M. Battel,

Steam-Boiler Water-Tube.

No. 25,085. Patented Aug. 16, 1859.

Fig. 1

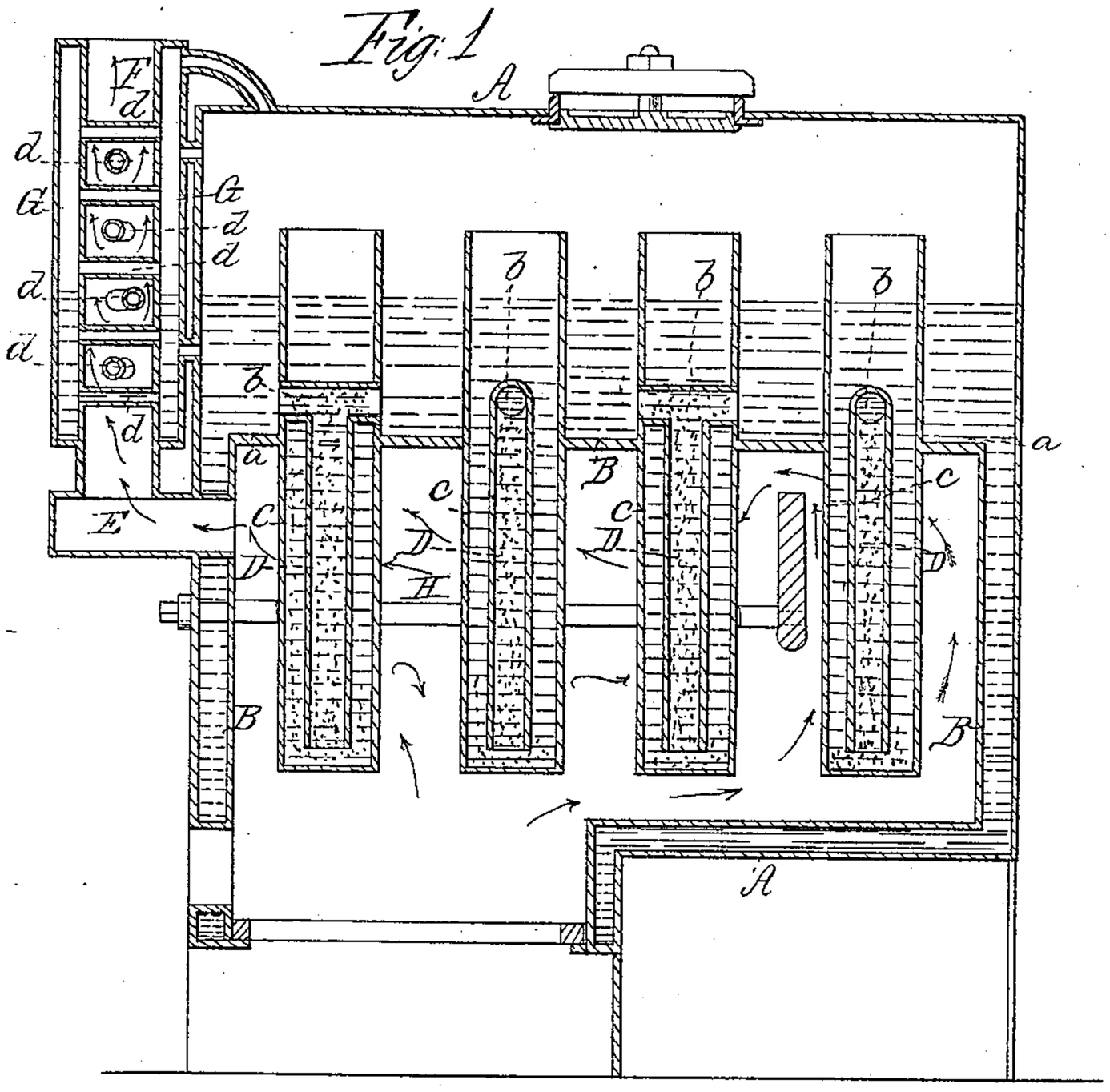
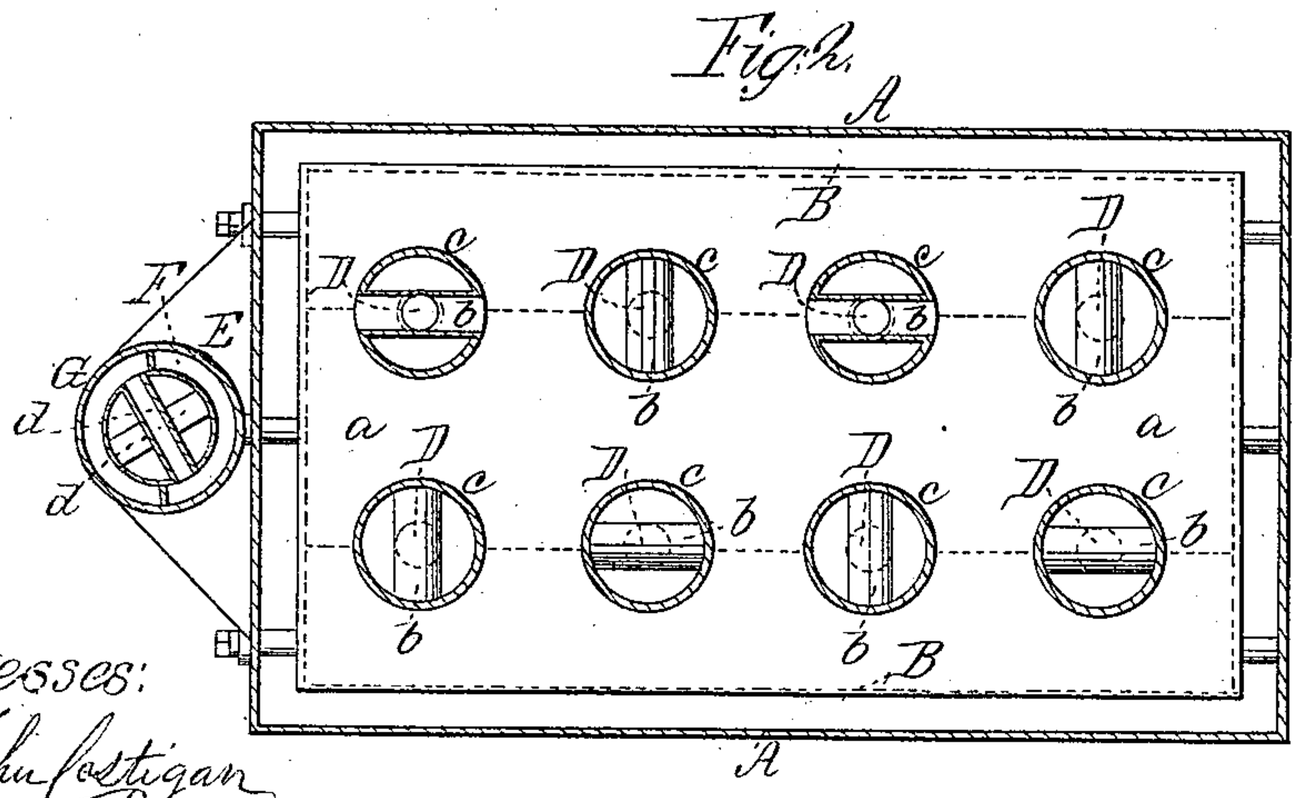


Fig. 2.



Witnesses:

John Costigan

John F. Hinton

Inventor:

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UNITED STATES PATENT OFFICE.

MELLEN BATTEL, OF ALBANY, NEW YORK.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **25,085**, dated August 16, 1859.

To all whom it may concern:

Be it known that I, MELLEN BATTEL, of the city and county of Albany, and State of New York, have invented a new and useful Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of a boiler with my improvements applied. Fig. 2 is a horizontal section of the same, taken a short distance above the fire-box.

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

My invention consists in the employment in the furnace or flue of a boiler of vertical water-tubes with closed bottoms suspended from the crown-sheet or top plate and extending downward to near the fire or bottom of the furnace or flue and upward through the crown-sheet or top plate above the surface of the water, and combined with inner tubes which extend to near the bottoms of those first mentioned and which form communication through the sides of the said tubes between the body of water above the crown-sheet or top of the furnace or flue and the lower parts of the first-mentioned tubes, such combination of tubes providing for the free upward circulation of steam through the outer tubes and the downward circulation of water through the inner ones to supply its place.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the outer shell of the boiler.

B is the furnace or fire-box surrounded by water on all sides and having the crown-sheet *a a* well covered with water.

E is the exit-flue, and F the smoke-pipe or chimney.

C C are the larger tubes with closed bottoms suspended from the crown-sheet *a a* and passing up through it and through the water above into the steam-space.

D D are the smaller tubes with open bottoms placed within the larger ones C C and extending from near the bottom thereof to a short distance above the crown-sheet where by means of an elbow or T-piece *b* each is connected with its larger containing one and made to communicate with the water to provide for a downward circulation through it to keep up a constant supply of water to the bottom of the larger one to take the place of what is converted into steam by the intense heat to which the larger one is exposed. By this combination of tubes a very rapid generation of steam is provided for, for the steam as fast as it is generated in the outer tube passes upward to the upward part of the boiler without passing through the descending water which forms a column in the smaller tube, thus producing so rapid a circulation that no sediment or crust can accumulate in the boiler, the matter which in other boilers would be deposited being carried off with the steam.

To prevent any water or spray that may be carried up by the ascending currents of steam through the tubes C C passing to the steam-engine, I provide a drum or superheating-vessel G, surrounding the smoke-pipe, with pipes *d d* crossing the smoke-pipe to form communication between opposite portions of the said drum, and to compel the steam to pass through these cross-pipes I provide vertical partitions *e e* (see Fig. 2) to prevent it circulating all round the said drum. By this means all the water taken up in suspension is exposed to the heat of the smoke-pipe and converted into steam.

To provide for the circulation of the flame and gaseous products of combustion in contact with the whole of the surfaces of those parts of the tubes C C which are below the crown-sheet, I employ a horizontal partition H, ascending from the front of the fire-box to near the rear thereof, said partitions being made in sections, one of said sections between every two contiguous rows of tubes C C, and said sections being arranged to revolve on journals for the purpose of dumping into the bottom of the fire-box any soot or dust that may accumulate upon the said partition.

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

The combination, with the tubes C C, extending downward through the tube-sheet or crown of the fire-box or downward into a flue and upward through the water above the tube-sheet, of the inner tubes D D, applied in the manner herein described, for the purpose set forth.

MELLEN BATTEL.

Witnesses:

JOHN COSTIGAN,

JOHN J. BURTON.