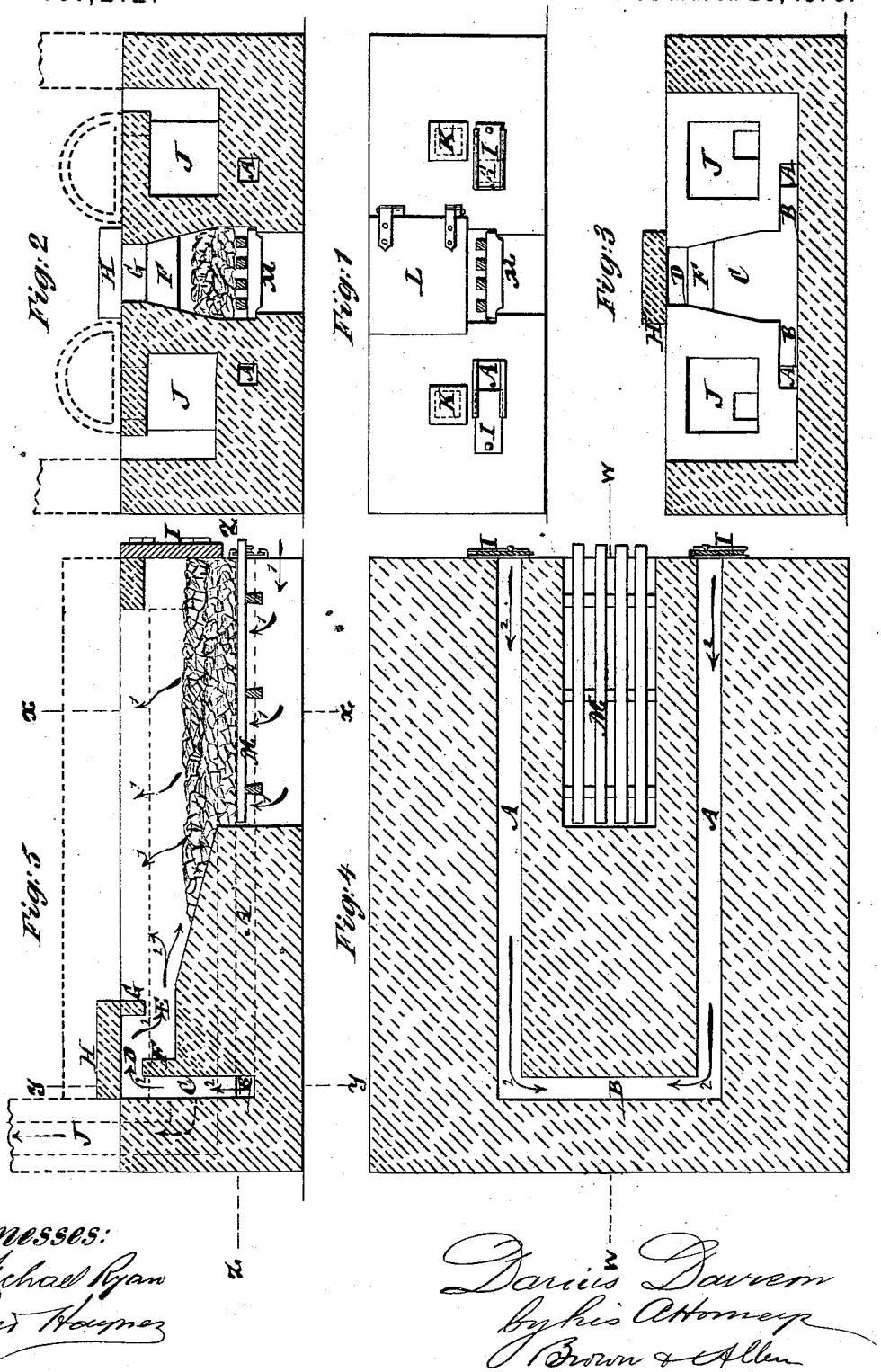
D. DAVISON.

Furnace for Gas-Retorts.

No. 161,212. Patented March 23, 1875.



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UNITED STATES PATENT OFFICE.

DARIUS DAVISON, OF NEW YORK, N. Y.

IMPROVEMENT IN FURNACES FOR GAS-RETORTS.

Specification forming part of Letters Patent No. **161,212**, dated March 23, 1875; application filed March 27, 1874.

To all whom it may concern:

Be it known that I, DARIUS DAVISON, of the city, county, and State of New York, have invented certain Improvements in Furnaces for Gas-Retorts, of which the following is a specification:

This invention consists in a novel construction and operation of furnaces for heating retorts for the manufacture of illuminating-gas.

Figure 1 is a front view of the lower or furnace portion of an oven for a bench of gas-retorts. Fig. 2 is a transverse section of the furnace at the line *x x* in Fig. 5; Fig. 3, a transverse section on line *y y*, Fig. 5; Fig. 4, a horizontal section of the furnace at the line marked *z z;* Fig. 5, a vertical longitudinal section of the furnace at the line *w w* in Fig. 4.

The dotted lines at the top of Figs. 2 and 5 indicate the position of the two lower retorts of a bench, and their usual proportion to the length and breadth of the oven, and positions of the surrounding brick-work at the sides and back end thereof.

My invention consists in the construction of certain draft-air flues, arranged longitudinally in the brick-work of the bottom of the oven, at each side thereof, uniting in an upright flue at the back of the oven, and from thence leading forward horizontally, and downward over a bridge, and from thence horizontally under a drop-bridge, out into the furnace, over the burning coke or fuel at the back end of the furnace. The said flues at the front end of the furnace have suitable dampers, to regulate the amount of fresh air to be admitted to the furnace by the flues to produce a proper or complete combustion of the combustible gases in the oven around the retorts, which gases usually escape unconsumed in the ordinary practice of working retorts. This obtains an increased heat in the oven by a decreased consumption of fuel, and a better and more equally diffused heat in all parts of the oven and retorts. Such invention is adapted especially to gas-retort furnaces.

I will now proceed to more fully describe the construction, operation, effects, and objects of my invention.

In the several figures, A represents the longitudinal horizontal draft-air flues; B, the horizontal draft-air flues at the back end of the oven; D, forward horizontal draft-air flue; E, outlet opening into the back end of the furnace; F, bridge to prevent the coal or dust falling or being thrown into the back flue to clog or stop the same; G, drop-bridge to prevent coke, fuel, or dust from being thrown or forced over the bridge F into the back flue C, to clog or stop the same; H, tile covering the top of the flues; I, dampers to regulate the amount of draft-air to be admitted over the fire. J represents the ordinary draft-air flues under the lower retorts of a bench; K, outside stoppers to the usual draft-air flues; L, ordinary furnace-door; M, usual fire-grate. The arrows marked 1 indicate the ordinary air-draft. The arrows marked 2 indicate the supplemental or new air-drafts admitted by my invention to enter the furnace at the back end thereof over the burning fuel.

In the ordinary operation of the fires in the oven-furnace of gas-retorts the whole draft-air is admitted through the burning coke, together with steam, which constantly arises from the water in the ash-pans of all such furnaces. Sufficient air and steam (which latter is decomposed, and furnishes oxygen and hydrogen in the burning coke of the furnace as aids of combustion,) is not, by such arrangement or operation, supplied to produce complete combustion of all the gases eliminated from the burning coke, and especially when the fire becomes to any degree clogged with ashes and clinker. Only partial combustion is thus produced; and there arises from the fire a large volume of hydrogen and carbonic-oxide gases, which enter the oven with no oxygen to effect their combustion, and therefore do not wholly or partially burn until they are brought in contact with fresh air at the top of the flue, producing there a large volume of intense heat, that is thus totally and wastefully lost. By my invention, however, sufficient fresh air, partly heated by the hot brick flues, is introduced to produce a complete combustion of all such gases in the oven around the retorts.

To operate this invention, after the flues and appurtenances pertaining thereto are properly constructed, as described, the dampers I are adjusted to the apertures of the flues at the front, so as to admit the maximum amount of fresh air required to produce complete com-

bustion in the oven. Then, when the fire is cleaned, so that a free draft is obtained through the coke, a large part of the air for combustion passes through the burning coke, and a small portion proportionately passes through the fresh-air flues A; but, as the fire becomes clogged and the draft checked thereby through the same, then more fresh air is drawn by the force of the draft through the flues A into the furnace above the fire, and thus supplies the necessary amount of oxygen to produce combustion of the gases arising from the incandescent coke in the furnace. Furthermore, the combustion of the gases takes place in all parts of the oven, generating heat at the point or place of combustion, and thereby a more equally diffused heat is obtained in all parts of the oven, all around the retorts, even to the flue under the bottom retort, than can be obtained in the usual way of burning the fuel in gas-retort furnaces.

The results gained by the application of this invention to the furnaces for heating gas-retorts are, first, a very material reduction of the amount of fuel to generate any required degree or volume of heat; second, a higher and more equally diffused heat in all parts of the oven, by which all the retorts are heated in all parts to a more equal and better working temperature for the best results in producing gas from the coal.

I claim—

The combination of the draft-air flues A B C D in the brick-work surrounding the furnace of the oven for heating retorts for the manufacture of illuminating-gas, combined with the bridge F, the bridge G, and the cap-tile H, forming opening E at the back of the furnace, the whole to be operated, in combination with the furnace, the oven, and the retorts contained therein, substantially as and for the purpose herein described.

DARIUS DAVISON.

Witnesses:

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