

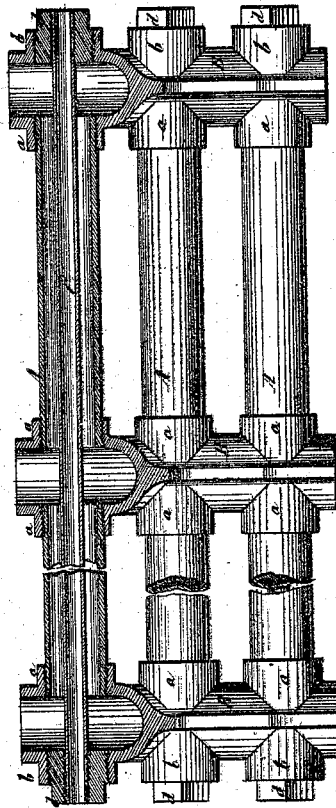
*H. Whittingham,*

*Sectional Boiler.*

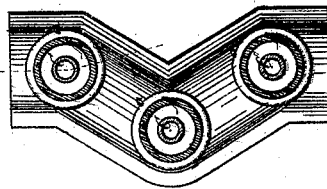
*No. 108075.*

*Patented Oct. 4. 1870.*

*Fig. 1.*



*Fig. 2.*



*Witnesses.*  
*C. F. Kastenhuber*  
*L. H. Harker*

*Inventor.*  
*H. Whittingham*  
*By Vandeventer Hauff*  
*his atty*

# United States Patent Office.

HARRY WHITTINGHAM, OF NEW YORK, N. Y.

Letters Patent No. 108,075, dated October 4, 1870.

## IMPROVEMENT IN SECTIONAL 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, HARRY WHITTINGHAM, of the city, county, and State of New York, have invented a new and useful Improvement in Sectional Steam-generator; 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 longitudinal section of this invention.

Figure 2 is a transverse section of the same.

Similar letters indicate corresponding parts.

This invention relates to an improvement on a steam-generator for which a patent was granted to me June 15, 1869, No. 91,395.

Said improvement consists in the arrangement of zig-zag tubes, each provided with a series of thimbles, also placed in a zig-zag position, and intended to receive the ends of horizontal or inclined water-pipes in such a manner that a steam-generator is obtained, which is composed of a series of horizontal or inclined water-pipes, connected at their ends by vertical pipes, and the water-pipes of which are situated in a zigzag position, or "staggered." So far as this part of my invention is concerned, it differs from my former patent, referred to above, only in the particular that the upright tubes are made of zigzag form rather than straight.

This invention consists, also, in the arrangement of screw-caps, or plugs, fitting over or into thimbles on the outside of the upright tubes, and bored out to receive the ends of the smoke-flues, which pass concentrically through the water-pipes in such a manner that said screw-caps, or plugs, form the guides for the concentric smoke-flues, and that, by removing said caps or plugs and concentric smoke-flues, easy access can be had to the interior of the water-pipes for the purpose of cleaning.

I also propose to construct my steam-generator with a right and left-hand thread on the ends of the water-pipes, in combination with corresponding threads in the thimbles of the upright tubes, in such a manner that the operation of connecting and disconnecting the water-pipes with the upright tubes is rendered comparatively easy, though I do not claim as my invention this mode of constructing and inserting the tubes or pipes of steam-generators.

In the drawing—

The letters A A A designate a series of water-pipes, which are placed in a horizontal or inclined position, and connected at their ends to upright tubes B. These upright tubes are cast, or otherwise produced, in the form of a zigzag, and they are provided with thimbles *a*, projecting from their inner sides, and with

thimbles *b*, projecting from their outer sides, the thimbles on the two sides of each tube being exactly opposite to each other, and those on each side being situated in a zigzag position above each other, to correspond to the zigzag form of the tubes.

The interior thimbles *a* are intended to receive the ends of the water-pipes, the connection being effected by right and left screw-threads, cut on the ends of the pipes and in the corresponding thimbles, so that, by inserting said pipes into their thimbles, and turning them gradually and successively in the proper direction, the tubes B are drawn toward each other, and tight joints are produced between the said tubes and the water-pipes.

If desired, additional upright tubes, B\*, may be placed between the tubes B, as described in my patent of June 15, 1869, the connection between the tubes B and B\* and the water-pipes being made by right and left screw-threads, above stated.

The water-pipes being inserted into the thimbles *a* become staggered, as shown in fig. 2 of the drawing, and thereby the effect of the fire on said pipes is materially improved.

The thimbles *b*, projecting from the outer sides of the tubes B, are provided with an internal screw-thread to receive plugs *d*, and these plugs are bored out to receive the fire-flues C, which pass concentrically through the pipes A, the boiler being set in such a manner that the heated products of combustion pass from the fire-grate, under one end of the pipes A, back to the opposite end, whence they return, through the concentric flues C, into the smoke-stack.

By unscrewing the plugs *d*, the concentric fire-flues can be readily taken out, and free access is obtained to the interior of the water-pipes for the purpose of cleaning.

Instead of providing the external thimbles *b* with an internal screw-thread to receive plugs, they might be provided with an external screw-thread to receive caps, which would produce the same result.

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

1. A sectional steam-generator, composed of zig-zag-shaped upright tubes B, and horizontal or inclined water-pipes A, substantially as set forth.

2. The plugs or caps *d*, in combination with the external thimbles of the upright pipes, and with the concentric fire-flues C and water-pipes, substantially as set forth.

This specification signed by me this 5th day of February, 1870.

H. WHITTINGHAM.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.