

## **Specification of Barnard Henry Brook : constructing and setting ovens and retorts.**

### **Contributors**

Brook, Barnard, Henry.

### **Publication/Creation**

London : Great Seal Patent Office, 1857 (London : George E. Eyre and William Spottiswoode)

### **Persistent URL**

<https://wellcomecollection.org/works/ngzvnxfq>

### **License and attribution**

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



17

A.D. 1828 . . . . . N° 5624.

**S P E C I F I C A T I O N**

OF

**BARNARD HENRY BROOK.**

**CONSTRUCTING AND SETTING OVENS  
AND RETORTS.**

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,  
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY :

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,  
25, SOUTHAMPTON BUILDINGS, HOLBORN.

*Price 9d.*

1857.





---

A.D. 1828 . . . . . N° 5624.

---

**Constructing and Setting Ovens and Retorts.**

---

**BROOK'S SPECIFICATION.**

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, BARNARD HENRY BROOK, of Huddersfield, in the West Riding of the County of York, Civil Engineer, send greeting.

WHEREAS His most Excellent Majesty King George the Fourth, by His  
5 Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Sixth day of March, in the ninth year of His reign, did give and grant unto me, the said Barnard Henry Brook, my eñors, admñors, and assigns, His special licence, full power, sole privilege and authority, that I, the said Barnard Henry Brook, my eñors, admñors, and assigns, during the term of years  
10 therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "IMPROVEMENTS IN THE CONSTRUCTION AND SETTING OF OVENS OR RETORTS FOR CARBONIZING COAL FOR THE USE OF GASWORKS;" in which Letters Patent there is contained a proviso obliging me, the said Barnard Henry Brook, under my  
15 hand and seal, to cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be enrolled in His Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, relation being thereunto had, may more fully and at large  
20 appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Barnard Henry Brook, do hereby declare that my said Invention of Improvements in the Construction and Setting of Ovens or Retorts for Carbonizing Coal for the Use of Gasworks, is ascertained and described by these

*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

Presents and the Drawings hereunto annexed and herein referred to by way of illustration and example.

My Invention consists in constructing the top and bottom of the retort in two parts, joined together gas-tight without bolts or screws, so that when one part has become worn out by use, that part may be replaced without the whole. On this plan I am enabled to make a retort of cast iron of larger capacity than others hitherto in use, and, from its extended surface, to carbonize the coal with greater rapidity and regularity; and the said retort I set on a plan calculated to insure greater durability than other retorts in general use. 5 10

I shall now proceed to describe the construction of my retort, and the mode of setting one of an ordinary size, by the Drawings hereunto annexed, and the reference thereto; but be it observed, that, although one on such construction will effect all the purposes which I have stated, the form, proportions, and arrangements of its parts may be greatly varied and modified, 15 according as circumstances or situation may require.

## REFERENCE TO THE DRAWINGS.

The Drawings are on a scale of one inch to a foot, and the several parts in each Figure, where they are similar, have similar letters of reference. Figure One the bottom of the oven, the size of which may vary according to the pleasure of those who want it. The one I am about to describe is from its size best adapted to public gasworks. Its size is four feet broad and six feet long measured outside. A, A, A, A, is the groove in which the top of the oven rests; such groove is an inch and a half broad, three inches and a half deep from the top of B, the flange, and half an inch deep from the surface of the bottom of the oven. The bottom of the oven (being half an inch higher than the bottom of the groove) is gradually raised one inch from the edge of the groove at the side to the centre of the bottom, in order to throw the decomposed coal into the groove, and which, by being calcined, stops the gas from escaping. The bottom of the oven is cast an inch and a half thick at the bottom of the groove. The groove is half an inch deep, and the bottom rises an inch from the edge of the groove to the centre, thereby making the bottom of the oven three inches thick in the middle. B, B, B, B, is the upper flange; it is five inches deep from the bottom outside, and three inches and a half from the bottom of the groove inside; it is an inch and a quarter thick. This flange encompasses the four sides of the oven, except that part at one end 20 25 30 35

*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

where the mouthpiece (hereafter described) is connected. The mouthpiece in this Figure is represented by dotted lines.

Figure 2, the top part of the oven, which is made to fit into the groove of the bottom, as already specified, and as shewn by outline sketch underneath; 5 the sides are nine inches deep outside and seven inches  $\frac{7}{8}$  inside, and the ends are twelve inches deep at the centre, so that the top forms an arch or segment of a circle rising three inches in the centre; the thickness the top part of the oven is cast is an inch and one eighth; there is about about a quarter of an inch left betwixt the sides and ends of the top part of the oven and the upright flange 10 in the bottom part of the oven. In order to make the joint, which is well made up with iron boring cement, worked in with caulking tool. The inside of the joint made be made in the same manner; but I feel perfectly satisfied that if nothing was done to the inside it would soon be stopped by the calcination of the decomposed coal alone. A flange D projects horizontally about two 15 inches over the top joint of the mouthpiece, under which flange an iron cement joint is made.

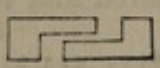
Figure 3 is the mouthpiece, which is eighteen inches wide inside, nineteen inches deep horizontally inwards, and ranges the same height as the oven; the thickness of the mouthpiece is about an inch and a half, with a flange at each 20 side, two inches broad, which, added to the width and thickness, makes the whole two feet and one inch broad; the front bottom of the mouthpiece projects one inch, in order that the door may rest upon it, till the person putting on the door (hereafter described) can bring across the bar or stay. A rebate is made all round the mouthpiece about half an inch deep, to which the door 25 is made to fit. The door is put on with a luting of clay or any other material used for that purpose. On the top of the mouthpiece a hole, five inches in diameter, is made, to which the pipe E, leading to the hydraulic main, is affixed. This pipe is also five inches in diameter. The length of this pipe varies with the height of the hydraulic main, which is uncertain. The mouthpiece may 30 be cast either alone or along with the top part of the oven; if the latter method should be adopted, the dimensions of the mouthpiece and of the top part of the oven above set out will be the same, and it will be joined in the moulding and casting instead of being fastened with screws. I have made them both ways, but I would recommend them to be cast separate, as, in consequence of the 35 great nicety required in the casting of the mouthpiece, it is very liable to be spoiled when cast along with the top part of the oven, and then the whole casting is rendered useless. The door of the mouthpiece is made of plaie, commonly called boiler plate, or it may be cast; it is formed to fit the rebate of the mouthpiece. There are two parallel bars of iron, eight inches asunder,

*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

placed perpendicularly. The handles F, F, extend from bar to bar, and are rivetted thro' holes made thro' the said bars and the door; the door is stayed with a cross bar *g*, hung by a he or she joint, with bolt and cotter, and fastens with a she end on the opposite lugg with a wedge, which forces the cross bar against the two perpendicular bars and fastens to the door, but the door may also be fastened with a cross bar and screw; the cross bars are generally hung on the right hand, but may be hung on either side. The fire door frame, as shewn on the plan of the front elevation, extends from pilaster to pilaster, is five feet six inches long between the pilaster, and fastens at back of each pilaster one inch or more; it is seventeen inches in height including the frame; is twenty-two inches long in the fire hole and twelve inches deep; the top and bottom are two inches and a half thick. The cross stay is seven inches broad, and extends from pilaster to pilaster, and about one inch and a half at back of pilaster at each end. At each end is a hole to clean out the flues, four inches and a half square. The front stay is three feet in length and four inches broad; it slips at back of the cross stay one inch and a half, and rests with the end of the front on the top of the cross stay nine inches from the bottom; it extends to twelve inches horizontally by nine inches perpendicularly, and then is reduced to four inches; it is strengthened by a rib projecting two inches in the middle of the broad part, and reducing gradually to nothing towards the ends and corner of the shield. The grate is two feet six inches broad by four feet long; the openings of the grate about half an inch. A sight hole, five inches square inside or two bricks thick outside, are placed betwixt the top of the oven and the upper arch (hereafter described in the setting), in order to clear the top of the oven from the dust which accumulates there, and which being scraped down to the side of the oven falls into the flue, and is drawn out at the the hole on each end of hole cross stay.

The description already given is that part of the oven already made and in use; but, be it understood, that the said ovens are not confined to the exact dimensions already given. I have constructed ovens on the same principle, but of various dimensions, from two feet broad and four feet in length to four feet broad and six feet in length, and they may be made of other dimensions as circumstances and situation may require. The bottom is invariably made of cast iron, but the top may be made of rolled iron, commonly called boiler plate. The plan or method in which the oven is set is such as is herein-after described. The ashpit is two feet six inches wide, and five course of bricks high. The first course of brick above the grate bars is a course of slope ends, set with the slope ends to the grate. The next course is set beyond the slope

*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

of the end of the brick, by which the fireplace is made three inches wider on each side, being three feet wide. The grate is two feet six inches wide and four feet long. A ribbed arch is then turned over the fireplace, which rises from the course on the slope ends. From the top of grate bars to the under  
 5 side of the arch is eighteen inches, making the arch nearly a semicircle, which, being well backed at the sides, it is almost impossible for it to come down; upon the crown of the arch, a brick, three inches thick, is placed, to the level of which the walls on the ribs of the arch and slides are raised. On these walls the tiles, which form the platform on which the oven rests, are  
 10 placed; the tiles are two feet two inches long, fourteen inches broad, and three inches thick; the tiles meet and rest on the course of bricks placed on the crown of the arch, and extends two inches beyond the bottom of the oven on each side, on which two inches other tiles rest, which are formed to fit the sides of the oven, and are made to rest on the end of the tiles, as above men-  
 15 tioned; and on the top of the upright flange I have generally set the ovens on a grated or pigeon-hole arch, but on that plan the tiles are most liable to break, and thereby endanger the safety of the bottom of the oven; besides, when a tile was broken it could not be replaced without taking out the oven. By the present plan of setting the oven the tiles are not so liable to be broken,  
 20 having a wall to rest on all around the tile; and if a tile should be broken, it would be almost impossible for it to get down; and if it should be desirable to replace a tile it might be done without taking out the oven. The last course of brick underneath the tile is placed in a longitudinal direction, and not across the wall, as by that means the bricks can be much easier  
 25 taken out in order to replace a tile than if the course of brick was placed across the wall, as in the latter case the adjoining tiles would also rest on the said brick, and it would be with difficulty the brick could be got out and the tile removed. Betwixt the ribs of the arch are formed four flues, five inches wide each, which meet within about three course of brick at the top of the  
 30 arch, and pass out at each side into the upright flue. If there were only three flues in the arch, which is four feet long to the back wall, which forms one side of the furthest flue, each flue would be eight inches and a half wide, by which the tiles would be more easily replaced, but then the arch would not be so strong nor the draft so well proportioned. In this case the tiles which  
 35 form the platform having to meet on the rib of the arch would have to be made seventeen inches and a half broad; if it should be necessary to replace a tile over a four-flued arch the new tile should be made in two or three parts, with a lap-over joint, thus ; by this means the tile could be easily replaced.



*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

The tile described in Figure 4 is an end view of the side tile; that side of the tile in which the angle is placed against the side of the oven, the lower part is placed against the upright flange, and the upper part against the side of the oven, the inward angle resting on the top of the upright flange of the bottom of the oven. To the bottom of this tile from the inward angle is five inches, and it is two inches thick; from the outward angle to the top of the tile is five inches and a half; it is four inches from the outward angle to the back of the tile, and runs off to a feather edge at top. These tiles are made eighteen inches long (the longer the better, as there are fewer joints). The flues from the arch pass into the side flue, which is three or four inches wide, extending the length and up the side tile of the oven. An arch is then turned over the top five inches from the top of the oven. The draft is then taken from the centre of the arch by three or four openings, seven inches long each, and two inches broad, and placed at equal distances, the first being within five inches of the front wall, and the last at the end of the oven. 5 10 15

Figure 5 is a cross section of the oven when sett, with a perspective view of the interior of the furnace. H, H, H, H, H, H, H, H, are the flues in the arch. I, the brick on the centre of the arch. K, K, the side tiles as placed against the side of the oven, and resting on the end of the platform tiles L, L, and on the upright flange B, B (before described). M, the arch over the oven. N, one of the four openings from the arch over the oven leading into the chimney. O shows the form of the bottom of the oven with the rise from the sides to the centre. P, P, are two holes left in the brickwork under the tiles, to see that the tiles remain fixed. 20

Figure 6 is a front view of the oven when sett and complete. Q, Q, are the pilasters. R, R, the front stays. S, S, the sight holes. T, T, is the cross stay. U, U, are the holes by which the flue is cleaned. V, V, two holes, about an inch in diameter, to look in to see that the tiles are perfect. W is the door to the mouthpiece. G, the cross bar which fastens to the door. E, the pipe from the mouth of the oven to the hydraulic main. X, X, X, X, is the door frame, extending from pilaster to pilaster. 25 30

Figure 7 represents a plan of the brickwork and flues H, H, H, H; and H, H, H, H, the flues, shewn in perspective in Figure 5, shews also the side flues Y, Y, leading to the top of the oven.

In witness whereof, I, the said Barnard Henry Brook, have hereunto set my hand and seal, this Twenty-fifth day of August, in the year of our Lord One thousand eight hundred and twenty-eight. 35

BARNARD HENRY (L.S.) BROOK.

---

*Brook's Improvements in Constructing and Setting Ovens and Retorts.*

---

AND BE IT REMEMBERED, that on the Twenty-fifth day of August, in the year of our Lord 1828, the aforesaid Barnard Henry Brook came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form  
5 above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Inrolled the Thirtieth day of August, in the year of our Lord One thousand eight hundred and twenty-eight.

---

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1857.



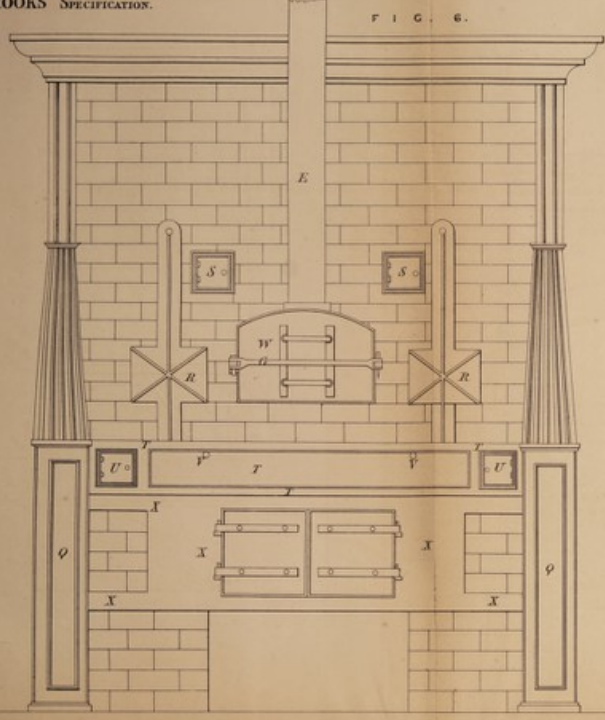


FIG. 6.

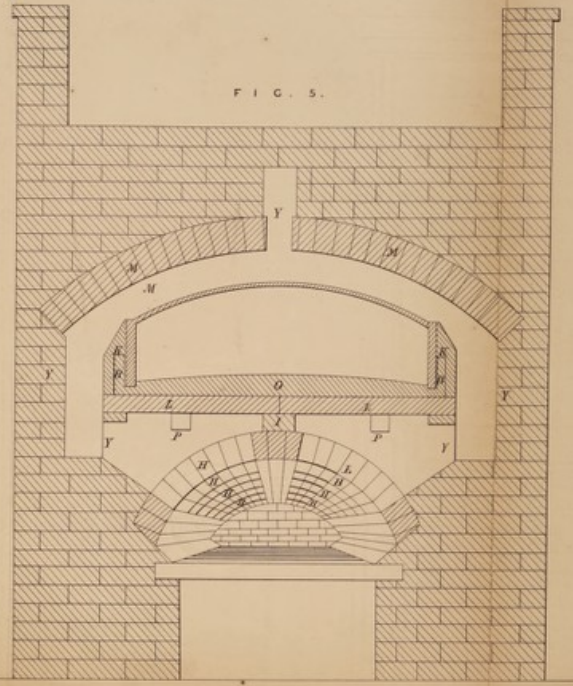


FIG. 5.

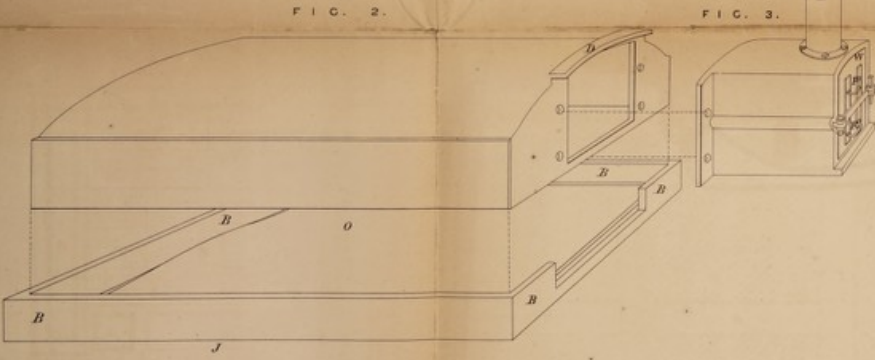


FIG. 2.

FIG. 3.

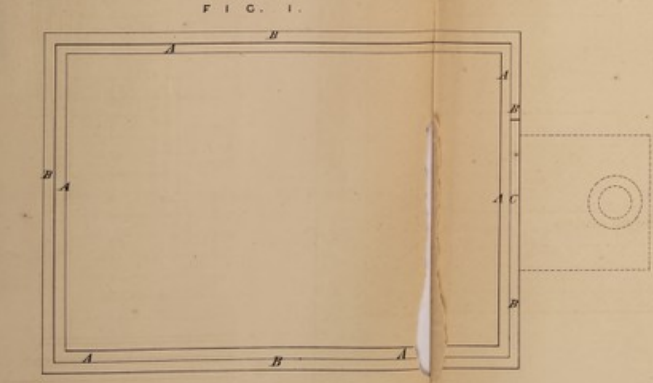
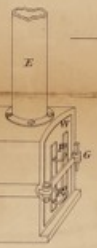


FIG. 1.

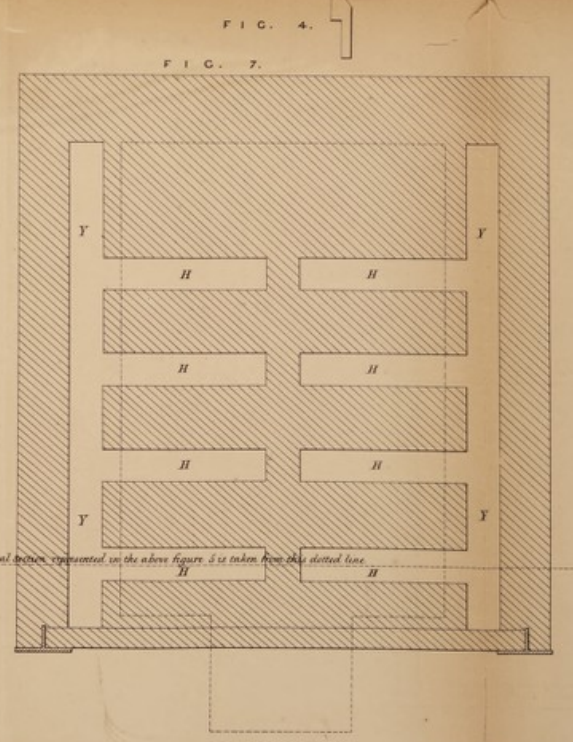


FIG. 4.

FIG. 7.

The vertical section represented in the above figure is taken from this dotted line

The enrolled drawing is colored

