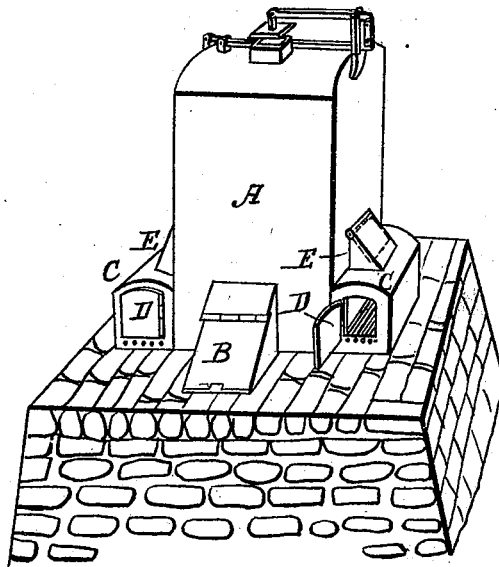


W. H. PHILLIPS.

Hot Blast Oven.

No. 1,748.

Patented Aug. 28, 1840.



# UNITED STATES PATENT OFFICE.

WM. H. PHILLIPS, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN THE MODE OF HEATING THE BLAST FOR SMELTING-FURNACES.

Specification forming part of Letters Patent No. 1,748, dated August 28, 1840.

*To all whom it may concern:*

Be it known that I, WILLIAM H. PHILLIPS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful improvement in the manner of heating the air to supply the hot-blast in those smelting-furnaces in which mineral coal is used, and in which there is an air-heating apparatus at the tunnel-head; and I do hereby declare that the following is a full and exact description thereof.

For the purpose of economizing fuel, it is a point of considerable importance to be able to use the waste heat for supplying the blast to the smelting-furnace, and this has been done in numerous instances and under various modifications of the apparatus employed. It has been found, however, that in all cases the air so heated is subjected to great variation in its temperature, and that from causes incident to the employment of such furnaces, when dependence is had upon the waste heat alone to accomplish the intended purpose. Whatever produces a diminution of heat in the interior of the furnace must produce a corresponding effect in the air-heating apparatus, and that at a time when it is most desirable to keep up or increase the temperature of the hot-blast, in order the more rapidly to restore the wonted temperature in the furnace. One of the most general causes of the temporary diminution of heat in the furnace is the introduction of the charges of coal, ore, and flux. The quantity of gas emitted from the fuel also varies considerably in different stages of its combustion, and with it, of course, the quantity of flame in the heating apparatus. Other sources of such variation of heat are well known to those conversant with the use of smelting-furnaces. My improvement is intended to, and does, effectually obviate this difficulty, and that in the following manner.

On the sides of, or otherwise close to, the heating apparatus on the tunnel-head, I place one, two, or more small furnaces for the express purpose of heating a portion of air which is to pass from them into the heating-oven and to commingle with that arising through the chimney of the smelting-furnace. To these auxiliary furnaces I make close-fitting doors, in order that no air shall pass into them, excepting that which is forced to pass through

the burning fuel which they are to contain. Into the ash-pits of these auxiliary furnaces I introduce a pipe, through which air, either hot or cold, may be blown from any suitable part of the blowing apparatus, which, by passing through the ignited fuel, and thence directly into the heating-oven, may be made to communicate a very high degree of heat to the pipes contained therein. I of course regulate the supply of air to be blown into the heating-oven, and to pass from the blowing apparatus into the auxiliary furnaces, by means of cocks, valves, or dampers applied in the ordinary way, which devices are well known to all machinists.

In the accompanying drawing, A is the heating-oven, which is to be placed on the top of the furnace-stack in the ordinary way, and with the tubes or other apparatus contained within it made in any of the known forms. B is a door, through which the charge of the furnace is to be introduced. C C are two auxiliary furnaces placed in the way which I deem most convenient; D D, the doors leading into them; E E, flues leading from them into the heating-oven.

Having thus made known the nature of my invention and shown the manner in which the same may be carried into operation, what I claim therein as constituting my improvement, and desire to secure by Letters Patent, is—

The combining with the ordinary air-heating apparatus on the tunnel-head of a blast-furnace for smelting iron by means of mineral coal, one, two, or more small auxiliary furnaces, into the ash-pits of which air is to be blown, and to be heated by passing through ignited coal, and thence conducted immediately into the heating-oven, the whole being connected and combined substantially in the manner and for the purpose above set forth.

I will here remark that when it is not requisite to employ the heat from the auxiliary furnace or furnaces, by closing the valves in the passages leading into and from them the contained fuel will merely remain ignited, scarcely undergoing any combustion, until urged by the blast.

WM. H. PHILLIPS.

Witnesses:

THOS. P. JONES,  
GEORGE WEST.