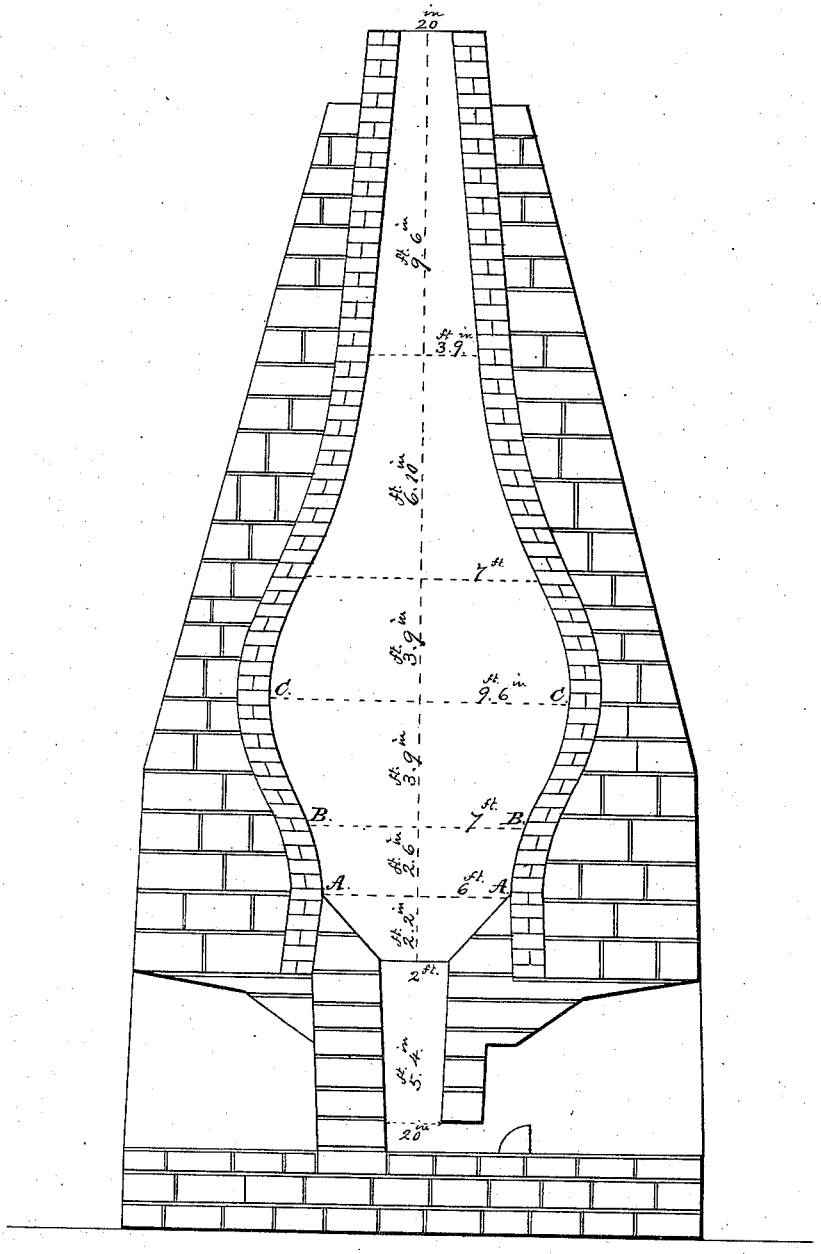
I. V. R. Hunter,

Blast Furnace,

No. 2,737. Patented July. 23, 1842



UNITED STATES PATENT OFFICE.

J. V. R. HUNTER, OF ROCKLAND TOWNSHIP, BERKS COUNTY, PA.

IMPROVEMENT IN FURNACES FOR SMELTING IRON.

Specification forming part of Letters Patent No. 2,737, dated July 23, 1842.

To all whom it may concern:

Be it known that I, JACOB VAN REED HUNTER, of Rockland township, in the county of Berks and State of Pennsylvania, iron-master, have made an improvement in the manner of constructing smelting-furnaces for the reduction of iron ores, by which the said furnaces are made to work more equally and efficiently than under any of the forms now in use, the yield of iron being generally more than twenty-five per cent. greater in furnaces built upon my plan than in any of those heretofore constructed.

A main feature of my improvement consists in giving to the interior of the furnace above the boshes a diameter very considerably greater than it has at the upper part of said boshes. I say very considerably greater, for, although furnaces have generally been built with the inwalls slightly inclining inward immediately above the boshes, they have also been made straight in that part, and have sometimes been made to incline outward for a short distance; but it does not appear that this has been done with any particular design, nor has it ever been carried to an extent which could produce any notable change in the action of the furnace. In my furnace, on the contrary, the diameter at the height of about six feet above the boshes will be fifty per cent. greater, or nearly so, than the greatest diameter of the boshes.

Although it is not possible to limit the relative dimensions with precision, the accompanying drawing will serve to exemplify in a manner sufficiently striking to all persons familiar with the subject the strong characteristics by which my furnace is distinguished from others, and the dimensions given are taken from one which I have found to answer well in practice. This furnace is represented as being about thirty-four feet in height. Its size, of course, may vary, its general arrangement, however, as respects form and proportions, being retained. The dotted line A A shows the upper part of the boshes, measuring six feet in diameter. Below this part the furnace does not require any description, as it does not differ from those in general use. At a point, B B, two feet and a half or three feet above the boshes, the diameter is increased to seven feet, and at C C six feet, more or less. Above the boshes it is increased to nine or nine and a half feet, more or less. From about this point I diminish the diameter, so that at about the height of ten feet it shall be seven feet, or nearly so, in diameter. From this point I continue to decrease the diameter, giving to the interior the general form shown in the drawing, which will, at about the height of seventeen feet above the boshes, reduce the diameter to somewhat less than four feet, and at the tunnel-head to about twenty inches.

To those acquainted with the different forms given to blast-furnaces it will be evident that there is as much peculiarity in the form or in the manner of diminishing the upper as there is of progressively increasing the diameter of the lower part of the furnace, and that this peculiarity must be productive of new results in the action of the furnace, whether advantageous or otherwise. I have been led gradually to the adoption of this form of the upper as well as that of the lower part of my furnace by repeated experiments and close observation. The unusual diminution of the diameter of the upper part in the manner represented serves very strikingly to concentrate the heat in the lower part, where it is most wanted. The enlarging the furnace above the boshes in the manner set forth regulates the descent of the fuel and of the ore in such way as to cause the operation of smelting to proceed with less waste of heat than heretofore. Its tendency, manifestly, is to cause the fuel to experience some obstruction in its descent, and to throw the ore more into the center of the ignited mass. Of the beneficial result no question remains, and the improvement is such, as herein stated, as will greatly facilitate the manufacture to which it is applied.

Having thus fully set forth the particular form of my furnace and shown the characteristics by which it is distinguished from those previously used for the smelting of iron, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The increasing the diameter of the interior of the furnace above the boshes in the manner herein set forth, and in a proportion

which shall be substantially the same with that herein designated, and represented in the accompanying drawing.

2. In combination with this form and enlargement of the interior above the boshes, the particular manner in which I diminish the upper portion of the furnace toward the tunnel-head, in the proportions substantially as designated, and as represented in the drawing.

JACOB V. R. HUNTER.

Witnesses:
WM. SCHOENE,
SAMUEL FIX.