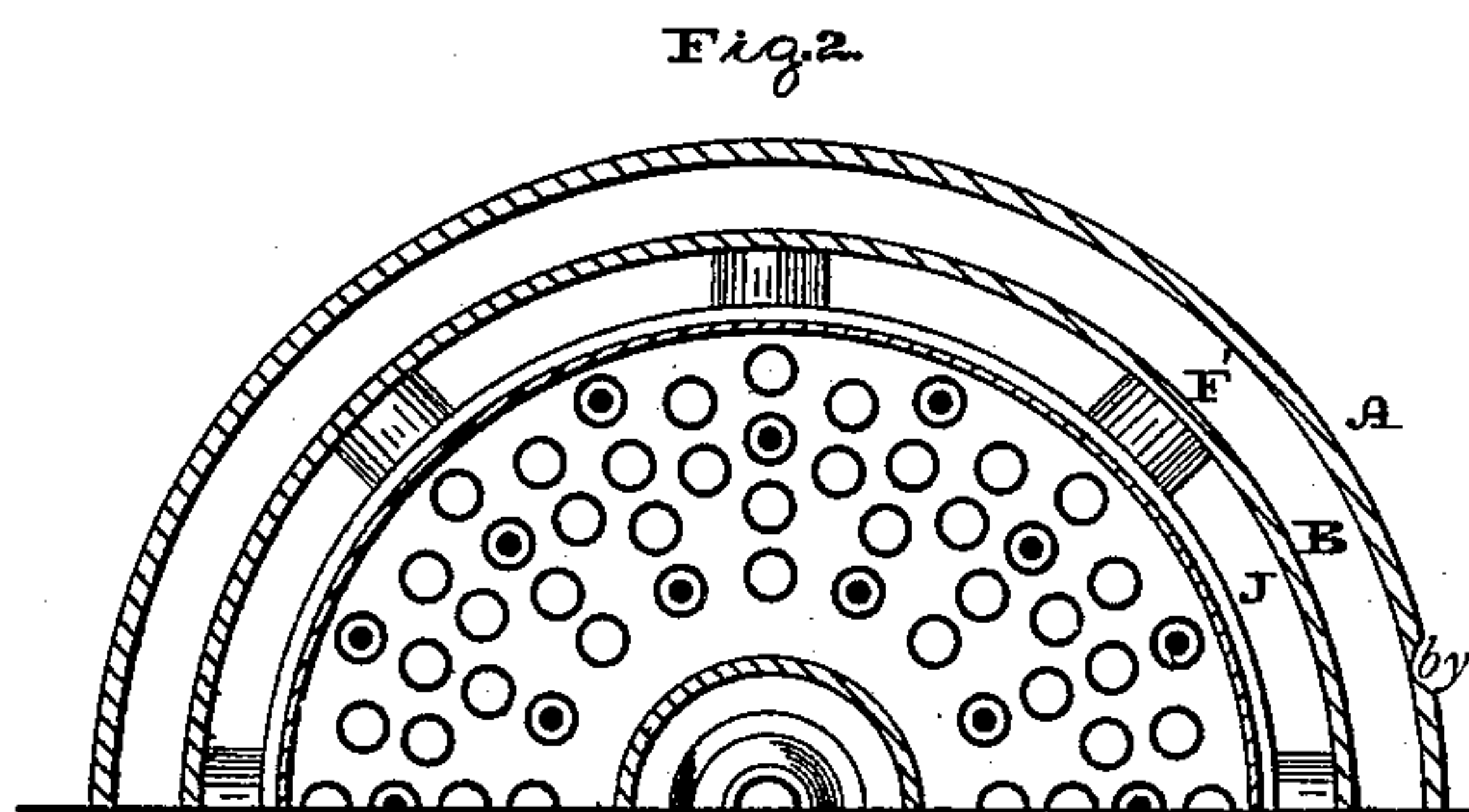
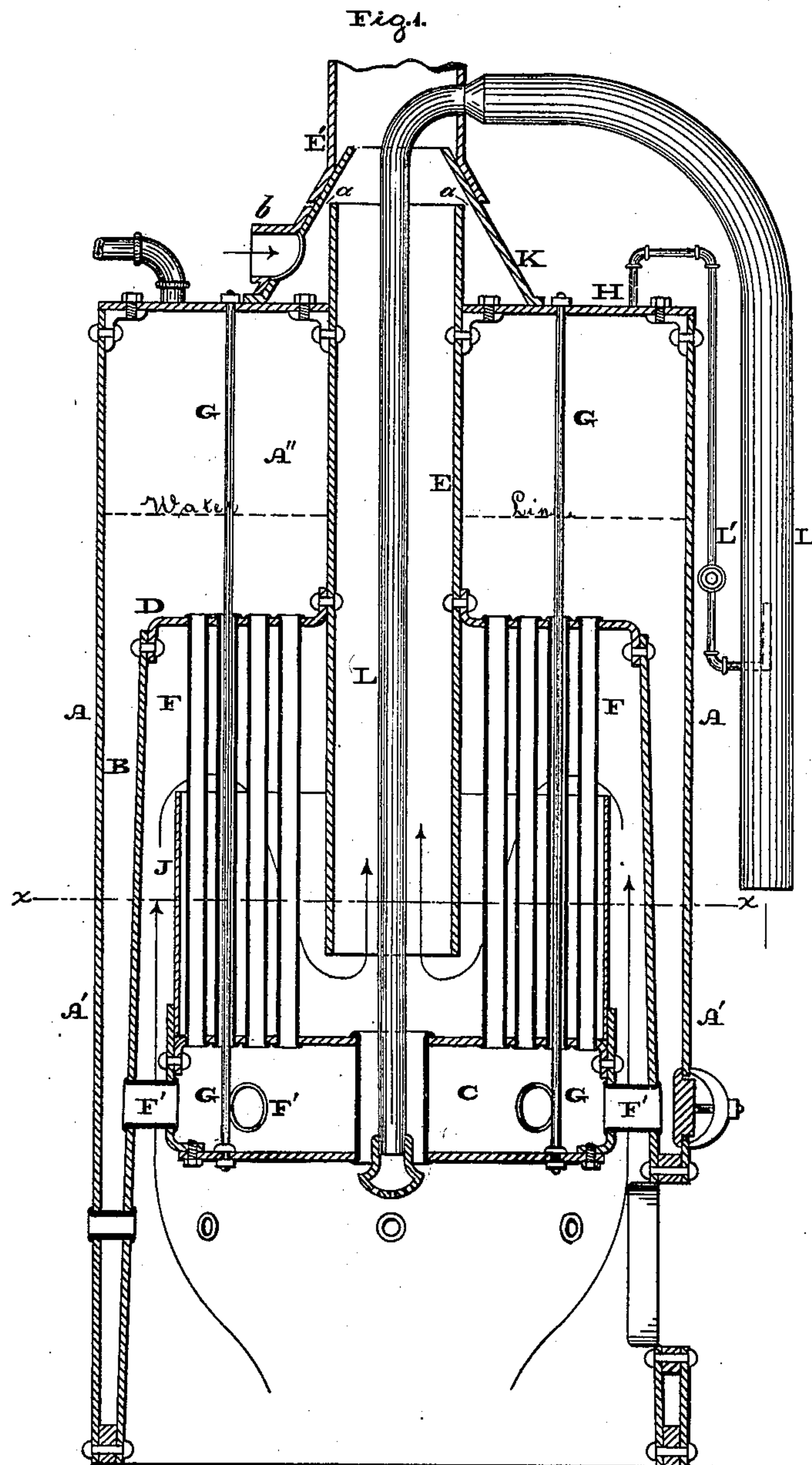


J. B. HAUPT.  
Steam Generator.

No. 230,938.

Patented Aug. 10, 1880.



Witnesses:

L. P. Grant,  
H. P. Kicher

Inventor:

J. B. Haupt,  
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# UNITED STATES PATENT OFFICE.

JACOB B. HAUPT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO SAMUEL T. LEWIS, OF SAME PLACE.

## STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 230,938, dated August 10, 1880.

Application filed December 3, 1879.

*To all whom it may concern:*

Be it known that I, JACOB B. HAUPT, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Steam-Generators, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a central vertical section of the generator embodying my invention. Fig. 2 is a horizontal section in line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of the construction of a steam-generator wherein the heat first strikes the bottom of the water-box, then passes around the same into a chamber surrounding the tubes and circulates around the tubes, then descends, and finally ascends the stack.

By these means I obtain a large heating-surface, the tubes are prevented from burning out quickly, and their ends are protected from fire, said tubes being held firmly in position and the steam-space left free of tubes, as will be hereinafter set forth.

Combined with the generator are means for reducing the noise of the exhaust and means for increasing combustion in the fire-chamber.

Referring to the drawings, A represents the outer shell or boiler proper, and B represents an inner shell, the two forming a water-leg, A'.

C represents a water-box, which is arranged above the fire-chamber, and D represents a crown-sheet, which is secured to the top of the shell B, and has the stack E passing centrally through it, the bottom of said stack opening above the water-box C.

Above the water-box C is a series of vertical water-tubes, F, whose upper ends are secured to the crown-sheet D, and lower ends to the top plate or sheet of the water-box, whereby said tubes form communication between the water-box C and upper portion of the boiler A. Communication between the boiler and water-box is had by means of horizontal tubes F'.

G represents stay-rods, which are suspended from the crown-sheet H of the boiler A, passed through the crown-sheet D and top plate of the water-box, and have their lower ends connected to the bottom sheet of said water-box.

Rising from the water-box C, and interposed

between the shell B and tubes F, is a jacket, J, which is open at top and extends only partly the height of the tubes F.

It will be seen that the products of combustion strike the bottom of the water-box C, pass around said box between the shells B, J, circulate around the tubes F, and descend to the bottom of the stack E, from whence they escape, whereby the water-box C, water-legs A', tubes F, crown-sheet D, and stack E are heated, the heat thus traversing a large surface and causing a rapid production of steam.

The products of combustion are temporarily retarded in the chamber or space of the shell B, whereby the crown-sheet D and tubes F are subjected to the powerful action of said products, which are at the highest temperature at the localities of said sheet and tubes.

It will also be seen that the ends of the tubes F are covered by water, and not exposed to the action of fire, the steam-space A'' is free of tubes, and the stay-rod supports the water-box and tubes in a simple, secure, and reliable manner.

K represents a canopy, of conical form, which rises from the crown-sheet H and overhangs the projecting top of the stack E, a throat, *a*, being left between them. The continuation E' of the stack is connected to the canopy, whereby the exhaust-steam entering at *b* circulates around the top of the stack and escapes through the throat *a* into the extension E', thus materially reducing the noise of the exhaust.

L represents a pipe which leads into the fire-chamber through the stack and communicates with the atmosphere, whereby air is admitted to said chamber to increase combustion, which is further assisted by a jet of steam admitted by means of a pipe, L', which projects into said pipe L and communicates with the steam-space A''.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The boiler A, in combination with the shell B, having crown-sheet D, water-box C, jacket J, tubes F, stack or smoke-flue E, and suspending stay-rods G, substantially as and for the purpose set forth.

Witnesses:

J. B. HAUPT.

JOHN A. WIEDERSHEIM,  
CHARLES F. ZIEGLER.