

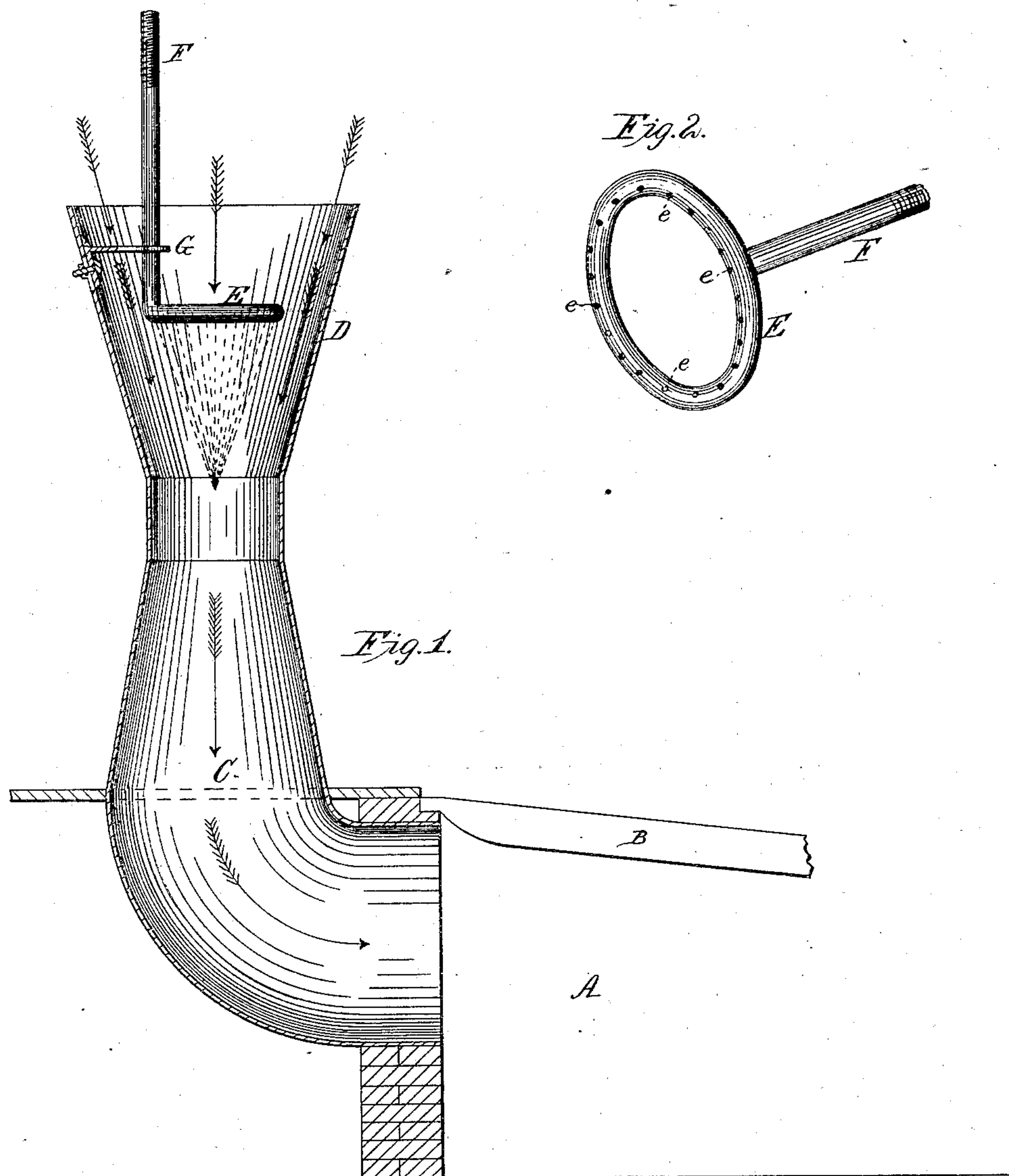
(No Model.)

F. E. FAHRIG.

STEAM AND AIR INJECTOR FOR FURNACES.

No. 314,925.

Patented Mar. 31, 1885.



Witnesses:  
W. C. Jirdiniston.  
Fred F. Church.

Inventor:  
Frank E. Fahrig  
by  
Newville Church  
his Attorney.



# UNITED STATES PATENT OFFICE.

FRANK E. FAHRIG, OF SCRANTON, PENNSYLVANIA.

## STEAM AND AIR INJECTOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 314,925, dated March 31, 1885.

Application filed June 1, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK E. FAHRIG, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain  
5 new and useful Improvements in Steam and Air Injectors for Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part  
10 of this specification, and to the figures and letters of reference marked thereon.

In culm-burning furnaces as ordinarily constructed a blast of steam and air is injected into the ash-pit and up through the grate bars  
15 thereof, so as to facilitate the combustion of the culm supported on the grate-bars, and the means employed for producing said blast consists of a blower pipe or nozzle of substantially the shape of two frustums of cones  
20 placed with their smaller ends together and connected to a pipe leading into the ash-pit, and of a single steam jet pipe inserted a short distance within the flaring mouth of the said blower-nozzle and adapted to discharge a jet  
25 of steam of from three-sixteenths to eight-sixteenths of an inch in diameter centrally into and through said nozzle, so as to create a partial vacuum therein and cause a quantity of air to be drawn in and forced with the steam  
30 into the furnace. This form of injector is, however, very objectionable, because of the exceedingly loud noise it produces while in operation. It has been my primary object, therefore, to provide an injector equally as effective as those at present in use, if not more  
35 so, and one whose operation shall be practically noiseless; and to this end my invention consists in combining with the old or any other suitable form of blower pipe or nozzle a steam-supplying device, by which the steam is delivered into said blow pipe or nozzle in a number of fine jets arranged preferably in a circular, oval, or square series and adapted to converge to a point within the nozzle.

45 In practice I prefer to effect the delivery of a circular series of converging jets by means of the circular perforated pipe arranged centrally within the mouth of the nozzle, so that the air drawn in may pass around as well as  
50 through the said circular pipe; and I also preferably support said circular pipe or perforated

tubular ring so that it may be adjusted back and forth within the nozzle till the point is reached where the maximum effect is obtained.

In the accompanying drawings, Figure 1 55 represents a sectional view of a culm-burning furnace, showing my improved injector applied thereto. Fig. 2 is a perspective view of the circular steam jet pipe detached.

Similar letters of reference in the several 60 figures denote the same parts.

A represents the ash-pit of the furnace; B, the grate of the same; C, the pipe or duct for carrying the blast of steam and air into the ash-pit; D, the blower pipe or nozzle into 65 which the air is drawn by the steam-jets, and E the circular perforated pipe arranged within the mouth of the nozzle D and connected to a steam-supply pipe, F, leading from the source of steam-supply. The pipe F is supported by 70 a bracket, G, or otherwise conveniently, and is adapted to be moved in and out through the said bracket, so as to adjust the circular pipe the desired distance within the nozzle. The perforations *e* in the circular pipe E are ar- 75 ranged so that the jets of steam issuing from them will converge or focus at a point down within the nozzle, as shown by the dotted lines, Fig. 1, and cause the air to be drawn into the nozzle through as well as around the 80 circle of live steam, as shown by the arrows, Fig. 1, and to be forced with the steam into the furnace with little or no noise as compared with the devices at present in use.

As a means of effecting the adjustment of 85 the steam-delivering ring, I have shown the pipe F screw-threaded at its upper end, so as to adapt it to be screwed up or down the pipe or support to which it is designed to be connected. 90

I am aware of the patent granted to Hancock, March 1, 1864, No. 41,770, and do not claim a central cross-tube with central induction branch pipe, such tube connecting a series of hollow perforated rings, as one of the 95 objects of my invention is to avoid obstructing the central air-passage as much as possible, and also to have the air-passage outside my perforated ring unobstructed to as great a degree as practicable. 100

I am also aware of the patent granted to Jones, May 29, 1877, No. 191,438, and do not

claim an induction-pipe applied centrally across straight perforated tubes.

Having thus described my invention, I claim as new—

5 1. In a steam and air injector for furnaces, the combination, with a nozzle, of a circular steam delivery pipe arranged therein and having perforations arranged so as to focus or converge the jets issuing therefrom and draw a  
10 supply of air into the nozzle through and around the circular delivery-pipe, substantially as described.

15 2. A hollow steam-injecting annulus provided with jet-perforations and a supporting-extension outside its central air-passage, in combination with an air-cone, whereby an unobstructed central passage for the air drawn through the cone by the steam-jets is secured

within the entire circle of the annulus, while an outside airway is also maintained between 20 the cone and the annulus, substantially as described.

3. In combination with an air-cone, the steam-injecting annulus having an unobstructed central passage and provided with jet-per- 25 forations which are arranged so as to prevent the steam-jets striking upon the inner surface of the cone, and thereby insuring an uninterrupted airway between the cone and the steam-jets flowing from the annulus, substantially as 30 described.

FRANK E. FAHRIG.

Witnesses:

DOUGLAS H. JAY,  
GEO. MURRAY.