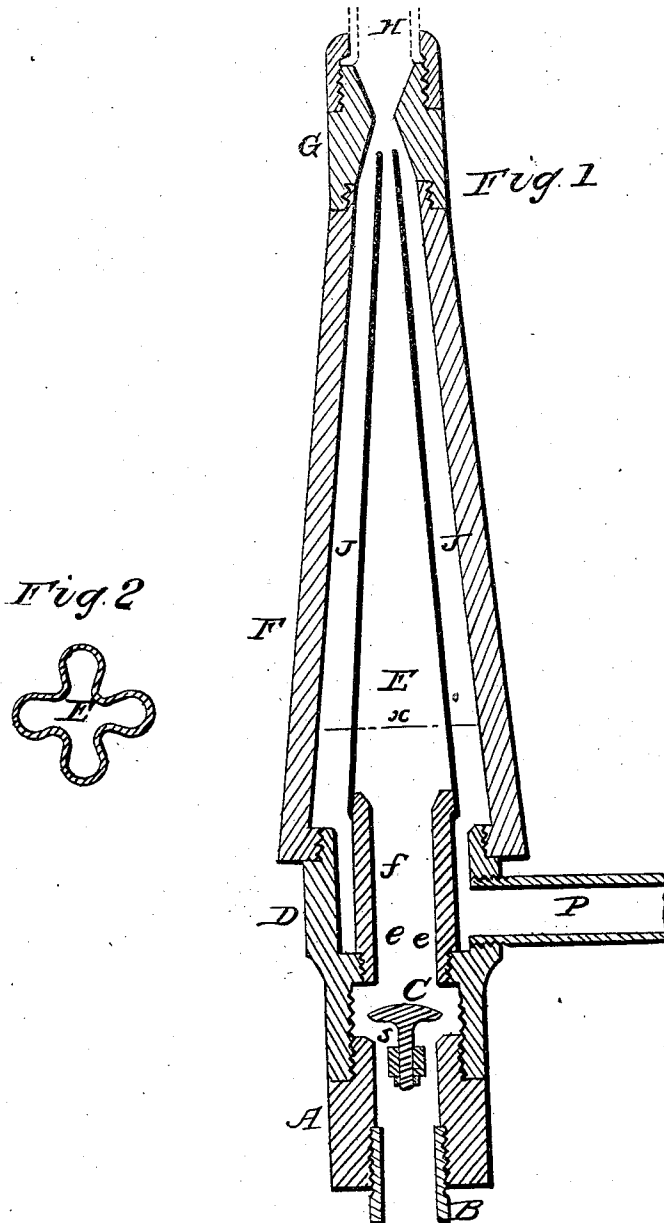


W. B. MACK.
Steam Heater.

No. 92,622.

Patented July 13, 1869.



Witnesses
Chauncey Mann
Alonso W. Silsbee

Inventor
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United States Patent Office.

WILLIAM B. MACK, OF DETROIT, MICHIGAN.

Letters Patent No. 92,622, dated July 13, 1869.

IMPROVEMENT IN STEAM WATER-HEATERS.

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 B. MACK, of the city of Detroit, in the county of Wayne, and State of Michigan, have invented a new and useful improvement in steam-heaters to water-delivery pipes, which I term a Steam Water-Heating-Pipe Nozzle; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal section through the centre of the nozzle.

Figure 2 is a cross-section of the central discharge-nozzle, at or about the line *x*.

My invention consists in the construction of a tapering corrugated radiator-pipe, secured centrally within a steam-casing or chamber, the several parts being arranged relatively with each other, as hereinafter described.

To enable those skilled in this branch of mechanical art and science, to fully understand and construct my invention, I will proceed to describe it.

I usually construct my steam-heating water-nozzle in four sections, exclusive of the connecting-parts and valve, substantially as seen.

The section marked A is a hollow cylindrical coupling, connected at one end by a screw-thread, or other suitable way, to the water-pipe, represented by a broken section at B, and it is provided at the other, with a valve-seat, *s*, and valve, C, of any suitable kind.

It is also threaded at the valve-end, to connect it with another section, D, forming an enlarged hollow steam-chamber casing, furnished, just above the valve-lift, with a seat or diaphragm, *e*, bored through in the centre, and tapped to receive the threaded end of a thimble, *f*, to which the but-end of the corrugated radiator-pipe (to be presently described) is brazed.

This pipe, shown at E, is firmly connected to the steam-casing D, by screwing the threaded end into the diaphragm-hole *e* aforesaid, the thimble and bore of the casing being of such relative proportions as to form an annular space between for steam, which is supplied from a steam-generator, through a steam-pipe, a broken portion, P, of which is shown as screwed into the wall of the chamber.

I usually construct the radiator-pipe of sheet-copper or brass, of a tapering form, substantially as shown, and corrugate it deeply, excepting at the extreme discharge-point, which is left round.

These corrugations, as clearly shown in fig. 2, are for the purpose of exposing a large radiating-surface to the action of the steam, and, at the same time, break up the enclosed water-column into comparatively thin sheets.

A tapering cylindrical casing, F, is screwed on the casing D, so as to surround the corrugated pipe nearly its whole length, thus forming a tapering continuation of the annular steam-chamber in the casing D.

An embouchure nozzle-piece, G, reamed out from each end, hour-glass fashion, the area of the contraction being about equal to the area of the water-discharge end of the pipe, is then screwed on the taper-end of the steam-casing, so that the steam-space may be narrowed down, when in close approximation to the discharging-water column.

A hose or pipe, H, (see dotted lines,) is then coupled to the embouchure, to convey the water, at the desired temperature, to any desired point in a building.

It is not absolutely necessary that the parts marked A and D should be made in two separate sections, for it will be readily seen that they may be cast together in one piece, since no obstacle exists to prevent the insertion and proper fitting of a suitable check-valve.

The relation which the area of the corrugated water-pipe, at its point, bears to the area at the but, will, of course, depend upon the relative steam and water pressure, and the necessities and requirements of the case, and, in order to heat the water, forced through the water-and-steam nozzle, to any specific temperature, the steam-pipe P must be furnished with a cock or valve, for the purpose of graduating the volume of steam admitted according to its indicated pressure and condition, that is to say, whether in a surcharged state or not.

The operation is as follows:

The steam being admitted into the annular chamber J, of a temperature in proper excess of that required of the water, and the cold water (under a relative area-pressure exceeding that of the steam) turned on into the corrugated water-pipe, the water absorbs a certain portion of the steam-heat, conducted through the corrugated shell of the pipe, which heat is further increased by the contact with and condensation of the steam, as the diminished water-column is being rapidly driven through the steam-ring surrounding the central contraction of the embouchure.

When the rushing water-column fills the embouchure-stricture and hose or pipe beyond, the steam-pressure behind accelerates the initial velocity of the water, and causes it to be delivered at a distant point, so rapidly as to part with but little of its heat acquired by continuously and silently absorbing the steam-heat, by radiation and condensation, without any of the detonations usually produced by steam-and-water contact.

Should, by inadvertence, the proper relative steam-and-water pressure be reversed, the check-valve C will close.

Besides being intended to furnish a constant supply of hot water for manufacturing-purposes, my heating-nozzle, from its compactness and its economical use of steam, is especially adapted for domestic and other occasional and immediate uses.

I am aware it is not new to heat water by the di-

rect contact with steam-currents, or by placing the pipe, through which it flows, in a steam-chamber; therefore, I do not claim either mode, singly or combined, irrespective of the peculiar modifications and arrangements by which I have better adapted them for general and special uses. Therefore,

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

I claim the construction and arrangement of the

tapering corrugated pipe E, embouchure-nozzle G, and check-valve C, with the steam-casing E, and steam-and-water casings D A, when the same are connected with steam and water-supply pipes P B, substantially in the manner set forth.

WILLIAM B. MACK.

Witnesses:

JOSEPH KUHN,
JAMES ROBINSON.