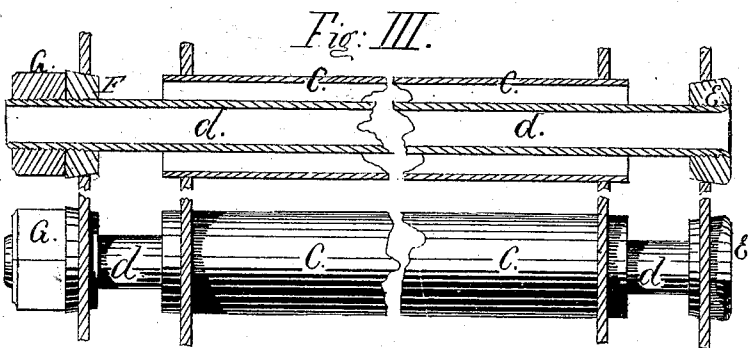
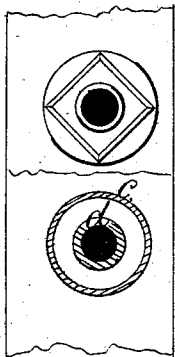
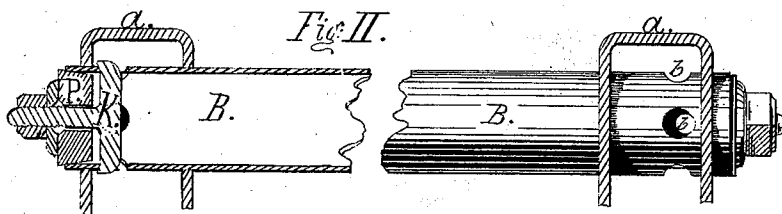
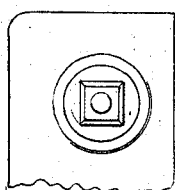
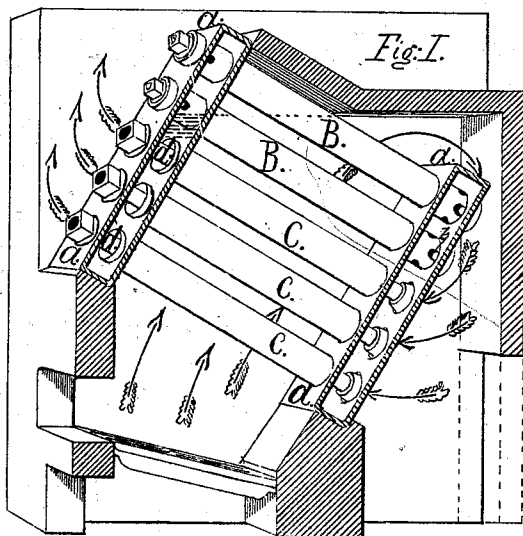


J. A. MILLER.

Sectional Steam-Generators.

No. 149,504.

Patented April 7, 1874.



Witnesses

Joseph A. Miller Jr.
Henry J. Miller.

Inventor

Joseph A. Miller

UNITED STATES PATENT OFFICE

JOSEPH A. MILLER, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **149,504**, dated April 7, 1874; application filed September 8, 1873.

To all whom it may concern:

Be it known that I, JOSEPH A. MILLER, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in the Construction of Steam-Generators; and I do hereby declare that the following is a clear, full, 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.

The object of my invention is to so construct that class of steam-generators known as "Water-Tube Boilers," that the interior of the tubes may be easily cleaned and inspected; that the communication between the several tubes may be large and not liable to fill up; that in case of a leak every joint may be easily reached and made tight; and that the whole combine great structural strength with simplicity of construction. Another object of my invention is to prevent foaming or lifting of the water in such a steam-generator when the steam-valve is opened or the generator forced with a strong fire.

In the accompanying drawing, Figure I shows the steam-generator in perspective, and Figs. II and III represent the details of its construction, partly in section and partly in view.

Similar letters of reference indicate corresponding parts.

a a are two box-shaped chambers, one forming the front and the other the rear end of the steam-generator, to which the tubes *B* and *C* are secured, as shown. The tubes *B* pass through both sides of the chambers *a a*, and are secured by expanding the tubes into holes made into the sides, so as to insure a tight joint, and also keep the sides from being forced apart by the internal pressure in the chambers *a a*, as is clearly shown in Fig. II. To establish free communication between the interior of the tubes *B* and the chambers *a a*, holes *b* are made into that part of the tube within the chamber, which holes are of such size and number as will insure a free access of water to the interior of the tubes, as also a free exit of steam from the same; but the area of these holes should be such that nearly all the upper tubes in a generator must furnish their proper portion of steam, and for that reason the whole

area of all the holes in the upper or topmost row of tubes should not much exceed the area of the steam-pipe through which the steam is delivered. The ends of the tubes *B B* are closed by metallic tapering plugs *P*, which are secured by passing the *T*-bolt *K* into two holes made for that purpose into the tube *B*, as shown, and securing the whole by the nut, as is clearly shown by Fig. II. They may, however be closed with a screw-cap or screw-plug, or in any other manner by which a tight joint is secured, and so that the tubes may be readily opened for inspection. The tubes *C C C* are secured into the inner sides of the chambers *a a*, and the joint is readily made through holes opposite the ends of the tubes in the under side of the said chambers *a a*. These holes are closed by metallic tapering plugs, one of which is permanently secured to the tube *d*, and the other by passing a loose plug over the other end of the tube *d*, on which end a screw-thread is cut, and the plug is securely held by the nut *G*. One, two, or more inclined rows of tubes, of any number required, may be secured into the chambers *a a*, or separate chambers may be used for each inclined row, and any number of such may be placed side by side in a furnace, as is shown in Fig. I. Proper connections are made to supply the same with water at the lowest part of the rear chamber, and also connections to take off the steam from the highest part of the front chamber. When filled with water to the proper level, and a fire built on the grate, the products of combustion will surround the tubes *C C C* and *B B*, and, passing over the rear chamber, will descend, and, passing through the tubes *d d d* to the front, will pass off by proper flues to the chimney. The steam generated within the tubes *C C C* will enter the front chamber directly; but the steam generated within the tubes *B B* must pass through the holes by which the interior of these tubes connect with the interior of the front chamber, and, as the areas of these holes are small, the steam rushes with some velocity from them into the chamber, where any water carried mechanically with the steam is separated and the steam delivered dry. When the generator is to be inspected the nuts on the tubes *d d d* are loosened, the loose plug is taken off,

and the tubes can be withdrawn, and the interior of the chambers, as well as the tubes C C, can be easily cleaned by taking off the tapering plug from one or both ends of the tubes B. They can also be readily inspected.

When it is desirable to discharge the products of combustion in the rear of the generator, I construct the generator entirely of tubes B, secured in any number required into chambers, as shown in Fig. II, and when so constructed the products of combustion will pass between, around, and among all the tubes, but will not return to the front.

I do not wish to confine the construction of steam-generators on this method to such as are set into brick-work; but I also surround them, when required, with a water-space, as is usual in marine boilers, but in all cases use either any required number of the tubes B or the tubes C and *d*, secured substantially as shown and described.

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

1. The combination of the plug P, bolt K, and tube B, when used for, or forming part of, a steam-generator.

2. The tube *d*, in combination with the metallic plugs E and F, and the nut G, substantially and for the purpose set forth.

3. The combination of a series of inclined tubes B, passing through and expanding in the chamber *a a*, and provided with holes *b* and plugs P K with the tubes C, having interior tubes *d d* secured by plugs E F and nut G, all constructed and arranged substantially as shown, and for the purpose set forth.

JOSEPH A. MILLER.

Witnesses:

JOSEPH A. MILLER,

HENRY J. MILLER.