R. Mc Millen,

Steam-Boiler Furnace.

No. 2,388. Patented Dec. 14, 1841.

Fig. 2.

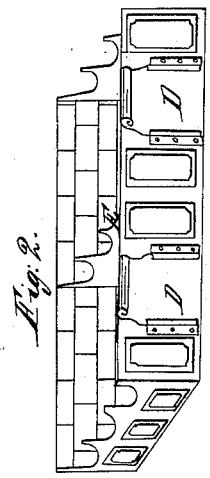
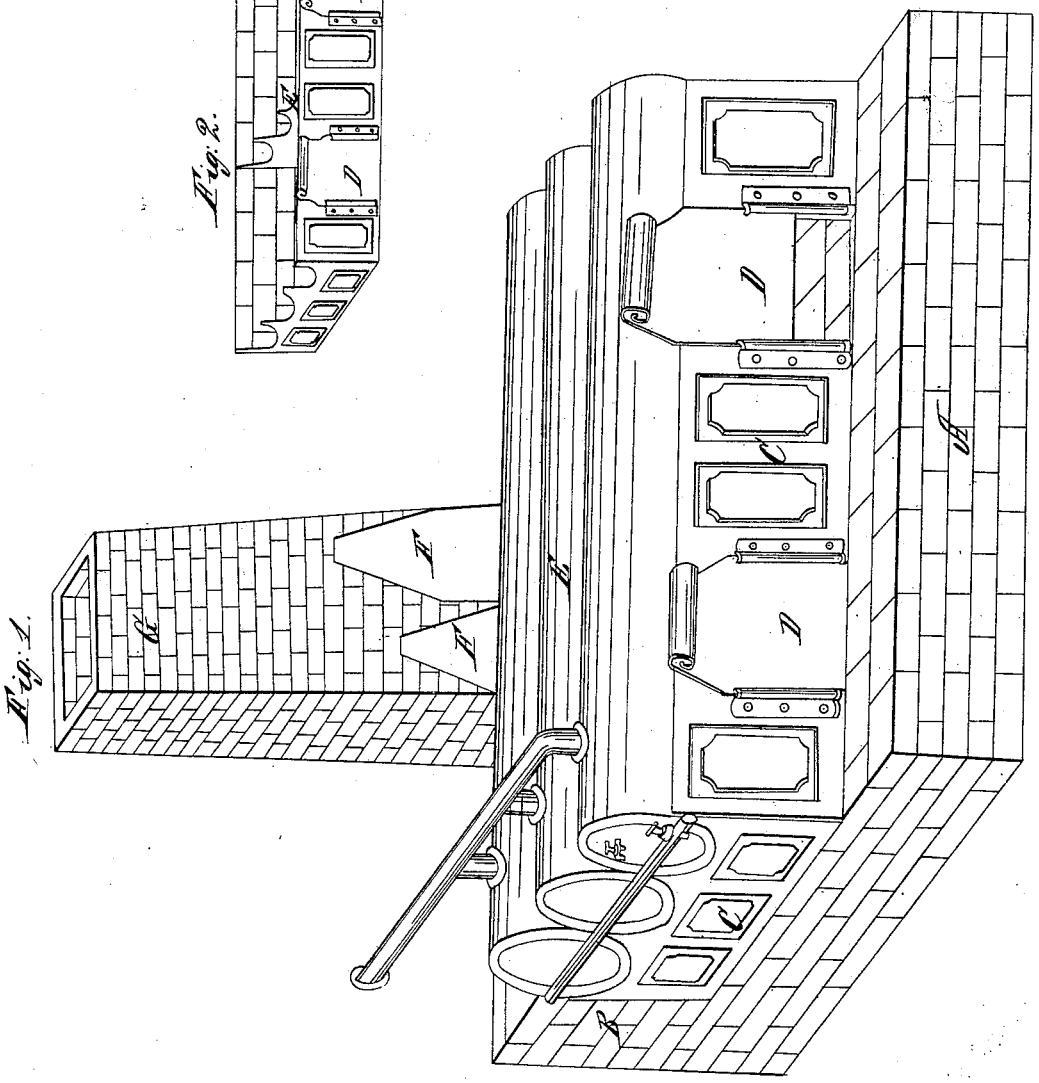


Fig. 1.



UNITED STATES PATENT OFFICE.

REUBEN McMILLEN, OF MIDDLEBURY, OHIO.

MANNER OF COMBINING COKING-OVENS AND BOILERS FOR THE GENERATION OF STEAM.

Specification of Letters Patent No. 2,388, dated December 14, 1841.

To all whom it may concern:

Be it known that I, REUBEN McMILLEN, of Middlebury, in the county of Summit and State of Ohio, have invented a new and useful improvement in the manner of combining coking-ovens with boilers for generating steam, by which improvement the heat liberated in the coking process is more advantageously and economically managed than has been heretofore done; and I do hereby declare that the following is a full and exact description thereof.

I construct my coking oven or ovens in such manner as that the bituminous coal, which is to be converted into coke, shall be contained within two or more compartments, each of which compartments is furnished with a close fitting door or doors, made as nearly air-tight as can be conveniently effected. The bottoms of these ovens, consist of a platform of bricks, stone, or other suitable material upon which the coal is to be laid, there not being any grate bars for the admission of air. The steam boiler or boilers are placed so as to constitute the upper part of the ovens, their lower sides for their whole length being exposed to the direct action of the heat extricated in the coking process, precisely in the same manner in which such boilers are exposed to the heat, of burning fuel in the furnaces ordinarily constructed for that purpose. The sides of my ovens may be formed of brick or stone or may consist of plates of cast iron as shown in the drawing, the former, however, will be found to economize heat, as a less portion will be lost by radiation when brick or stone are employed.

In the accompanying drawing Figure 1 is a perspective view of my oven, and boilers. A, is a platform of brick work, the upper part of which constitutes the bottom of the coke oven.

B is a back wall, elevated above the platform, said wall being connected with and sustaining the chimney G; this wall, when more than two coking compartments are used, may contain flues leading from the ovens to the chimney. The ends and front C, C, are represented as made of cast iron, D, D, are feeding doors, which should be made to slide in grooves, as they are in this way most readily made tight, and the draft admitted is more easily regulated than when hung by hinges.

The line E, crossing the three boilers, H, H, H, shows the place of the dividing wall, or partition, by which the oven is divided into two compartments; this is more distinctly shown in Fig. 2, which represents the sides of the ovens with the boilers removed. F, F, represents the upper parts of two registers, or dampers, which regulate openings into the chimney from the ovens, in the same manner in which the sliding doors D, D, regulate the feed openings.

The partition, or partitions E, which separate the respective compartments, enable me to remove the coke, and to supply a fresh quantity of coal to be coked, from one compartment, while the full operation is going on in another, and also to regulate the fire to the production of the amount of steam required. The discharge of the coke and the furnishing of a fresh supply of coal is the operation of a few minutes only; and while this is being effected, the register F, at the back of the oven is to be entirely closed, to prevent a draft of cold air passing through the oven; the heat of the latter will produce the immediate ignition of the fresh coal, and the flame from this, during the burning out of the bituminous matter, may be increased or diminished in intensity, by regulating the draft through the feed doors and through the register openings, as there will not be any sensible diminution of product of coke by increasing the inflammation of the bituminous matter while any considerable portion of it remains to be burned out.

The height from the bottom of the ovens to that of the boilers may be varied according to the size of the latter; it may ordinarily amount to from two to three feet. By an apparatus of this construction I have experimentally proved that a larger portion of steam can be generated by the heat from the combustion of the bitumin alone, than is ordinarily produced by the entire combustion of the coal when burned upon grates; the quantity of heat carried off by the draft through the chimney being under my arrangement comparatively small; and a vast portion of heat being also supplied by the coke in the completion of the process of coking after the doors and registers are closed.

From the above it will be seen that my improvement consists in so constructing of

the ovens, or furnace, under the boilers as that they shall consist of two or more chambers, or compartments and in the burning the volatile matter out of the coal in one of the chambers while the other is closed, and the operation of coking within it is being rendered complete; the advantage of which arrangement is that I am enabled to regulate the generation of steam by opening or closing the door of the chamber in which the volatile matter is being burned out without disturbing the other chamber or chambers.

Having thus fully described the nature of my improvement, I do hereby declare that I do not claim to be the first that has combined an oven for coking with a boiler or boilers for generating steam, with the intention of economizing heat; but what I do claim as new in my apparatus is—

The method of applying heat in the coking of bituminous coal, and of coking the same, by means of an oven, or ovens, consisting of two or more compartments divided from each other by close partitions, and to which compartments the coal is supplied, and its combustion and coking regulated, as set forth; the same being combined with the boiler or boilers, as specified, and the whole being constructing and operating substantially in the manner described.

REUBEN McMILLEN.

Witnesses:
THOS. P. JONES,
JOS. ANDREWS.