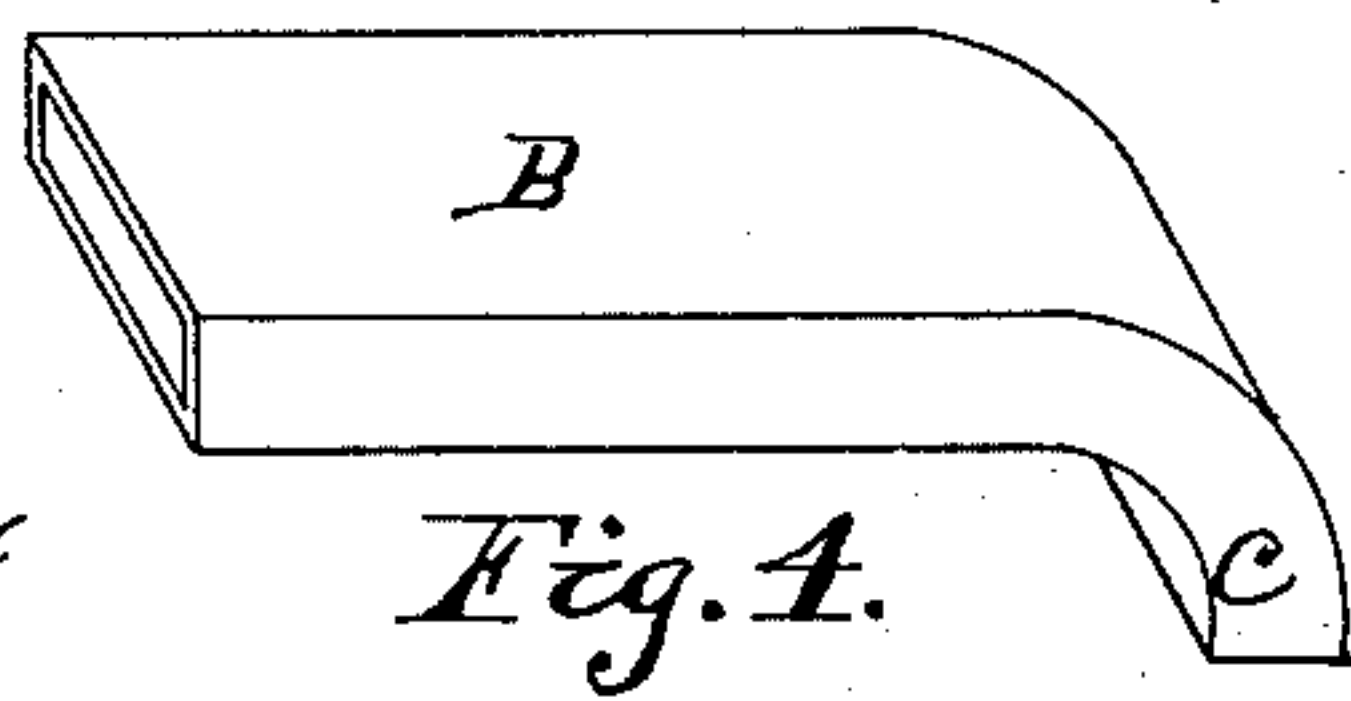
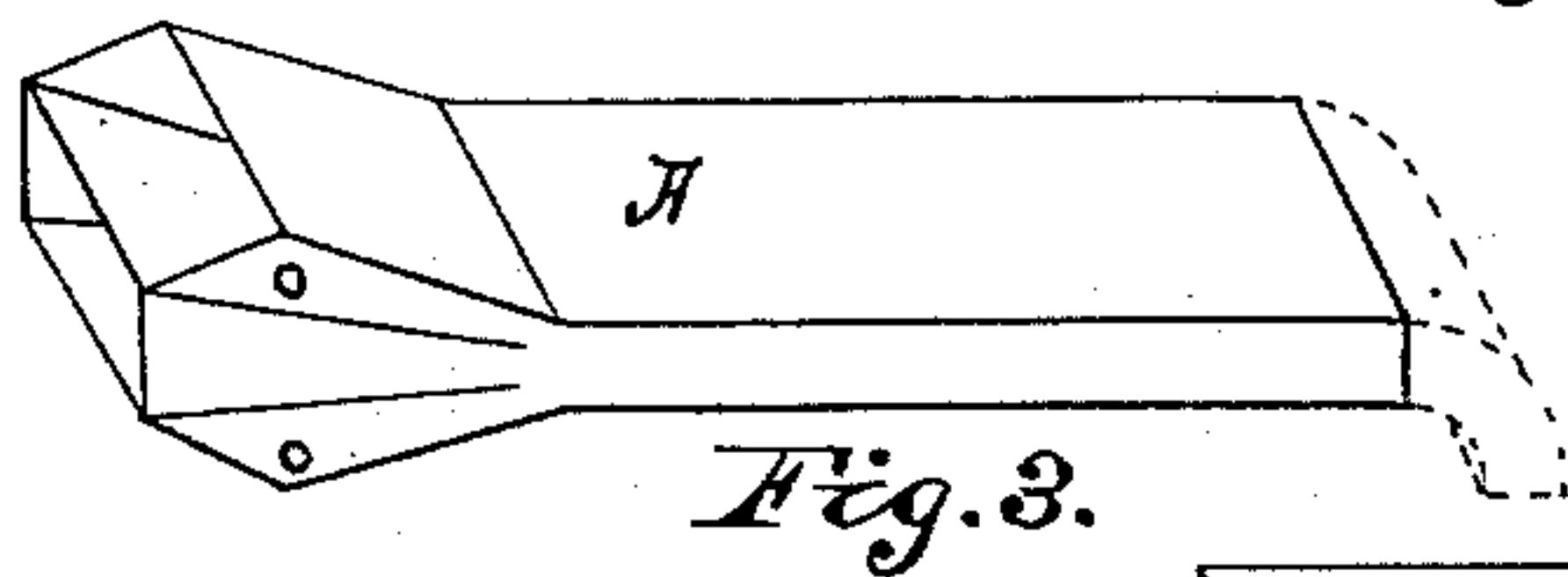
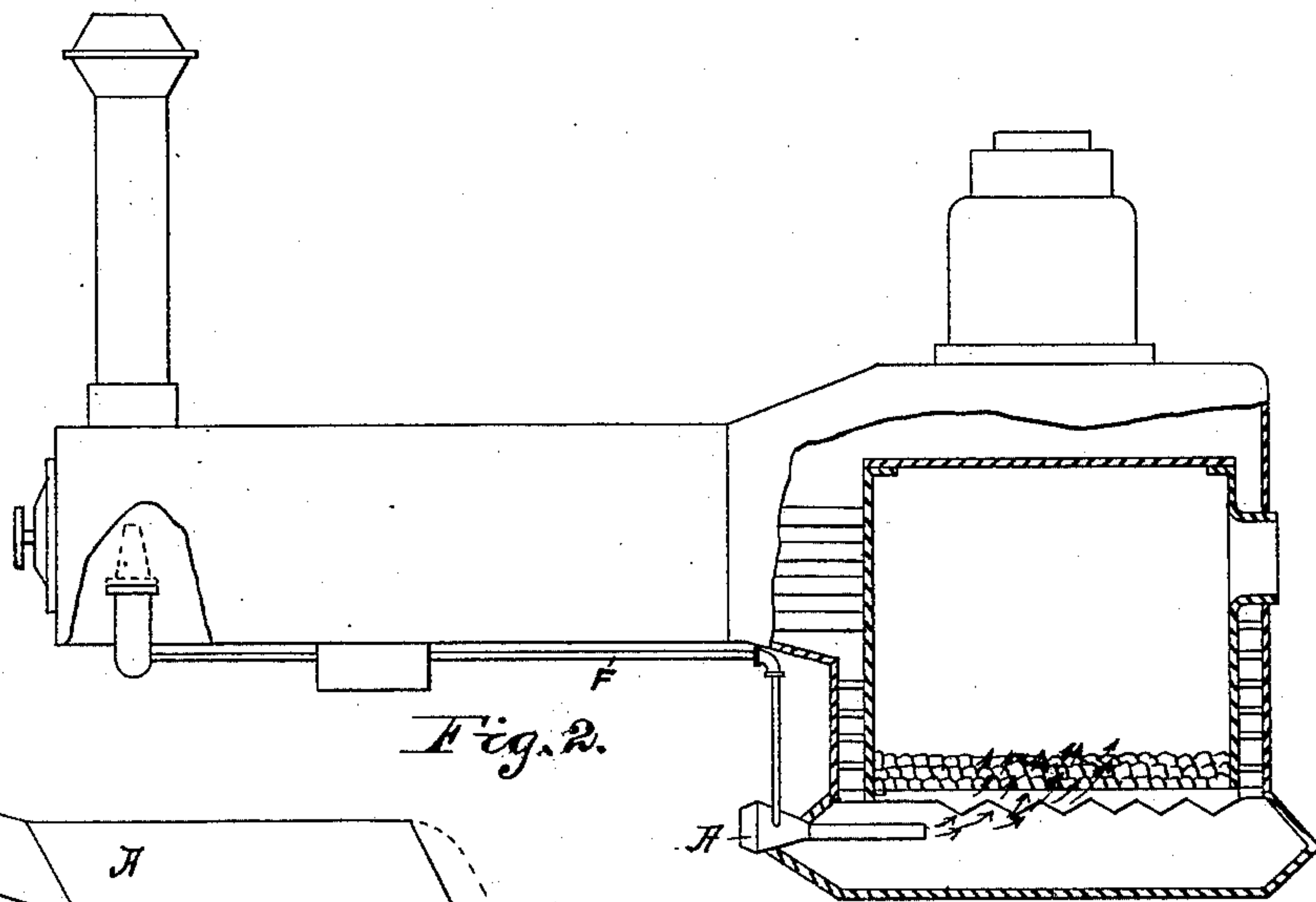
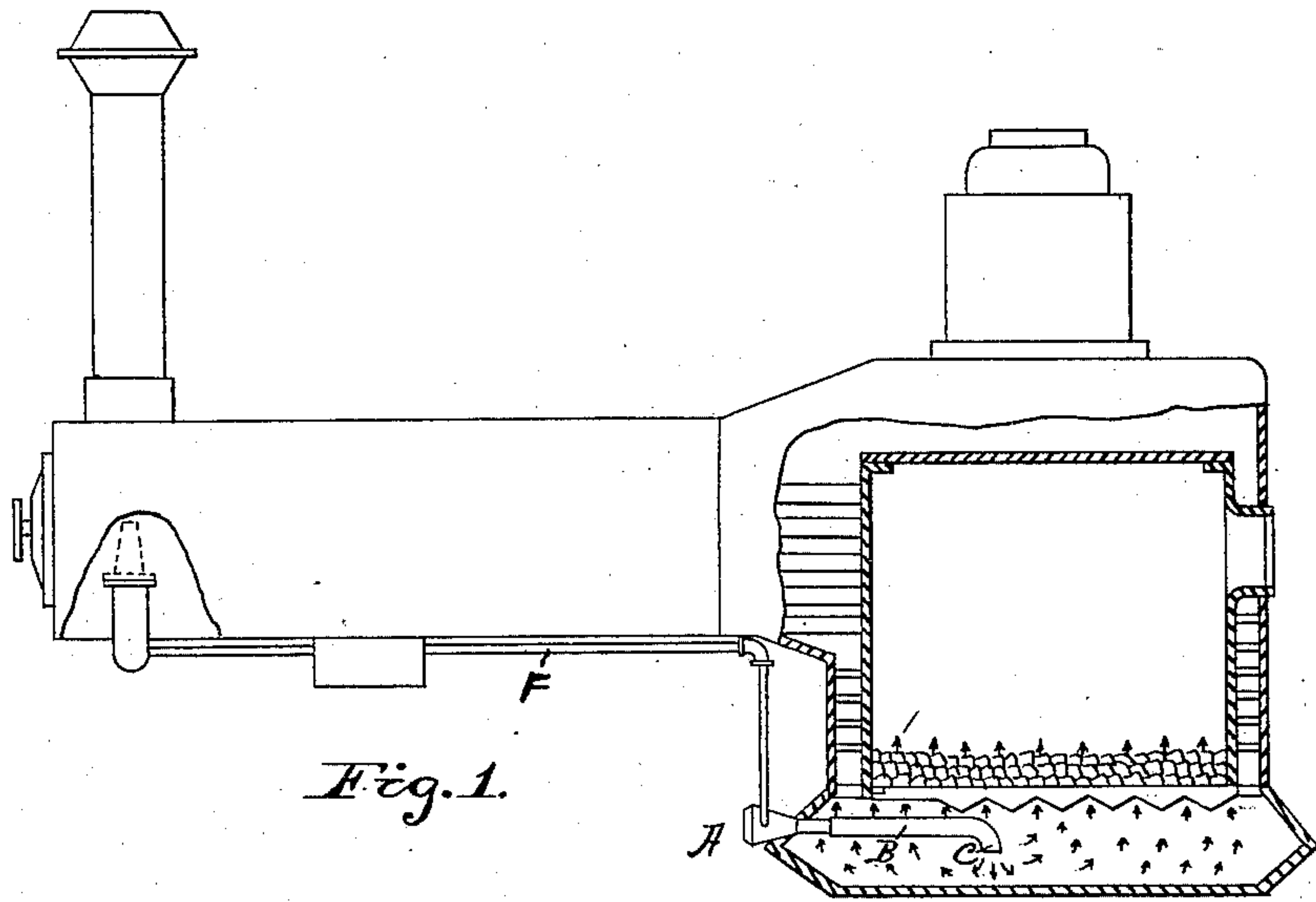


(No Model.)

E. B. CORNELL.  
AIR INJECTOR FOR FURNACES.

No. 353,351.

Patented Nov. 30, 1886.



WITNESSES:

Edw. M. Cullen.  
Chas. A. Mahony

INVENTOR

Elijah B. Cornell  
by his attorneys  
J. R. Rhoads  
Chas. A. Rutter.

# UNITED STATES PATENT OFFICE.

ELIJAH B. CORNELL, OF PHILADELPHIA, PA., ASSIGNOR TO THE E. B. CORNELL MANUFACTURING COMPANY, (LIMITED,) OF SAME PLACE.

## AIR-INJECTOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 353,351, dated November 30, 1886.

Application filed May 20, 1886. Serial No. 202,754. (No model.)

*To all whom it may concern:*

Be it known that I, ELIJAH B. CORNELL, a citizen of the United States, and a resident of the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Air-Injectors for Furnaces, of which the following is a specification.

My invention relates to improvements in air-injectors for furnaces in general, and it relates more particularly to improvements upon the Patent No. 287,754, granted to James W. Bonta, October 30, 1883; and the objects of my invention are to so introduce the air beneath the grate-bars—that is, into the ash-pit—that there will be a pressure in this space which will be equal at all points, and consequently the air which passes up through the grate-bars and fire and which creates the draft will not pass up at any one point alone, but will pass through every part of the fire, keeping it all aglow and causing a perfect combustion of the fuel.

In the accompanying drawings, forming part of this specification, and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a longitudinal central sectional elevation of a fire-box of a locomotive-boiler, and a side elevation, partly in section, of the boiler fitted with my improved air-injector. Fig. 2 is a similar view fitted with Bonta's invention; Fig. 3, a perspective view of Bonta's injector, and Fig. 4 a perspective view of my hood.

A is the injecting appliance, which is similar to that shown and described by Bonta in his patent referred to above.

F is the pipe connection used by Bonta for conducting steam from the exhaust-pipe or steam-dome to the injector.

B is a hood which I use in connection with Bonta's invention to increase the efficiency of the device.

In Bonta's invention (see Fig. 2) the air is injected through the injector A into the ash-pit through a straight pipe and parallel to the grate-bars. The consequence is that the air and steam pass into the ash-pit and up through

the fire, as shown by the arrows, causing the combustion of the coal in the track of the air, while the coal to both sides of this track is dead and is practically not affected by the injected air.

In my invention I simply slip over the end of the injector A a hood, B, which is bent down, as shown at C. The air passes through this hood and is discharged downward at right angles to the grate-bars. It strikes the bottom of the ash-pit and is dispersed to all points, raising the pressure at all points equally in this place. The air passing from the ash-pit passes up through every part of the fire, as shown by the arrows, and causes a complete and perfect combustion of the coal and a great saving of fuel, and as the combustion is perfect there will be no sparks or smoke.

I do not desire to limit myself to the use of the hood B alone, for the nozzle of the injector A may be bent down, as shown by the dotted lines in Fig. 3, or any other device may be used, the object being to introduce the air downward and at or nearly at right angles to the grate-bars.

The invention is not intended for locomotive-boilers alone, for it is applicable also to stationary and marine boilers, and may be applied to other injectors besides Bonta's.

Having thus described my invention, I claim—

1. The combination, with the fire-box and ash-pit of a furnace, of the injector A, with downwardly-bent nozzle and suitable devices, as described, for conducting air and steam to said injector, all substantially as and for the purposes set forth.

2. The combination, with the fire-box and ash-pit of a furnace, of the air-injector A, hood B, with downwardly-bent end C, and suitable devices, as described, for introducing air and steam to said injector, all arranged and operating substantially as and for the purposes set forth.

ELIJAH B. CORNELL.

Witnesses:

EDWD. G. MCCOLLIN,  
HARRY S. HOPPER.