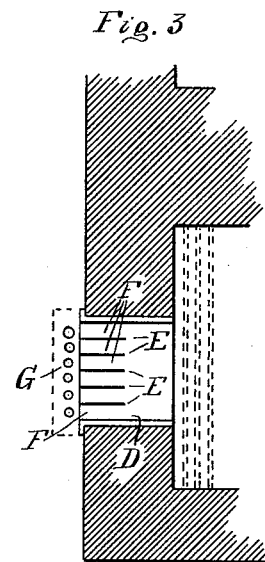
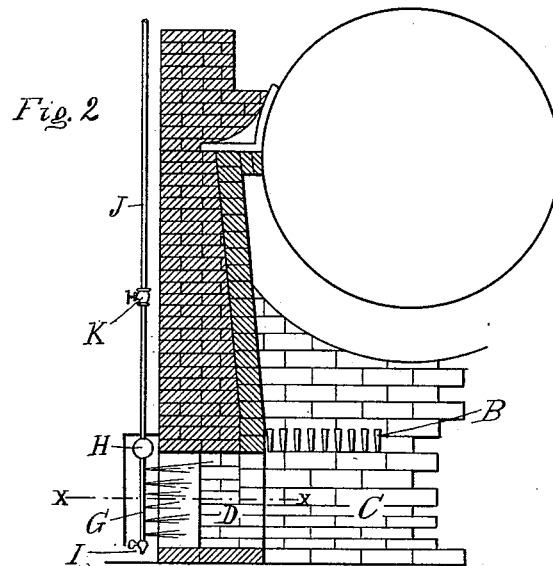
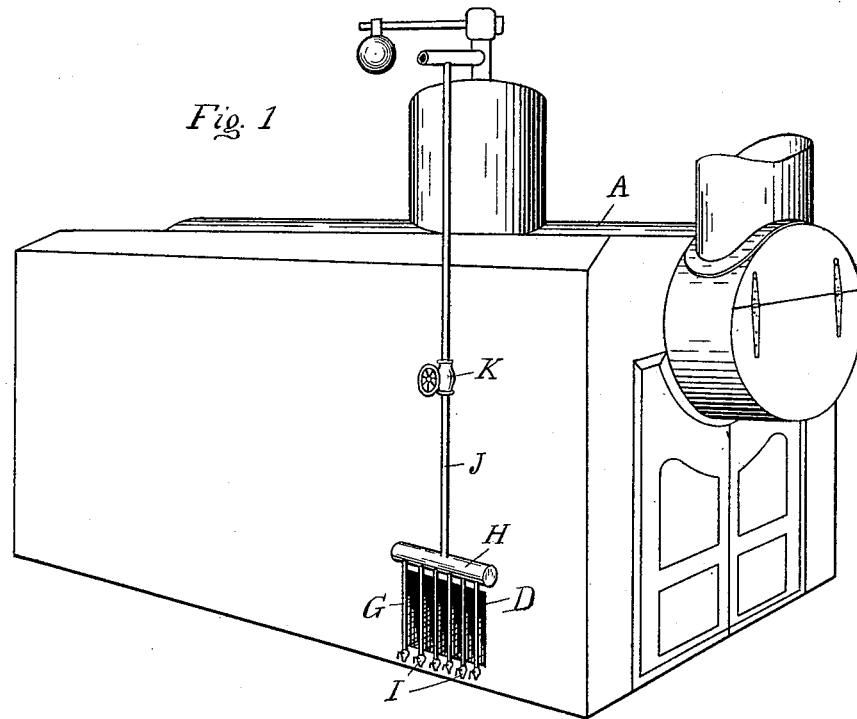


(No Model.)

F. LEADBEATER.  
AIR FEEDING DEVICE.

No. 386,140.

Patented July 17, 1888.



Witnesses:

*P. M. Hulbert,*  
*A. J. Sprague.*

Inventor:

*Frederick Leadbeater,*  
By *Thos. L. Sprague & Son*  
Att'y.

# UNITED STATES PATENT OFFICE.

FREDERICK LEADBEATER, OF DETROIT, MICHIGAN.

## AIR-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 386,140, dated July 17, 1888.

Application filed December 19, 1887. Serial No. 252,260. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK LEADBEATER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Steam and Air Feeding Devices for Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in steam and air devices for smoke-consumers; and the invention consists in the peculiar arrangement and construction of the different parts, all as more fully hereinafter described.

In the drawings which accompany this specification, Figure 1 is a perspective view showing my device as applied to an ordinary boiler-furnace. Fig. 2 is a vertical central section, and Fig. 3 is a horizontal section on line  $x x$  in Fig. 2.

A is a steam-generator. B is a grate. C is the ash-pit of a boiler of ordinary construction, arrangement, and operation, except as hereinafter described.

D is an aperture formed in the side of the furnace, preferably of rectangular shape, and leading into the ash-pit underneath the grate.

E are a series of partition-strips dividing the aperture into a series of small inlets, F.

G are a series of small tubes connected to a head, H, and secured in proximity to the aperture D in such manner as to have one of the tubes G in proximity to each one of the inlets F. These tubes G are perforated upon the side toward the inlets, and are preferably provided at the lower ends with drip-cocks I.

J is a steam-supply pipe connecting with the source of supply in the generator and provided with the valve K.

In practice the parts being arranged as shown and described, their operation is as follows: When steam is available from the generator and the valve K is open, the steam is admitted into the tubes G and issues from the perforations therein in numerous jets through the inlets F into the ash-pit. A large amount of air is simultaneously carried in with the steam, and if the ash-pit doors are tightly closed there will be a strong draft or blast of

air, which will force its way through the interstices of the grate and produce, in connection with the steam, a perfect combustion with entire absence of smoke. The amount of steam or air needed for such perfect combustion is easily controlled by the valve K.

My device in producing a forced blast permits the use of cheap fuel—such as hard-coal screenings or slack—which cannot be burned with the ordinary air-feeding devices, thereby producing a large saving. I claim also, as an especial advantage in my device, that I can apply it to any construction of furnace and transform the same into a perfect smoke consumer without requiring any alterations, and without interfering in any manner with the construction of the furnace. It requires neither additional floor-space, nor is it injuriously affected by the heat of the fire, as is the case with all such air or steam injectors arranged within the furnace-walls. A further advantage is that I can produce a large volume of air-blast with a minimum of steam, dispensing with all other devices for feeding air, so as to keep a plenum of compressed air constantly below the grate, which prevents the collecting of the ashes in the interstices of the grate-bars.

I do not claim, broadly, the injection of steam into the ash-pit of a furnace, nor a plurality of perforated vertical tubes connected with a suitably source of supply for this purpose; but deem it important that the steam from each pipe be separated, but that the steam be not forced through a contracted opening, avoiding all similarity to an injector.

What I claim as my invention is—

1. The combination, with a furnace having an aperture with parallel sides leading into the ash-pit, of the plurality of vertical division-strips dividing said aperture into separated passage-ways, a corresponding series of vertical perforated tubes arranged outside said aperture, one opposite the space between each two strips, and a cross-head communicating with all of said tubes and connected with a suitable source of steam, substantially as described.

2. In a steam and air feeding device for smoke-consumers, the combination of the

aperture D, formed in the side wall of the ash-pit, the partitions E, inlets F, perforated tubes G, drip-cocks I, one for each tube G, cross-head H, supply-pipe J, and valve K in such  
5 supply-pipe, the parts being arranged and constructed to operate substantially as and for the purpose described.

In testimony whereof I affix my signature, in presence of two witnesses, this 4th day of December, 1887.

FREDERICK LEADBEATER.

Witnesses:

JAS. WHITEMORE,  
H. S. SPRAGUE.