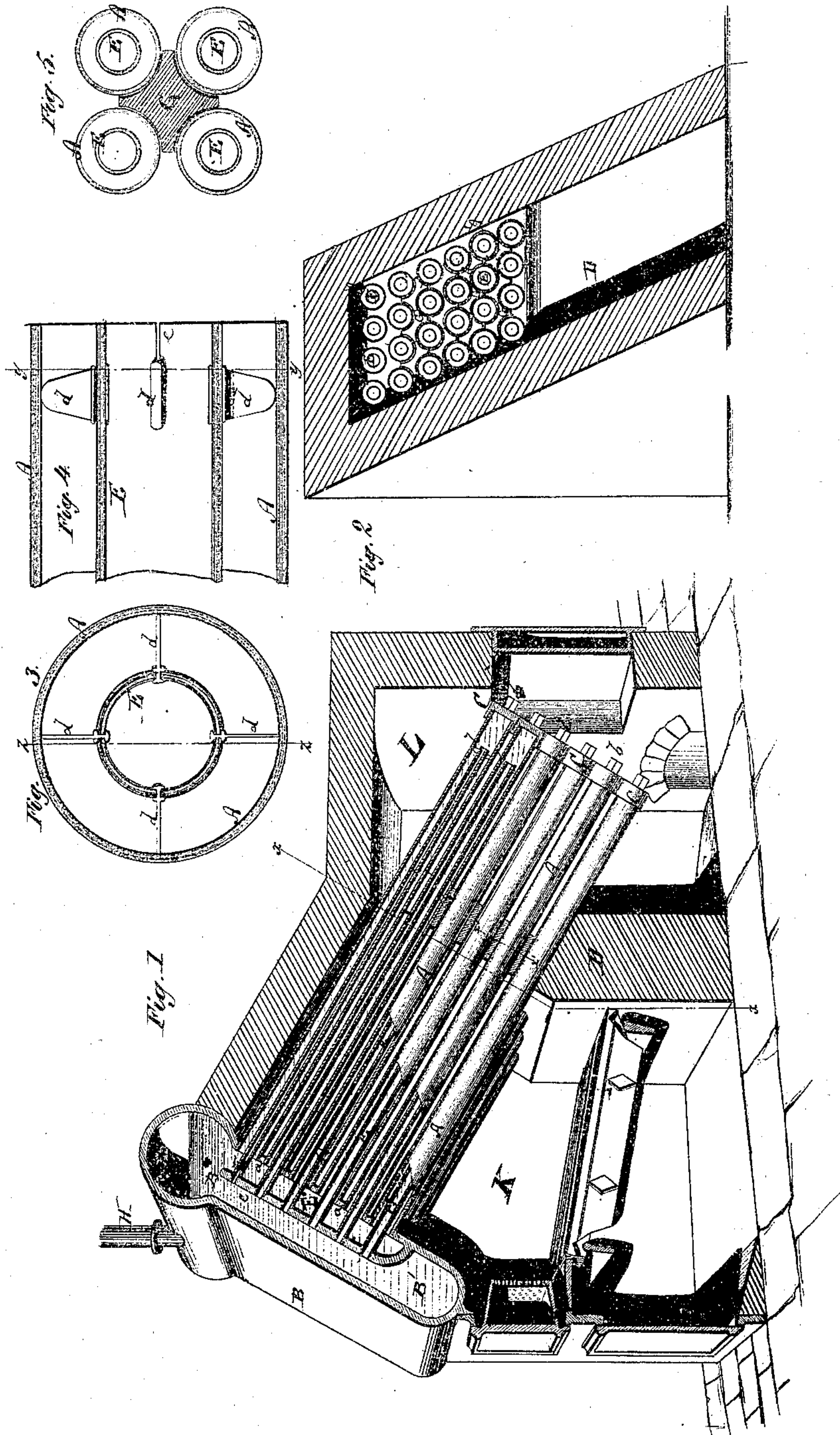


J. A. Miller,

Sectional Boiler.

No 106388.

Patented Aug. 16. 1870.



WITNESSES
Gustave Dutcher
Brookbrook

INVENTOR
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JOSEPH A. MILLER, OF NEW YORK, N. Y.

Letters Patent No. 106,388, dated August 16, 1870.

IMPROVEMENT IN 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, JOSEPH A. MILLER, of the city, county, and State of New York, have invented a new and improved Tubulous-Boiler; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 represents a sectional perspective view of my improved tubulous boiler.

Figure 2 is a vertical transverse section of the same, the plane of section being indicated by the line *x x*, fig. 1.

Figure 3 is a detail transverse section on an enlarged scale of one of the tubes.

Figure 4 is a detail longitudinal section of the same.

Figure 5 is a detail transverse section of some tubes showing the manner of erecting the bridge-wall between the same.

Similar letters of reference indicate corresponding parts.

This invention relates to tubular steam-boilers, and the principal object aimed at is to impart a progressive heat to the water and steam, the maximum of temperature being at the water-outlet, and the minimum at the water-inlet of pipes A.

The invention consists in the combination of means employed for the accomplishment of this purpose, and which will be described and specified hereinafter.

In the drawing—

The letter A represents a series of inclined pipes parallel to each other. Their front ends are open, and are fast in the wall *a*, while their rear ends are closed by the caps C.

These caps have projections *b*, by which they may be unscrewed with a wrench, and are also formed of a diameter suitable to the intended distance between the tubes. They are made to rest upon one another.

B is a steam-box, to which the front ends of the steam-tubes are attached, and is inclined in a degree to correspond with the inclination of those tubes.

D is a bridge, which supports the lowest row of pipes and forms one of the walls of the furnace.

E represents a series of small tubes placed within the tubes A, but extending beyond them in front, and fastened to a plate of the box B.

They have at their lower ends lips *d*, by which they are held parallel to the circumjacent tubes.

Each internal tube is preferably formed of about one-half the diameter of the one surrounding it.

The lips *d* are made to slide in the tubes A by means of the slots *e*.

The tubes E are open at both ends, and do not extend in the rear to the bottom of the surrounding tubes.

G are fire-bricks or blocks of any suitable material, shaped to fill the spaces between the tubes A.

K represents the fire-space, which is located beneath the upper half of the tubes, so as to produce the greatest intensity of heat at the steam-outlets, and the least at the lowest points where the water issues from the tubes E.

B' is the water-chamber, which directly supplies the pipes E and E', the chamber into which the steam issues from the tubes A.

B'' is the dome, from which the steam passes into the discharge-pipe H.

The mode of operation is as follows:

The water naturally passes through the pipes E by its own gravity, and seeks their depressed ends, where it is emptied into the lower ends of tubes A. At this point is the minimum of temperature, by reason of its greater distance from the fire. As it ascends, the intensity of the heat progressively increases until it is converted into steam, and tends to ascend by reason of its own levity. As the steam then proceeds toward the outlet of the tube, it becomes more and more superheated, until it finds its way to the dome.

I am aware that tubes A E, one within another, steam-box B, and the fire-space K, are each, in themselves, old.

What, therefore, I esteem to be of my invention, and desire to protect by Letters Patent, is—

The two series of inclined pipes A E, one within the other, combined with a fire-space K under the upper portion of said pipes, all arranged to subject the water and steam to progressive augmentations of heat, as set forth.

JOSEPH A. MILLER.

Witnesses:

WM. A. KIMBALL,
J. A. GROSVENOR.