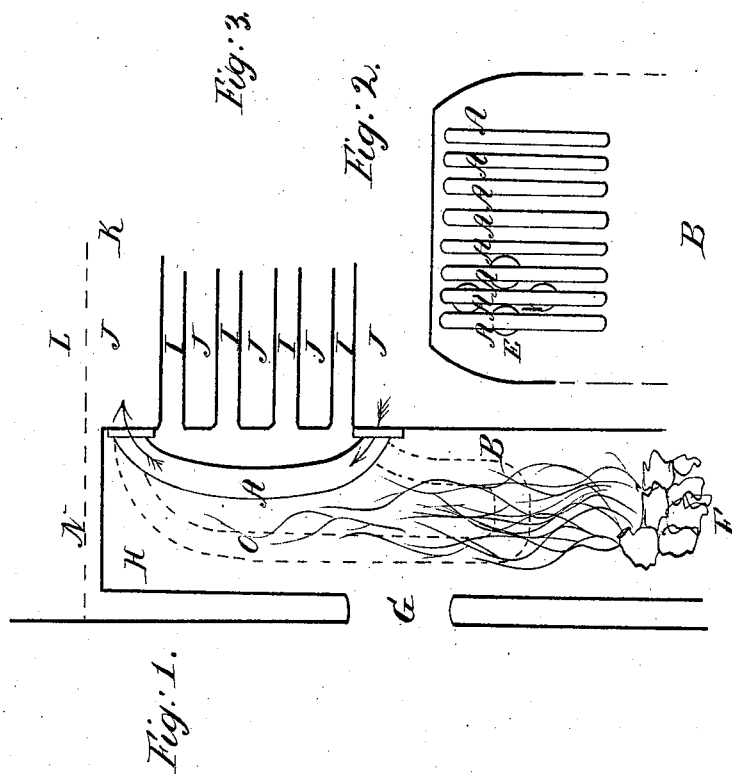
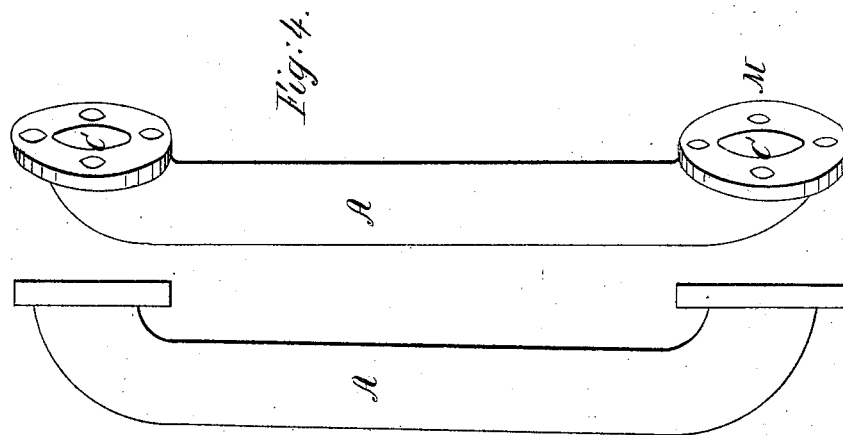


J. Penniman
Steam-Boiler Water-Tube.
N^o 1568. Patented Apr. 24, 1840.



UNITED STATES PATENT OFFICE.

JOHN PENNIMAN, OF BALTIMORE, MARYLAND.

BOILER OF LOCOMOTIVE-ENGINES.

Specification of Letters Patent No. 1,568, dated April 24, 1840.

To all whom it may concern:

Be it known that I, JOHN PENNIMAN, of the city of Baltimore, in the State of Maryland, have invented a new and improved method of constructing the boilers of steam-engines, by means of which improvement a continual circulation of the water contained in the boiler is obtained, the heat from the furnace is more equally diffused, a larger quantity of steam is produced, and the boiler itself is rendered more durable; and I do hereby declare that the following is a full and exact description thereof.

In the accompanying drawing I have represented in Figure 1 a part of a tubular boiler, such as is in ordinary use for locomotive steam engines, to which boiler my improvement is particularly applicable.

H, is the fire box, G, the door leading into it, and F, a portion of fuel.

B, is the lower part of the front of the boiler, I, I, I, the tubes passing through the boiler in the ordinary way, and surrounded by the water J, J, J. The water line is shown at N, and L is a part of the steam chamber.

My improvement consists in the placing a number of tubes on the front plate of the boiler, which tubes connect the lower part thereof with the upper, said tubes standing in the fire box, and being exposed to the direct action of the fire. One of these tubes is shown at A, in Fig. 1, and a series of them at A, A, A, in Fig. 2. They are shown separately, and on a larger scale at A, A, Figs. 3 and 4. The effect of these tubes will be to produce the circulation of the water in the boiler, in the following way: As these tubes open below into the lower part of the boiler,

and at their upper ends into the upper part of it, below the water line, the water which will become highly heated in the lower parts of the tubes, will naturally ascend, and that with considerable rapidity, toward the upper part, where they will give out their steam, and by the action of the water circulating through them they will necessarily draw the water in the lower part of the boiler toward them, and effect the required circulation. Should it be found desirable to expose a larger portion of the water in the tubes to the action of the heat, said tubes may descend, and project out to a greater distance in the fire box, as represented by the dotted lines at O. There will be little or no danger of the heat affecting these tubes injuriously, as the circulation of water through them will necessarily keep them supplied with that fluid.

Having thus fully described the nature of my improvement, and the manner in which I carry the same into operation, what I claim therein as my invention, and desire to secure by Letters Patent, is—

The placing a series of circulating tubes on the front plate of the boiler, in such a manner, as that they shall at their lower ends communicate with the water in the lower part of the boiler, and at their upper ends with the water in said boiler a little below the water line, while they are, along their whole length, exposed to the direct action of the heat in the fire box, in the manner and for the purpose above set forth.

JOHN PENNIMAN.

Witnesses:

THOS. P. JONES,
GEORGE WEST.