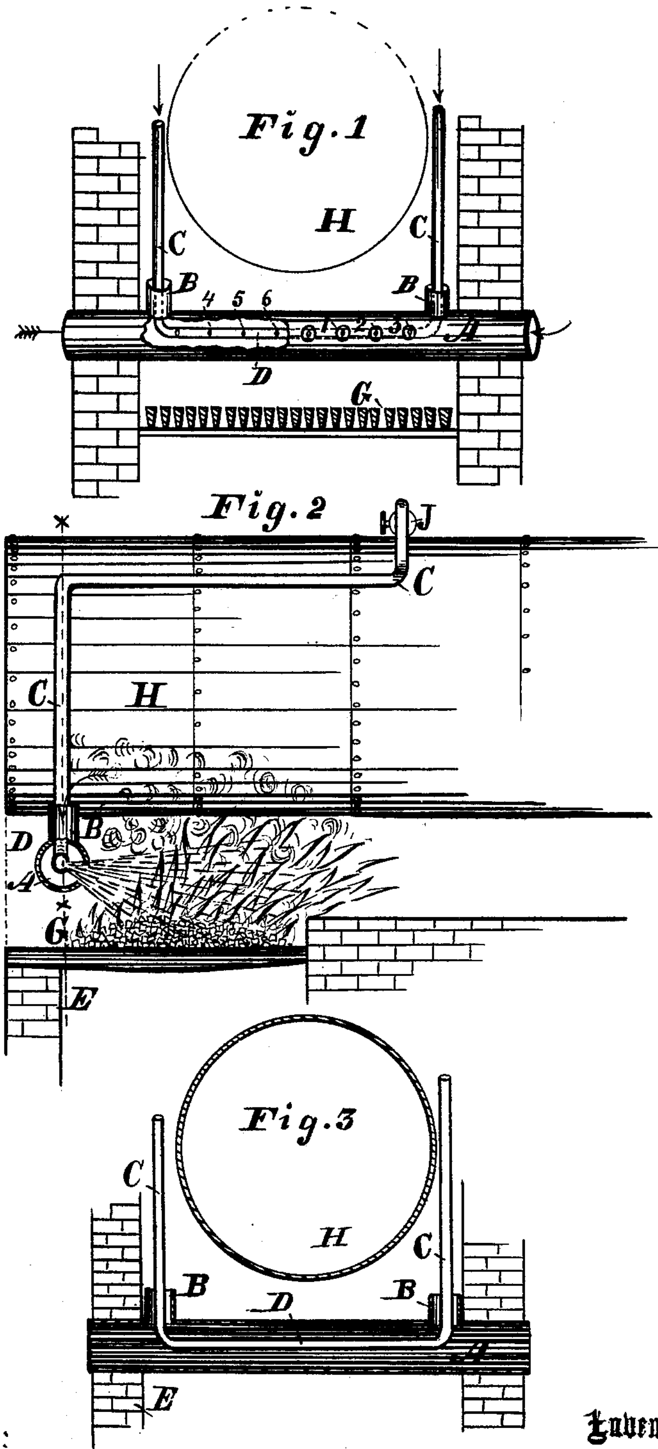
L. C. COOK.

BLOWERS AND SMOKE CONSUMERS FOR FURNACES.

No. 190,706. Patented May 15, 1877.



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LUTHER C. COOK, OF OTTUMWA, IOWA.

IMPROVEMENT IN BLOWERS AND SMOKE-CONSUMERS FOR FURNACES.

Specification forming part of Letters Patent No. **190,706**, dated May 15, 1877; application filed February 1, 1877.

To all whom it may concern:

Be it known that I, LUTHER C. COOK, of Ottumwa, in the county of Wapello and State of Iowa, have invented an Improved Boiler-Furnace, of which the following is a specification:

The object of my invention is to economise labor and fuel in the production of steam-power, and to prevent the annoyance and waste occasioned by smoke and soot. It consists in forming, arranging, and combining conducting and distributing tubes with a boiler and furnace in such a manner as to bring together hydrogen and oxygen gases, to be simultaneously and automatically discharged and distributed in the combustion-chamber and mingled with the carbon, to produce perfect combustion and increased amount of caloric, all as hereinafter fully set forth.

Figure 1 of my drawing is a perspective view, illustrating the construction of my combined hydrogen and oxygen conveying and distributing tubes.

A is a straight tube, preferably cast metal, that may vary in length and diameter to suit furnaces of different dimensions. It is open at each end. B B are tubular and open-ended branches near the ends of the tube A, designed to receive and protect minor tubes from becoming too highly heated. 1 2 3 represent a series of openings in the tube A, in a line between the branches B, through which jets of migled hydrogen and oxygen gases are discharged into the combustion-chamber of the furnace. C C represent minor tubes leading from the steam-chamber of the boiler into the branches B of the tube A, to unite with a distributing-tube, D, inclosed in the tube A. 4 5 6 represent a series of openings in the inclosed distributing-tube D, corresponding in position with the series of openings 1 2 3 in the tube A.

Fig. 2 is a side elevation of a boiler-furnace, illustrating the application and operation of my complete invention. Fig. 3 is a transverse sectional view through the line *x x* of Fig. 2.

E E is the furnace-wall; G, the grate; H, the boiler. The conveying-pipes C rise from the branches B of the tube A and pass upward through the combustion-chamber, near the front end of the boiler H, to near its top surface, and from thence rearward at the side of the boiler to its rear portion, where they are connected with the boiler, or a steam-chest, by means of a combined eduction-tube and globe-valve, J, or in any suitable way, so that the flow of steam into and through the tubes C can be readily governed by the operator to regulate the automatic blast of mingled gases, as required to suit the varying conditions of the furnace-fire.

In the practical operation of my invention, when a fire has been started on the grate G, and steam generated in the boiler H, the eduction-tube J is opened, and the steam is allowed to fill the conveying-tubes C, which have become heated in the combustion-chamber. As the steam passes forward through these tubes C it becomes superheated and decomposed, and expanded, and presses out of the series of openings 4 5 6 of the inclosed distributing-tube D in the form of hydrogen gas, and is discharged and distributed into the fire-chamber of the furnace through the series of openings 1 2 3 in the surrounding tube A. The action of the hydrogen gas thus formed and forced into the furnace causes a suction in the tube A, that draws cold air in through the open ends thereof and hot air mingled with carbonic-acid gas through the open ends of the branches B, all to be caught, absorbed, and mingled with the forced jets of hydrogen gas, and therewith carried and discharged into the furnace fire-chamber to produce perfect combustion of the carbonaceous fuel. The series of openings 1 2 3 in the tube A, and 4 5 6 in the tube D, may vary in number, size, and form, and position, as desired. They are preferably placed in such a position as to direct the jets of mixed gases into the combustion-chamber at an angle of about forty-five (45) degrees relative to the horizontal grate-surface.

I am aware that steam has been superheated and injected to furnace-fires to produce a forced blast, and that a steam-distributing pipe has been inclosed in a perforated tube, as a means of mingling gases in a furnace-chamber; but I claim that my manner of forming an open-ended tube, A, having open-ended branches B formed integral therewith, and a series of perforations intervening between the branches,

as a means of inclosing and protecting a steam conveying and distributing tube inside of the fire-chamber, and also conveying oxygen from the outside of the furnace to produce a forced blast of mingled gases, is a novel and valuable improvement.

By forming the open-ended branches B on the open-ended and perforated tube A, at a suitable distance from its ends, it is specially adapted to rest upon the furnace-walls and extend through the walls to convey the natural atmosphere inward while the branches are in proper position to receive the steam-conveying pipes inside of the walls. The manner of construction is thus simplified, and the results contemplated are more economically produced.

I claim as my invention—

In a boiler-furnace, the open-ended tube A, having open-ended branches B B opening into the furnace, and a series of intermediate openings, 1 2 3, the steam conveying, superheating, and distributing tubes C, C, and D, constructed and arranged and combined relative to the furnace-walls E E, and grate G, and the boiler H, substantially as and for the purposes shown and described.

LUTHER C. COOK.

Witnesses:
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