A. GROSS.

Smoke-Consuming Furnace.

No. 202,646. Patented April 23, 1878.

Fig. 1

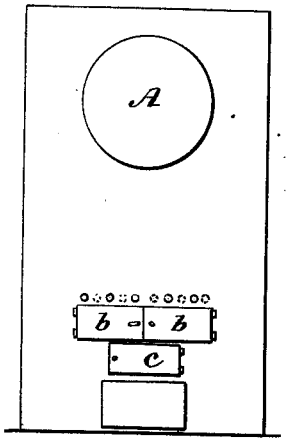


Fig. 3.

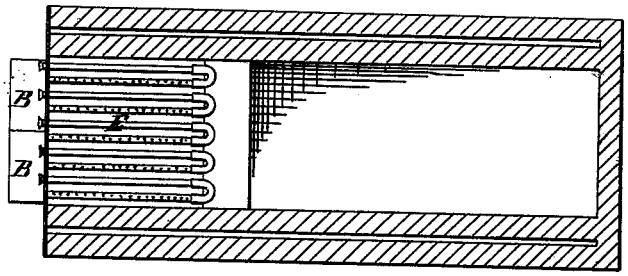


Fig. 2.

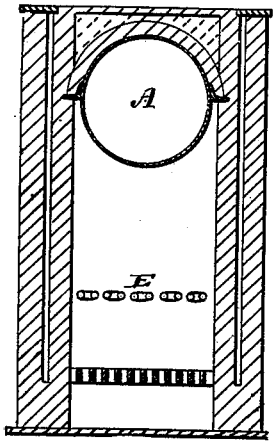


Fig. 4.

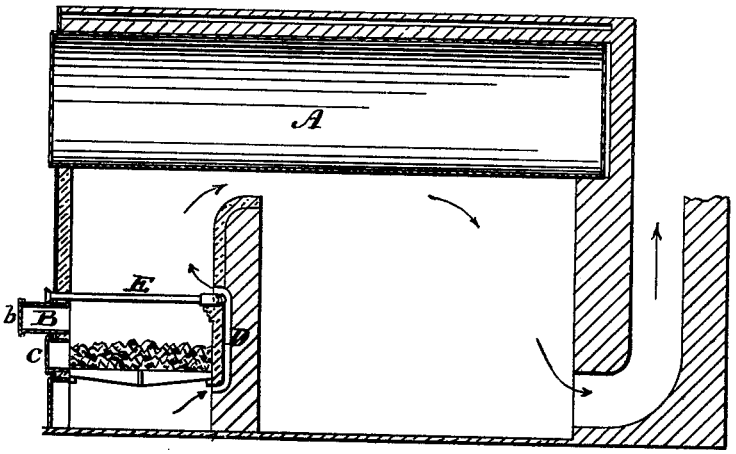
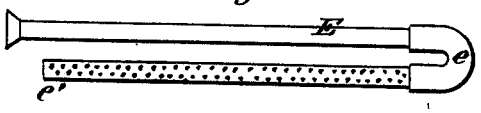


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

ANDREW GROSS, OF NEW YORK, N. Y.

IMPROVEMENT IN SMOKE-CONSUMING FURNACES.

Specification forming part of Letters Patent No. **202,646,** dated April 23, 1878; application filed March 12, 1878.

To all whom it may concern:

Be it known that I, ANDREW GROSS, of the city, county, and State of New York, have invented a new and useful Improvement in Smoke-Consuming Furnaces, which improvement is fully set forth in the following specification and accompanying drawing, in which—

Figure 1 is a front elevation. Fig. 2 is a sectional view thereof. Fig. 3 is a vertical section. Fig. 4 is a longitudinal section. Fig. 5 is a detached view of twin air-supplying pipes.

In the drawings, A represents the boiler; B, the retort; E, the pipes or air-ducts.

Other appropriate letters designate the several parts.

The object of my invention is to furnish a device by which the smoke and gases escaping from burning fuel may be consumed.

To effect this object I make the fuel-chamber much deeper than ordinary, and constructed with a lower pit and an upper division, terminating with an outwardly-projecting box or retort, B. The lower pit has an ordinary furnace-door, C. The retort has similar doors *b b*. The fire is first lighted in the lower pit through the door C, and the fuel is afterward fed through the retort B, where it is allowed to remain a given time, and thence is distributed over the live coal in the lower section.

Above the upper part of the fuel-chamber, and directly over the ascending flames, are arranged longitudinally a series of hollow pipes joined together at the rear in couples. One length of each of these twin pipes is perforated, the other length is imperforated, thus making a series of alternated perforate and imperforate tubes. The open end or mouth of each imperforate tube extends through the outer front wall of the furnace into the open air, as shown in Figs. 1 and 3, and may be made with trumpet-shaped ends, if desirable, as shown in detail in Fig. 5. The end or mouth of the perforated arm rests within the wall, but is not bricked up or closed, but remains free, so that the heated air can escape therefrom.

At the rear of the fuel-chamber is an air-duct, D, commencing under the grate-bars, extending all the way up the back, and terminating in the open space above the fuel-chamber and under the boiler.

The jointed ends *e* of the tubes E extend, through the fire-brick bridge-wall forming the back of the fire-chamber into the air-duct D, and they are thus kept constantly supplied exteriorly with a blast of cool air.

As the open end of each twin pipe extends through the front wall, as before described, as soon as the fire is lighted, the draft draws a constant supply of fresh air through each imperforate arm, which circulates through the joint *e*, and is eventually expelled through the jet-holes of the perforate arm and its interior open end *e'*. In its passage this air becomes heated, and thus sprays of heated air are constantly commingled with and distributed into the whole mass of the flames rising from the fire below. An ascending draft is maintained above the burning fuel, causing the combustion of the generated smoke and gases.

I do not claim, broadly, as my invention the principle of supplying fuel-chambers with sprays of heated air, as this has been done before by means of perforated pipe surrounding the side walls of furnaces. Experience has shown that this mode of construction gives but a partial and imperfect supply of air-sprays, necessarily limited to the margin of the furnace, while by my series of longitudinal alternately-perforated twin pipes extending lengthwise in the furnace from front to bridge-wall, over the entire surface of the incandescent fuel, a constant uniform shower of heated air is evenly distributed over the whole mass of ascending flame.

What I claim as my invention is—

In a furnace for heating boilers, a series of twin coupled pipes, E, alternately perforated and imperforated, arranged horizontally over the entire fuel-chamber, the rear joints of said pipes resting on the bridge-wall, whereby the ascending flames are mingled with sprays of heated air for the more perfect combustion of the fuel, substantially as described.

ANDREW GROSS.

Witnesses:
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