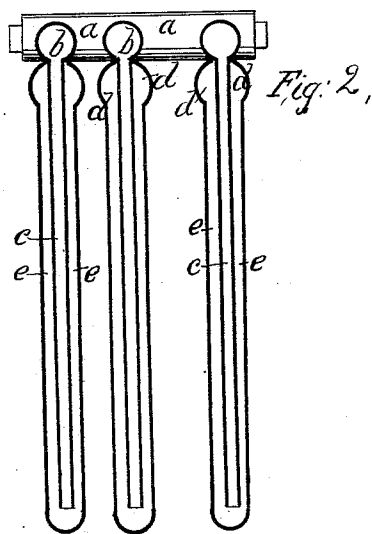
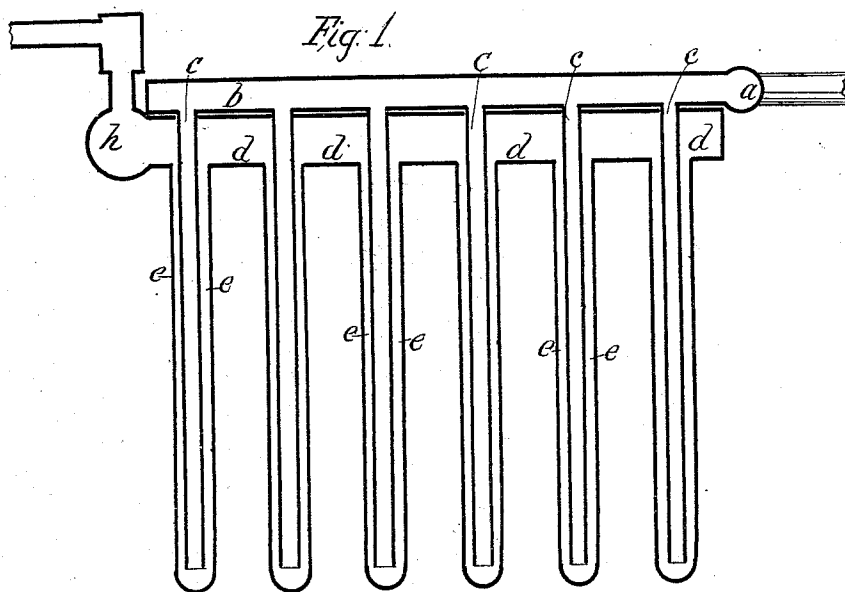


W. H. Laubach,
Steam-Boiler Water-Tube.
N^o 83,863. Patented Nov. 10, 1868.



Witnesses;
W. Kilmer
G. O. Brown

Inventor
by Geo. E. Brown
Atty



WILLIAM H. LAUBACH, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 83,863, dated November 10, 1868.

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, WILLIAM H. LAUBACH, of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Steam-Generators; 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, and letters of reference marked thereon, making a part of this specification, in which—

Figure 1 is a longitudinal vertical central section through one of the divisions of my boiler.

Figure 2, a transverse vertical central section through the same.

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

Similar letters, in the drawings, refer to like parts.

This invention relates to that class of boilers in which steam is generated in a system of vertical tubes, arranged in sections; and it consists of a novel combination of devices for introducing feed-water; also, in a novel construction of steam-spaces and feed-water spaces, at the top of the boiler, and also in other particulars, as will hereafter more fully appear.

d represents a cast-iron tube, of such dimensions as may be required, into the lower part of which is screwed a number of wrought-iron tubes, *e*, and along the top of which, and cast in one piece with it, is a smaller tube, *b*, from which wrought-iron pipes *c* pass downward, through the tube *d*, and into the vertical pipes *e*, extending to within a short distance of the bottom of the same, the pipes *c* being open at the bottom, and tubes *e* closed at the bottom, and there being no other communication between the tubes *b* and *d* than that afforded by the vertical pipes *c* and *e*.

The horizontal and vertical tubes above described form a section of a steam-generator, made up of as many of these divisions as may be desired.

a represents a transverse pipe, into which all of the tubes *b* of the various sections open at one end, and through which passes a transverse bolt, supplied at its ends with screw-threads or nuts, by means of which the sections are connected.

h represents a similar transverse pipe, at the opposite end of the boiler from the pipe *a*, into which pipe *h* open all of the tubes *d* at one end, the other ends of the tubes *d* as well as of the tubes *b* being closed.

Through the tube *h* also passes a bolt, provided at its ends with screw-threads and nuts, for the purpose of connecting the sections of the boiler.

The tube *h* is provided with an escape-pipe for steam, and a safety-valve.

Operation.

The feed-water enters the pipe *a*, and passes thence into the tubes *b*, whence it is conducted, by the vertical pipes *c*, into the vertical tubes *e*, in all of which it rises to the same level.

The exteriors of the tubes *e* are in immediate contact with the fire of the furnace, whence it is manifest that steam is generated in these tubes, which, passing upward into the tubes *d*, escapes, by the pipe *h*, to the engine.

I am aware that it is no new thing to generate steam in tubes, or to supply water to such tubes by means of inner pipes, like those I denominate *c*.

I consider my improvement to consist chiefly in the devices for keeping the feed-spaces and steam-spaces separate, whereby cold water may be conveyed from the source of supply to the point where it is heated, without coming in contact with the steam, thereby condensing it, and also in the devices for introducing the feed-water into the chamber or pipe *b* previous to its passing into the vertical feed-pipes *c*, whereby the water is caused to rise to an equal height in all said vertical feed-pipes, and this whether the evaporation from the same is equal or not, and that danger of explosion resulting from an unequal distribution of water in the tubes is to a great extent avoided.

Having thus described my invention,

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

1. The combination of the transverse pipe *a*, the horizontal pipes *b*, and the inner vertical feed-pipes *c*, constructed substantially as described.
2. The feed-pipes *b* *c*, in combination with the steam-pipes *d*, and the outer tubes *e*, as set forth.
3. The construction of the horizontal water-pipes *b*, and the horizontal steam-pipes *d*, combined as herein described.

W. H. LAUBACH.

Witnesses:

A. B. BEAMISH,
J. G. SHULL.