Garvin & Pettibone,

Furnace Grate.

No. 107,356. Patented Sep. 13. 1870.

Fig: 1

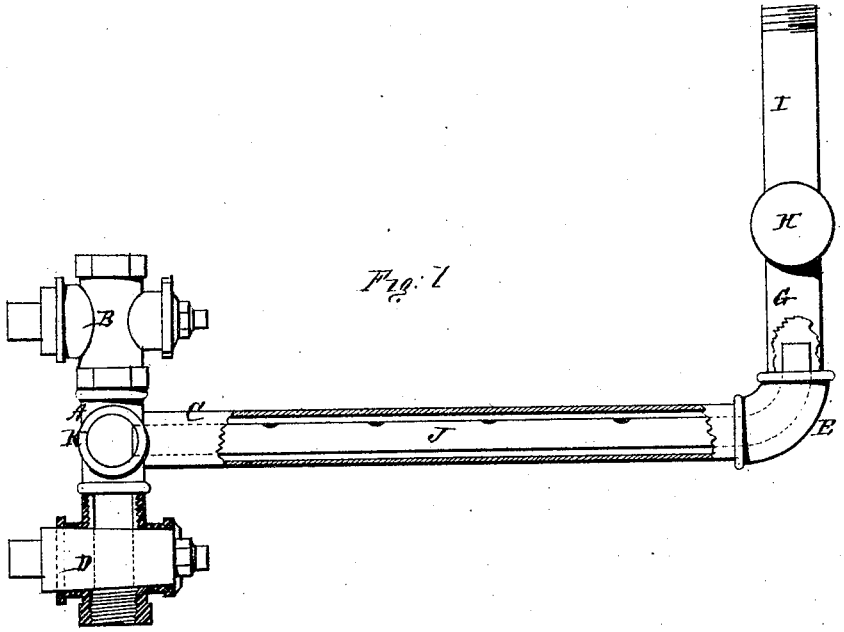
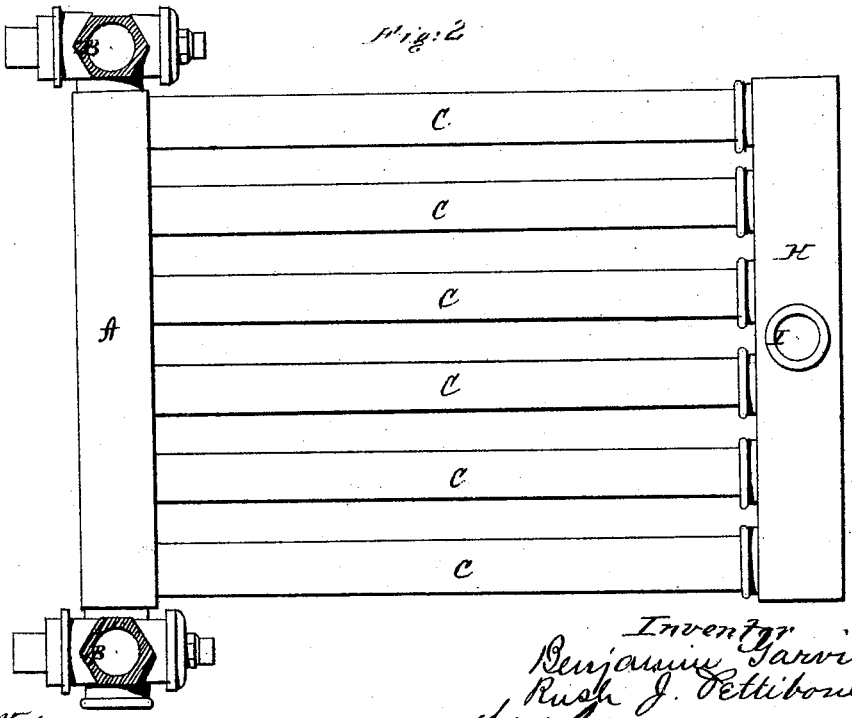


Fig: 2



Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN GARVIN AND RUSH J. PETTIBONE, OF OSHKOSH, WISCONSIN.

IMPROVEMENT IN TUBULAR GRATES.

Specification forming part of Letters Patent No. **107,356,** dated September 13, 1870.

To all whom it may concern:

Be it known that we, BENJAMIN GARVIN and RUSH J. PETTIBONE, of Oshkosh, in the county of Winnebago, and in the State of Wisconsin, have invented certain new and useful Improvements in Tubular Grates; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, making a part of this specification.

The nature of our invention consists in the construction and arrangement of a tubular grate, with three or more connections with the boiler, as will be hereinafter fully set forth.

In order to enable others skilled in the art to which our invention appertains to make and use the same, we will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side view, part in section, and Fig. 2 is a plan view, of our grate.

A represents a drum of any suitable dimensions, provided with two stop-cocks, B B, having connections with the boiler, to allow the water to pass from boiler to drum. The drum receives the water from the boiler and distributes it in the tubes C C, which are connected with the drum, as shown. Below the drum A is a stop-cock, D, to be used as a blow-off. The other ends of the tubes C C are, by elbows E E, connected with upright tubes G G, which lead into a steam-chamber, H, and said steam-chamber has one or more connections, I, with the boiler. The chamber H receives the steam generated in the tubes C C, while the tube or tubes I convey the steam from the chamber into the boiler. Inside of each of the tubes C C is placed a smaller tube, J, which is perforated on its upper side, and causes a circulation of water, to prevent the steam from forcing the water out of the tubes. The water in the inside tube, J, is of a lower temperature than that in the outside tube, C, and as the steam and heat rises to the highest point in the vessel that it is confined in, it rises from around the inside pipe, and the water flows through the holes or perforations in the inside pipe to the outside, and forms a current, which, at a high heat, prevents it from being blown dry.

The grate thus constructed can be used over the fire, and, where the boilers will permit, can be used the whole length under the boiler, either as a heater, as a mud-drum, and as additional heating-surface, or it can be used as additional heating-surface alone.

As a grate, the tubes should take the place of the usual grate-bars; as a heater, the water should be pumped through the tubes. It can be used at either or both ends of the boiler in a horizontal or perpendicular position.

If the water is to be pumped through the tubes in any of the above-mentioned positions, the cocks B B should be closed while pumping, otherwise always open. When pumping through the tubes, the water enters the tubes at the cross K, and enters the boiler through the pipe or pipes I.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The perforated pipe J, placed inside of the tube C, substantially as and for the purposes herein set forth.

2. The arrangement of the drum A with stop-cocks B B and D, outside tubes, C C, inside perforated tubes, J J, connections E G, steam-chamber H, and pipe or pipes I, all constructed as described, and used in combination with a steam-boiler, substantially as and for the purposes herein set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 15th day of June, 1870.

BENJAMIN GARVIN.
RUSH J. PETTIBONE.

Witnesses:
JOHN J. SARGENT,
RAYMOND AYRES.