

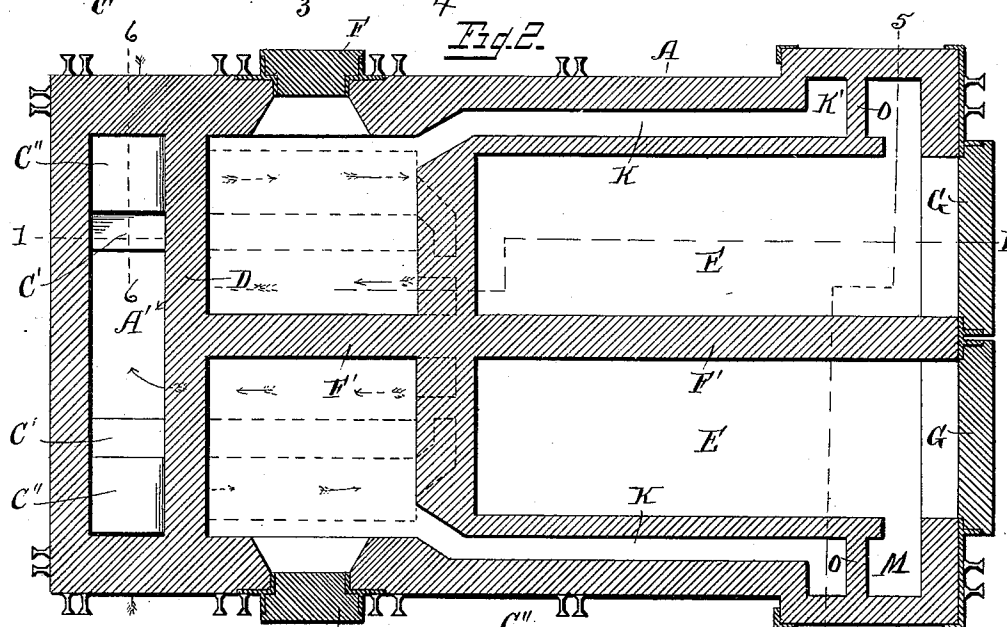
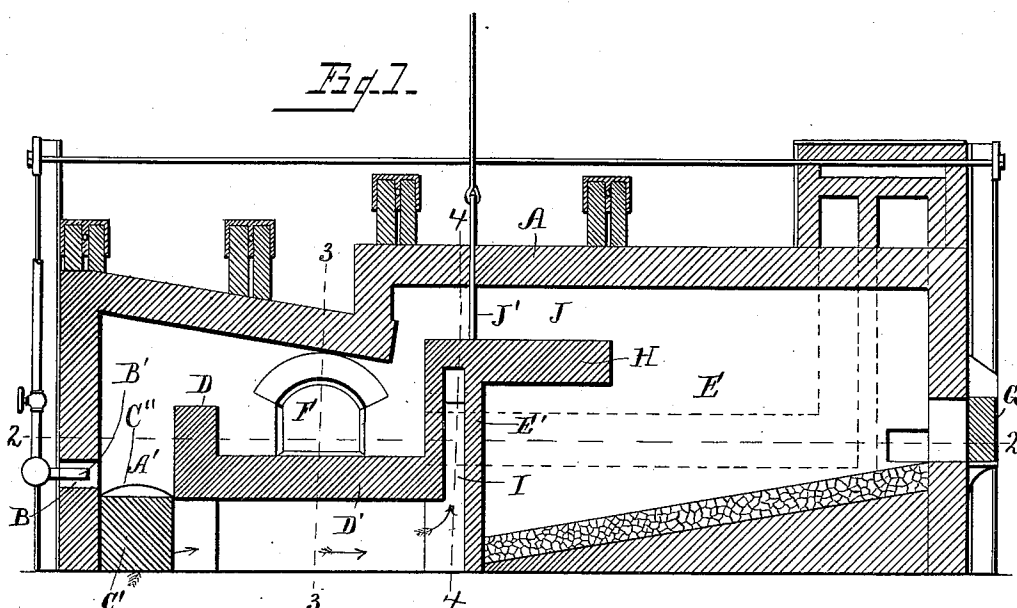
(No Model.)

2 Sheets—Sheet 1.

S. B. GROVE & G. EMLONG.  
COMBINED PAIR AND REHEATING FURNACE,

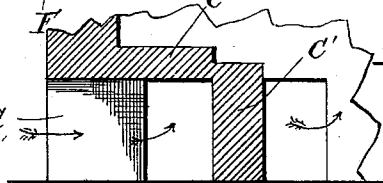
No. 568,847.

Patented Oct. 6, 1896.



Witnesses

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J. M. Fowler, Jr., C.



Inventors

Samuel B. Grove,  
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their Attorney.

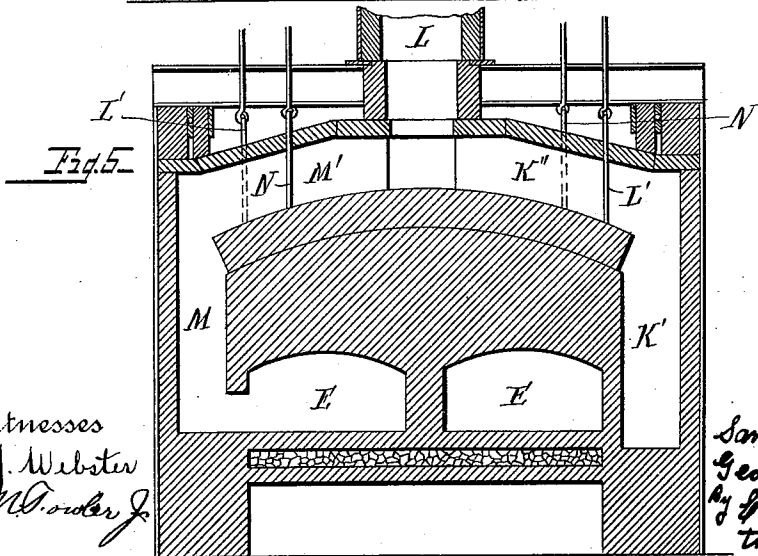
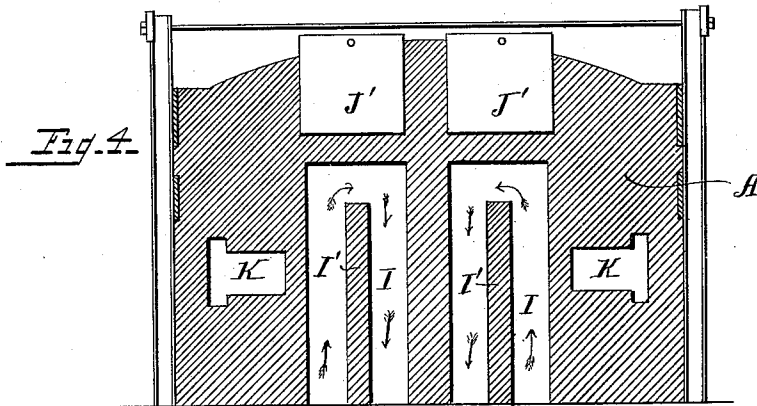
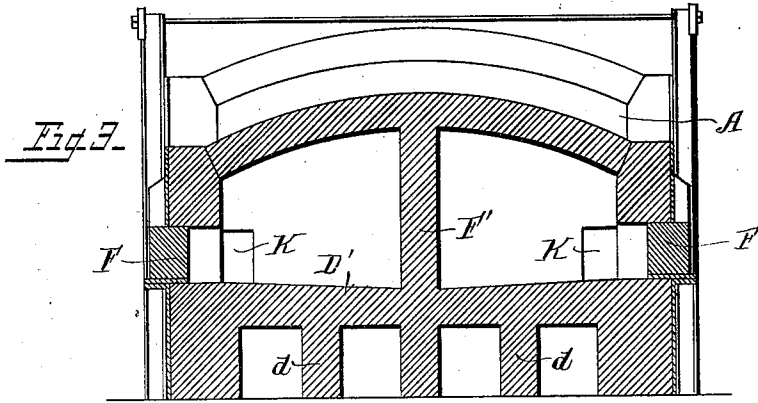
(No Model.)

2 Sheets—Sheet 2.

S. B. GROVE & G. EMLONG.  
COMBINED PAIR AND REHEATING FURNACE.

No. 568,847.

Patented Oct. 6, 1896.



Witnesses  
C. J. Webster  
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# UNITED STATES PATENT OFFICE.

SAMUEL B. GROVE AND GEORGE EMLONG, OF MUNCIE, INDIANA.

## COMBINED PAIR AND REHEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 568,847, dated October 6, 1896.

Application filed January 11, 1896. Serial No. 575,164. (No model.)

*To all whom it may concern:*

Be it known that we, SAMUEL B. GROVE and GEORGE EMLONG, citizens of the United States, residing at Muncie, in the county of Delaware and State of Indiana, have invented certain new and useful Improvements in Pair and Sheet Furnaces; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a new and useful improvement in a combined pair and reheating furnace; and it consists in the construction and arrangement of parts hereinafter described, and definitely pointed out in the claims.

The aim and purpose of this invention is to construct a combined pair and sheet furnace producing the greatest amount of heat with the least expenditure of fuel, and this object is accomplished by passing the same products of combustion first through the pair-furnace and then into the sheet-furnace and thence to the stack.

A further object of this invention is to construct the pair and sheet furnace with two compartments having separate doors for each compartment, so that each compartment may be charged or discharged without materially affecting the temperature of the other compartments, and also in providing the combined furnace with flues and dampers to regulate the heat in the different compartments or shut off the heat entirely from the sheet-furnace and convey the products of combustion direct from the pair-furnace to the stack; and also, further, in constructing a furnace occupying a small space and one that is cheaply built and easy to manipulate. These and other objects not hereinbefore specified are accomplished by the construction illustrated in the accompanying drawings, wherein like letters of reference indicate corresponding parts in the several views, and in which—

Figure 1 is a vertical longitudinal section on the line 1 1, Fig. 2. Fig. 2 is a sectional plan on the line 2 2, Fig. 1. Fig. 3 is a vertical cross-section on the line 3 3, Fig. 1. Fig. 4 is a vertical cross-section on the line 4 4, Fig. 1. Fig. 5 is a vertical cross-section on the

line 5 5, Fig. 2; and Fig. 6 is a section on the line 6 6, Fig. 2.

In the drawings, A represents the casing, constructed of the ordinary materials used for that purpose and built in the usual manner.

A' represents the combustion-chamber, provided with the apertures B, through which pass the supply-pipes B', carrying the gaseous or oleaginous fuels.

While we have shown a construction adapted either to gas or oil, we do not wish to confine ourselves to these fuels, for with but slight changes of construction we could substitute any other suitable fuels which would produce the desired heat.

C designates air-passages under the combustion-chamber leading to the opposite outsides of the casing. The inner ends of these passages are blocked by the walls C' and are covered by the arch C'' to prevent the air from rising directly into the combustion-chamber, for a purpose hereinafter described.

D designates the bridge-wall between the combustion-chamber and pair-furnace. The pair-furnace is constructed with a bottom D', supported on the vertical walls d, and is separated from the reheating or sheet furnace E by the separating-wall E'. The pair-furnace is provided with doors F, arranged on opposite sides thereof, and is divided centrally by the wall F', forming two compartments, with a door for each compartment. This wall F' extends from the bridge-wall D the entire length of the furnace, and besides dividing the pair-furnace it divides the reheating-furnace into two independent compartments. Each one of these compartments is provided with a door G for charging and discharging the compartments independent of each other.

The separating-wall E' is provided with a hood or arch H, extending partly over the rear of the reheating or sheet furnace. This wall E' is formed with hollow portions I, which are divided by the walls I', which do not extend to the top of the hollow portions, and allow a circulation of air therethrough. It will be noticed that a space is left under the pair-furnace, divided by the wall d and the dividing-wall F'. This space connects at one end with the air-passages C and at the

opposite end with the hollow portions of the separating-walls, and the air will circulate under the pair-furnace and through the hollow portions back to the bottom of the combustion-chamber, as shown by the arrows in Figs. 1 and 4.

The separating-wall E' is provided with two apertures J, through which the products of combustion pass from the pair-furnace into the reheating or sheet furnace. These apertures are controlled by the dampers J', which preferably extend through the casing and are operated by any suitable means.

K represents horizontal flues, there being one flue for each compartment of the pair-furnace, which lead from this furnace on opposite sides of the sheet or reheating furnace to vertical flues K' at the rear of the casing. These vertical flues in turn lead to the flues K'', which lead to the stack L and are controlled by the dampers L', which can be operated in any suitable manner.

M represents vertical flues leading from the front of the sheet or reheating furnace to the flues M', which lead to the stack L and are controlled by the damper N, which are also controlled by any suitable means. (Not shown.) These vertical flues K and M and the flues K' and M' are separated by the wall O and are disconnected their entire length.

In the construction as above described it will be seen that the heat can be entirely shut off from the reheating or sheet furnace by means of the dampers J', and the products of combustion will then pass through the flues K K' K'' to the stack, or else these flues are closed by the dampers L', and the dampers J' open, when the heat will pass through the apertures J in the dividing-wall into the reheating and sheet furnace and to the stack through the flues M and M'.

By properly operating the various dampers the heat passing through the different furnaces and compartments can be readily regulated. By the arrangement of the air-passages under the pair furnace and through the separating-wall the cold air is taken from the outside of the furnace and is gradually but highly heated before entering the combustion-chamber, thereby aiding the combustion of the fuel, as is well understood. It will also be noticed that by using the same products of combustion and allowing the heat to pass from the pair furnace direct to the sheet or reheating furnace the metal after being

changed from the pair furnace to the reheating-furnace can be reheated to a uniform degree without affecting the heat in the pair furnace, and by dividing the furnace into compartments by shutting off one side of the furnace by the dampers all the heat can be concentrated on one compartment or the quantity of fuel used reduced in proportion.

We are aware that many minor changes can be made in the construction and arrangement of parts hereinbefore described and shown without in the least departing from the nature and principles of our invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a furnace, the combination with a pair furnace and sheet or reheating furnace, of a dividing-wall separating the furnaces into compartments, a combustion-chamber, passage-ways connecting the combustion-chamber with the compartments of the pair and sheet or reheating furnaces adapted to pass the products of combustion through the compartments of the pair furnace and then through the compartments of the sheet or reheating furnace, dampers controlling said passage-ways, flues leading from the compartments of the pair furnace to the stack, dampers for controlling said flues, flues leading from the compartments of the sheet or reheating furnace to the stack, and dampers for controlling said flues, substantially as described.

2. In a furnace, the combination with a pair furnace and sheet or reheating furnace, of a separating-wall separating the pair furnace from the sheet or reheating furnace, a flue connecting the pair furnace with the sheet or reheating furnace, passing through the separating-wall, a damper for controlling said flue, a flue leading from the pair furnace to the stack, a damper for controlling said flue, a flue leading from the sheet or reheating furnace to the stack, a damper for controlling said flue, a combustion-chamber, and a passage-way connecting the said chamber with the pair furnace, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

SAMUEL B. GROVE.  
GEORGE EMLONG.

Witnesses:

H. PALMER,  
JOHN W. SANDERS.