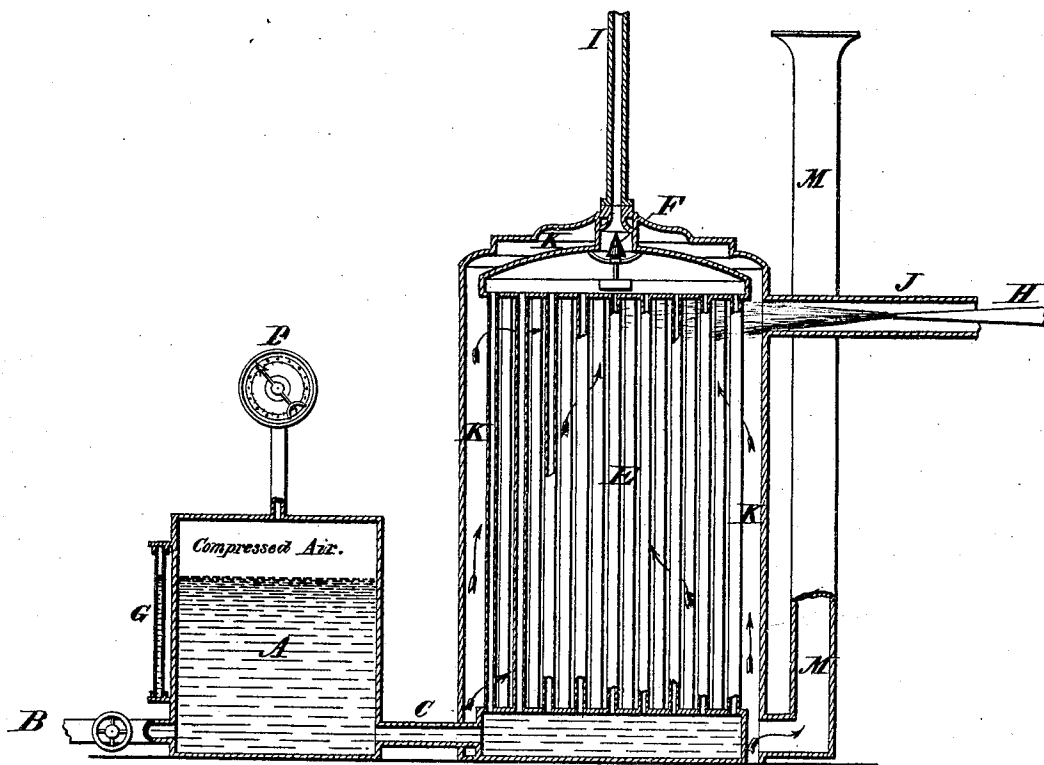


J. KIDD.

Improvement in Apparatus for Lighting, Heating,
Vaporizing, and Drying.

No. 132,403.

Patented Oct. 22, 1872.



Witnesses.

Geo. H. Johnson
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UNITED STATES PATENT OFFICE.

JOSHUA KIDD, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR LIGHTING, HEATING, VAPORIZING, AND DRYING.

Specification forming part of Letters Patent No. 132,403, dated October 22, 1872.

To all whom it may concern:

Be it known that I, JOSHUA KIDD, of the city, county, and State of New York, have invented an Improvement in Apparatus for Lighting, Heating, Vaporizing, and Drying; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same.

My improvements consist in the application of an invention for which I have had letters patent granted to me dated January 10, 1872, No. 110,857, reissued May 22, 1872, No. 4,910, for the purposes herein set forth. My improvements consist in sucking the hot results of combustion from a fire, either before or after it has been used for the generation of steam, by the escaping force of a jet of superheated steam, and forcing the same into a hot-air chamber closed at the top and open at the bottom, and in contact with vertical tubes placed in said chamber, containing water or other liquid to be vaporized. When water or any other liquid is vaporized in this way it is not agitated by any rising bubbles of steam, and the current of heated gases coming downward through the hot-air chamber comes in contact with a colder stratum as it descends. In this way the hot gases are more effectually deprived of their heat. This method of heating and evaporating water enables vaporizing-tubes of much smaller diameter to be used for generating steam than can possibly be employed in the method at present adopted. In this way much greater heating-surface is secured and a larger amount of steam generated than when the heat is applied under the water. This method of vaporizing water is particularly applicable for utilizing the waste heat from steam-furnaces, and when applied for this purpose the vaporizer may be placed anywhere between the furnace and smoke-stack. The hot gases drawn from the fire I force, by the superheated steam-jet, downward, in contact with the tubes of the vaporizer before escaping. It is well known that when steam is superheated its latent heat is changed to sensible heat and its volume much augmented. When in a highly superheated and expanded condition it is greedy for moisture, and when mixed with hot air it forms an excellent drying agent.

When I use it for this purpose I make the drying-chamber of any required size and close it at the top, except the inlet for the hot gases, and make openings at its lowest part for the exit of the saturated and denser air.

The operation of my invention will be better understood by reference to the drawing attached and forming part of this specification. It shows a sectional elevation of my improved apparatus.

A shows the liquid-reservoir; B, the liquid-inlet; C, the connecting-pipe between the reservoir and the vaporizer; D, the pressure-gage; E, the vertical pipe vaporizer; F, the float and valve which regulates the steam-outlet and governs the water-level, thus preventing it rising too high in the tubes. G shows the water-gages; I, the steam-outlet; H, superheated steam-jet, for inducing the results of combustion through inlet J; K, hot-air chamber. M is the escape or outlet for the results of combustion.

Before starting the apparatus the required pressure of air must be placed on the liquid in reservoir A. After this pressure has once been obtained all that is required afterward is to force the water into the reservoir. The steam may be superheated in any convenient manner and connected to jet H. The inlet-pipe J must be connected to the flue leading to the chimney. When my improvements are used for drying purposes I dispense with the vaporizer E and reservoir A, and I place any material to be dried or vaporized on suitable shelves in the upper part of the hot-air chamber K. This hot-air chamber may be made either round, square, or any other convenient shape, or it may be made of sheet metal, forming circuitous channels so as to radiate the heat. The air and superheated steam, after parting with their heat and becoming saturated, escape at outlet M. If the hot-air chamber K is large, I sometimes make a number of outlets at the bottom.

This apparatus may also be used for generating vapor from naphtha for the manufacture of illuminating-gas.

I claim as new—

1. The method described of placing a tubular boiler in a hot-air chamber, between the furnace and smoke-stack; also, heating the

liquid in said boiler at the top of its vertical column.

2. Supplying the steam-generator from a separate tank containing the bulk of the water under pressure, automatically, as described, when used for generating steam.

3. The combination of a jet of superheated steam with a steam-generator, when said jet is placed between the fire and the steam-generator, and used for the purposes set forth.

4. The valve F, also steam-generator E made of vertical tubes, having its steam outlet at the top and its water-supply pipe con-

nected and open from its lowest part to a supply-tank, so that when the pressure increases in the generator it will drive the liquid away from the hottest part of the tubes back to the supply-tank, and vice versa.

5. The combination of a superheated steam-jet with a hot-air chamber when said jet is placed between the fire and the hot-air chamber, and used for the purposes set forth.

JOSHUA KIDD.

Witnesses:

JAMES KIDD,
JNO. H. SIMMONS.