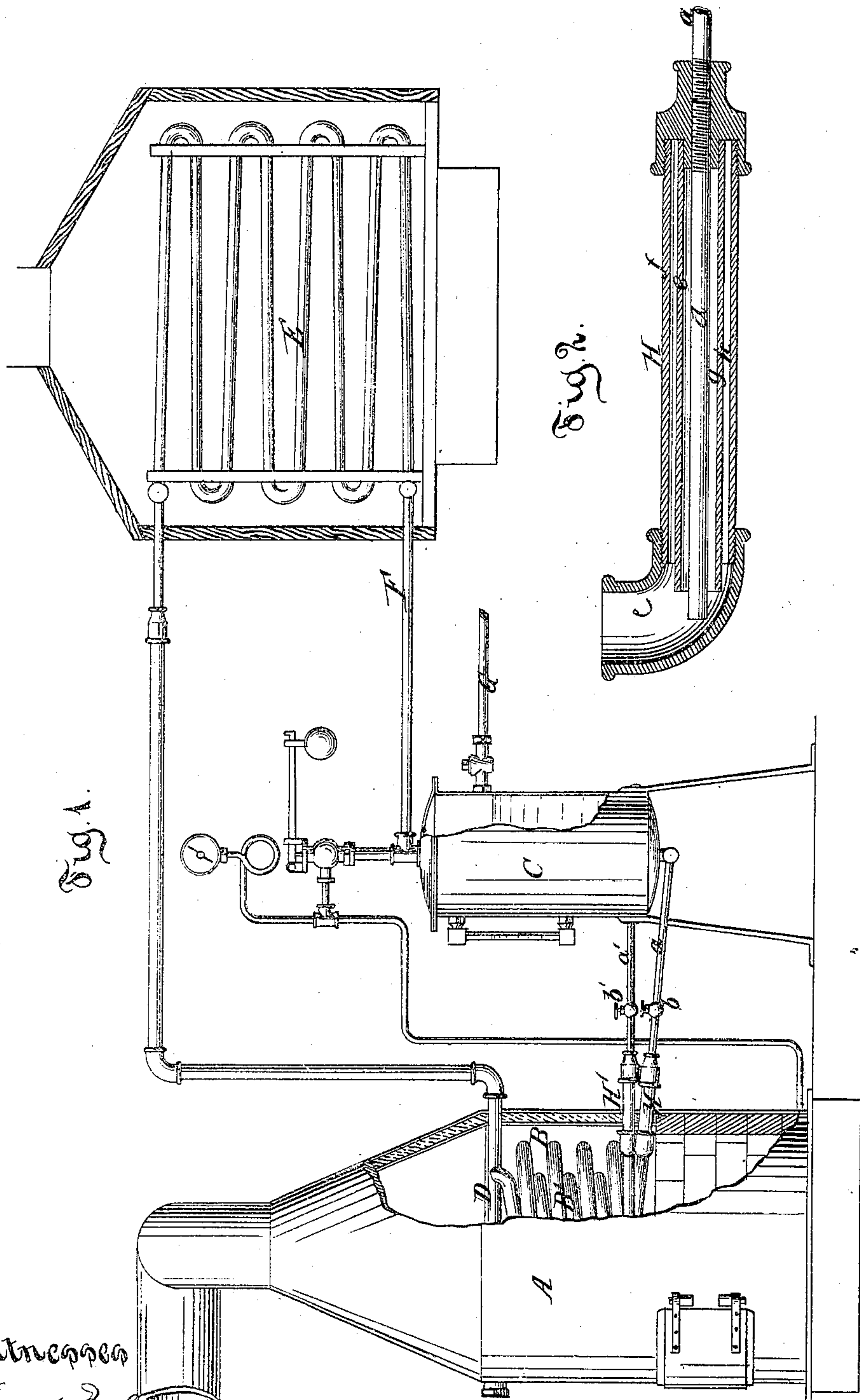


G. B. RIGGINS.  
Steam Heaters.

No. 138,936.

Patented May 13, 1873.



Witnesses  
Ernst Bilhuber.  
Chas. Wickers.

Inventor.  
George B. Riggins  
per  
Van Santvoord & Sharp Attys



# UNITED STATES PATENT OFFICE.

GEORGE B. RIGGINS, OF NEW YORK, N. Y.

## IMPROVEMENT IN STEAM-HEATERS.

Specification forming part of Letters Patent No. **138,936**, dated May 13, 1873; application filed March 12, 1873.

*To all whom it may concern:*

Be it known that I, GEORGE B. RIGGINS, of the city, county, and State of New York, have invented a new and Improved Steam-Heating Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a sectional elevation of my apparatus. Fig. 2 is a detached section of part of the connecting-pipe between the supply-tank and the generating-coil in a larger scale than the previous figure.

Similar letters indicate corresponding parts.

This invention relates to a certain improvement on a heating apparatus of that class in which one or more generating-coils are used, which are supplied with water from a supply-tank, situated outside the furnace that incloses the generating-coils. My improvement consists in the arrangement of a compound nozzle forming part of the connection between the supply-tank and each of the generating-coils, in such a manner that by said nozzle the flow of the water from the tank to the coils is promoted and that said coils are furnished with a regular and uniform supply of water.

In the drawing, the letter A designates a furnace which contains one or more generating-coils, B B', so that said coils are exposed to the direct action of the fire in the furnace. The lower ends of the coils B B' connect by pipes *a a'* with a supply-tank C, and said pipes are provided with check-valves *b b'*, to prevent the steam from passing through them into the supply-tank. The upper ends of the coils connect with a pipe, D, which passes transversely through the furnace A and connects with one or more heating-coils E. From the tail ends of these heating-coils extend pipes F to the supply-tank C, so that the water which results from the condensation of the steam in the heating coil or coils, is carried back into the supply-tank.

This tank is supplied with water by means of a pipe, G, and it is so placed that when the same is filled to the desired level the water

will flow into the generating-coils B B' and fill the same up to the required degree, provided the pressure on both sides is the same. But if the generating-coils are heated and the water contained therein is converted into steam, the back pressure of this steam on the check-valves *b b'* keeps these valves closed, and the supply of water from the tank to the coils stops, unless some means are devised to overcome this difficulty.

The device which I have invented for the purpose of effecting a uniform supply of water from the tank C to the generating-coils, while these coils are in operation, consists of a compound nozzle, H, an enlarged section of which is shown in Fig. 2 of the drawing. This nozzle connects at one end by means of an elbow, *c*, with its generating-coil, while its other end is secured to the pipes *a* or *a'* leading from the supply-tank C to the generating-coils. My compound nozzle is constructed of three pipes, *d e f*, one within the other, the inner pipe *d* being in line with and about of the same size as the pipe *a* or *a'* leading to the tank C, while the pipes *e* and *f* are of larger diameter so as to form annular spaces *g h*, one between the pipes *d* and *e* and another between the pipes *e* and *f*. The front part of my nozzle is made to extend into the furnace A, while its rear part is situated outside of the furnace, and at the beginning of the operation the pipes *d*, *e*, and *f* are filled up with water. When the fire in the furnace is started, the water in the generating-coils is gradually evaporated, and by the peculiar combination of the three pipes *d e f* of my compound nozzle a suction is produced in the inner pipe *d*, and the water from the supply-tank is enabled to flow into the generating-coils without interruption.

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

The combination of a compound nozzle, H, with a supply-tank, C, and a generating-coil, B, substantially in the manner and for the purpose herein shown and described.

GEO. B. RIGGINS.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.