(No Model.) 3 Sheets—Sheet 1.

A. H. CALVELAGE & J. M. DODGE.

GAS FURNACE.

No. 306,717. Patented Oct. 21, 1884.

Fig. 1.

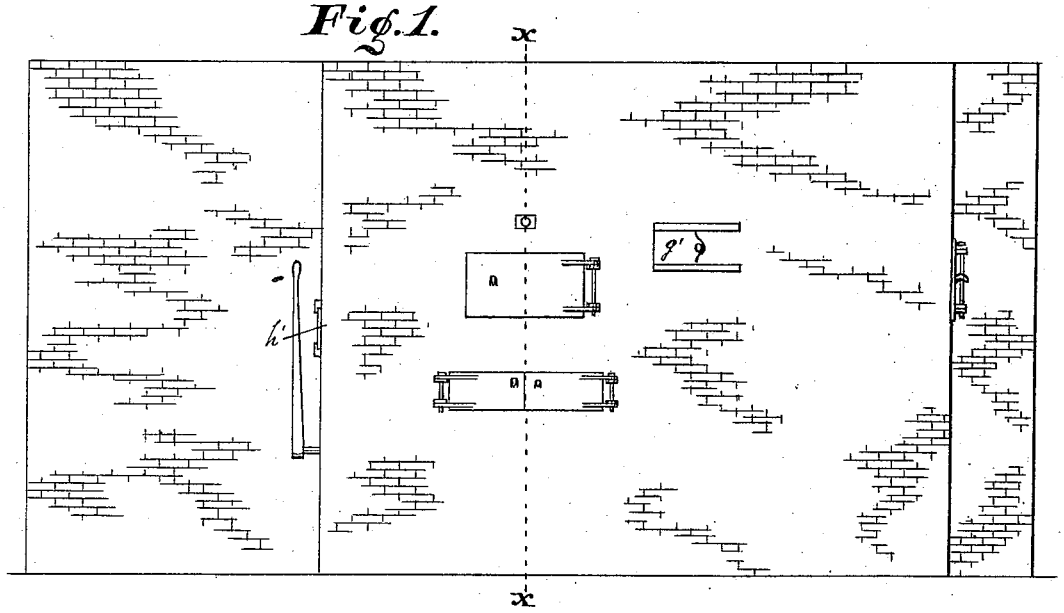

Fig. 2.

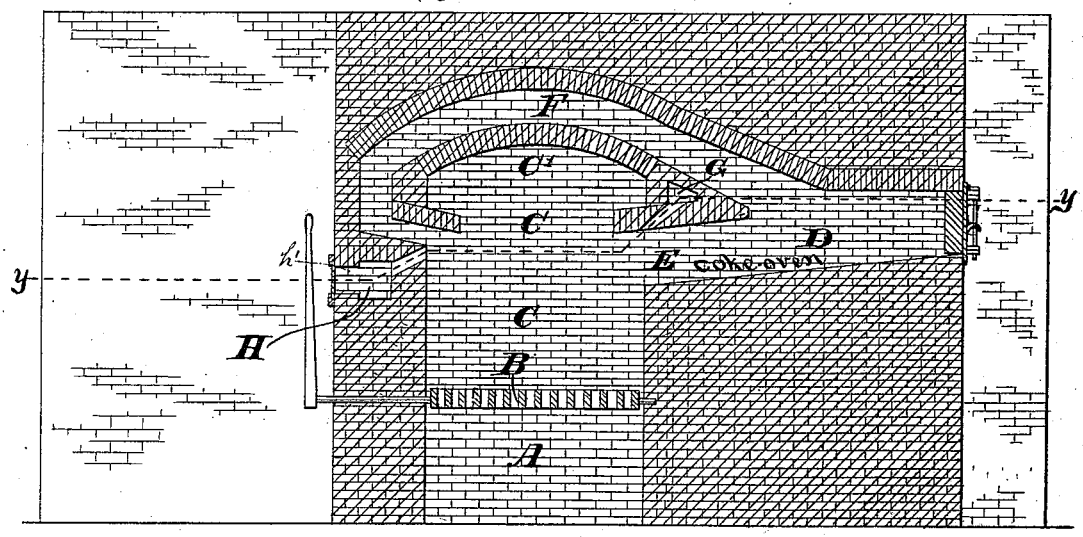

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Fig. 3.

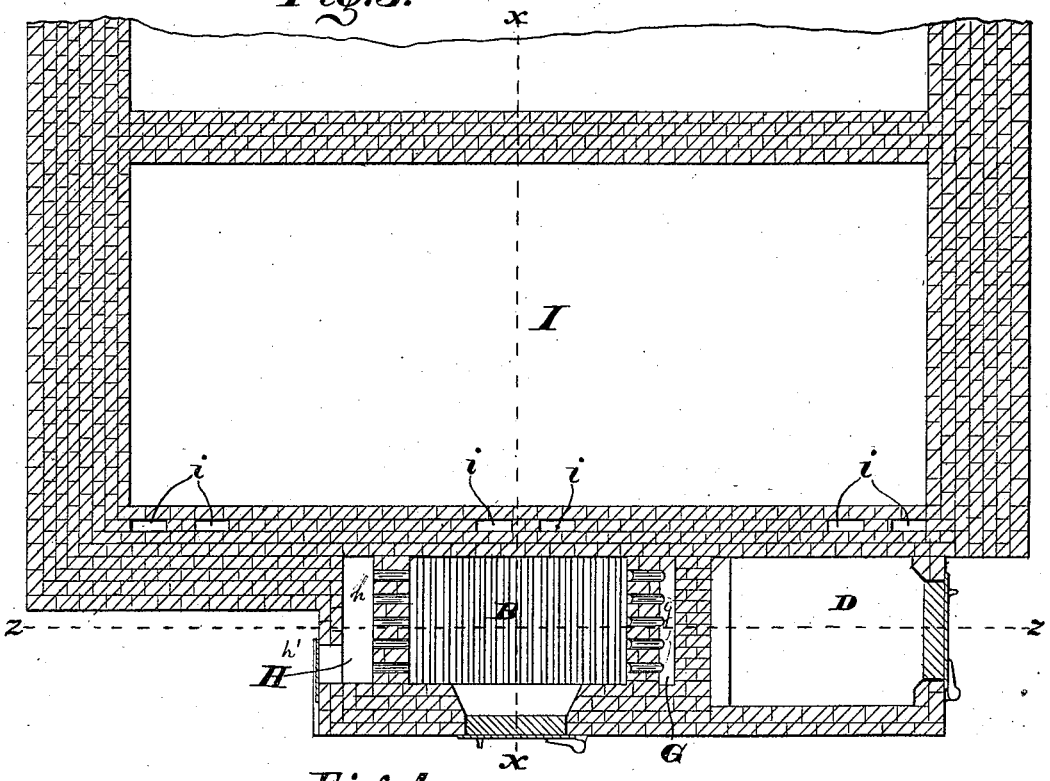

Fig. 4.

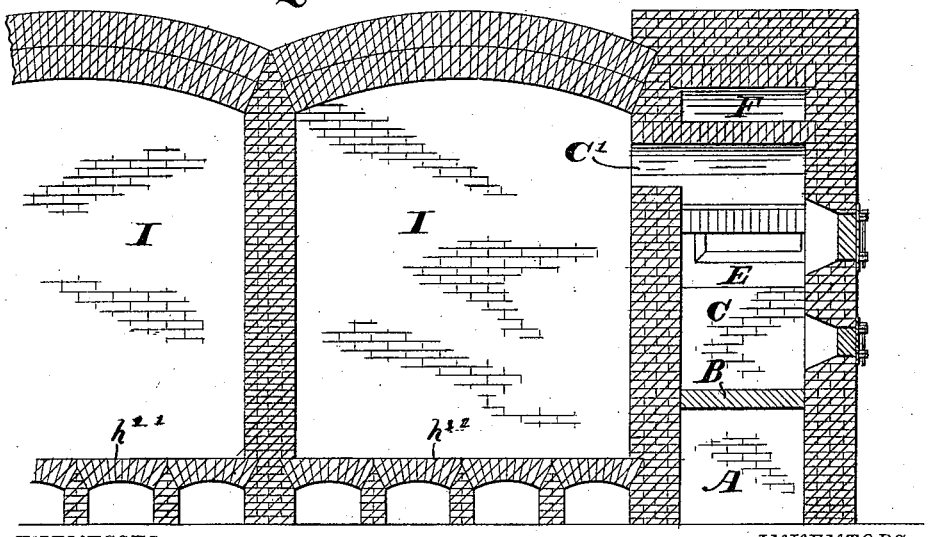

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Fig. 5.

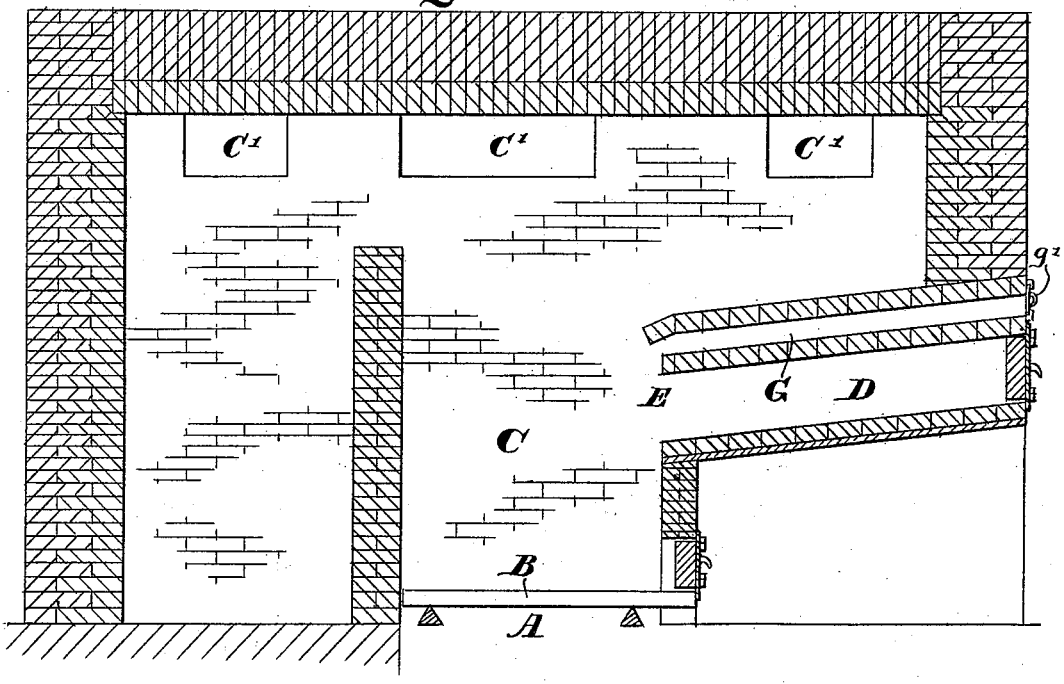
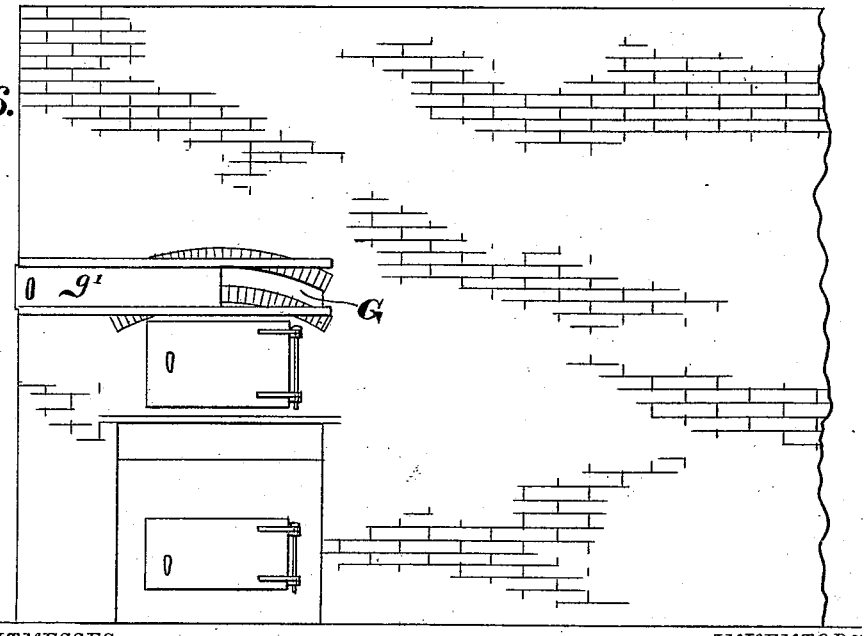


Fig. 6.



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UNITED STATES PATENT OFFICE.

AUGUST H. CALVELAGE, OF HAUGHVILLE, AND JAMES M. DODGE, OF INDIANAPOLIS, INDIANA.

GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 306,717, dated October 21, 1884.

Application filed October 30, 1883. (No model.)

To all whom it may concern:

Be it known that we, AUGUST H. CALVELAGE, of Haughville, and JAMES M. DODGE, of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Gas-Furnaces, of which the following is a specification.

The object of our said invention is to produce a coking and heating furnace for various purposes, in which a great degree of economy shall be coupled with the best results. This object is accomplished by the construction and arrangement of the coking-oven, the fire-space, and the gas and air passages, so that the gas from the coking-oven and atmospheric air from an air-passage or air-passages may be combined at or near the point where they enter the combustion-chamber, as will be presently described.

Our furnace is especially adapted to be used with an annealing-furnace in the production of malleable-iron castings, and is illustrated in connection with such a furnace.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a furnace embodying our said invention; Fig. 2, a vertical sectional view thereof looking upwardly from the dotted line *z z* in Fig. 3; Fig. 3, a horizontal sectional view looking downwardly from the dotted line *y y* in Fig. 2; Fig. 4, a vertical sectional view looking toward the right from the dotted line *x x;* Fig. 5, a view corresponding to Fig. 2 of another and somewhat simpler construction, but which embodies substantially the same general matter; and Fig. 6, a front elevation of the form shown by Fig. 5.

In said drawings the portions marked A represent the ash-pit; B, the grate-bars; C, the combustion-chamber; D, the coke-oven; E, a combined gas and fuel passage; F, a separate gas-passage; G H, openings through which air enters the combustion-chamber; and I, an annealing-furnace shown in connection with our improved furnace and as receiving its heat therefrom.

In using our invention the fuel is first placed in the coking-oven D, where it is allowed to remain until coked to a sufficient extent to free the gases or volatile matter contained therein. The gas generated during the process of coking passes into the combustion-chamber through the combined gas and fuel passage E, and in the construction shown by Figs. 1, 2, 3, and 4 through the gas-passage F, being thus, in this construction, distributed by means of the several passages equally to both sides of said chamber, thus producing a more perfect combustion. After the fuel is coked to the desired extent it is pushed along the bottom of the coke-oven, over onto the grate-bars, and is there consumed. By reason of the flow of gas into the combustion-chamber, a greater supply of atmospheric air is needed to insure a perfect combustion of the fuel than would otherwise be necessary, and we have therefore provided an opening or air-passage, G, to furnish such supply. In the construction shown in Figs. 1, 2, 3, and 4 we provide a second passage, H, and numerous small inlets, *g h*, from said two passages, to more equally distribute such supply. These openings G H are adapted to be closed or partly closed by the dampers *g' h'*. The gas and air passages, as will be seen, reach the combustion-chamber at or near the same point, and thus a substantially perfect combustion and consequent great economy in the use of fuel is secured, as will be readily understood, the supply of air being easily regulated by means of the dampers, and the supply of gas by the quantity and method of handling the fuel. The air is preferably heated before being admitted, and in the form of furnace shown by Figs. 5 and 6 this is accomplished by means of the heat from the coking-oven striking the under wall of the air-passage, and the radiation of heat through the overhead arch. In the other figures we have shown no means of accomplishing this result. The products of combustion enter the annealing-furnace I through the fire-ports C', and pass through the same, down the flues *i* under the bottom *h''*, and out through appropriate flues to a smoke-stack. (Not shown.)

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

1. In a furnace, a coking-oven, a combustion-chamber, passages leading from the coking-chamber into both sides of the combustion-chamber, and openings for the admission of air to said passages at their entrance to the combustion-chamber, substantially as described, and for the purposes specified.

2. In a combined coking and heating furnace, the coking-oven, combustion-chamber, a passage leading from the oven to the chamber, and one or more air-passages controlled by dampers arranged as set forth, whereby the gas from the oven and the air as it enters through said air-passages are combined at or near the point where they enter the combustion-chamber, substantially as set forth.

3. The combination, with the combustion-chamber, of an arch over the same, a coking-oven at the side of the chamber, communicating therewith directly at one side and over the arch to the other side, and passages from the end of the arch to convey heat to a heating-chamber, all relatively arranged substantially as shown and described.

In witness whereof we have hereunto set our hands and seals, at Indianapolis, Indiana, this 27th day of October, A. D. 1883.

AUGUST H. CALVELAGE. [L. S.]
JAMES M. DODGE. [L. S.]

In presence of—
E. W. BRADFORD,
CHAS. L. THURBER.