

## **Specification of William Johnson : furnaces.**

### **Contributors**

Johnson, William.

### **Publication/Creation**

London : Great Seal Patent Office, 1855 (London : George E. Eyre and William Spottiswoode)

### **Persistent URL**

<https://wellcomecollection.org/works/jet4cqdx>

### **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.



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>



---

A.D. 1818 . . . . . N<sup>o</sup> 4325.

---

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

OF

WILLIAM JOHNSON.

—  
FURNACES.  
—

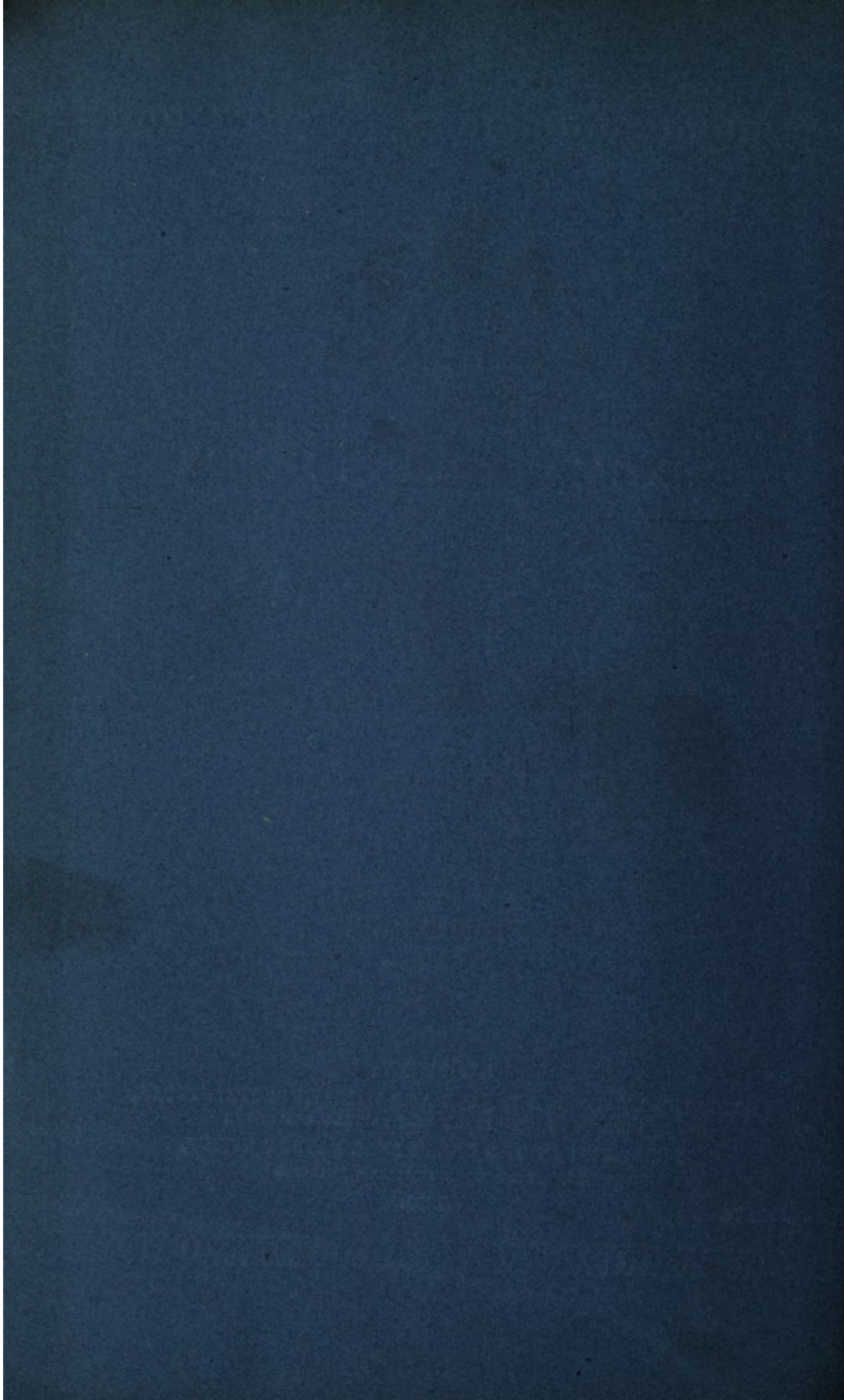
L O N D O N :

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 7d.*

1855.





---

A.D. 1818 . . . . . N° 4325.

---

**Furnaces.**

---

**JOHNSON'S SPECIFICATION.**

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM JOHNSON, of Salford, in the Parish of Manchester, in the County Palatine of Lancater, Brewer, send greeting.**

**WHEREAS** His present Majesty King George the Third, in and by His  
5 Letters Patent under the Seal of Great Britain, bearing date at Westminster, the Twenty-fourth day of December last, for Himself, His heirs and successors, did give and grant unto me, the William Johnson, my executors, administrators, and assigns, His especial license, full power, sole privilege and authority, that I, the said William Johnson, my executors, administrators,  
10 and assigns, and every of them, by myself and themselves, or by my and their deputy or deputies, servants or agents, or such others as I, the said William Johnson, my executors, administrators, or assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term of years therein expressed, should and lawfully might make,  
15 use, exercise, and vend, within that part of the United Kingdom of Great Britain and Ireland called England, the Dominion of Wales, and Town of Berwick-upon-Tweed, my Invention of "**CERTAIN IMPROVEMENTS IN THE CONSTRUCTION OF FURNACES OR FIRE-PLACES FOR THE PURPOSES OF HEATING, BOILING, OR EVAPORATING OF WATER AND OTHER LIQUIDS, WHICH IMPROVEMENTS ARE**  
20 **APPLICABLE TO STEAM ENGINES AND OTHER PURPOSES, WHEREBY A GREATER SAVING IN THE CONSUMPTION OF FUEL IS EFFECTED, WITH A MORE COMPLETE DESTRUCTION OR CONSUMPTION OF THE SMOKE BY COMBUSTION, THAN HAS HITHERTO BEEN PRODUCED;**" in which said Letters Patent there is contained a proviso, obliging

---

*Johnson's Improvements in the Construction of Furnaces, &c.*

---

me, the said William Johnson, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be inrolled in His Majesty's High Court of Chancery within two calendar months next and immediately after the date of the said recited Letters Patent, as in and by the same, reference being thereunto had, will more fully appear. 5

NOW KNOW YE, that in compliance with the said proviso, I, the said William Johnson, do hereby describe and ascertain the nature of my Invention, and in what manner the same is to be understood, acted upon, and carried into execution by the plan or Drawing in the margin of these Presents, and the following description thereof, that is to say :— 10

My said newly improved method of constructing furnaces or fire-places consists in causing the smoke or flame of fresh fuel in its way to the flues or chimney ; first, to take a downward direction, immediately behind the common bridge ; then, secondly, to pass under an arch or arches, extending in an angular line with the boiler seating, for the purpose of supporting a wall that is erected thereon, which erection is brought up to or nearly unto the boiler bottom, parallel with the said common bridge, which I call a stop wall, for the purpose of giving the flame the downward direction ; and, thirdly, 15 of bringing up the flame to the boiler bottom again immediately behind the said stop wall, which is afterward trassed forwards into the flues or chimney. When the said arch or arches and the stop wall, together with the adjoining brickwork, that determines the downward and upward direction of flame, has become red-hot, or heated to redness, the smoke or flame 25 of fresh fuel when brought into contact with or near unto the said heated bodies, together with an admission of a proportionate quantum of fresh or unburnt air, whilst in these circumstances, there commences a certain ignition of the combustible properties of smoke or grosser parts of flame, with an increase of heat or pure flame free from smoke. For the performance of 30 which (the furnaces or fire-places, that are upon the common principle,) are divided into two, by introducing a partition, as is represented at *b*, in Fig. 2, that, by extending backwards to, and being connected with, the stop wall behind, forms two separate yet connected furnaces or fire-places, for the purpose of bringing one fire over the other, in cases of a sudden surcharge of steam, 35 arising from a cessation of, or stop put to, any branch of operation, such as boiling, heating, &c. by steam, or from any other cause connected with the steam engine, without sustaining any loss whatever, either in opening of the

*Johnson's Improvements in the Construction of Furnaces, &c.*

furnace doors, or of discharging the steam to waste. This operation may be performed alternately by opening and shutting of dampers or doors, or by any other medium, moving vertically, horizontally, or laterally either against or near unto the stop wall, or any part determining the downward or upward  
 5 direction, for the purpose of uniting or disuniting of either or of both of the said fires, with the regular course passing into the flues or chimney through the said flues or passages, determining the downward or upward direction. But in general I prefer dampers that act horizontally upon slides that pass through the common bridge about four or six inches below the bearer of the bars, as is  
 10 represented near to number 6 to the left hand in Fig. 4; and when required to be shut, they are shot forward by the rods that come to the front, as is represented at 3, 3, in Fig. 3, against a stop that is upon the slides at the father end of them, to prevent the dampers from injuring the stop wall. For example: suppose the fire acting in furnace or fire-place No. 1, Fig. 3, was become red,  
 15 and of a pure flame, and at the same period the fire acting in No. 2 in the same Fig. be recruited with fresh fuel, then, by shutting or closing of the damper belonging to the said No 2 fire, the smoke of flame arising from the same is by this operation cut off from taking the downward direction, and is reverberated to the front and conveyed through the passage forming the connection  
 20 of the two furnaces or fire-places at *m*, and is passed over through or into contact with or near unto the said intensely heated fuel in No. 1 furnace or fire-place, when and where a complete ignition of the combustible properties of smoke ensues, with a conversion of the same into heat or pure flame, free from smoke, and so long as the aforesaid surcharge of steam should continue  
 25 arising from causes being such as before stated, or that there should be produced a sufficient quantity of steam, by using of the said damper in such manner as has been already recited, the saving of fuel and the regularity of heat produced will be found of the utmost importance. But in cases where there is a sudden demand for steam of a greater elasticity than what can  
 30 be produced from such a mode of proceeding, then the dampers, or doors, or whatever may be the term given to any moveable body, acting vertically, horizontally, or laterally, for purposes aforesaid recited, must in this case be opened, and both fires united with the course leading through the flues or passages determining the downward and upward direction into the flues or  
 35 chimney.

Fig. 1 represents the exterior front of the steam engine boiler with its erection. *a*, the boiler; *b, b*, the furnace or fire-place doors; *c, c*, the bottom flue doors, opening into the downward and upward direction, for the purpose of

*Johnson's Improvements in the Construction of Furnaces, &c.*

cleaning out; *d, d*, the side flue doors; *e, e*, the ash-pit; *f*, the partition wall; 1, 1, the bearers; 2, 2, the dampers, that slide horizontally towards the stop wall, against a stop that is upon the slides, to prevent the stop wall from being injured by them.

Fig. 2 represents the interior of the same. *a*, the boiler; *b*, the partition wall, which is brought up to the boiler bottom with a brick upon the edge; *c, c*, the bearers; *d, d*, the flues round the boiler; 1, 1, the common bridge at the extremity of the furnace or fire-place; 2, 2, the arch or arches that support the stop wall; 3, 3, the entrance to, or bottom of, the downward and upward direction. 10

Fig. 3 is a plan of the same. *a, a*, the furnaces or fire-places; *b, b*, the partition wall; *c, c*, the common bridge, which the flame passes over; *d, d*, the downward direction; *e, e*, the stop wall, which the flame passes under; *f, f*, the upward direction; *g*, the back bridge; *h*, the passage under the boiler leading to the flues; *i, i, i, i*, the side flues; *k*, the chimney; 1, 1, the furnace 15 or fire-place doors; 2, 2, the front plate; 3, 3, 3, 3, the rods that work the dampers; 4, 4, the apertures in the common bridge, for the admission of air for the purpose of giving vigour to the flame.

Fig. 4 is a side view of the aforesaid Fig. *a, a, a*, the back bridge; *b*, the upward direction; *c*, the stop wall; *d*, the downward direction; *e*, the common 20 bridge; *f*, the bottom flue door, opening to the downward and upward direction; *g*, the ash-pit; *h, h*, the flues round the boiler; *i*, the aperture in the common bridge; *k, k*, the furnace or fire-place; 1, the bars; 2, 2, the bearers; 3, the front plate; 4, the door frame; 5, 5, 5, the boiler; 6, 6, 6, represents the dampers and the rods that work them. 25

Fig. 5 represents the figure or form of the bottom of a steam engine boiler, to which my method of constructing furnaces or fire-places are more effectually applied, which figure or form of the said boiler bottom extends backwards to the stop wall, but afterwards upon the common principle. *a, a*, the furnaces or fire-places; *b*, the partition wall, which serves in this case for the seating of 30 the boiler at the centre; *c, c*, the bearers; *d, d*, the ash-pit.

Fig. 6 is a front view of the furnace or fire-place applied to a copper or round boiler. *a, a*, the furnaces or fire-places; *b*, the partition wall; *c, c*, the bearers; *d, d*, the ash-pit; the dotted lines shewing the Figure above the seating of the boiler. 35

Fig. 7 represents the plan of the same upon the boiler seating. *a, a*, the furnaces or fire-places; *b, b*, the common bridge; *c, c*, the downward direction; *d, d*, the stop wall, which is brought up to the boiler seating; *e, e*, the





*Johnson's Improvements in the Construction of Furnaces, &c.*

upward direction ; *f, f*, the partition wall ; *g*, the passage from one fire to the other ; *h, h, h, h*, the flues round the boiler ; 1, 1, the fire doors ; 2, 2, the front plate, the chimney being over the fire doors, as is represented by the dotted lines ; the dotted circle shews the boiler seating.

5 Lastly, be it known that I do not claim the partition wall as my Invention, but the use and application of it, as before specified or set forth ; nor do I mean to say that giving the flame a downward direction is a new Invention, but the application thereof in manner aforesaid ; and it is this modification of these things in producing the effect aforesaid in which my Invention consists.

10 And be it likewise known that I do not confine myself to any specific body, substance, or composition standing the test of heat, in the erection of the partition and stop wall, or to the figure or form of the same, by being constructed hollow, having interior divisions or subdivisions, for the purpose of passing air or water through them.

15 In witness whereof, I have hereunto set my hand and seal, this Twenty-second day of February, One thousand eight hundred and nineteen.

WILLIAM (L.S.) JOHNSON.

Signed, sealed, and delivered by the said William  
Johnson (being first duly stamped), in the presence of

20 CHARLES COOKE, Solicitor,  
Salford.

HENRY COOKE, Solicitor,  
Salford.

AND BE IT REMEMBERED, that on the same Twenty-second of  
25 February, in the year above mentioned, the aforesaid William Johnson came before our Lord the King in his Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute in that case made and provided.

30 Inrolled the Twenty-fourth day of February, in the year above written.

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1855.

CHARLES COOKE, a Master  
Extraordinary in Chancery.

