H. C. RICHMOND.

AIR-FEEDING DEVICES FOR FURNACES.

No. 193,726. Patented July 31, 1877.

Fig. 1.

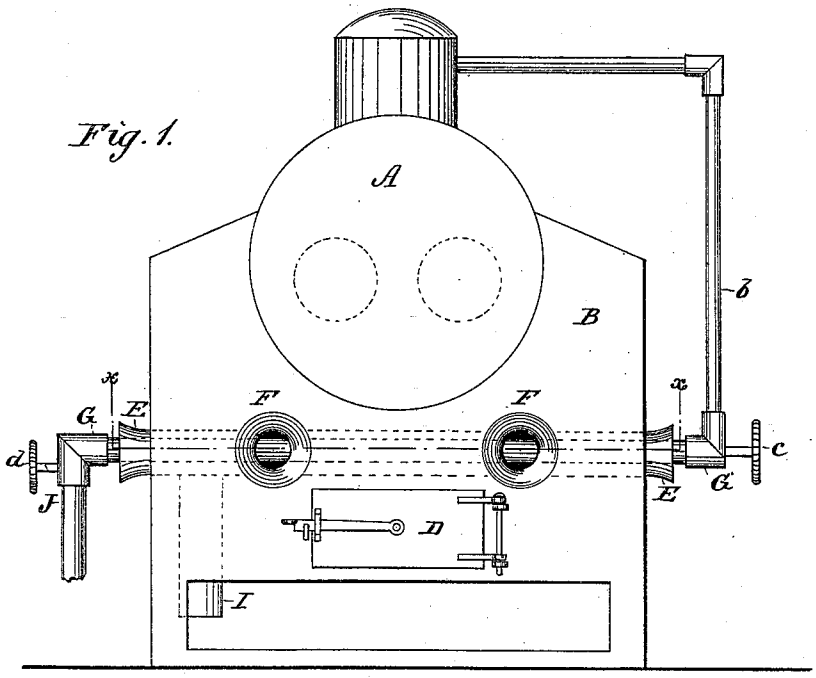
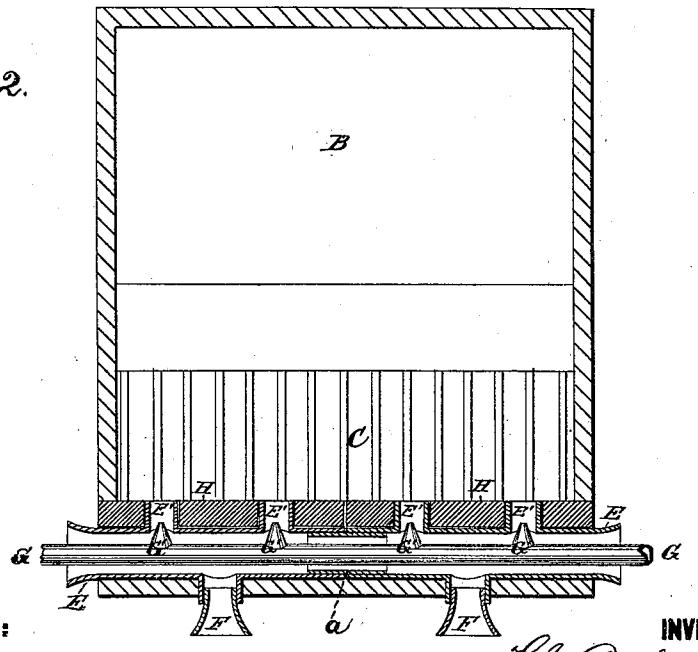


Fig. 2.



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HENRY C. RICHMOND, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN AIR-FEEDING DEVICES FOR FURNACES.

Specification forming part of Letters Patent No. **193,726**, dated July 31, 1877; application filed May 28, 1877.

To all whom it may concern:

Be it known that I, HENRY C. RICHMOND, of the city and county of Allegheny and State of Pennsylvania, have invented a new and Improved Furnace; 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, forming part of this specification, in which—

Figure 1 is a front elevation. Fig. 2 is a horizontal section through line *x x* of Fig. 1.

My invention relates to certain improvements in steam-boiler furnaces designed to secure a more perfect and economical combination of the fuel by consuming the smoke, and to increase the generation of steam. It is an improvement upon that form of furnace in which steam-jets are employed to inject or carry in by induction atmospheric air to the combustion-chamber; and it consists of an air-pipe arranged parallel with and immediately adjacent to the front wall of the furnace, and having short pipe extensions therethrough for the access of air in front and nozzles at the back, combined with an interspacing of fire-tile flush with said nozzle, and with an interior steam-pipe having nozzles corresponding to and concentric with the air-pipe nozzle, as hereinafter more fully described.

In the drawing, A represents a steam-boiler, and B the body of a furnace, in the front part of which is arranged the grate-bar C, upon which the fuel is charged through the door D. Inside of the furnace against the front wall, and immediately above the grate-bars, are arranged my improved devices, which consist as follows: A pipe, E, is disposed parallel with the front of the furnace, opening outside of the furnace through short pipes protruding through the front wall, and having funnel-shaped openings F for the ingress of air, and opening into the furnace itself through numerous nozzles E′, which emerge laterally from the pipe. Inside of this pipe E is arranged a second pipe, G, which communicates at one end with the steam-dome through pipe *b* and valve *c*, and distributes the steam received therefrom through small nozzles G′ arranged concentrically in the nozzles E′ of the air-pipe. Now, as the superheated steam passes into the furnace through the small nozzles G′, it carries by induction and injects into the furnace annular currents of air, and these currents of air, by reason of the location of the pipes directly in the furnace, are heated to a high temperature before they are brought into contact with the smoke and gases evolved from the fuel, so that they immediately ignite and consume all of the combustible particles.

Immediately surrounding the discharge-nozzles in the furnace, flush with the same, and about the most exposed side of the pipes, is arranged a protective casing, H, of fire-tile, the same being designed to prevent injury to the pipes from burning, due to the excessive heat incident to their location in the furnace.

To prevent the pipes from becoming disconnected or cracked from the expansion and contraction due to the varying degrees of heat I connect the parts of a pipe by a lap or expanding joint, *a*, as shown in Fig. 2, which consists simply of a sleeve of smaller diameter than the pipe arranged to connect the adjacent ends, as shown. This expanding joint will be especially desirable when the pipes are extended through a set of furnaces for a battery of boilers.

J is a drain-pipe with valve *d* for discharging the condensations in pipe G.

Having thus described my invention, what I claim as new is—

The air-pipe E arranged against and parallel with the front wall of the furnace, and having pipes protruding therethrough with funnel-shaped opening F for access of air, and nozzles E′ opening into the furnace, in combination with the interspaced fire-tile H arranged flush with the nozzles and upon the exposed side of the pipe, together with the concentric steam-pipe and nozzles G G′, as described.

HENRY C. RICHMOND.

Witnesses:

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