J. L. WINSLOW.
Boiler-Furnace.

No. 203,688. Patented May 14, 1878.

Fig. 1.

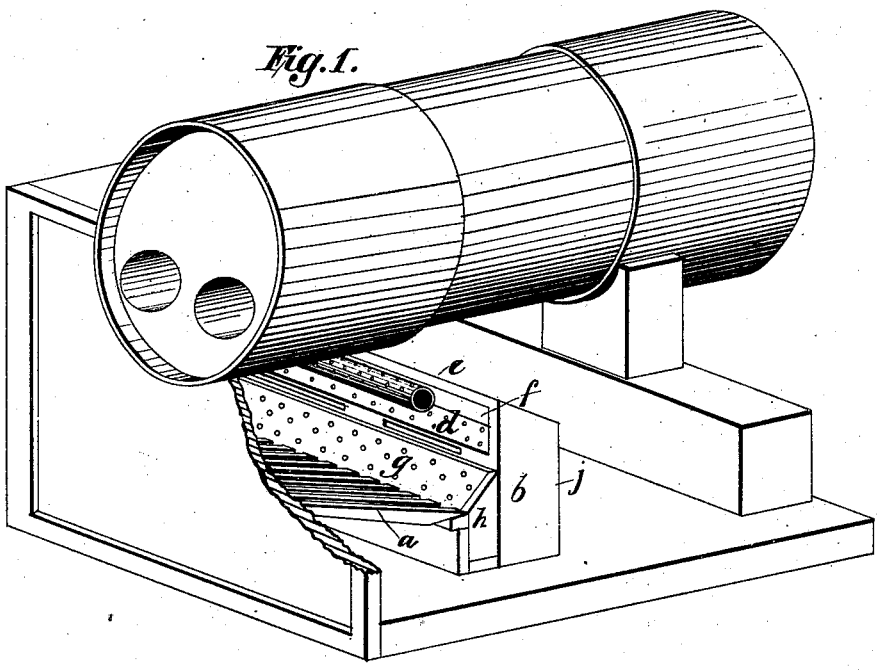


Fig. 2.

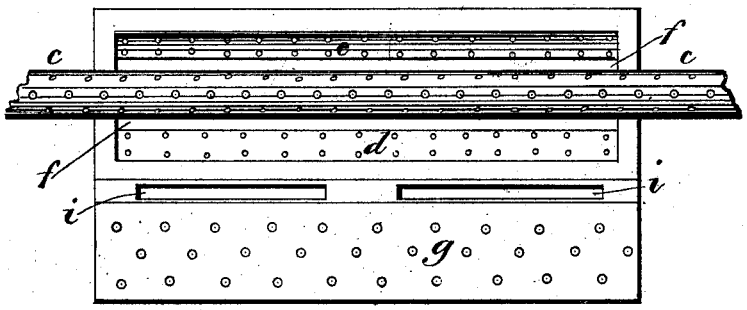
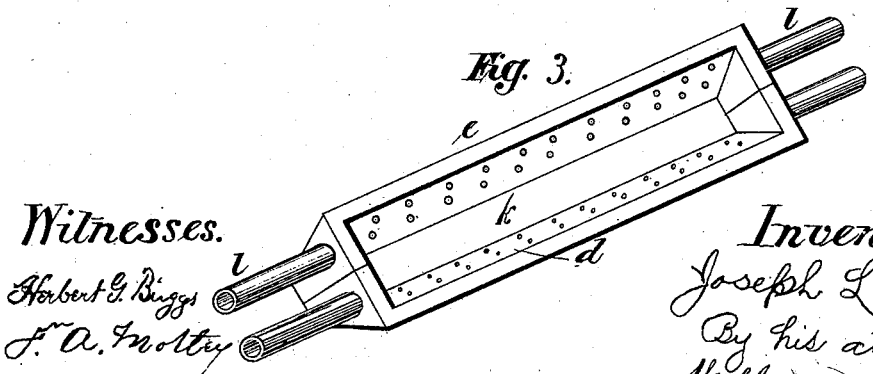


Fig. 3.



Witnesses.
Herbert G. Biggs
F. A. Moltby

Inventor:
Joseph L. Winslow
By his attorney
William Henry Clifford

UNITED STATES PATENT OFFICE.

JOSEPH L. WINSLOW, OF PORTLAND, MAINE.

IMPROVEMENT IN BOILER-FURNACES.

Specification forming part of Letters Patent No. **203,688**, dated May 14, 1878; application filed June 28, 1877.

To all whom it may concern:

Be it known that I, JOSEPH L. WINSLOW, of Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Furnace-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective of my invention, with parts broken out. Fig. 2 is a front view of the bridge-wall, with pipes, deflector, and inclined plate. Fig. 3 is a modified form of deflector.

Same letters show like parts.

The purpose of my invention is to produce certain new and useful improvements in boiler and other furnaces, whereby the combustion of fuel is rendered more nearly perfect, and whereby smoke and gases which usually escape are wholly or partially consumed.

a is the grate and fire-pot. *b* is the bridge-wall. *c* is a pipe, perforated with numerous holes, to admit air into the flames as they pass up the inclined surface *d*. *e* is a deflector, by which the flames and other products of combustion pass while making their exit through the aperture *f*. *g* is an inclined plate over an air-chamber, *h*. *i* is a slot or slots opening into the space or spaces *j* under the inclined surface *d*.

I will now proceed to describe the objects for which the several devices referred to are employed. Flame, smoke, and gases enter the flaring space *k*, formed by the deflector *e* and the inclined surface *d*. Across the mouth of this space extends the perforated pipe *c*, for the purpose of admitting fresh air and oxygen into the smoke, &c., passing into the space.

By the deflector *e*, the space between the boiler and the bridge-wall is contracted, and the air and smoke is held a greater time, and thus heated to an increased temperature, before passing the deflector, and thus a more perfect combustion takes place. This is the fact whether outside air is injected or not. The deflector improves the efficacy of the bridge-wall.

Fig. 3 shows a form of this deflector, which may be of iron, made in two pieces, and supplied with numerous perforations, and made hollow, so that as the smoke and flames pass through the space *k* air can be injected into the same through these holes. *l* shows pipes through which air is conducted into the hollow perforated deflector. The air, being heated within the hollow of the deflector, is in the best state for being mingled with the products of the imperfect combustion on the grate *a*.

If desired, the upper part of the deflector may be made of iron and the lower half of fire-brick or clay.

The form of the deflector may render the use of the pipe unnecessary.

The slots *i* admit flame and heat to pass under the inclined plate or surface *d*. This secures a more complete heating of said surface, by reason of its having heat and flames on both sides, and, when the perforated deflector is used, very much improves its efficient action.

Into the air-chamber *h*, as also into the pipe *c* and the perforated deflector, whether these devices be used separately or conjointly, air from without is forced by convenient means.

When the air is admitted into the chamber *h*, it passes through the perforation in the inclined plate *g* into the flame, &c., at an acute angle with the direction of the flames as they are swept by the draft. This prevents, when united with the force employed to inject the air, the said air from passing immediately up over the bridge-wall and up the inclined surface *d*.

The air thus introduced, being forced in a general direction contrary to the direction of the draft, has time to mingle with the smoke and gases, and better to produce the desired effect in the combustion.

By the use of either or all conjointly of the above-described devices combustion can be rendered nearly perfect, and little or no visible or perceptible escape of smoke from chimney will take place.

Furthermore, to obtain a given degree of heat, much less draft under the grate is required.

In speaking in this specification of the air being forced or injected, I mean that a force-

blast of air is used such as is created by a fan-blower.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the perforated pipe *c*, grate *a*, deflector *e*, inclined surface *d*, forming the space *k*, and the slots *i* and spaces *j*, as and for the purposes set forth.

2. The hollow perforated deflector, made in two parts, as shown in Fig. 3, in combination with the bridge-wall provided with slots *i* and spaces *j*, substantially as described.

3. The combination of the inclined perforated plate *g*, air-chamber *h*, cap or deflector *e*, made hollow, surface *d*, with proper air-conducting tubes, as herein set forth.

4. The inclined perforated plate *g*, air-chamber *h*, slots *i*, and spaces *j*, with the bridge-wall proper air-conducting tubes, as herein described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOSEPH L. WINSLOW.

Witnesses:
HERBERT G. BRIGGS,
F. A. MOTLEY.