W. J. O'NEAL.

Feeding Air to Furnaces.

No. 167,467. Patented Sept. 7, 1875.

Fig. 1

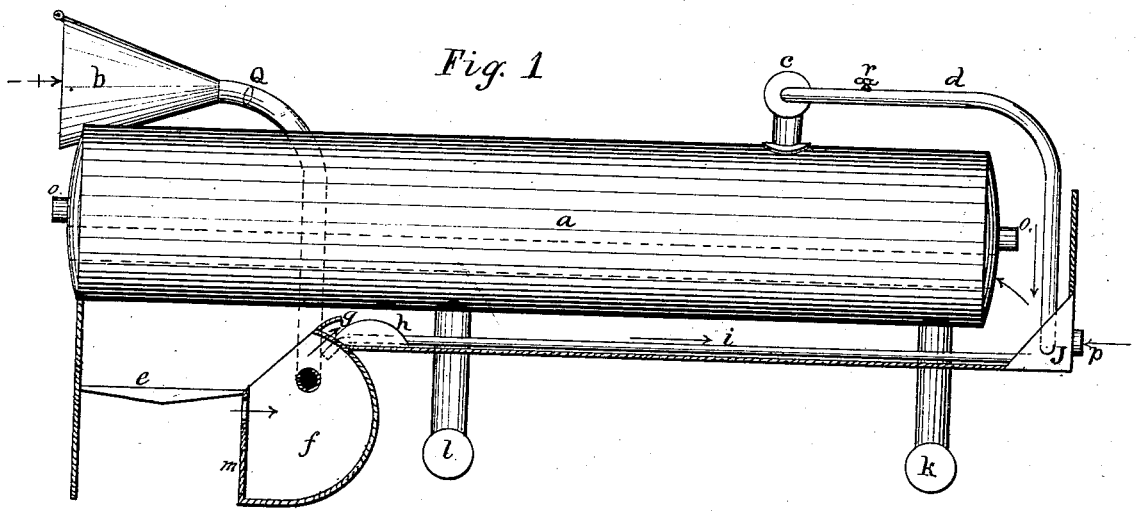
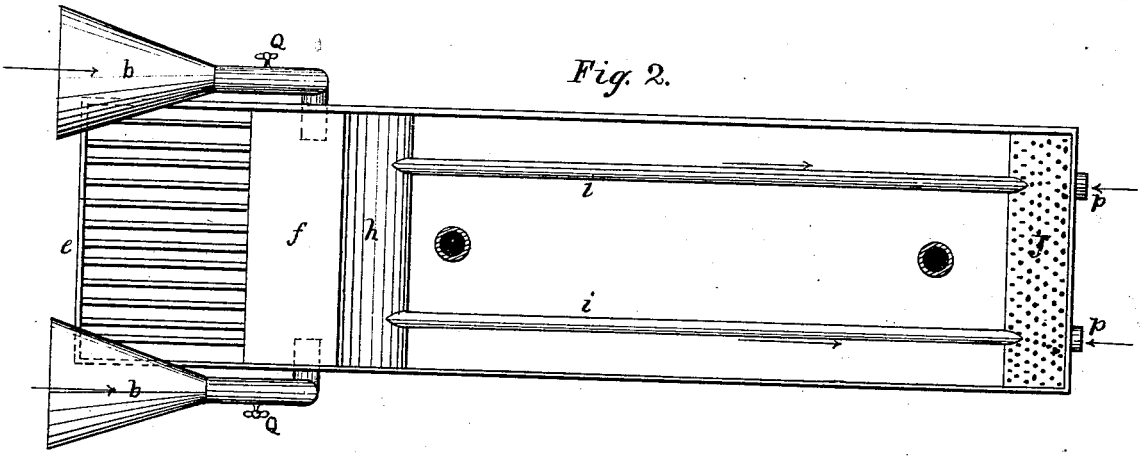


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM J. O'NEAL, OF NEWPORT, KENTUCKY.

IMPROVEMENT IN FEEDING AIR TO FURNACES.

Specification forming part of Letters Patent No. **167,467**, dated September 7, 1875; application filed January 7, 1875.

To all whom it may concern:

Be it known that I, WILLIAM J. O'NEAL, of the city of Newport, State of Kentucky, have invented a Smoke-Consuming Furnace, of which the following is a specification:

The object of my invention is the more perfect combustion of coal in furnaces for steam-boilers and such other places as it may be used; and consists in the manner of introducing cold air into the furnace through the bottom of combustion-chamber and heating the same before it reaches the flames of fire in combustion-chamber; also, in the manner of introducing air or steam or both into the rear end of furnace.

In the accompanying drawing, Figure 1 is a side elevation of a steam-boiler with my improvements attached.

a is the boiler, and may be of any kind or pattern desired. *b* is a funnel-shaped air-tube, made of malleable metal. *c* is an ordinary steam-dome. *d* is a steam-pipe leading from steam-dome to air-chamber *j*. *e* is an ordinary furnace under steam-boiler. *f* is an air-chamber, with sides and ends made of brick or iron, and top formed by the bottom of combustion-chamber and back of the first fire-wall, and a perforated metal plate covering the intervening space between the two. *g* is what I call a deflector, and is made of fire-clay or other fire-proof substance, and is set on top of first bridge-wall, coming out flush with the face of same and running back horizontal with bottom of boiler about twelve inches. *h* is a second bridge-wall, made of fire-clay or other fire-proof substance, and is built from the bottom of the combustion-chamber, commencing about nine inches in rear of first bridge-wall, with an arched top passing within about two inches of the back end of deflector *g*. *i* is an ordinary metal air-pipe, with its two ends resting in chambers *f* and *j*. J is an air-chamber, through which steam or air may be introduced into the back end of the combustion-chamber, through the perforated plate forming the front and top of the chamber. This chamber I form by securing a perforated plate of fire-clay across the back lower corner of the combustion-chamber. K is the stand-pipe to the boiler. L is the mud-drum. O is the flues in the boiler. Q is an ordinary damper to regulate the supply of air in chamber *f*.

The operation of a furnace with my device attached is as follows: When a fire is first built in the furnace the flame and smoke pass back over the first and second bridge-wall, in the ordinary way, until the second bridge-wall becomes heated sufficiently, when I open the damper Q and allow the air to pass into chamber *f*, thence through the perforated plate in jets, through the throat between the first and second bridge-wall, against the deflector *g*, which deflects the same, in the direction of the arrow, onto the heated surface of bridge-wall *h*, where the air becomes rarefied and, by its expansion, presses the flames up close against the boiler, thus more effectually utilizing the heat; and, by reason of the airs being lighter than the flames, as they come from the furnace heavily charged with carbon, I claim that the air rises and more thoroughly mixes with the carbon, and hence produces more complete combustion than when the air is introduced from the top of the combustion-chamber, and, for the purpose of further facilitating combustion, and at times to increase the draft of the furnace, I pass a current of air back from chamber *f*, through pipe *i*, into chamber *j*, and thence in jets through its perforated wall into the back end of the combustion-chamber; and, as occasion may require to facilitate the draft, I introduce steam into chamber *j* through pipe *d*, and thus throw jets of steam and air combined into the back end of the combustion-chamber.

I claim as my invention—

1. The above-described smoke-consuming device, consisting of pipe *b*, air-chamber *f*, deflecting-plate *g*, the second bridge-wall *h*, pipe *i*, back air-chamber J, and pipe *d*, combined and operated substantially as and for the purposes set forth.

2. The deflecting-plate *g*, in combination with second bridge-wall *h*, air-chamber *f*, pipe *i*, and back air-chamber J, combined and operated substantially as and for the purposes set forth.

3. The bridge-wall *h*, in combination with deflecting-plate *g*, and air-chamber *f*, combined and operated substantially as and for the purposes set forth.

WILLIAM J. O'NEAL.

Attest:
S. H. WHITMORE,
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